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Mines

THE COPPER HANDBOOK

A MANUAL OF THE COPPER INDUSTRY
OF THE WORLD.

E191

VOL. X

COMPILED AND PUBLISHED BY
HORACE J. STEVENS
HOUGHTON, MICH., U. S. A.
1911

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Following the text of the book is an advertising section, carrying the announcements and cards of manufacturers, dealers in mining supplies. copper producers, engineers, metallurgists, chemists, trade journals, etc.

PREFACE.

This, the tenth edition of the Copper Handbook, is given the double date of 1910-1911. Owing to the unavoidable loss of six months time in 1907, through an unfortunate combination of fire, sickness, surgical operations and unavoidable absence on the part of the author, the work on the book was thrown behind so badly that it was necessary to issue a book incompletely revised in 1907, and again in 1909 another incomplete revision was issued. This was deemed necessary, in each case, in order to prevent the skipping of a year in the issue of an annual publication. In the case of the present volume, fifteen months steady work was required for the complete revision of the long chapter devoted to detailed descriptions of mines, and the great length of time so consumed in the work necessitated postponement of the issue of Vol. X until the end of August, 1911. Under these circumstances, and inasmuch as the mine descriptions contain matter as recent as July, 1911, it has been deemed the part of wisdom to give this edition a double date covering the years 1910 and 1911. Had this course not been taken, the book necessarily would have been issued under somewhat anomalous circumstances, in August, 1911, containing matter up to and including the preceding month, yet dated 1910. Furthermore, the hiatus between the actual and ostensible dates of issue would have grown longer rather than shorter, and yet a third edition with an incomplete revision would have been necessary. In view of all these circumstances, it is felt that the decision to issue the present volume as for two years is best for the readers, as well as for the author.

This issue, like the two preceding editions, is printed on special thin paper, made for the publication, this provision being necessary in order to keep the work in a single volume under the weight limit of two kilograms prescribed by the International Postal Union. It is obvious, from the steady growth of the work, that in time it will be necessary to issue the work in two volumes, and probably to increase the price also.

In the eleven years of its life, the Copper Handbook has grown from the modest volume of 328 pages, which was the first issue, to its present size of more than 1,900 pages, and, as now set, each page carries upwards of one-third more matter than was the case with Volumes I to VII inclusive, the present volume containing nearly eight times as much matter as was given in Vol. I. The first volume contained descriptions of 256 properties, while the present issue lists and describes 8,130 mines and mining companies, this being the largest number of titles ever given in any work of reference devoted to any branch of mining, or to mining as a whole. As in past editions, additional

information and corrections of errors are solicited from any and every reader. The author wishes expressly to disclaim all pretensions to infallibility, and, in this connection, especially requests investors in copper shares to bear in mind that the Copper Handbook is not free from mistakes, and that errors will creep in, while later developments may change, most radically, the prospects or value of any given mining stock. The author wishes, as in past years, to return his sincere thanks to the mining companies and mining men who have shown their friendship for the book by furnishing returns, data, information and corrections.

The cordial thanks of the author are returned to the subscribers of the Copper Handbook, to whose loyal support the success of the enterprise is due, and which support has given this work, for some years past, the largest circulation enjoyed by any mining annual printed in any language.

HORACE J. STEVENS.

HOUGHTON, MICHIGAN, U. S. A., AUG. 9, 1911.

THE COPPER HANDBOOK

CHAPTER I.

THE HISTORY OF COPPER.

The mists of antiquity shroud the discovery of copper, but the metal and its alloy, bronze, were known at a period so remote as to antedate the beginnings of history. Possibly gold, which occurs native, was discovered before copper, but the uses of gold in prehistoric times seem to have been purely ornamental, while those of copper, and its alloy, bronze, were utilitarian as well as ornamental, from their discovery.

The Neolithic, or polished stone age, was succeeded by the age of bronze, but the process of substituting weapons and implements of bronze for those of polished stone was not instantaneous, and doubtless was spread over hundreds of years, as polished stone and bronze instruments, obviously of about the same age, have been found in juxtaposition, at many points, and it should be borne in mind that while the comparatively civilized peoples of Asia Minor and the Nile valley were far advanced in the bronze age, the Greeks doubtless were in the Neolithic period, while the barbarians to the north had not advanced beyond the Paleolithic age. Similarly, the natives of the two Americas were in the bronze and stone ages, when discovered by Columbus, in the Fifteenth Century, at a period when the civilized peoples of Europe had left the bronze age two thousand years behind.

Copper is one of the six metals mentioned in the Old Testament, and the bible names Tubal Cain as a cunning artificer in brass and iron. A legendary account of the discovery of iron on Mount Ida has been handed down, but it is certain that copper was known to the ancients for a long time, probably some thousands of years, before the discovery and utilization of iron, and it is known that copper mines were worked on Mount Ida, in Asia Minor, centuries before the alleged discovery of iron.

According to the latest historical investigations, copper was known long before the time of Menes, the founder of the First Dynasty, who was the first king of Upper and Lower Egypt, and who reigned at a period possibly as early as 5500 B. C. Copper was known, at least as a rarity, by one of the aboriginal races of Egypt, probably as early as 7000 B. C. and possibly at a date considerably more remote. At a much later period, yet antecedent to the First Dynasty, the use of copper became more

widely disseminated, and the metal was in quite general use in Egypt before the time of Menes. It is believed that the Egyptians used unalloyed copper for centuries before discovering the use of tin, the alloy of copper and tin producing bronze that is much harder than pure copper, consequently much better suited for weapons and implements of all sorts. The ancient Egyptians are believed to have used arsenic for hardening the copper when used alone.

Bronze was in very early use in Egypt, for the making of weapons and tools, and the use of bronze is mentioned in inscriptions antedating the great pyramids. Rawlinson says "A metallurgy of no small merit must have formed and originated the implements whereby materials, such as those used by the Egyptian scupltors, were worked with ease and freedom." Some of the blue and green pigments used by the earliest Egyptian painters contained copper.

King Sneferu, the first Pharaoh of the Fourth Dynasty, ascended the Egyptian throne at a date variously estimated from 2000 B. C. to 5000 B. C., succeeding the king who carved the great sphinx, and being in turn the immediate predecessor of Cheops, builder of the great pyramid at Gizeh. King Sneferu, according to the inscriptions of his reign, conquered the Sinaï Peninsula for its stores of mineral, hence the inference that its copper mines must have been opened at an even earlier date. The copper mines of Mount Sinaï, which are the oldest now known to man, are said to have been worked as recently as 1300 B. C. Ancient workings are still visible, with slags from the furnaces and occasional remains of tools. The oldest piece of bronze, of anything like an established date, is a knob from the scepter of Pepi I, a Pharaoh of the Sixth Dynasty, who flourished circa 3000 B. C. This remnant of the regal might of an early day now reposes in the British museum. The Posno collection, in the Louvre, at Paris, shows two small statues, believed by Perrot to date from the close of the Old Empire, or the beginning of the Middle Empire, circa 2300 B. C. These are light, hollow and cast in single pieces, showing workmanship of a high order. A hollow cast statue of Rameses II, of excellent workmanship, dates from 1300 B. C. As early as the New Empire, more than 2000 B. C., copper seems to have been the monetary basis of Egypt, as accounts were recorded in uten of copper, the uten being a spiral of metal, of about 91 grams weight. In the time of the New Empire, bronze was in use for armor and weapons, artisans' tools, occasional farm implements, household utensils, nails, locks, butts, hardware for chariots and boats, and for jewelry and general decorative purposes. In the old hieroglyphs, several varieties of bronze are referred to, according to their composition. The most common variety of bronze in use in ancient Egypt, as determined by modern assays, contained, respectively, 85 per cent copper and 15 per cent tin, and 88 per cent copper and 12 per cent tin, while bronze used for weapons and cutting tools contained 94 per cent copper, 5.9 per cent tin and 0.1 per cent iron, the iron probably having been included as an impurity, and not through design.

M. de Sarazé judges that copper was produced in Babylonia about 4000 B. C. Gudea, patesi or high priest of Lagash, who became a dependent king under Dungi II of Babylon, who reigned approximately 2000 B. C., at Ur—"Ur of the Chaldees"—collected, as material for temples and statues,

copper from northern Arabia, and the metal and its alloy, bronze, were in quite general use throughout Babylonia at least as early as 2000 B. C.

Apparently copper was known to the Greeks from the earliest historical times. The ancient Greek historians credited the discovery of copper to Cadmus, who also is said to have invented the alphabet, both of which credits are open to serious doubt, as Cadmus really adapted the Phœnician alphabet to Greek use and doubtless brought the first knowledge of copper smelting to the Greeks from the same source. Apparently copper was first found by the Greeks near Chalkos, on the Island of Eubœa, hence took the name of chalcos, and was so termed by Homer, Hesiod and other early Greek authors. Pliny states that the method of reducing copper from its ores was discovered on the Island of Cyprus, whence the metal was termed by the Romans, first aes cyprium, and later, cuprum. This discovery unquestionably was merely an adaptation of the methods known to the Egyptians several thousand years earlier. The name of the metal in most of the modern European languages, as the English copper, Swedish koppar, Norwegian kobber, German kupfer, Spanish and Portuguese cobre, and French cuivre, are corruptions of the Latin cuprum. In the ancient mythologies, copper was consecrated to Hathor by the Egyptians, to Aphrodite by the Greeks and to her counterpart, Venus, by the Romans.

It is probable that the first copper mines of Cyprus were opened by the Phœnicians and that knowledge of the metallurgy of the metal was derived from them by the Greeks. The Phœnicians also brought copper from Asia Minor, and later from Iberia, beyond the Pillars of Hercules, and some of the ancient Carthaginian mines, in the Provinces of Huelva in Spain, and Alemtejo in Portugal, were reopened during the latter half of the Nineteenth Century, and remain large producers. It is certain that the Phœnicians brought tin, and possibly copper also, from Cornwall, at a period as remote, in all likelihood, as 500 to 700 B. C., which would indicate that the native Britons were possessed of a rudimentary metallurgy of considerable importance, at a period long antecedent to the conquest of Caesar. The hegemony of the ancient Phœnician world was wrested from the cities of Tyre and Sidon by Carthage, an early Phœnician colony which became far greater than its parent, and Carthage, in turn, lost the supremacy of the Mediterranean to the Romans.

The knowledge of copper possessed by the Romans doubtless was inherited from the Greeks, all of the historical evidences pointing to this conclusion, but it is certain that copper mines in Tuscany were worked by the Etruscans previous to the foundation of Rome. The copper mines of Piedmont, Liguria and Tuscany were worked extensively in Roman times, but the Iberian mines, wrested from the Carthaginians, formed the chief source of the copper supply of the Roman Empire. Spain has been furnishing copper to the world for nearly or quite three thousand years, and remains one of the principal sources of the world's supply. The Rio Tinto mine has been worked, off and on, for about three milleniums, yet remains one of the greatest copper producers of the globe. Prof. Vogt estimates that not less than twenty to thirty millions of metric tons of ore were mined during the eras of Phœnician, Carthaginian and Roman domination, from this mine alone.

During the dark period of the middle ages, mining, while not a lost

art, certainly was not followed as systematically and successfully as during the more prosperous and enlightened era of the Roman Empire. The world's supply of gold and silver decreased from century to century, owing to the losses from attrition and misplacement not being made good by new production. Iron, being subject to rust, was mined and smelted as required, though the production was surprisingly small, and it is probable that the United States Steel Corporation now turns out, in every working day, more iron than was produced in all Europe in a full year, during the period of greatest darkness of the mediæval era. The supply of copper during the middle ages must have been very small, but statistics are so fragmentary that they scarce afford basis for estimates.

The production of copper from Iberian mines was spasmodic, but more or less of the metal was produced in every century, though the industry suffered a severe check when Spain was lost by the Western Roman Empire to the Visigoths, who, in turn, were succeeded by the Moors, that warlike race that held possession of southern Spain and Portugal, until driven out, late in the Fifteenth Century, by Ferdinand and Isabella. The San Domingos mines of Portugal, which were opened, certainly as early as Roman times, and, in all likelihood, by the Carthaginians, or their predecessors, the Phœnicians, were worked spasmodically during the middle ages, and were reopened in 1859, under modern methods.

The mines of Italy and Austria were small producers of copper in mediæval times, the most important Austrian mine being the Gratslitz, in Bohemia, which probably was the largest European producer about the Fourteenth or Fifteenth Century, but which was abandoned in the Eighteenth Century, though reopened, on a small scale, late in the Nineteenth. There are evidences that copper mines were worked in Bulgaria, and probably in Servia also, during the Roman era, and the Servian mines were small producers during the middle ages. There also was a little copper mining in Hungary during mediæval times, and possibly in Roumania also. Copper has been mined and smelted on a small scale in both European and Asiatic Turkey for some centuries.

In Germany, the Rammelsberg mines, in the Ober Harz, were opened circa A. D. 933, and have been producers for nearly a thousand years. The Mansfeld mines of the Ober Harz, opened A. D. 1199, have been fairly steady producers for 700 years, though with occasional hiatuses in output, due mainly to some of the numerous wars that were at once the business and the recreation of the middle ages. These mines made about 1500 long tons of fine copper in the days of Martin Luther, and were producers to about the same extent in 1860, but since have been developed into very large and successful mines, by the use of modern methods and equipment.

Stora Kopparberg, at Falun, Sweden, was opened A. D. 1228, and is claimed to have given to the world, to the end of the Nineteenth Century, not less than 1,200,000 tons of fine copper, remaining a small producer.

One of the earliest English mines was at Newlands, near Keswick, in Cumberland. This property was worked as early as A. D. 1250, and was working as late as A. D. 1470. The Ecton Hill mines, in Staffordshire, were among the earliest English copper mines after Newlands, and the tin mines of Cornwall were small producers of copper also, at least as early as the time of Queen Elizabeth, and probably for a century or

two earlier, though copper production on a large scale began with the Eighteenth Century. The copper mines of Anglesea, in Wales, were producers in Roman times, and were reopened in the Eighteenth Century, but have been idle since about the middle of the Nineteenth Century. In Ireland, mines worked during the Eighteenth Century and up to their closing in 1880, have been reopened, in an exploratory way, during the early years of the Twentieth Century. As early as A. D. 1586, copper ore was shipped to Anglesea for reduction, and in A. D. 1765 there were several smelters treating copper ore near Bristol. The Welsh smelting industry at Swansea seems to date from the Sixteenth Century. The first copper pennies of England were coined A. D. 1717.

At the beginning of the Eighteenth Century Great Britain was making at least three-quarters of the world's copper. The Cornish mines produced 4,923 tons of refined copper in 1799, and the Welsh mines of Anglesea made nearly 2,000 tons in the same year. The great Mansfeld mine, in Germany, made only 372 tons in that year, and only estimates are obtainable for the products of other countries. Spain's output was insignificant, and the United States made but a few tons. Russia and Japan probably ranked next in importance after England as producers, and Austria, Norway, Sweden, Italy and several other nations made small contributions to the world's copper stock. Australia, South Africa and Canada were then unknown as sources of supply. It is a notable fact that one hundred years ago, the mines of the United States, Spain, Chile, Mexico, Canada, South Africa, Australia and Tasmania, which now make about 90 per cent. of the world's copper, were either totally undeveloped, or else producers of but a few tons each, while Great Britain, which made almost 7,000 tons of copper in 1799, produced but 550 tons in 1899.

At the beginning of the Eighteenth Century the English mines, in Cornwall, were making much the largest part of the world's copper output, and even at that date were of such considerable depth, and with such extensive underground openings, that the problem of disposing of the water was of vital importance. Many good mines were allowed to remain idle, solely because the expense of keeping them free of water was greater than the profits of operation. The first steam engine was built for a Cornish mine, the Wheal Por, by a Captain Savery, very early in the Eighteenth Century. It was but a partial success, and the plan was improved on by Newcomen, who erected a pumping engine at the Wheal Fortune mine, Cornwall, in 1720. The Newcomen steam engine was a crude and wasteful device, according to the standards of the present day, but it was much more effective than hand and horse power, or a water wheel, and was used in many of the larger Cornish mines for fifty years or more, until the genius of Watt brought forth the modern steam engine. It should be said, however, for Savery and Newcomen, that crude as were their engines, the pumping plan followed by them was essentially sound, and the Cornish pump, first made by Savery two hundred years ago, and improved a little later by Newcomen, remains the basic model for the Cornish mine pumps, scattered over the habitable world, wherever there are mines.

The first Watt engine, erected at Chacewater, Cornwall, in 1777, proved a great success, and came none too soon, as the larger mines, deepened by reason of the aid given from Newcomen's pumps, were at a depth

where the first crude engines no longer could give satisfactory results.

Although steam power was first applied to copper mining two centuries ago, it was used only for handling water until after the beginning of the Nineteenth Century. The first application of steam power to other mining uses was in the first or second decade of the Nineteenth Century, when a hoisting drum was first actuated by steam.

For the first half of the Nineteenth Century, Great Britain maintained its position at the head of the world's copper producers, but for British copper mines the latter half of the century was a period of ever increasing depression, relieved by only occasional years of prosperity. The invention of the Watt engine and its application to pumping machinery enabled the mine operators of Cornwall and Anglesea to penetrate to depths theretofore undreamed of. In 1790 the Dolcoath mine, in Cornwall, was 600 feet deep; in 1816 it was down 1,368 feet, and in 1830 the Tresavean mine, also of Cornwall, reached the great depth of 1,920 feet. As the mines increased in depth rapidly, various improvements became necessary. The old method of raising ore in baskets, carried up ladders on the backs of men and women, was replaced by whims, operated first by hand, then by horse power, later by water-wheels, and eventually by steam, the ropes that hoisted ore in wicker baskets being coiled around these whims. A little later the hempen ropes were replaced by wire cables, and the baskets gave way to iron skips and cages. In 1842 the first man-engine was built, for taking miners to and from their work in the deep shafts. Mine surveying was introduced, and machinery employed in the mills, where hand-work had been the rule for centuries. The Anglesea mines enjoyed great prosperity for the first quarter of the century, but gave unmistakable signs of exhaustion a few years later, and in the fourth decade ceased to be important factors in the world's copper industry. The smelters of Wales had attained such growth, however, that Swansea still remains the seat of one of the greatest and most diversified smelting industries of the world.

Apparently the first copper mining was done in Japan circa A. D. 700, but the industry did not become important until about A. D. 1600, and in the Seventeenth Century, more or less copper was exported to Europe, through the medium of the trading ships of the Dutch, who enjoyed a monopoly of Japanese trade, until the excesses of the traders and missionaries lead to the closing of the ports in Japan to all foreign trade, after which Japan was a sealed book to the balance of the world, until reopened by Commodore Perry, in 1854. In 1830 the production of Japan was about 4,000 long tons, and in 1874 was only 3,360 long tons, of which four mines furnished about half, and nearly 200 mines the other half, giving an average annual production of about 10 tons only for the smaller mines. Modern Japan may be said to date from 1869, when the Tokugawa government was deposed, and the Shogun was compelled to surrender his usurped power to the Mikado, the rightful ruler. The readjustment of internal political affairs occupied the attention of the Japanese, almost to the exclusion of other matters, for some years, but about 1880 the task of readjusting the ancient economy of the empire to modern environments was begun in earnest, and from that year, in which the first modern mining and smelting machinery was introduced to Japanese

mines, may be said to date the beginning of the present copper industry of Nippon—an industry that has made gigantic strides, and which is well equipped and conducted upon as modern methods as can be found in any country on the globe. Since 1890 the progress has been steady and rapid.

As early as the Sixteenth Century, copper was discovered in Cuba, Mexico, and several of the South American countries, but the Spanish conquistadors were more anxious for the gold of the Peruvian Incas and the silver from Potosi and Guanajuato, than for the baser metals, hence the production of copper in Spanish America remained trivial, being merely sufficient for local needs, until about the middle of the Nineteenth Century. In Chile a little copper mining was done during the Eighteenth Century, but the inception of the great copper mining industry of that country may be said to date from about 1840, when the systematic development of the great copper measures of Chile was undertaken along modern lines.

Argentina first became a producer of copper about 1856, but never has become a large factor in the industry, though possessing copper fields of promise, which doubtless will be heard from in the future.

In Mexico, copper was mined and smelted in a crude way, and to a very limited extent, by the Aztecs. A little metal was produced under Spanish domination, but the Mexican copper mining industry did not become important until about 1880, the profits of silver mining having blinded the miners to the possibilities of great returns existing in the baser metals. Mexico now ranks second only to the United States among the copper producing fields of the world, and its present large production is but an earnest of future possibilities, practically unlimited in extent.

In Cuba, copper mining was begun in the Sierra Madre Mountains, near Santiago, during the Sixteenth Century. These mines were reopened early in the Nineteenth Century, and secured a considerable tonnage between 1817 and 1868, the principal production being after 1834, when the various mines were bought and consolidated by an English company, annual production averaging about $1,000,000 in value, until the rebellion of 1868, when the plant was burned by insurgents.

In the United States, copper was discovered in Massachusetts as early as 1632, and in 1709 a company was incorporated in Connecticut, for the purpose of working copper ores. The copper deposits of New Jersey were exploited as early as 1719, but the copper mines of Vermont, dating from the Eighteenth Century also, remained the principal source of American production until the opening of the Lake Superior mines in 1844. A promising copper industry was begun, circa 1850, in Tennessee, but was destroyed by the American Civil War, and was not rejuvenated until nearly forty years later.

Really important copper mining in the United States dates from 1844, when the first production, a few tons of black copper ore, probably chalcocite, was taken from a fissure vein near Copper Harbor, Keweenaw County, Michigan. The beginnings of the Lake Superior industry were crude, but the growth was fairly steady from the start, and within two decades the Lake Superior mines became the most important producers of the United States, and second only to the mines of Chile, which were passed in the ninth decennium of the Nineteenth Century. The existence

of the rich stores of native copper in the Lake Superior district was known to the aborigines, and these mines had been worked by some prehistoric people that left considerable traces of their extensive operations. In 1882 Montana, now the largest copper producing district of the world, made its first production of the metal, and the beginnings of the great copper industry of Arizona were a decade earlier.

In British North America, Newfoundland opened its first mines of importance in 1865. A little mining of cupriferous pyrites was done shortly afterward in the Province of Quebec. Copper mining in the Province of Ontario begun with the opening of the Bruce Mines in 1846, but really important copper production dates only from the exploitation of the great nickel-copper deposits of Sudbury about 1886, and the large and promising copper industry of British Columbia had its inception in the last decade of the Nineteenth Century.

In Northern Africa the mining of copper ore, along the shores of the Mediterranean, dates from prehistoric times, but in Southern Africa the industry had its inception in the opening of the O'okiep mine, in Little Namaqualand, Cape Colony, in 1852, though copper had been discovered late in the Seventeenth Century by the Dutch settlers, and some fugitive efforts made in the direction of mining. The exploitation of the copper resources of Central Africa, still at an early stage of development, dates from the closing years of the Nineteenth Century and the same remarks hold true regarding the copper measures and mines of German Southwest Africa. The first recorded production of Australian mines was in 1844, and it is probable that in the future Australia will become a much more important factor in the copper market than has been the case in the past.

In Asia, copper mining and reduction, along very crude lines, have existed for unknown centuries, in China, India and Persia. The copper measures of China are of much promise, and this ancient empire, now awakening to the light of Twentieth Century civilization, doubtless will become a large producer of this necessary metal during the present generation.

The copper industry of the Twentieth Century may be said to date practically only from about the middle of the Nineteenth Century. Of the leading copper producing fields of the world, Lake Superior, Montana, Arizona and Utah, in the United States, were unknown in 1840. Mexico, which now holds second place as a producer, made no copper worth mentioning previous to the last quarter of the Nineteenth Century. The present great copper industry of Canada is so recent that all of its principal developments have occurred since 1880. The copper production of Australasia and South Africa date from about the middle of the Nineteenth Century, and production along modern lines, and on an important scale, in Chile, also began about 1850. Of the really important copper producing fields of the world, only Spain, Germany and Japan have a history that is not covered by the span of life of a man of three score and ten.

The beneficial influence of the copper industry upon the mining and metallurgical methods of the world has been most marked, and the copper industry has been well to the fore in the introduction of improvements. Gunpowder for blasting was first used at Frieberg, in 1610, and was

introduced at the Wheal Vor mine, in Cornwall about 1670. Steam for pumping and later for general use, was first introduced to mining at the copper properties of Cornwall. Wire rope and iron buckets for hoisting were first used in copper mining, and high explosives and power-drills for breaking rock were first used in the Lake Superior mines. The history of the metallurgy of copper for the past quarter century is almost coincident with the history of metallurgy as a whole for the same period.

Various attempts have been made to corner the production of copper since it became a metal of prime importance. The first attempt along these lines was made by the Associated Smelters of Swansea, which perhaps was the original copper trust. The Associated Smelters, which flourished from 1840 to 1860, was most arbitrary in its operations, buying as cheaply and selling as dearly as possible, and zealously guarding its smelting processes. The short-sighted policy of this association, in screwing prices of ore to the lowest possible figure, while advancing the price of the finished metal, aggravated by its arbitrary charges for draftage and moisture, and by the use of unfair assay methods, led to the establishment of independent smelters at or near the mines, in most of the principal copper producing districts, and effectually shattered the power of Swansea as the arbiter of the copper industry.

The second attempt at a copper corner was made by a group of French financiers, under the leadership of M. Secretan. The basis of this corner was the Société des Metaux, of Paris, formed 1877, which in February, 1887, became one of sixteen underwriters that organized the Secretan Syndicate, with a nominal capitalization of $13,587,000, eventually reduced to $10,718,500. Of this capitalization, the Société des Metaux held $2,910,000, and M. Secretan, personally, $2,328,000. The Comptoir d'Escompte, which then was second only to the Bank of France, among French financial institutions, became involved, first through guaranteeing purchases from the mines, and later through loaning funds to the Syndicate, originally upon the security of the metal itself, and latterly upon endorsements. The first step of the Secretan Syndicate was to secure control of the production of the Anaconda mine, in December, 1887, the Anaconda being, at that time, the largest copper producer of the world. This was followed shortly by the making of contracts with the Calumet & Hecla, Rio Tinto and other large mines producing at least 75 per cent., and probably as much as 85 per cent., of the copper output of the globe. At the end of August, 1888, the Syndicate had borrowed $24,825,000, and at the end of December, 1888, the Comptoir d'Escompte had loaned to the Syndicate the enormous sum of $33,368,000, of which only $16,878,000 was fully secured. The price of copper was advanced, speedily, by the Syndicate, from 11 cents to 17¾ cents per pound, this advance taking place within one month. Consumers, understanding the situation fully, reduced their demands to the lowest possible figure, and an immense amount of old copper was broken up and resmelted, the available supply of old copper proving vastly greater than had been anticipated by anyone, and forming perhaps the largest single factor in causing the downfall of the Secretan Syndicate.

Very early in 1899 the credit of the Syndicate was exhausted, and the Comptoir d'Escompte was so seriously involved that the manager

committed suicide, and the bank was saved with great difficulty, while the Secretan Syndicate was demolished utterly. Notice of the failure of the syndicate was followed by an immediate drop, from the market price of £100 per long ton of copper, and, in a single day, in the spring of 1889, copper dropped £70 to £35 per long ton. The bankers, who had loaned immense sums upon copper stored in bonded warehouses, decided to sacrifice their holdings, at any price that would enable them to realize upon their collateral, but, through the action of the Calumet & Hecla, backed by the Anaconda, which threatened to put the price of copper to five cents per pound, unless the bankers would spread the marketing of the surplus over a period of years, utter paralysis of the copper trade was averted. The accumulation of copper made by the Secretan Syndicate, in a period of about eighteen months, has been estimated variously, but may be set down safely at about 175,000 long tons. A period of four years was required to work off this accumulated surplus, which was marketed without serious disturbance to the trade, though entailing six years of low prices for the metal.

The third attempt at a copper corner was made in February, 1899, by the organization of the Amalgamated Copper Company, avowedly formed with the intention of controlling, first the American, and, later the world's copper trade. This corporation was organized with a controlling share interest in the Anaconda, and several other smaller mines of Butte, to which, two years later, was added the Boston & Montana mine. The Amalgamated Copper Co., operating through its sales agency, the United Metals Selling Co., maintained the price of copper at 17 cents per pound until October, 1901, when it was seen that a break in prices was inevitable, and at which time nearly 200,000,000 pounds of copper had been accumulated, this being owned mainly by the Amalgamated Copper Co., and by its subsidiary and affiliated producers. A panic in the copper market was precipitated by the action of the United Metals Selling Co., in making repeated cuts in the price of the metal, at regular intervals. The Amalgamated was credited, popularly, with the intention of cutting the price of the metal squarely in two, to 8½ cents per pound. This price was not reached, however, for the reason that several of the large independent producers, led by Phelps, Dodge & Co., aided by several of the largest American consuming interests, stepped in and bought up all of the surplus copper remaining in the market, at prices around 12 cents to 13 cents per pound.

Early in 1907 an effort was made, by strong interests, to form a combination to include the leading American producers, with a view to maintaining prices through regulation of marketing, and by restricting production if necessary, but this effort was frustrated by the stand taken by several leading independent producers of the United States.

Further and more detailed particulars regarding the history of mining and metallurgical developments will be found in the chapters devoted to metallurgy and to the copper deposits of the world, in addition to which detailed references to the history of individual mines will be found in the descriptions of many of the more important copper properties, contained in the long chapter devoted to copper mines.

CHAPTER II.

The Geology of Copper.

Merely an outline of geological features of interest pertaining to copper is attempted in this chapter. The subject is so great that many books of value have been written upon the matter by different authorities. From its very nature, geology is largely an empirical science, but the Twentieth Century geologist is a vastly better-fitted worker, in his chosen field, than his predecessor of even the preceding generation. The geological work of the Nineteenth Century, until well toward its close, was largely of a synthetical nature, but the new school of geology teaches, and with wisdom, that analysis must precede synthesis. As a consequence of this new spirit, great strides have been made in geological knowledge, and in the special field of copper, much work of a brilliant and highly valuable nature has been done during the few years of the present century. The work of Weed, Winchell, Kemp, Lindgren and other scientists of solid attainments and indefatigable industry has added greatly to our sum of knowledge of the geology of copper. The geologist, who was regarded, fifty years ago, by practical men, as belonging to much the same class of pseudo-scientists as the alchemist, has made for himself, through sound work, a safe place in the ranks of the technical men whose labors are of practical, as well as of theoretical value, to the world.

There is much diversity of opinion, on various important points, among the leading geologists of the present time, but out of this turmoil of argument and confusion, is arising a newer and a sounder knowledge of geology, not only in theory, but in its vital bearings upon the industry and civilization of the world, so fundamentally dependent upon an assured supply, at reasonable cost, of the important metals and minerals.

Rocks may be divided into three classes, these being igneous, sedimentary and metamorphic. The igneous rocks, fused in the bowels of the earth, and ejected by volcanic action, or oozing forth as magma from cracks in the earth's crust, may be divided into granitic, porphyritic, vitreous and tufaceous forms, this latter division including the tuffs ejected as scoriaceous material, by volcanic action. The sedimentary rocks were deposited by the action of water, usually on the beds of ancient seas. The detrital material so deposited formed conglomerate, shale, sandstone and limestone strata, and, in the case of the three forms first named, the material for sedimentary beds was obtained necessarily, mainly from the breaking down of the older igneous rocks. Strata of igneous and sedimentary rocks frequently alternate in the older geological groups. The third, or metamorphic class of rock forms, consists of altered rocks of both the igneous and sedimentary forms, in which the phenomena of crystallization and replacement have been brought about since their formation

by the action of intrusive deposits of molten magma, and by the effects of percolating waters, whether meteoric or volcanic.

The ores of copper are described in detail in the chapter on chemistry and mineralogy, but some brief reference thereto is necessary in an outline of the geology of the metal. The principal copper ores of commercial importance may be divided into seven classes, as follows: Native copper, existing alone, or practically so, in the Lake Superior district, Bolivia and elsewhere, and occurring in the oxidized zone of mines of copper ore in almost every mineral field; oxide ores, including cuprite and melaconite; carbonate ores, including malachite and azurite; sulphide ores, of which chalcocite, bornite and chalcopyrite are the more important; chalcanthite, or sulphate of copper, occurring as an alteration product in many rich sulphide mines, and being the source of the copper secured by precipitation from cupriferous mine-waters; enargite, among the arsenides, and atacamite among the chlorides. In importance, the sulphide group is overwhelmingly preponderant, about three-fourths of the world's copper supply coming from ores of this class. Contrary to the opinion formerly held, chalcocite is a far more important source of copper supply than chalcopyrite, and bornite probably is but slightly behind chalcopyrite, as a source of copper supply from the sulphide ores. It is probable that chalcocite, which is the most important ore of copper, produces nearly one-half of the world's supply of the metal.

The copper ores are very showy, giving nearly every color of the spectrum, hence attract attention more readily than most ores of other metals, but nature has so deposited many of our most important stores of copper, as hereinafter described, that the outcrops first visible to the discoverer are merely rusty stains of hematite and limonite, both ores of iron, with colors ranging from yellow through brown to red, these outcrops occasionally carrying small quantities of green and blue copper carbonates.

The industrial metals known to man have varying affinities, this referring not only to their valencies, as determined by their position among the elements, but also referring to their preference for combining with other elements, and furthermore to their choice of neighbors, this latter depending, necessarily, largely upon the material available. It is found, however, in geological and mineralogical research, that certain groups of metals may be looked for in juxtaposition, under given circumstances. Gold, the king of metals, and platinum, scarcely the inferior of gold, hold themselves aloof from the common herd, and occur but rarely as ores. Silver is more democratic, and the common workaday metals are found commingled in a spirit of fellowship, but, as in the social fabric of man, there are certain family relations, and cleavage lines by which classes are formed.

Most copper deposits carry both gold and silver, usually in small quantities, but frequently in sufficient amounts to add materially to the gross values recovered, especially since the very general utilization of the electrolytic process for copper refining has made it possible to recover the precious metal values, practically without cost, while eliminating the impurities remaining in the blister copper turned out by the smelters. Lead and zinc are found very commonly in connection with copper ores,

the three sulphide ores of copper, lead and zinc, being closely affiliated, and iron, while rarely considered a commercial product of copper ores, is found in the great majority of copper mines, first as the iron hat, marking the outcrop of the vein, and in the lower workings of the mines, chemically united with copper and sulphur, as chalcopyrite, or, as is frequently the case, intimately, but mechanically, associated as chalcocite and pyrite, the sulphide ores respectively of copper and iron. Arsenic and bismuth also are common associates of copper, these being deleterious elements. Zinc also, mechanically mixed with many copper sulphide ores, is a damage, and its presence has prevented the successful development of many otherwise valuable copper mines. Only within the past few years has it become possible to mechanically remove zinc from sulphide copper ores, previous to smelting.

The more common metals, and frequently the rarer ones, are found as component parts of many ordinary igneous rocks, though commonly in such small quantities that these rocks cannot be considered as ores of even the lowest grade. There are notable exceptions to this rule, as in the case of the monzonite ore bodies of Bingham, Morenci and Ely, and it is probable that in the future other sources of copper supply, of the first magnitude, will be found in igneous rocks, in which the original cupriferous contents have been enriched by local action. The enrichment of the monzonite ore bodies referred to, seems to have been due to the shattering of the soldified upper portions of the cooled magma, containing originally a small quantity of magmatic copper concretions, followed by the precipitation of additional copper, in the form of chalcopyrite, from the heavily mineralized magmatic vapors rising into the shattered zone from the still molten mass below. This process may have been aided by later enrichment from percolating waters, which would tend, however, as a rule, to extract the mineral values disseminated throughout the rock-mass, and segregate these values in fissures in the igneous rocks, or along the line of contact with adjacent sedimentary or metamorphic rocks.

In the light of present geological knowledge, it seems probable that the original source of most of the present workable copper deposits was in chalcopyrite disseminated sparingly, in minute particles, through the magma of igneous rocks. From these disseminated particles of chalcopyrite, most of our copper ore bodies have been formed, either by magmatic segregation, in which the greater part of the ore values was deposited, usually at the point of contact with adjacent rock forms, or by leaching therefrom. Nature is much the greatest chemist and metallurgist now doing business, and the work of her laboratories and forges, while exceedingly slow, is upon a vast scale, and never ceases. The sulphide ore values, contained originally in molten magma, have been reconcentrated, and redeposited, repeatedly in many cases, during the millions of years that have elapsed since the work was begun, consequently the miner finds ores existing in a great variety of forms, and giving evidences of complicated chemical reactions, as well as of long continued mechanical concentration.

In a complex magmatic intrusion, the edges of the intrusive mass naturally cool first, through the radiation of heat to adjoining rocks, and, in addition, the less soluble minerals are the first to crystallize. Copper,

having a greater affinity for sulphur than is possessed by any other metal, is one of the first minerals to crystallize out of the molten magma, as chalcopyrite. These facts afford an explanation of the occurrence of magmatic ore bodies along the point of contact between igneous intrusives and the rocks so intruded. Many of the best workable bodies of copper ore are found at or near the contact between granitic intrusions and sedimentary or metamorphic strata adjoining, occurring either as contact deposits, or, frequently, in fissures traversing either or both the igneous mass and the adjoining strata.

Many important bodies of copper ore occur as contact metamorphic deposits, at or near the contact between intrusive rocks and stratified formations. While the exact genesis of these ore deposits varies according to circumstances, and frequently remains somewhat obscure, the main point of magmatic segregation seems sufficiently plain, and much corroborative evidence has been brought to light by recent investigations. These deposits may be separated roughly into two classes, the first being products of simple metamorphism, with slight changes in ore bodies previously laid down, while the more important, and probably more common class, is attended by contact metasomatism, due to reactions caused by vapors and magma emanating from the intrusive rocks. Where such ore bodies are deposited in limestone, which frequently is the case, further alterations and reactions of prime importance have followed the cooling of the igneous rock, in many instances, the limestone offering an exceptionally suitable reagent, in connection with percolating waters, for further chemical changes in the nature of the ores.

Rain, falling upon the surface of the earth, carries small quantities of oxygen and carbonic acid gas, both weak solvents of many minerals. The weakness of the solvents has been fortified by the immense quantity of rain so falling, and by the lapse of untold millions of years, during which the process of leaching has been continuous. When attacking primary sulphide ores, such as chalcopyrite or pyrite, the water carrying oxygen and carbon dioxide in solution, eventually sets free an atom of sulphur, which, combining with the water, forms a dilute sulphuric acid, very weak to be sure, but a much more powerful solvent than carbonic acid gas or oxygen, and the weak sulphuric acid solution reattacks the sulphide ores, gradually breaking them down, and taking them into solution, and they are redeposited, at suitable points, lower down, as enriched sulphides, carbonates and oxides, and occasionally as native copper. The synthesis of most of the important ores of copper has been fairly established by extended and successful laboratory reactions.

The important part played in ore deposits by water is now acknowledged by all geological authorities. In fact, it is a question if the importance of the work done by water in forming commercial ore bodies is not over-rated by some geologists. While the work of water in laying down ore bodies is generally acknowledged, there are considerable differences of opinion as to whether deposition has come mainly from waters of meteoric or of volcanic origin, and also whether the ore was deposited mainly from descending or ascending waters. There seem excellent grounds for believing that both descending and ascending waters have played very important parts in depositing mineral values. The rains that fall upon

the surface of the earth sink into the rocks to great depth, there being practically no rock formations that are impervious, though the degree of permeability varies greatly. For all practical purposes the rocks composing the earth's crust may be considered permeable by water to the depth where increased temperature vaporizes it. That percolating meteoric waters have been responsible for a considerable proportion of the ore bodies now in existence seems reasonably assured, but that the meteoric waters have been, in many cases, greatly assisted by terrestrial waters, ascending from great depth, strongly charged with metallic solutions, also seems a hypothesis fully warranted by known facts. The terrestrial ascending waters naturally would possess the advantage of heat, to a degree adding greatly to their natural solvent power, and the pressure existing at great depths also would add largely to the solvent power of such waters.

In addition to the primary force of magmatic segregation, and the secondary force of waters carrying minerals in solution, there are other genetic forces of lesser, but by no means negligible importance. That organic matter has played a considerable part in the precipitation of copper minerals is shown plainly in numerous instances. There also is a theory, now in rather general discredit, that metallic values have been precipitated by electro-chemical action, from sea-water. The water of the ocean contains a very small quantity of copper, probably less than one grain in one hundred cubic meters, but, in the aggregate, the seas hold an enormous amount of this metal. Apparently the sea was the source of the metal found in cupriferous shales at many points on the earth's surface, and there is corroborative evidence that the native copper found in the Keweenawan belt of Lake Superior may have been precipitated in metallic form by the action of sodium chloride, the ferrous condition of the small quantities of iron found associated with this native copper seeming to substantiate this view.

Another theory, once widely held, but now in general disfavor, is that the metals were deposited by electrical action. In all likelihood, electricity, which seems but another name for all energy, whether dynamic or static, was not devoid of power in the great work of concentrating mineral values from the original disseminated particles contained in rock magmas, to the point of sufficient richness to be available for the uses of man.

An evidence of the truth of the hypothesis that mineral values have been deposited from heated ascending waters is furnished at a number of points on the earth's surface by hot springs, that are now depositing copper in small quantities. Not the least interesting of these is a hot spring in Java that carries in solution copper iodide, which is concentrated and produced commercially on a small scale.

Clays possess the power, through adsorption, of extracting metals from wonderfully dilute solutions, and it has been ascertained that all clay-shales are more or less cupriferous, though usually valueless as ores. Copper is a peculiarly soluble metal, in most of its compounds, which are largely associated with iron sulphides, hence easily attacked by oxidizing waters. Carbonaceous and organic matters are powerful reagents, and lead to numerous reactions, in connection with the oxygen, carbon dioxide and dilute sulphuric acid found in underground waters.

Copper, nickel and cobalt are found frequently in basic gabbros, in many parts of the world. The Lake Superior traps are of this class, as a rule, and copper, in small amounts, is found as impregnations in dense dioritic rocks, and in uncomformable adjacent sandstone of a later geological horizon, near the point of contact, where there are some evidences of metamorphism. The home of the Lake Superior copper, however, is in the metamorphic amagdaloidal traps and conglomerates, and in the sandstones of the upper Keweenawan series. Native copper is found frequently in greenstone, as in the amygdaloids of Lake Superior, in the Nicholai deposits of the Copper River district of Alaska, in the melaphyrs of Newfoundland, in Amador and Calaveras counties, California, and at a number of other points.

Various classes of copper ore deposits are found, these including magmatic segregations, metamorphic contact deposits, fissure veins and deposits formed by percolating waters and mineralized vapors, replacements, sedimentary deposits, and impregnations in sandstones, tuffs, conglomerates and breccias. While these various classes of deposits are distinct, in theory, and usually distinguishable in practice, the lines between individual deposits are extremely difficult to draw in some cases.

While some ore bodies are entirely covered by flows of later geological age, and while some of the contact deposits in stratified rocks, notably in limestone, show very small outcrops, as a rule there are strong surface indications of cupriferous values at depth. Occasionally the unaltered sulphide ores outcrop at surface, as in the case of deposits of disseminated chalcopyrite in the Algoma district of Ontario and elsewhere, and in the instance of the magnificent surface croppings of massive bornite, chalcocite and chalcopyrite found in the Copper River district of Alaska, the latter probably being the richest outcrops ever discovered. As a rule, however, a copper-bearing fissure vein or contact deposit shows a gossan, or iron hat, this deriving its color of rusty yellow, brown or red, from iron in the form of hematite or limonite. The gossan may, and frequently does, show copper ore, usually as carbonates, either both malachite and azurite, or more commonly, the green carbonate alone, and occasionally there are other oxidized copper ores shown in the gossans, but, as a rule, these carry but small copper values, and rarely can be considered commercial ores of copper, though in numerous cases the gold contents are sufficient to warrant their working as gold mines. In fact, many mines have been opened for gold that really contained immensely greater values in copper, at depth, and there are frequent instances of gold mines turning into copper mines at depth, the most recent example of importance of this change in metallic values being afforded by the Mount Morgan mine, of Queensland, Australia, for many years one of the largest gold producers of the world, and now a copper mine of great value, at a depth of 1,000 feet or more.

Frequent reference is made to the silver mines of Butte turning into copper mines at depth, but this is somewhat misleading. The first mines at Butte were silver properties, and there seems good reason to believe that some of these may turn into copper mines at great depth, but, as a matter of fact, the silver mines were opened on an entirely different set of veins than those carrying the wonderful copper values for which

Butte is famed, and the discovery of the copper mines was due to cross-cutting, at depth, from the mines on the silver veins, as the copper veins contain practically no values for 500 to 1,000 feet depth from surface. Some of the greatest ore bodies at Butte have no gossans, and surface indications are most meagre, not being sufficient to justify the expense of exploring, in an unproven district.

Examples of silver-lead mines turning into copper properties at depth are fairly numerous in Utah, Mexico and elsewhere, probably the best examples being furnished by the mines of the Bingham district of Utah. At Leadville, Colorado, the zinc ores of the upper workings are being replaced by copper at depth.

In the majority of cases the outcrops of copper ore bodies are leached, and, in such cases, only infrequently give workable values in copper at surface, though, as before stated, there are numerous instances of gossans carrying workable gold values, causing the opening of gold mines that at depth have turned into copper mines.

As chalcopyrite, which may be considered the original form of copper ore, carries one atom of iron, and one of copper, held together by two atoms of sulphur, the breaking up of the granule of chalcopyrite not only releases copper, for redeposition in the form of an enriched sulphide, or as a silicate, carbonate or oxide ore, but also releases the atom of iron, which may be carried upward or downward, or left in place, and which usually appears as hematite, the sesquioxide of iron, or as limonite, the hydrated sesquioxide, disseminated through the outcrop of the vein. This is the gossan or iron hat, a welcome sign of probable copper values below, in nearly every copper mining district of the world. It is not, however, an invariable indication of workable values at depth, and there are numerous instances where fine gossans, of the most promising appearance, have proven deceptive as to values carried in the vein beneath. These gossans also have the bad habit of spreading beyond the limits of the walls of the vein below, through lateral surface filtration, and occasionally a wide gossan covers a narrow vein. At other points the original gossan has been removed by surface erosion, or by glacial action, but, as a rule, a good gossan means at least a fair chance of a good mine beneath.

The depth of gossan cappings varies greatly, according to local circumstances, occasionally being merely superficial, but sometimes extending to the water level. In the case of a typical cupriferous fissure vein with a typical gossan, the iron capping is succeeded by a leached zone, and where the leaching has been long continued and thorough, and erosion light, the mineral values have been removed, almost completely, from the leached zone, to be redeposited at greater depth. In other instances, the leaching has been less thorough, and copper values, usually small, remain in the leached area. The depth of the leached zone varies greatly, according to the circumstances following the first deposition of the ore, and occasionally the leached zone is of great depth, as at Butte, while elsewhere it is comparatively shallow, and sometimes is lacking entirely. The great depth of the leached zone in Butte, and the great depth and richness of the succeeding zone, afford evidence in support of the palpable hypothesis that, under average circumstances, the greater the depth of leaching, the greater the quantity of secondarily enriched ores to be found below.

The typical cupriferous fissure vein may be divided into five zones. The upper is the iron hat or gossan outcrop, succeeded by the leached zone. The third zone is that of oxidized ores, carrying rich oxides and carbonates, and occasional silicates and chlorides, followed immediately by the fourth zone, carrying enriched secondary sulphides, such as chalcocite and bornite, with occasional covellite. The limits between the zone of oxidized ores and that of enriched sulphides are not always clearly defined, and these two zones frequently are considered as one, under the name of the zone of secondary enrichment. It is, however, possible to draw a rough line of demarcation between the oxidized ores above and the enriched secondary sulphides below, in this so-called zone of secondary enrichment, in most cases. The source of the copper in the enriched zone is, of course, the values leached from the vein above, and here redeposited. The depth of the zone of secondary enrichment varies enormously, being dependent upon a considerable variety of factors, including the average percentage of copper in the original vein, the depth to which leaching has been carried, the amount of surface erosion, and the time that has been consumed. In some of the mines of Butte the zone of secondary enrichment is of tremendous depth, a strong vein of massive chalcocite having been found at a depth of 2,400 feet in one of the Anaconda mines.

In the fifth or final zone, the ore is chalcopyrite, sometimes massive, but more commonly disseminated, and usually associated with pyrite, or chalcocite in thin films, as coatings on grains of pyrite. In this zone, values gradually decrease with depth, until the vein pinches out, or, as is more commonly the case, carries lessening values that lead to the abandonment of the property as unpayable.

Bonanza ores in the zone of secondary enrichment sometimes hold to great depth, but, usually are comparatively shallow, the most important exception to this rule being in the case of the deep mines at Butte, previously referred to. The zone of secondary enrichment sometimes carries silicate and chloride ores of copper, as the results of various reactions. Where the unaltered ores in the final zone are argentiferous, copper ores rich in silver occur in the zone of secondary enrichment. Copper ore bodies frequently carry the native metal in the zone of secondary enrichment, where crystals of cuprite shade into crystals of native copper. Masses of native metal of hundreds, and even of thousands of pounds in weight, occur in many of the well-known copper ore mines, but such masses of native metal must be held radically distinct in genesis from the native copper of Lake Superior.

The influence of wall-rocks seems of considerable weight in determining the nature of secondary deposits. Where the wall-rocks are silicious, the products of secondary enrichment, in the sulphide zone, usually are chalcocite and occasionally covellite, while limestone walls are apt to give more or less chrysocolla in the oxidized zone. Chalcocite is especially liable to occur in veins traversing silicious rocks, but frequently is found in considerable quantities in limestone deposits. The copper and tin deposits of Cornwall afford an interesting field for speculation in this connection. According to the best authorities, these metals were given off from granitic magmas, in the form of gases, heavily laden with metallic vapors, which deposited the tin and copper in the same veins, but with a

fairly sharp line of demarcation, the copper occurring mainly in those portions of the fissures that traverse slate, while tin usually occurs in granite.

The most common gangue of copper ore is quartz, which also is true of many other metals. Calcite and spathic iron ore frequently are found also, and occasionally barite. Very commonly the gangue is merely altered country-rock.

All copper ore bodies, including the native copper mines of Lake Superior, notwithstanding a general impression to the contrary, show decreased values at great depth. The exact depth at which the permanent decrease begins depends, necessarily, upon many factors, and no general rule, other than the one herein laid down, can be predicated.

Deposits of copper ore, of size and tenor sufficient to warrant ranking them among commercial ore bodies, may be considered, as to occurrence, by three widely differing methods of grouping. The first of these is geographical, and, while, for commercial reasons, the geographical occurrence of copper is of prime importance, and is treated of fully in later chapters covering the entire world, under the title of Copper Deposits, such a grouping is essentially commercial, and by no means in accordance with geological rules, for the reason that the geographical divisions of the earth have been made by man, hence rarely correspond with the geological divisions made by nature. The two other methods of grouping occurrences of ore may be termed the method of geological horizons, and the lithological plan. It is necessary, in order to afford even an outline of the geology of copper, to give brief consideration to occurrences grouped under both of the latter-named headings. Viewed by geological ages, it is noted that copper deposits occur in rocks of practically all periods except the Quaternary, but the ore bodies are mainly post-Cretaceous deposits of Devonian and Carboniferous ages, laid down in rocks of those or of previous ages. The Permian veins throughout the world are notably cupriferous, and furnish a number of mines, though many of the Permian beds are too low in copper tenor to be considered as available deposits, at the present time, though doubtless these will have their place in the economy of future generations. The rocks of the Permian age, and the Jura-Trias system of the Mesozoic, or age next younger than the Permian, are more uniformly cupriferous than those of any other period, but are apt to carry disseminated ores of very low copper tenor, and these are workable only in occasional spots of exceptional richness, usually due to local enrichments caused by igneous intrusives. While the percentage of copper in the Permian and early Mesozoic beds is small, the aggregate of copper so deposited is past computation, owing to the dissemination of the ores through beds of vast area.

Viewed from a lithological standpoint, workable ore deposits occur mainly in igneous areas, most usually at or near the point of contact between igneous intrusive rocks and stratified beds, limestone being the most common form of the latter, but a number of the largest deposits now worked, including those of Lake Superior, Butte and Mansfeld, are of other classes. Very many of the principal copper deposits now worked are closely connected with intrusive granite rocks, of post-Cretaceous age.

Like most workable deposits of practically all other metals found in place, copper occurs in mountain ranges, perhaps more frequently in the

flanks or the foot-hills than in the higher peaks. In frequent instances, as in the Lake Superior deposits, copper is found in the roots of very ancient mountain ranges that have been quite thoroughly eroded. Many of the largest copper deposits are found at or near the point of contact between igneous intrusives and other rock forms, leading necessarily to the assumption that the metallic values were contained originally in the granitic magma, and either were deposited as magmatic segregations, at or near the point of contact, or, as is more commonly the case, were leached from the magma and redeposited as concentrated ore in fissures and limestone cavities, or as impregnations in permeable rocks. Primary ores usually are associated with basic rocks, or may be contact deposits of igneous acid rocks, but the secondary ores may occur in any adjacent rock strata offering a place for their deposition.

There are occasional occurrences of magmatic copper ores not existing as segregations distinct from the magma, though such deposits offer evidences of strictly local segregation, but most of these cases are of scholastic rather than of commercial importance. Exceptions must be made, however, in the instances of the wonderful monzonite ore bodies of Bingham, Utah, and of Ely, Nevada, and of a portion of the deposits of Clifton and Morenci, in Graham county, Arizona. It is probable that in the future greater attention will be paid to the possibilities of discovering similar porphyritic ore bodies containing magmatic ores, low in copper tenor, to be sure, but immensely valuable because of the almost unlimited quantity of such ore that may be found to occur in a single deposit.

The districts carrying copper in sedimentary formations are low in copper tenor as a rule, but more extensive in area than those fields carrying copper in igneous and metamorphic rocks. The Mansfeld district of Germany covers about two hundred square miles, and the Permian formation of the Ural Mountain range, that separates Russia and Siberia, is very extensive on both flanks, covering several thousand square miles. The Lake Superior copper district is of an exceptional nature, and of unusual extent, having a known length of about 400 miles, from Michipicoten Island, on the east to Pine and Chisago counties, only a short distance north of Minneapolis and St. Paul, on the west, but nearly half of this distance is submerged under Lake Superior, between the western end of Michipicoten Island and the eastern tip of the Keweenaw Peninsula. The present limits of exploitation include a strip of about 100 miles only in length, the Keweenawan series having a width of 2 to 8 miles, and being flanked by beds of sandstone.

Copper is found in practically every class of mineral deposit known to miners, and, in Alaska, and elsewhere, occurs as native stream metal. Copper deposits of more or less value are found in nearly every country on the globe, but many of these are not of sufficient value to justify present working, though what the future may have in store, when the world demands more tons of copper yearly than it now requires tons of pig iron, the best of prophets scarcely could foretell. Copper ores frequently occur in lenticular form, some lenses, as in the case of the Rio Tinto mine, being of immense size, but some of the ore deposits formerly classed as beds are now rated, in view of later and more exact knowledge, as veins.

In the commercial exploitation of copper ore bodies, one of the most

common and most fatal of errors is in attempting to base the future of the mine upon the rich and easily smelted ores of the zone of secondary enrichment. The wise management endeavors to learn the nature and extent of its ore bodies at depth, before building large and costly reduction plants of a permanent nature. When a mine is already opened in rich copper ores, sinking always is a good policy. Only by sinking to depth can the future of the mine be predicated with safety, and only by determining the different kinds and grades of ore, and the proportions in which they exist, can permanently satisfactory reduction plants be planned and installed.

Detailed information regarding the distribution of copper ores throughout the globe, with numerous detailed references to the geology of copper, will be found in the various chapters devoted to the geography of the metal. Geological particulars regarding individual mines also will be found scattered through the long chapter devoted to detailed mine descriptions.

The foregoing matter in this chapter is intended merely as an outline, and is not put forth as infallible in any particular, being merely the best judgment of the author, deduced from such limited studies of ore deposits as he has been able to make personally, amplified by the more detailed and valuable studies of many better authorities. For those who wish to make more careful investigation into the subject of ore deposits, and the geology of copper, I would recommend the perusal of Weed's Copper Mines of the World. While not holding with Mr. Weed on all points, the author of this brief monograph bears witness, cheerfully and gladly, to the vast amount of patient and well-considered investigation of details that has been made by Mr. Weed, and his exposition of the genesis and occurrence of copper ores, while by no means representing the last possible word in so wide a field, where so much remains to be learned, is much the most luminous and satisfactory of anything yet put forth in this particular line. The searcher after truth would do well also to read Kemp's Ore Deposits of the United States and Canada, and in this connection the monographs of Winchell, Lindgren and Sperr are worthy of the most serious consideration.

CHAPTER III.

Chemistry and Mineralogy of Copper.

In this chapter is given a brief outline of pertinent facts regarding the chemistry and mineralogy of copper, ending with an alphabetical list of copper minerals, which will be found to include a considerable number not mentioned in any other work. Despite the appreciable length of this chapter, no attempt has been made to render it exhaustive, as such an effort would, of necessity, include a long treatise on general mineralogy, which not only would be out of place in a work of this nature, but which, even were the ability at command, has been done to such excellent purpose by two generations of scientists of one family that Dana's System of Mineralogy stands, as it long has stood, the world's authority in the special field of mineralogy. To the average reader this chapter will give sufficient detail, and may be found of some interest to all who are especially interested in copper, while those desiring to make a serious study of the subject are referred to Dana's monumental work.

The elements with which copper unites most readily are sulphur, oxygen, carbon, silicon, arsenic, antimony, bismuth and chlorine. Among the other metals, iron is the most common associate of copper. Many copper ores are more or less argentiferous, and sulphide copper ores frequently carry gold, though gold is not found in chemical combination with copper.

Following is a list of the 36 elements with which copper has been found chemically united in nature. Following the full name of each element is its chemical symbol and atomic weight, as now figured by the best authorities.

Element	Symbol	Atomic weight.	Element	Symbol	Atomic weight.
Aluminum	Al	27.	Nickel	Ni	58.6
Antimony	Sb	120.	Niobium	Nb	93.7
Arsenic	As	74.9	Nitrogen	N	14.
Barium	Ba	137.	Oxygen	O	16.
Bismuth	Bi	207.5	Phosphorus	P	31.
Calcium	Ca	39.9	Platinum	Pt	194.3
Carbon	C	12.	Potassium	K	39.
Chlorine	Cl	35.4	Selenium	Se	78.9
Chromium	Cr	52.5	Silicon	Si	28.
Cobalt	Co	58.7	Silver	Ag	107.7
Copper	Cu	63.2	Sodium	Na	23.
Hydrogen	H	1.	Sulphur	S	32.
Iodine	I	126.5	Tellurium	Te	125.
Iron	Fe	55.9	Tin	Sn	117.4
Lead	Pb	206.4	Tungsten	W	183.6
Magnesium	Mg	24.	Uranium	U	240.
Manganese	Mn	54.8	Vanadium	V	51.1
Mercury	Hg	199.8	Zinc	Zn	65.1
Molybdenum	Mo	96.			

The ores of copper (alone or with other metals) may be divided into the following groups:

antimonides	iodides	sulphoantimonates
antimonites	manganates	sulphoantimonites
arsenates	molybdates	sulphoarsenates
arsenides	niobates	sulphoarsenites
arsenites	nitrates	sulphates
arsenoantimonites	oxides	sulphides
arsenobismuthites	oxychlorides	sulphobismuthites
arsenophosphates	phosphates	tellurides
bismuthides	phosphochromates	tungstates
carbonates	selenides	uranates
chlorides	selenites	vanadates
chlorosulphates	silicates	

While the appended alphabetical list of copper minerals gives several hundred titles, the more important ores are scarcely more than a dozen in number, though many of the minor minerals are of local importance in certain fields.

The sulphide ores are of predominant importance. Of these chalcopyrite, the lowest in copper tenor, is the most common, being found in practically every copper field. The major production from sulphide ores comes, however, from the rich chalcocite or copper glance. Bornite, the first alteration product of chalcopyrite in the ascending scale of enriched sulphide ores, is a valuable ore, and is found in large quantities in many copper fields. Covellite, the next richest sulphide above bornite, is found in connection with bornite and chalcocite in most sulphide districts, but as a rule does not occur in large quantities, though by no means a rare ore, and in a few fields, as in Utah and Wyoming, is found in quantities of considerable commercial importance. There are numerous other copper sulphides and copper-iron sulphides that are found in greater or less profusion, but many of these greatly resemble the more important sulphides previously noted, and rarely are differentiated in practical mining operations. There are a number of copper sulphates, of which chalcanthite is the only important ore. While found in natural beds, in Chile, this mineral is, as a rule, essentially a joint product of man and nature, the mine openings in sulphide ores made by man being leached by nature. Being readily soluble, and the copper contents easily precipitated, considerable copper is secured, in many districts, by leaching mine waters charged with bluestone, and in Spain a large part of the extensive copper product is secured in this form.

Next in commercial importance after the sulphide ores comes native copper. This is mined very extensively in the Lake Superior district, and on a considerable scale in Bolivia. Native copper is found in the upper workings of most rich mines of copper ore, and the aggregate production therefrom is quite large.

Third in importance come the carbonates. Of these, azurite and malachite are the only ones usually found in considerable quantities, and malachite is of much the greater importance. This ore is found in profusion in the upper or oxidized workings of many mines, and being rich and easily smelted, is the source of a considerable share of the world's copper supply.

BARNHARDTITE. Formula uncertain. A copper and iron sulphide, probably an alteration product from chalcopyrite that has lost part of its iron and copper, containing 46.7 to 50.4% copper. Apparently is nearer to bornite than to chalcopyrite. Structure, massive, compact. Fracture, conchoidal. Hardness, 3.5. Gravity, 4.5. Lustre, metallic. Color, bronze-yellow, tarnishing to pinchbeck-brown. Streak, grayish black, slightly shining. Occurrences, North Carolina and Arizona.

BARRACANITE. Cupropyrite.

BAYLDONITE. $4(Pb,Cu)O.As_2O_5.2H_2O$. A hydrous basic lead and copper arsenate containing 26.1% copper. Occurs in minute mamillary concretions with drusy surface. Fracture, subconchoidal. Hardness, 4.5. Gravity, 5.35. Lustre, resinous. Color, grass-green to blackish green. Streak, apple-green. Is subtranslucent. Soluble, with difficulty, in nitric acid. Occurs in Cornwall, England.

BEAUMONTITE. A very doubtful hydrous copper silicate, from Cheesy, France.

BELL-METAL ORE. Common name for stannite.

BERZELIANITE. Cu_2Se. A copper selenide containing 61.6% copper. Occurs disseminated in incrustations. Is very soft. Gravity, 6.71. Lustre, metallic. Color, silver-white, soon tarnishing. Streak, shining. Usually is argentiferous. Occurs in Småland, Sweden.

BEUDANTITE. Apparently this name is applied to two minerals, one an arsenate and the other a sulphate of iron, lead and copper, carrying from a trace to 9.8% copper.

BINNITE. Formula probably $3Cu_2S.2As_2S_3$. A copper sulphoarsenite, containing 37.7% copper. Crystallization, isometric. Fracture, conchoidal. Tenacity, brittle. Hardness, 2.5 to 3. Gravity, 4.47. Lustre, metallic. Color, dark steel-gray to iron-black. Streak, reddish brown. Occurrence, Binnenthal, Switzerland.

BLACK COPPER. Common name for melaconite or disseminated chalcocite. In all likelihood much of what has been taken for melaconite in the past was disseminated chalcocite.

BLUE COPPER. Common name for azurite.

BLUE MALACHITE. Common name for azurite

BLUESTONE. Common name for chalcanthite; also for blue vitriol, the manufactured product corresponding in chemical formula with chalcanthite.

BLUE VITRIOL. Common name for chalcanthite or bluestone.

BOGOSLOVSKITE. Chrysocolla carrying carbon dioxide as an impurity, from the Bogoslovsk mine, Perm, Russia.

BOLEITE. $(Pb,Cu,Ag)Cl,OH_2$. A hydrated lead, copper and silver oxychloride, containing circa 12% copper. Crystallization, isometric. Hardness, 3 to 3.25. Gravity, 5.08. Color, indigo-blue. Occurrence, at the Boleo mines, Baja California, Mexico.

BORNITE. Cu_3FeS_3. A copper and iron sulphide, containing 55.5% copper, 16.4% iron, 28.1% sulphur. Common name, peacock copper ore. Crystallization, isometric, with many hexagonal penetration twins. Struc-

ture, granular or compact. Fracture, small conchoidal to uneven. Tenacity, brittle. Hardness, 3. Gravity, 4.9 to 5.4. Lustre, metallic. Color, copper red to bluish brown, quickly tarnishing to iridescence, often most brilliant. Streak, pale grayish-black. Is soluble in nitric acid, with separation of sulphur. Is the first alteration product from chalcopyrite among the secondary copper sulphides, and often carries nodules and occasionally larger masses of chalcocite. Is one of the most important ores of copper.

BOTALLACKITE. Atacamite.

BOURNONITE. $3(Pb,Cu_2)S.Sb_2S_3$. A lead and copper sulphoantimonite, containing 13% copper, and 42.5% lead. Crystallization, orthorhombic. Structure, massive, granular and compact. Cleavage, imperfect. Fracture, subconchoidal to uneven. Tenacity, rather brittle. Hardness, 2.5 to 3. Gravity, 5.7 to 5.9. Lustre, brilliant metallic. Color and streak, steel-gray, inclining to blackish-gray or iron-black. Fuses easily on charcoal and is soluble in acids. Occurrence, in many copper fields.

BRASS ORE. Common name for aurichalcite.

BROCHANTITE. $4CuO.SO_3.3H_2O$. A basic copper sulphate containing 56.2% copper. Crystallization, orthorhombic. Fracture, uneven. Hardness, 3.5 to 4. Gravity, 3.9. Lustre, vitreous. Color, emerald-green to blackish green. Streak, paler green. Is translucent to transparent. Is found in many copper fields, and is an important commercial ore in the Clifton district, Graham county, Arizona.

BURATITE. An aurichalcite containing calcium monoxide, probably as a mechanical admixture.

CACHEUTAITE. A lead, copper and silver selenide carrying 7 to 36% copper. Is closely related to zorgite.

CALCIOVOLBORTHITE. $4(Cu,Ca)O.V_2O_5.H_2O$. A hydrous basic copper and calcium vanadate, containing 31.7% copper. Hardness, 3.5. Gravity, 3.5 to 3.86. Color, gray to green. Streak, brownish yellow to greenish yellow. Occurrence, Thuringia, Germany.

CALEDONITE. $2(Pb,Cu)O.SO_3.H_2O$. A basic lead and copper sulphate, containing 9.4% copper. Crystallization, orthorhombic. Fracture, uneven. Tenacity, rather brittle. Hardness, 2.5 to 3. Gravity, 6.4. Lustre, resinous. Color, verdigris-green to bluish green. Streak, greenish white. Is translucent. Occurrence, Scotland, Hungary, California, etc.

CANTONITE. A dimorphous variety of covellite, apparently a pseudomorph after galena, crystallized in cubes with cubical cleavage.

CAPILLARY RED OXIDE OF COPPER. Common name for cuprite.

CARMENTITE. A variety of digenite.

CARROLLITE. $CuS.Co_2S_3$. A cobalt and copper sulphide containing 20.5% copper and 38% cobalt. Crystallization, isometric. Fracture, subconchoidal to uneven. Hardness, 5.5. Gravity, 4.85. Lustre, metallic. Color, light steel-gray, with faint reddish hue. Occurrence, Carroll county, Georgia.

CASTILLITE. $(Cu,Ag)_2S.2(Cu,Pb,Zn,Fe)S$. A copper, silver, lead, zinc and iron sulphide carrying circa 41% copper. Apparently an impure bornite. Structure, massive. Hardness, 3. Gravity, 5.19 to 5.24. Resembles bornite in color, streak and tarnish. Occurrence, Guanacevi, Mexico.

senate carrying 48% copper. Crystallization, monoclinic. Is brittle. Hardness, 2.5 to 3. Gravity, 4.19 to 4.36. Lustre, vitreous to resinous. Color, blackish blue-green externally, dark verdigris-green internally. Streak, bluish green. Is subtransparent to translucent. Is soluble in nitric acid. Occurrence, Cornwall and Utah.

COPPER. Cu. Native copper. The chemical symbol Cu is an abbreviation of cuprum, the Latin word for copper. The metal, native or refined, has the following names in modern languages: kupfer in German; koppar in Swedish; kobber in Norwegian; cobre in Spanish and Portuguese; cuivre in French; rame in Italian.

Atomic weight, 63.2. Belongs in the first group and is the leader of the fifth series of Mendeleéff's Periodic System. The group is as follows: 1, hydrogen; 2, lithium; 3, sodium; 4, potassium; 5, copper; 6, rubidium; 7, silver; 8, cæsium; 9, unknown (possibly terbium, atomic weight 160); 10, gold; 11, unknown. The fifth series, of which copper is the basic leader, is as follows: 1, copper; 2, zinc; 3, gallium; 4, germanium; 5, arsenic; 6, selenium; 7, bromine. The three metallic elements falling between series four and five in Mendeleéff's table, are iron, cobalt and nickel. The frequency with which these three elements are found associated with copper, and the ease with which all four metals replace one another, are notable. The general resemblance between copper, silver and gold, which form ascending steps in the same group, is readily apparent.

System of crystallization, isometric. Tetrahexahedronal forms are the most common, with much twinning. Crystals often show cavernous faces and occasionally elevations, are often distorted and pass gradually through distortions into filiform and arborescent forms. Native copper also occurs massive, in granular form, and in laminæ. In the Lake Superior mines the metal occurs in all observed forms and sizes, including lamellæ from microscopic flakes up to sheets of immense size and weight, crystals of greatly varying form and size, grains from microscopic size to considerable nodules, and druses, often of considerable size, show various filiform and arborescent shapes. The finest particles are grains and exceedingly minute flakes, occurring in an upper sandstone of the Keweenawan series, while the largest masses, weighing upwards of 500 tons, have been found in contact and fissure veins.

Cleavage, none. Fracture, hackly. Tenacity, second only to that of iron. Is perfectly sectile and highly ductile and malleable, ranking in these particulars with the precious metals. Electrical conductivity, 931, as compared with 1,000 for silver, which possesses the most perfect electrical conductivity of any known metal or alloy. Conductivity for heat, 898, as compared with 1,000 for gold, the most perfect conductor of heat.

Hardness, 2.5 to 3. Specific gravity, in vacuo, at 0 degrees Centigrade (equal to 32°, or freezing point, Fahrenheit), when chemically pure and devoid of porosity, is 8.945. Specific gravity of the ordinary copper of commerce, none of which is free from impurities, varies from about 8.75 when cast, to about 8.95 when rolled, hammered or drawn, the exact gravity depending upon how handled, as well as upon the extent and nature of the impurities contained.

Lustre, metallic. Color, copper-red. Streak, copper-red, metallic, shin-

ing. Tarnishes upon exposure to air to brownish red, and is liable to form a coating of verdigris or oxide upon long exposure to air. Atmosphere laden with moisture and carbonic acid is especially favorable to the formation of verdigris.

Fusibility: Copper is fusible at approximately 2,000° Fahrenheit, or a trifle less than 1,100° Centigrade. Color, when fused, sea-green. Copper becomes volatile under the high temperature of the electric arc.

Solubility: Copper is soluble in nitric acid, aqua regia, and strong boiling sulphuric acid, also, slowly, in dilute hydrochloric and sulphuric acids, with admission of air. When in solution in nitric or sulphuric acids will deposit metallic copper on iron immersed therein.

Affinities: Copper has a greater affinity for sulphur than for any other element, possessing also marked affinities for oxygen, carbon dioxide, arsenic, antimony and bismuth, and unites with many other elements.

Alterations: Native copper alters on exposure, especially in damp air, to the simpler oxide and carbonate ores, such as cuprite, malachite and azurite, and occasionally, in time, to the more complex ore forms.

Occurrence: Native copper occurs, usually in small quantities, in most of the principal copper districts of the world. The native metal is mined upon a considerable scale only in Lake Superior, U. S. A., and Bolivia. The Lake Superior native copper carries considerable silver, mechanically admixed, though not alloyed, but carries no gold. In districts outside of Lake Superior and Bolivia the metal occurs most frequently in connection with the oxide and carbonate ores, and occasionally with the secondary sulphide ores.

Impurities: Native copper frequently contains silver, arsenic, bismuth, antimony, zinc and occasionally mercury. Commercial copper, refined from ores, may contain any of the elements already named, and also gold, tin, lead, selenium and tellurium, the latter two elements in very minute quantities.

COPPER GLANCE. Common name for chalcocite.

COPPER MICA. Common name for chalcopyrite.

COPPER NICKEL. Common name for niccolite.

COPPER PHOSPHATE. Common name for libethenite.

COPPER PITCHBLENDE. An impure chrysocolla containing limonite.

COPPER PYRITES. Common name for chalcopyrite.

COPPER SULPHATE. Common name for chalcanthite in nature; bluestone when manufactured.

COPPER URANITE. Common name for torbernite.

COPPER VITRIOL. Common name for chalcanthite when found native, or for bluestone when manufactured.

COPPITE. A ferruginous variety of tennantite.

CONDURRITE. Apparently a copper arsenide, related to domeykite. Is supposed to be an alteration product of tennantite. Is soft and black. Occurs in the Condurrow mine, and at Carn Brea, Cornwall, England.

CONICHALCITE. $4(Cu,Ca)O.\ As_2O_5.\ 1\frac{1}{2}H_2O$. A hydrous basic copper and calcium arsenate, carrying 24% copper. Structure, reniform and mas-

sive. Fracture, splintery. Tenacity, brittle. Hardness, 4.5. Gravity, 4.12. Color and streak, pistachio-green. Is subtranslucent. Occurs in Andalusia, Spain and at Eureka, Juab county, Utah.

CONNELLITE. Formula probably $Cu_{19}(Cl,OH)_4SO_{16}.15H_2O$. A hydrous basic copper chlorosulphate, containing circa 57.6% copper. Crystallization, hexagonal. Hardness, 3. Gravity, 3.36. Lustre, vitreous. Color, fine blue. Is translucent. Is soluble in nitric acid. Occurrence, Cornwall, England.

CORNWALLITE. $5CuO.As_2O_5.3H_2O$. A hydrous basic copper arsenate containing 46.5% copper. Structure, massive. Fracture, conchoidal. Hardness, 4.5. Gravity, 4.16. Color, verdigris-green to emerald green. Occurrence, Cornwall, England.

COSALITE. Empirically lead sulphobismuthite, but usually cupriferous to the extent of from a trace to 8.75% copper.

COVELLINE. Covellite.

COVELLITE. CuS. A copper sulphide containing 66.4% copper. Chemical name, cupric sulphide. Crystallization, hexagonal; also occurs massive. Is flexible in thin layers, with basal cleavage. Hardness, 1.5 to 2. Gravity, 4.6. Lustre, submetallic on crystals, dull when massive. Color, dark indigo-blue. Streak, lead-gray to black, shining. Occurs in most sulphide copper districts, as a secondary ore and is a valuable commercial ore of copper, when found in sufficient quantities, as in Utah, Wyoming and elsewhere.

CLARITE. A dimorphous form of enargite, from Schapbach, Baden, Germany.

CREDNERITE. $3CuO.2Mn_2O_3$. A copper manganate containing 34.4% copper. Crystallization, monoclinic. Cleavage, basal, perfect, less distinct in other directions. Hardness, 4.5. Gravity, 4.9 to 5.1. Lustre, metallic. Color, iron-black to steel-gray. Streak, brownish black. Is soluble in hydrochloric acid.

CROOKESITE. $(Cu,Tl,Ag)_2Se$. A copper, thallium and silver selenide, containing 44 to 46% copper, 17 to 18.5% thallium and 1.5 to 5% silver. Structure is massive, without crystallization. Is brittle. Hardness, 2.5 to 3. Gravity, 6.9. Lustre, metallic. Color, lead-gray. Occurrence, Småland, Sweden.

CUBANITE. $CuS.Fe_2S_3$. An iron and copper sulphide containing 23.3% copper and 41.3% iron. Crystallization, isometric; also occurs massive. Cleavage, cubic. Hardness, 4. Gravity, 4.026 to 4.169. Color, bronze to brass-yellow. Streak, dark reddish bronze to black. Occurrence, Cuba and Sweden.

CUMENGITE. $PbCl_2.CuO.H_2O$. A hydrous lead and copper oxychloride, related to boléite. Crystallization, tetragonal.

CUPRIC OXIDE. Tenorite, when found in nature; copper monoxide in chemistry.

CUPRITE. Cu_2O. A copper oxide, containing 88.8% copper, being the richest copper ore. Chemical names, cuprous oxide, copper protoxide. Common names, ruby copper, red glassy copper ore, octrahedral copper ore. Crystallization, isometric, commonly in octohedrons; also occurs massive,

granular and sometimes earthy. Fracture, conchoidal. Is brittle. Hardness, 3.5 to 4. Gravity, 5.85 to 6.15. Lustre, adamantine to earthy. Color, light to dark red; when fresh, usually ruby-red, but fades to duller red. Streak, brownish red, shining. Is subtransparent to subtranslucent. Occurs in most copper districts in the upper oxidized zone, frequently shading into crystals of native copper.

CUPROBISMUTITE. $3Cu_2S.\ 4Bi_2S_3$. A copper sulphobismuthite containing 15% copper and 65.1% bismuth. Occurs in prismatic crystals. Gravity, 6.31 to 6.68. Lustre, metallic. Color, dark bluish black. Streak, black. The copper frequently is replaced partially by silver.

CUPROCALCITE. Formula perhaps $(Cu_2O)_2.\ CO_2+2CaO.\ CO_2+H_2O$. Apparently merely an intimate mixture of cuprite and calcium carbonate. Hardness, 3. Gravity, 3.9. Color, vermilion-red. Is soluble in hydrochloric acid.

CUPROCASSITERITE. Formula possibly $4SnO_2+Cu_2Sn(OH)_2$. Occurrence, Black Hills of South Dakota.

CUPRODESCLOIZITE. A cupriferous variety of descloisite, which is a basic lead and zinc vanadate.

CUPROFERRITE. Pisanite.

CUPROIODARGYRITE. CuI.AgI. A copper and silver iodide. Apparently a decomposition product of stromeyerite. Occurs, as incrustations, at Huantajaya, Chile.

CUPROMAGNESITE. $(Cu, Mg)\ SO_4+7H_2O$. A copper and magnesium sulphate. Color, bluish green. Is an alteration product, occurring as incrustations, from Mt. Vesuvius.

CUPROPLUMBITE. $5Cu_2S.\ PbS$. A copper and lead sulphide, carrying 61.3% copper and 19% lead. Structure, massive. Lustre, feeble or lacking. Color, lead-gray to indigo-blue. Occurence, Catemou, Aconcagua, Chile, Butte, Montana, and Semipalatinsk, Siberia.

CUPROPYRITE. $CuFe_2S_4$. An iron and copper sulphide, carrying 24% copper. Is closely related to cubanite.

CUPROSCHEELITE. $(Ca,Cu)WO_4$. A calcium and copper tungstate carrying 3 to 5% copper. Is a variety of cuprotungstite in which copper is mainly replaced by calcium.

CUPROTUNGSTITE. $CuWO_4$ A copper tungstate carrying 24% copper. Structure, granular and incrustive. Hardness, 4.5 to 5. Color, pistachio-green to leek-green. Streak, greenish gray to greenish yellow. Is soluble in hydrochloric acid. Occurrence, Llamuco, Santiago de Chile.

CUPROURANITE. Torbernite.

CUPROUS OXIDE. Cuprite in nature. Chemical term for two atoms of copper united with one atom of oxygen.

CUPROVANADITE. Chileite.

CYANOCHALCITE. A phosphoriferous variety of chrysocolla, from Nijni Tagilsk, Perm, Russia.

CYANOCHROITE. $CuSO_4.K_2SO_4+6H_2O$. A hydrous copper and potassium sulphate, carrying 14.3% copper. Crystallization, monoclinic. Color, clear blue. Is an alteration product from Mt. Vesuvius.

CYANOTRICHITE. $4CuO.Al_2O_3.SO_3.8H_2O$. A hydrous basic copper and aluminum sulphate, carrying 39.4% copper. Crystallization, orthorhombic. Lustre, pearly. Color, smalt-blue to sky-blue. Occurrence, Hungary, France, Arizona and Utah.

DARWINITE. Whitneyite.

DELAFOSSITE. An iron, copper and aluminum oxide containing 37.9% copper, 47.99% iron sesquioxide and 3.52% aluminum sesquioxide. Occurrence, Ekaterinburg, Perm, Russia.

DEMIDOVITE. A phosphoriferous variety of chrysocolla from Tagilsk, Perm, Russia.

DIGENITE. Apparently a partly altered chalcocite containing a considerable percentage of covellite.

DIHYRITE. $5CuO.P_2O_5.2H_2O$. A hydrous basic copper phosphate containing 55.2% copper. Crystallization, monoclinic; also occurs massive and fibrous. Fracture, conchoidal to uneven. Tenacity, brittle. Hardness, 4.5 to 5. Gravity, 4 to 4.4. Lustre, adamantine. Color, dark emerald-green. Streak, pale emerald-green. Is translucent. Is soluble in nitric acid. Occurrence, Germany and the Ural Mountains of Russia.

DILLENBURGITE. An impure chrysocolla containing copper carbonate.

DIOPTASE. $CuO.SiO_2.H_2O$. A hydrous copper silicate carrying 40.3% copper. Common names, emerald copper, emerald malachite. Crystallization, rhombohedral; also occurs massive. Fracture, conchoidal to uneven. Tenacity, brittle. Hardness, 5. Gravity, 3.28 to 3.35. Lustre, vitreous, Color, emerald-green. Streak, green. Is subtranslucent to transparent. Gelatinizes with hydrochloric acid. Is fusible with charcoal and soda. Occurrence, Chile, Hungary, Siberia, French Congo, Arizona, etc.

DOGNACSKAITE. Formula perhaps $3Cu_2.5Bi_2S_3$. A variety of cuprobismutite carrying slightly less copper and sulphur and slightly more bismuth than the normal mineral.

DOLEROPHANITE. $2CuO.SO_3$. A basic copper sulphate carrying 53.1% copper. Crystallization, monoclinic. Color, brown. Is soluble in nitric acid. Is a sublimation product from Mt. Vesuvius.

DOMEYKITE. Cu_3As. A copper arsenide carrying 71.7% copper. Common name, arsenical copper. Structure, reniform and botryoidal, also massive and disseminated. Fracture, uneven. Hardness, 3 to 3.5. Gravity, 7.2 to 7.75. Lustre, metallic, dulling on exposure. Color, tin-white to steel gray, tarnishing to iridescence. Is fusible in open tube, yielding a white sublimate of arsenic trioxide. Is soluble in nitric acid. Occurrence, Chile, Bolivia, Saxony, Mexico and Lake Superior.

DUCKTOWNITE. Apparently merely a mechanical mixture of chalcocite and pyrite.

DÜRFELDTITE. $3(Pb,Ag,Cu,Mn,Fe)S.Sb_2S_3$. A lead, silver, copper, manganese and iron sulphobismuthite. Occures in acicular crystals. Hardness, 2.5. Gravity, 5.4. Lustre, metallic. Color light gray. Is related to stylotypite. Found in Perú.

EHLITE. $5CuO.P_2O_5.3H_2O$. A hydrous basic copper phosphate con-

taining 52 to 55% copper. Is closely related to dihydrite and pseudomalachite. Gravity, 4.2 to 4.4. Occurrence, Cornwall, England and Nijni Tagilsk, Perm, Russia.

EMERALD COPPER. Common name for dioptase.

EMERALD MALACHITE. Common name for dioptase.

EMPLECTITE. $Cu_2S.Bi_2S_3$. A copper sulphobismuthite containing 18.9% copper and 62% bismuth. Crystallization, orthorhombic. Tenacity, brittle. Hardness, 2. Gravity, 6.3 to 6.5. Lustre, metallic. Color, tin-white. Occurrence, Chile, Saxony and Norway.

ENARGITE. $3Cu_2.As_2S_5$. A copper sulphoarsenite containing 48.3% copper. Crystallization, orthorhombic; also occurs massive and granular. Fracture, uneven. Tenacity, brittle. Hardness, 3. Gravity, 4.45. Lustre, metallic. Color and streak, grayish black to iron-black. Is soluble in aqua regia and fusible on charcoal. Occurs in many copper fields, notably at Butte, Montana, where it is a common and valuable ore.

EPIGENITE. Formula probably $4Cu_2S.3FeS.As_2S_5$. A copper and iron sulphoarsenite, carrying circa 41% copper. Crystallization, orthorhombic. Fracture, uneven. Hardness, 3.5. Lustre, metallic. Color, steel-gray. Streak, black. Is soluble in nitric acid. Occurrence, Wittichen, Baden, Germany.

ERINITE. $5CuO.As_2O_5.2H_2O$. A hydrous basic copper arsenate, containing 47.8% copper. Occurs in mamillated concentric crystalline groups, also fibrous and rough. Tenacity, brittle. Hardness, 4.5 to 5. Gravity, 4.04. Lustre, slightly resinous. Color, emerald-green. Streak, grass-green. Is opaque to subtranslucent. Is soluble in nitric acid. Occurrence, Cornwall and Utah.

ERYTHROCALCITE. $CuCl_2+nH_2O$. A hydrated copper chloride. Is an alteration product from Mt. Vesuvius.

EUCAIRITE. $Cu_2Se.Ag_2Se$. A silver and copper selenide carrying 25.3% copper and 43.1% silver. Crystallization, isometric; also occurs massive and granular. Hardness, 2.5. Gravity, 7.5. Lustre, metallic. Color, silver-white to lead-gray. Streak, shining. Occurrence, Småland, Sweden, and Copiapó, Chile.

EUCHLORINE. A compound of copper sulphate and cuprous chloride, from Mt. Vesuvius.

EUCHROITE. $4CuO.As_2O_5.7H_2O$. A hydrous basic copper arsenate containing 39.7% copper. Crystallization, orthorhombic. Fracture, subconchoidal. Tenacity, brittle. Hardness, 3.5 to 4. Gravity, 3.39. Lustre, vitreous. Color, emerald-green to leek-green. Is translucent to transparent. Occurrence, Libethen, Hungary.

FAHLORE. Common name for tetrahedrite or tennantite.

FALKENHAYNITE. $3Cu_2S.Sb_2S_3$. A copper sulphoantimonite carrying 39.5% copper. Apparently is related to stylotypite. Structure, massive. Gravity, 4.83. Color, gray-black. Occurrence, Joachimsthal, Bohemia, Austria.

FAMATINITE. $3Cu_2S.Sb_2S_5$. A copper sulphoantimonite carrying 43.3% copper. Crystallization, orthorhombic; is isomorphous with enargite;

darker red. Is soluble in nitric acid. Occurrence, Mohawk mine, Keweenaw county, Michigan.

KLAPROTHOLITE. $3Cu_2S.\ 2Bi_2S_3$. A copper sulphobismuthite containing 25.3% copper and 55.4% bismuth. Crystallization, orthorhombic. Fracture, uneven. Tenacity, brittle. Hardness, 2.5. Gravity, 4.6. Lustre, metallic. Color, steel-gray, tarnishing to iridescent brass-yellow. Occurrence, Baden, Germany.

KOBELLITE. A lead sulphoantimonite, usually cupriferous to the extent of about 1%.

KRÖHNKITE. $CuSo_4.Na_2SO_4+2H_2O$. A hydrous copper and sodium sulphate carrying 18.8% copper. Crystallization, monoclinic. Fracture, conchoidal. Hardness, 2.5. Gravity, 1.98. Lustre, vitreous. Color, azure-blue. Occurrence, Cobija, Atacama, Chile.

LAMPADITE. A cupriferous wad containing 3 to 15% copper.

LANGITE. $4CuO.SO_3.4H_2O$. A hydrous basic copper sulphate containing 53% copper. Is closely related to brochantite. Crystallization, orthorhombic. Hardness, 2.5 to 3. Gravity, 3.5. Lustre, vitreous on crystals, silky on crusts. Color, greenish blue. Is translucent. Occurrence, Cornwall, England.

LAUTITE. An imperfectly determined copper sulphoarsenite, of the enargite family, from Marienberg, Saxony.

LAVENDULAN. Chemical formula probably $3(Cu,Co,Ni)O.\ As_2O_5+3H_2O$. A hydrous copper, cobalt and nickel arsenate, containing about 32% copper, 2.5% cobalt monoxide and 1.35% nickel monoxide. Is related to trichalcite. Structure, amorphous. Fracture, conchoidal. Hardness, 2.5 to 3. Gravity, 3.01. Lustre, greasy to vitreous. Color, lavender blue. Streak, pale lavender blue. Diaphaneity, translucent. Is soluble in warm hydrochloric acid. Occurrence, Chile and Saxony.

LAXMANNITE. Vauquelinite.

LEPIDOPHAEITE. A varietal form of lampadite.

LETTSOMITE. Cyanotrichite.

LEUCOCHALCITE. $4CuO.As_2O_5.\ 3H_2O$. A hydrous basic copper arsenate, carrying about 39.8% copper. Structure, acicular. Lustre, silky. Color, light greenish white.

LIBETHENITE. $4CuO.P_2O_5.H_2O$. A hydrous copper phosphate carrying 51.1% copper. Common name, copper phosphate. Crystallization, orthorhombic. Fracture, subconchoidal to uneven. Tenacity, brittle. Hardness, 4. Gravity, 3.6 to 3.8. Lustre, resinous. Color and streak, olive-green. Diaphaneity, subtranslucent. Is soluble in nitric acid. Occurrence, Chile, Bolivia, England, Germany and Hungary.

LILIANITE. A lead sulphobismuthite, sometimes cupriferous to the extent of about 1.5%.

LIME-MALACHITE. Apparently merely a malachite carrying gypsum or calcite, or both, as impurities.

LINARITE. $PbO.CuO.SO_3.H_2O$. A basic lead and copper sulphate carrying 15.8% copper and 55.7% lead oxide. Crystallization, monoclinic. Fracture, conchoidal. Tenacity, brittle. Hardness, 2.5. Gravity, 5.3 to

6.45. Lustre, vitreous to adamantine. Color, deep azure-blue. Streak, pale blue. Diaphaneity, translucent. Occurs in many lead and copper districts.

LINDACKERITE. Chemical formula probably $3NiO.\ 6CuO.\ SO_3.\ 2As_2O_5.\ 7H_2O$. A hydrous copper and nickel sulphoarsenate containing 27.8% copper. Crystallization, orthorhombic. Hardness, 2 to 2.5. Gravity, 2 to 2.5. Lustre, vitreous. Color, verdigris-green to apple-green. Streak, pale green to white.

LINNAEITE. A cobalt sulphide in which cobalt frequently is replaced partially by nickel, iron or copper, latter to the extent of 1 to 8%.

LIROCONITE. $18CuO.\ 4Al_2O_3.\ 5As_2O_5.\ 55H_2O$. A hydrous basic copper and aluminum arsenate carrying 28.7% copper. Crystallization, monoclinic; also occurs rarely, granular. Cleavage, subconchoidal. Is imperfectly sectile. Hardness, 2 to 2.5. Gravity, 2.88 to 2.98. Lustre, vitreous. Color and streak, sky-blue to verdigris-green. Is soluble in nitric acid. Occurrence, Hungary and Cornwall, England.

LITHIDIONITE. A copper, iron, potassium and sodium silicate carrying circa 5.2% copper. Is an alteration product from Mt. Vesuvius.

LUNNITE. A name proposed for dihydrite, pseudomalachite and their varietal forms.

LUZONITE. A dimorphous form of enargite, found in the Mancayan-Suyoc district, Lepanto, Luzon, Philippines.

LYELLITE. Langite.

MALACHITE. $2CuO.\ CO_2.\ H_2O$. A basic copper carbonate carrying 57.5% copper. Common names, green copper carbonate, basic cupric carbonate. Crystallization, monoclinic. Commonly massive, but frequently incrustive and sometimes granular or earthy, and disseminated as stains. Fracture, subconchoidal to uneven. Tenacity, brittle. Hardness, 3.5 to 4. Gravity, 3.9 to 4.03. Lustre, of crystals, adamantine, frequently with concretionary bands of varying shades from pistachio-green to bluish green. Streak, green. Is opaque to translucent. Is soluble in nitric acid. Occurs in most copper districts, in the upper portions of the oxidized zones of ore bodies, and frequently is an important commercial ore. When massive and beautifully marked is a semi-precious stone, used for table tops, etc.

MALINOWSKITE. A plumbiferous and usually argentiferous variety of tennantite.

MARCYLITE. An imperfectly determined alteration product from copper sulphides, consisting of hydrated copper oxides and sulphides. Occurrence, Perú and Arkansas, U. S. A.

MARSHITE. Cu_2I_2. A copper iodide containing 33.4% copper. Crystallization, tetragonal. Fracture, subconchoidal. Tenacity, brittle. Lustre, adamantine. Color, oil-brown. Streak, orange-yellow. Is translucent. Occurrence, Broken Hill mines, New South Wales, Australia.

MELACONITE. Tenorite.

MELANOCHALCITE. $Cu_2(Si,C)O_4.Cu(OH)_2$. A copper silicate containing 61.4% copper. Structure, amorphous or cryptocrystalline, habit of crystals being undetermined. Hardness, 4. Gravity, 4.14. Lustre, vitreous. Color, jet black, powder is coffee-brown. Fine particles are translucent under high power of microscope, light passing through as yellowish brown.

Is decomposed by dilute hydrochloric acid, even a 3% solution changing a fragment into a white silicious mass retaining the original outlines, only cupric chloride being produced. Heated in a closed tube loses water and carbon dioxide, and powder changes in color from coffee-brown to brownish black. Heated with borax gives the sky-blue color of copper. With salt of phosphorous gives a skeleton of silica on the blue glass. SiO_2 and CO_2 replace each other within certain limits. From this fact, and the behavior of the mineral under dilute hydrochloric acid, it is deduced by Dr. Geo. A. Koenig, the discoverer, that there exists in it a compound orthoacid, $H_4(Si,C)O_4$, with the hydrogen replaced by copper. Viewed in this light melanochalcite represents the basic copper salt of the orthoacid. Occurs in the Calumet & Arizona mine, Bisbee, Arizona, the mineral surrounding cuprite as a black band, and being overlaid, in turn, by chrysocolla and malachite.

MELANOTHALLITE. Chemical formula probably $CuCl_2.CuO.2H_2O$. A copper oxychloride. Is an alteration product of Mt. Vesuvius.

MIARGYRITE. A silver sulphoantimonite, frequently cupriferous to the extent of one-half to one per cent.

MIXITE. Chemical formula probably $20CuO.Bi_2O_3.5As_2O_5.22H_2O$. A hydrated basic copper arsenobismuthite, carrying 35.2% copper. Occurs in acicular crystals. Hardness, 3 to 4. Gravity, 3.79. Color, whitish green to emerald-green or bluish green. Streak, lighter green. Is translucent, and, in fine particles, transparent. Occurrence, Baden, Germany, and Utah.

MOKAWKITE. $(Cu, Ni, Co)_3As$. A copper, nickel and cobalt arsenide, carrying 63 to 69% copper, 3 to 7% nickel and 0.5 to 2% cobalt, usually somewhat argentiferous. Crystallization, hexagonal, by synthesis, no crystals being found in nature. Cleavage, indistinct. Fracture, uneven. Tenacity, slight. Hardness, 4. Gravity, 8.05. Color, light gray on fresh fractures, tarnishing to purple or brassy yellow. Streak, gray. Is soluble in nitric acid. Occurrence, Mohawk mine, Keweenaw county, Michigan.

MOHAWK-WHITNEYITE. Cu_3As. A copper arsenide, carrying 83 to 87% copper. Is a mere name of convenience for an intimate blending of mohawkite and whitneyite, or keweenawite and whitneyite, indistinguishable to the eye but determined chemically. Cleavage, none. Fracture, hackly. Tenacity, is malleable, to only a slightly less extent than copper. Hardness, about 5. Gravity, 8.6. Color, gray, with a yellowish tinge, tarnishing to coffee-brown. Streak, gray. Is soluble in nitric acid, with a small residue of gray powder. Occurrence, at Mohawk mine, Keweenaw county, Michigan.

MOTTRAMITE. Chemical formula undetermined. A hydrous basic lead and copper vanadate containing about 16.3% copper. Is very closely related to psittacinite.

MOUNTAIN BLUE. Common name for azurite.

MOUNTAIN GREEN. Common name for malachite. Name sometimes is applied to chrysocolla also.

MYSORIN. An impure malachite from Mysore, India.

NAMAQUALITE. Chemical formula probably $2CuO.Al_2O_3.4H_2O$. A hydrated copper and aluminum oxide, carrying 35.8% copper. Occurrence, Little Namaqualand, Cape Colony.

NANTOKITE. Cu_2Cl_2. A copper chloride, carrying 84.1% copper. Crystallization, isometric; also occurs massive and granular. Cleavage, cubic. Fracture, conchoidal. Hardness, 2 to 2.5. Gravity, 3.9. Lustre, adamantine. Color, grayish white to colorless. Is translucent to transparent. Is soluble in nitric or hydrochloric acids, and in ammonia. Yields chlorine when sharply struck. Oxidizes readily on exposure to atmosphere. Occurrence, Carmen Bajo mine, Chile, and Broken Hill mines, New South Wales.

OCTAHEDRAL COPPER ORE. Common name for cuprite.

OLIVE GREEN COPPER ORE. Common name for olivenite.

OLIVENITE. $4CuO.As_2O_5.H_2O$. A hydrous basic copper arsenate, carrying 44.8% copper. Common name, olive green copper ore. Crystallization, orthorhombic, with prismatic and acicular crystals; also occurs globular and granular. Fracture, conchoidal to uneven. Tenacity, brittle. Hardness, 3. Gravity, 4.1 to 4.4. Lustre, adamantine to vitreous. Color, olive-green to blackish green. Is opaque to subtransparent. Is soluble in nitric acid. Occurrence, Nijni Tagilsk, Perm, Russia, Cornwall and Devon, England, Chile, Utah, etc.

ORILEYITE. $(Cu_2, Fe)_3 (As, Sb)_2$. A copper and iron arsenoantimonite, carrying 12.13% copper. Is related to stibiodomeykite. Structure, massive. Hardness, 5.5. Gravity, 7.4. Lustre, metallic. Color, steel-gray, with purplish tinge on fresh fracture. Streak, dark gray. Occurrence, Burmah.

PARAMELACONITE. CuO. A copper oxide carrying 79.3% copper. Is a dimorphous form of melaconite. Crystallization, tetragonal. Hardness, 5. Gravity, 5.83. Lustre, brilliant. Color, purplish black on faces, pitch-black on fractures. Occurrence, with footeite, at Bisbee, Arizona.

PARTZITE. Chemical formula undetermined. A hydrous copper antimonite, carrying circa 28.7% copper. Fracture, conchoidal. Hardness, 3 to 4. Gravity, 3.8. Color, yellowish green to blackish green. Occurrence, Mono county, California.

PEACOCK ORE. Common name for bornite. Sometimes is applied also to chalcopyrite when showing an iridescent tarnish.

PEARCEITE. Chemical formula probably $9(Ag,Cu)_2S.As_2S_3$. A silver and copper sulphoantimonite. Crystallization, rhombohedral; also occurs massive. Cleavage, none. Fracture, conchoidal. Tenacity, brittle. Hardness, 3. Gravity, 6.125. Lustre, metallic. Color and streak, black. Occurrence, Aspen, Colorado.

PELOCONITE. A varietal form of lampadite.

PENTLANDITE. An iron and nickel sulphide carrying up to 1.75% copper.

PERCYLITE. Chemical formula probably $PbCuO.Cl_2.H_2O$. A hydrous lead and copper oxychloride carrying circa 17% copper. Crystallization, isometric. Hardness, 2.5. Color and streak, sky-blue. Occurrence, Chile, Bolivia, South Africa and Mexico.

PHILLIPITE. $CuSO_4.Fe_2(SO_4)_3+nH_2O$. A hydrous copper and iron sulphate, carrying 11.5% copper. Structure, granular and fibrous. Lustre, vitreous. Color, azure-blue. Diaphaneity, translucent. Taste, astringent. Is soluble in water. Occurrence, Los Condes, Santiago de Chile.

PHOSPHOROCHALCITE. $6CuO.P_2O_5.3H_2O$. A hydrous basic copper phosphate, closely related to dihydrite and pseudomalachite.

PHOSPHOCHROMITE. Vauquelinite.

PILARITE. An aluminous variety of chrysocolla, from Chile.

PISANITE. $(Fe,Cu)SO_4+7H_2O$. A hydrous iron and copper sulphate, carrying variable percentages of copper. Practically is a cupriferous melanterite, or copperas. Crystallization, monoclinic. Lustre, vitreous. Color, bright blue. Occurrence, Italy and Turkey.

PLANERITE. A hydrous aluminum, copper and iron phosphate, carrying circa 2.8% copper. Occurrence, Gumlshevsk, Perm, Russia.

PLUMBOCUPRITE. Cuproplumbite.

PLUSH COPPER ORE. Common name for cuprite.

POLYBASITE. $9(Ag,Cu)S.Sb_2S_3$. A silver and copper sulphoantimonite carrying 3 to 10% copper and 62 to 72% silver. Crystallization, orthorhombic. Fracture, uneven. Hardness, 2 to 3. Gravity, 6 to 6.2. Lustre, metallic. Color, iron-black, in thin splinters cherry-red. Streak, black. Is nearly opaque. Occurrence, Guanajuato, Mexico, Colorado, etc.

PRASINE. A varietal form of dihydrite, containing alumina, silica and arsenic in small amounts, apparently merely as impurities.

PSEUDOBOLEITE. Cumengite.

PSEUDOLIBETHENITE. Libethenite.

PSEUDOMALACHITE. $6CuO.P_2O_5.3H_2O$. A hydrous basic copper phosphate containing 53.5% copper. Is closely related to dihydrite, but has one extra unit each of cupric oxide and water. Structure, massive, reniform and botryoidal. Hardness, 4.5 to 5. Gravity, 3.4 to 4.4. Lustre, vitreous. Color, emerald-green to blackish green. Streak, paler green.

PSITTACINITE. Chemical formula probably $4(Pb, Cu).V_2O_5.2H_2O$. A hydrous basic lead and copper vanadate, containing circa 15.4% copper. Structure, pulverulent. Color, olive-green. Occurrence, Argentina and Montana.

PURPLE COPPER ORE. Common name for bornite.

PYRITES OF COPPER. Common name for chalcopyrite.

RABDIONITE. Chemical formula uncertain. A hydrated iron, manganese and copper oxide, containing 11.2% copper. Is very soft. Gravity, 2.8. Lustre, dull. Color, black. Streak, dark brown. Occurrence, Nijni Tagilsk, Perm, Russia.

RAHTITE. An impure cupriferous sphalerite.

RAMIRITE. Cuprodescloizite.

RED COPPER ORE. Common name for cuprite.

RED GLASSY COPPER ORE. Common name for cuprite.

REDRUTHITE. Chalcocite.

REGNOLITE. $5Cu_2S.FeS.ZnS.As_2S_3$. A copper, iron and zinc sulpharsenite containing 32.6% copper. Is closely related to sandbergerite. Crystallization, tetragonal. Occurrence, Cajamarca, Perú.

RESANITE. Chemical formula uncertain. A hydrous copper and iron silicate, containing circa 18.5% copper. Structure, massive. Color, olive

green. Is soluble in hydrochloric acid. Occurence, Luquillo, Porto Rico, associated with chrysocolla and malachite.

REZBANYITE. A lead sulphobismuthite, usually cupriferous to the extent of 1.75 to 3.75%.

RICHMONDITE. A cupriferous variety of beegerite, which is, normally, a lead sulphobismuthite.

RICKARDITE. $Cu_4Te.2CuTe$. A copper telluride containing 40.5% copper. Structure, massive. Fracture, irregular. Hardness, 3.5. Gravity, 7.54. Color, brilliant purple, rivaling bornite tarnish, even on a fresh fracture, and showing deep color when pulverized. Is fusible on charcoal and soluble in nitric acid. Occurrence, Good Hope mine, Vulcan, Colorado.

RIONITE. A bismuthiferous variety of tennantite.

RIVOTITE. Chemical formula uncertain. A copper and antimony carbonate carrying circa 31.6% copper. Structure, amorphous, compact. Fracture, uneven. Tenacity, fragile. Hardness, 3.5 to 4. Gravity, 3.55 to 3.62. Color, yellowish green to grayish green. Streak, grayish green. Occurrence, Lerida, Spain.

RUBY COPPER. Common name for cuprite.

SAFFLORITE. A cobalt diarsenide, usually cupriferous to the extent of 0.25 to 4.25%.

SALVADORITE. $FeSO_4.7H_2O.2(CuSO_4).7H_2O$. A hydrous copper and iron sulphate carrying circa 14.5% copper. Is near pisanite. Crystallization, monoclinic. Lustre, vitreous. Color, bluish green. Occurrence, Calama, Antofagasta, Chile.

SANDBERGERITE. A ferruginous, plumbiferous and zinciferous variety of tennantite, from Perú.

SCHULZENITE. Chemical formula probably $CuO.\ 2CoO.\ Co_2O_3+4H_2O$. A hydrous copper and cobalt oxide. Structure, amorphous. Fracture, conchoidal. Hardness, 3.5. Gravity, 3.39. Color and streak, black. Occurrence, Chile.

SCHWATZITE. A mercurial tetrahedrite, in which mercury replaces copper variably, usually to the extent of about 15% of the total. Gravity, 5.10. Lustre, dull. Color, dark gray to iron-black.

SERPIERITE. $3(Cu,Zn,Ca)SO+3H_2O$. A hydrous basic copper, zinc and calcium sulphate, containing 28.8% copper. Crystallization, orthorhombic. Color, bluish green. Is transparent. Occurrence, Laurium, Greece.

SIEGENITE. A nickeliferous variety of linnæite, frequently carrying small percentages of copper.

SMALTITE. Empirically cobalt disulphide, but frequently carrying copper in quantities from a mere trace to 3.25%.

SOMERVILLITE. $CuSiO_3.4H_2O$. A hydrous copper silicate, corresponding in formula with chrysocolla and asperolite, except as to excess of water. From Somerville, Somerset county, New Jersey.

SPANGOLITE. Chemical formula probably $(AlCl)SO_4.6Cu(OH)_2+3H_2O$. A basic copper and aluminum chlorosulphate, carrying circa 47.7% copper. Crystallization, rhombohedral. Fracture, conchoidal. Hardness, 2 to 3.

Gravity, 3.14. Lustre, vitreous. Color, dark green. Occurrence, Cochise county, Arizona.

SPANIOLITE. An imperfectly established variety of schwatzite.

STANNITE. Chemical formula probably Cu_2S. FeS. SnS_2. A copper, iron and tin sulphide, containing 29.5% copper, 13.1% iron and 27.5% tin. Structure, massive, granular and disseminated. Cleavage, cubic, indistinct. Fracture, uneven. Tenacity, brittle. Hardness, 4. Gravity, 4.3 to 4.5. Lustre, metallic. Color, steel-gray when pure, ranging to iron-black when impure, latter with bluish to yellowish tarnish. Streak, blackish. Occurrence, County Wicklow, Ireland, and Cornwall, England.

STELZUERITE. Chemical formula uncertain. A basic copper sulphate, closely related to brochantite. Crystallization, orthorhombic. Hardness, 3.5 to 4. Gravity, circa 3.9. Lustre, vitreous. Color, dark emerald-green to blackish green. Streak, lighter green. Is translucent to transparent. Occurrence, Chile, associated with brochantite and atacamite, and frequently mistaken for both.

STETEFELDTITE. A hydrous copper antimonite, carrying circa 12.8% copper. Structure, massive. Hardness, 3.5 to 4.5. Gravity, 4.12 to 4.24. Color, brown to blackish. Streak, shining. Occurrence, Nevada.

STIBIODOMEYKITE. $Cu_3(As,Sb)$. A copper arsenoantimonite containing circa 65% copper. Apparently is an antimonial domeykite. Crystallization, hexagonal in synthetic crystals, none being found in nature. Cleavage, none. Fracture, uneven. Tenacity, very slight. Hardness, 4. Gravity, 8.1. Lustre, metallic. Color, gray, with yellowish tinge, like domeykite. Streak, gray. Is soluble in nitric acid, with small residue of gray powder. Occurrence, Mohawk mine, Keweenaw county, Michigan.

STYLOTYPITE. $3(Cu_2Ag_2Fe)S.Sb_2S_3$. A copper, silver and iron sulphobismuthite carrying 28.3% copper and 8.1% silver. Apparently is an argentiferous and ferruginous bournonite. Crystallization, orthorhombic. Fracture, imperfectly conchoidal. Tenacity, brittle. Hardness, 3. Gravity, 4.8. Lustre, metallic. Color, iron-black. Streak, black. Occurrence, Copiapó, Chile.

STROMEYERITE. $(Ag,Cu)_2S$. A silver and copper sulphide, carrying 31.1% copper and 53.1% silver. Crystallization, orthorhombic. Fracture, subchonchoidal. Hardness, 2.5 to 3. Gravity, 6.15 to 6.3. Lustre, metallic. Color and streak, dark steel-gray. Occurrence, Chile, Perú, Siberia, Colorado, etc.

STÜBELITE. Chemical formula undetermined. A hydrous manganese, copper, iron and aluminum silicate, carrying circa 12% copper. Structure, massive, reniform and botryoidal. Fracture, conchoidal. Tenacity, brittle. Hardness, 4 to 5. Gravity, 2.22 to 2.26. Lustre, vitreous, brilliant. Color, velvet-black to pitch-black. Streak, dark brown.

STUDERITE. A varietal form of tennantite containing, as partial replacement of normal copper content, silver, lead, zinc and iron.

SUB-OXIDE OF COPPER. Cuprite in mineralogy; cuprous oxide in chemistry.

SYCHNODYMITE. $(Co,Cu,Ni)_4S_5$. A cobalt, copper and nickel sulphide, containing circa 14.5% copper. Crystallization, isometric. Granite.

4.75. Lustre, metallic. Color, steel-gray. Is soluble in nitric acid. Occurrence, Eiserfeld, Siegen, Germany.

TAGILITE. $4CuO.P_2O_5.3H_2O$. **A hydrous basic copper phosphate containing 49.4% copper. Crystallization, monoclinic; also occurs in spheroidal concretions with structure fibrous to earthy. Fracture, uneven. Tenacity, brittle. Hardness, 3 to 4. Gravity, 4.08. Lustre, vitreous. Color, verdigris-green to emerald-green. Diaphaneity, substranslucent. Is soluble in nitric acid. Occurrence, Coquimbo, Chile and Nijni Tagilsk, Perm, Russia.**

TALLINGITE. Chemical formula probably $Cu_5(OH)_8Cl_2+4H_2O$. **A hydrated copper oxychloride containing circa 64% copper. Structure, subcrystalline. Hardness, 3. Gravity, circa 3.5. Color, greenish blue. Streak, white. Is subtranslucent. Occurrence, Botallack, mine, Cornwall, England.**

TARGIONITE. Apparently merely an impure galena carrying circa one per cent each of copper, silver and zinc, from Tuscany, Italy.

TENNANTITE. $4Cu_2S.As_2S_3$. **A copper sulphoarsenite containing 57.5% copper when pure, but shading into a great number of varietal forms. Common name, gray copper ore, in common with tetrahedrite, to which tennantite is closely related and joined by a chain of rather obscure minerals shading gradually from tennantite into tetrahedrite. The many varietal forms of this mineral are brought about by partial replacement of copper by silver, lead, zinc, iron, mercury, cobalt, nickel, tin and platinum, with a marked tendency toward mutual substitution of the antimony of tetrahedrite for the arsenic of tennantite, and vice versa, rendering the tetrahedrite-tennantite group unusually prolific. Crystallization, isometric; also occurs massive and granular, compact. Cleavage, none. Fracture, subconchoidal. Tenacity, brittle. Hardness, 3.5 to 4.5. Gravity, 4.4 to 5.1. Lustre, metallic. Color and streak, flint-gray to iron-black. Diaphaneity, opaque to subtranslucent in small splinters. Is soluble in nitric acid and fusible on charcoal. Occurrence, at numerous points, being found in greater or less profusion in most copper districts. Is not regarded usually as a commercial ore, except where argentiferous, which is quite commonly the case.**

TENORITE. CuO. **A copper oxide, containing 79.8% copper. Common names, black copper, black oxide of copper. Chemical names, copper monoxide, copper peroxide, cupric oxide. Crystallization, monoclinic; also occurs massive, pulverulent and earthy. Fracture, conchoidal to uneven. Hardness, 3 to 4. Gravity, 5.8 to 6.25. Lustre, metallic. Color, dull grayish-black when massive, steel-gray in flakes. Is soluble in nitric and hydrochloric acids. Is found in most copper districts, and is a valuable ore of copper when occurring in quantities, but much of what has been considered tenorite in the past really was chalcocite, for which it is easily mistaken when disseminated.**

TETRAHEDRITE. $4Cu_2S.Sb_2S_3$. **A copper sulphoantimonite containing 52.1% copper. Shades into tennantite, which see, for reference to protean forms of these two closely related and frequently indistinguishable minerals. Common name, gray copper ore. Crystallization, isometric; also occurs massive and granular [illegible]. Cleavage, none. Fracture, subconchoidal to [illegible]. Hardness, 3.5 to 4.5. Gravity, 4.4 to 5.1. Lustre, [illegible]. Color, flint-gray to**

iron-black. Streak, grayish-brown to cherry-red. Opaque in quantity, but occasionally subtranslucent in very thin splinters, giving cherry-red transmitted light. Is soluble in nitric acid and fusible on charcoal. Occurrence, in most copper districts, but commonly is not regarded as a commercial ore, except when argentiferous, which frequently is the case.

THROMBOLITE. An imperfectly determined hydrous copper antimonate, carrying circa 31.5% copper. Structure, amorphous. Color, emerald-green. Occurrence, Rezbánya, Hungary.

TIEMANNITE. An imperfectly determined silver, mercury and copper selenide, carrying circa 8.8% copper. Occurrence, with eucairite and umangite, in the Sierra de Umango, Rioja, Argentina.

TORBERNITE. $CuO.2UO_3.P_2O_5.H_2O$. A hydrous uranium and copper phosphate, carrying 6.9% copper. Common name, uranium mica. Crystallization, tetragonal. Cleavage, micaceous, with brittle laminæ. Hardness, 2 to 2.5. Gravity, 3.4 to 3.6. Lustre, pearly on cleavage planes and subadamantine on other faces. Color, emerald-green to grass-green. Streak, apple-green. Diaphaneity, translucent to transparent. Is soluble in nitric acid. Occurrence, Cornwall, Saxony, etc.

TRICHALCITE. $3CuO.As_2O_5+5H_2O$. A hydrous copper arsenate containing 34% copper. Structure, in radiated groups, columnar, also dendritic. Hardness, 2.5. Lustre, silky. Color, verdigris-green. Is soluble in hydrochloric acid. Occurrence, Russia.

TRIPPKEITE. ($nCuO.As_2O_3$.) A copper arsenite. Crystallization, tetragonal. Color, bluish-green. Is soluble in acids. Occurrence, Copiapó, Chile, in druses.

TRITOCHORITE. Cuprodescloizite.

TURQUOISE. A gemstone, essentially a hydrous aluminum phosphate, colored by 2 to 6% of copper, which probably is included as a hydrous basic copper phosphate.

TYROLITE. $CuO.As_2O_5.9H_2O$. A hydrous basic copper arsenate carrying 40.1% copper. Crystallization, orthorhombic. Cleavage, micaceous. Tenacity, highly sectile and flexible in thin laminæ. Hardness, 1 to 1.5. Gravity, 3.02 to 3.1. Lustre, pearly to vitreous. Color, verdigris-green to apple-green. Diaphaneity, subtranslucent to translucent. Occurrence, Libethen, Hungary, Utah, etc.

UMANGITE. Cu_3Se_2. A copper selenide containing 54.6% copper. Structure, massive. Cleavage, none. Fracture, subconchoidal to uneven. Hardness, 3. Gravity, 5.62. Lustre, metallic. Color, dark cherry-red, with violet tinge on fresh fracture, soon tarnishing to violet-blue. Streak black. Occurrence, with tiemannite and eucairite, in the Sierra de Umango, Rioja, Argentina.

URANIUM MICA. Common name for torbernite.

URANOCHALCITE. Chemical formula undetermined. A basic uranium and copper sulphate carrying circa 5% copper, acicular crystals. Hardness, 2 to 2.5. Color, grass-green. Joachimsthal, Bohemia.

VALLERIITE. A sulphate of copper, iron, aluminum and

Apparently is a mixture of covellite, pyrrhotite and several aluminous and magnesian minerals. Occurrence, Nya Kopparberg, Sweden.

VARIEGATED COPPER ORE. Common name for bornite.

VAUQUELINITE. Chemical formula probably $2(Pb,Cu)CrO_4.(Pb,Cu)_3P_2O_8$. A lead and copper phosphochromate carrying 3.9 to 10% copper. Crystallization, monoclinic; also occurs amorphous. Fracture, uneven. Tenacity, brittle. Hardness, 2.5 to 3. Gravity, 5.8 to 6.1. Lustre, adamantine to resinous. Color, apple-green to liver-brown. Streak, greenish to brownish. Diaphaneity, opaque to faintly translucent. Occurrence, Berezov, Russia.

VELVET COPPER ORE. Common name for cyanotrichite.

VENERITE. A hydrous copper, aluminum, iron and magnesium silicate containing circa 14% copper. Occurrence, Springfield, Berkshire county, Pennsylvania.

VERDIGRIS. Copper carbonate. Is formed from metallic copper by the action of carbon dioxide and moisture in the atmosphere. The verdigris of the pharmacist is a copper acetate and care should be taken not to confuse these widely varying compounds bearing the same name.

VESZEYLITE. Chemical formula probably $7(Cu,Zn)O.(P,As)_2O_5.9H_2O$. A hydrous copper arsenophosphate carrying circa 30% copper. Crystallization, monoclinic. Hardness, 3.5 to 4. Gravity, 3.53. Color and streak, greenish blue. Occurrence, Moravitza, Hungary.

VOGLITE. Chemical formula uncertain. A hydrous uranium, calcium and copper carbonate carrying circa 6.9% copper. Occurs in aggregations of crystalline scales. Lustre, pearly. Color, emerald-green to bright grass-green.

VOLBORTHITE. Chemical formula probably $(Cu,Ca,Ba)_3(OH)_2VO_4+6H_2O$. A hydrous basic copper, calcium and barium vanadate carrying circa 30.9% copper. Hardness, 3 to 3.5. Gravity, 3.55. Lustre, pearly to vitreous. Color, olive-green to citron-yellow. Streak, greenish yellow. Is translucent in thin splinters. Occurrence, Perm, Russia.

WARRINGTONITE. A varietal form of brochantite.

WHITNEYITE. Cu_2As. A copper arsenide containing 88.4% copper. Structure, massive, crystalline, very finely granular. Tenacity, malleable. Hardness, 3.5. Gravity, 8.4 to 8.6. Lustre, dull and submetallic on fresh fracture, strongly metallic when scratched, soon tarnishing. Color, pale reddish to grayish white, pale reddish white on a rubbed surface, tarnishing to yellowish bronze, brown and brownish black, sometimes with iridescence. Is soluble in nitric acid. Occurrence, Houghton, Michigan, Sonora, Mexico, and Chile.

WINKLERITE. Chemical formula uncertain. A hydrous cobalt, nickel and copper arsenate carrying circa 11 to 12% copper. Structure, amorphous, massive. Fracture, conchoidal. Hardness, 3. Gravity, 3.43. Lustre, dull. Color, bluish black to violet black. Streak, dark brown. Occurrence, Almería, Spain.

WITTICHENITE. [illegible] copper sulphobismuthite carrying 38.4% copper. Crystalli[illegible] [illegible]ture, conchoidal. Hardness, 3.5. Gravity, 4.3 [illegible] [illegible]-white, tarnishing to

chemist and engineer, and possibly also bookkeeper and supply clerk, and there are cases on record where to these accomplishments the mine manager added the blacksmith's trade as well, but that is almost too much talent for one man to possess. The records of old mines usually are deficient in reliable maps, but modern practice is very thorough as to engineering and mapping, and blueprints are extended monthly, from accurate data obtained underground.

While the general public uses the term miners for all underground workmen, this term is reserved in actual practice for the skilled workmen who do the drilling and blasting. Mine timbering is skilled work that is done sometimes by the miners, and sometimes by special timber gangs. The muckers, or trammers, are the men who do the shovelling and rough labor of the mine. Some large properties have special shot-firers for blasting. Miners may work by the day or on contract, contracts being divided into two general classes, the first being opening work, which consists mainly of shaft-sinking and running drifts. The second class of contract work is stoping, the latter being the actual breaking down and extraction of ore in considerable quantities. Contract work is preferable in nearly every case where possible, and gives more satisfactory results to both miners and mine-owners, as it secures more work to the owners for the money paid, and also gives larger earnings to the good workmen. In the case of contract miners the supplies furnished by the mine, such as candles, detonators, fuse, dynamite, etc., usually are charged at much more than cost, such prices sometimes running two or three times the actual cost to the mine. On the face of it this practice is a great injustice to the miners, but in actual work is defensible on the ground of results. It has been shown by actual trial that the average contract miner is careful or careless of supplies in proportion to their cost, and as the excessive use of supplies is a dead loss that eventually must be shared between the miners and the owners, anything that operates to bring about economy is an advantage to both parties.

Most copper mines work two or three shifts. The double shift mines usually work shifts of ten hours each, but in mines giving the eight-hour day it is customary to work three shifts, thus utilizing the entire twenty-four hours. There is economy in keeping underground work going at top speed, with double or triple shifts, the fixed charges and many of the heavy expenses on surface being the same in either case.

Mining, at best, is a dangerous calling, and when not surrounded by proper safeguards is extra hazardous. The copper mines make a good showing among the metalliferous mines of the world, in their proportion of fatalities, and in the leading districts the precautions taken result in keeping down the percentage of mortality to a fairly low basis. The principal cause of accidents, responsible for more than half of all the deaths, is the carelessness of the miners themselves. Human nature is so constituted that the average man becomes habituated to danger that is met with in the course of his daily work, and miners fall into shafts and winzes, or step from stagings through sheer carelessness. Of the semi-avoidable sources of accidents, falling ground is responsible for more than half the deaths. This source of trouble is called semi-avoidable for the reason that, with care, accidents from this cause can be greatly reduced, though not

entirely eliminated by even the utmost vigilance on the part of both men and management. Missed holes or premature explosions are responsible for many horrible accidents and deaths. Poor fuse is more dangerous to miners than dynamite, and wise managers scrutinize the quality of their fuse as closely as they investigate the safety of their hoisting cables. Accidents through riding in skips are unpleasantly common. In many mines there is a rule that miners shall not ride to or from their work in skips, but this rule seems made to be broken, and serves merely as an excuse to the management when accidents occur. It is much better to shoulder the responsibility, as many managements have done, and permit the men to ride in the skips with such safeguards as can be furnished.

Ankylostomiasis, or the hook-worm disease, is found in but few copper mines, but seems to be spreading, and should be guarded against. The spread of this disease is greatly facilitated by dampness.

The methods by which ore is extracted vary greatly, the principal factors determining the method to be used being the nature and size of the ore deposits, and the character of the walls. Most mines are irregular as to both the size and value of their ore bodies, which vary from point to point, in dip, strike and tenor, and the walls of ore bodies frequently are poorly defined. Sometimes there is a selvage of fluccan, very soft clayey material, along either or both walls. Faults are noted frequently, and the ore body may be thrown in any direction by a fault, or series of faults, or may be cut out temporarily by a dyke, or may be divided by a horse, or may come to a final end against a different formation. In other cases the ore body may continue as a vein, while losing its mineral values when passing into a different country rock. Veins also fork and come together. Superincumbent strata are apt to creep, especially in a limestone formation, on a mountain side where the strata are deeply tilted, such mines requiring heavy timbering and constant care. Heavy pillars of vein rock usually are left standing beside the shafts, and sometimes elsewhere in the mine, as supports for the rock above. When a mine is considered worked out it is customary to rob the ore from the pillars and permit the mine to cave in, but sometimes nature caves in the mine before the owners get around to the job.

By the caving system of mining superincumbent rock and drift are permitted to fall into the mine, a litle at a time, the process being practically continuous. The shafts are protected by heavy pillars, or, preferably, are sunk in the solid footwall and the ore body reached by crosscuts. Mining is begun on the top level, which is timbered lightly, being secured just enough to permit the safe extraction of ore values. While stoping is in progress on the upper level, drifts are being run on the level below, and a plat cut from the shaft for a third level. The various levels are stoped in order, from the top down, no reserves being left in the levels that are stoped, as these begin caving almost as soon as the work [illegible] ished, and sometimes before. In a mine worked on the [illegible] stoped out levels above are constantly coming in, and [illegible] times are working under caving ground. Notwithstanding danger of this plan, the mines worked on the caving [illegible] as safe as those worked by the older methods, and [illegible] advantages for many mines. It is not, however,

a modified system, in use at a few properties, bids fair to increase, especially in the Lake Superior district, where some of the older and deeper mines are experiencing much trouble from air-blasts and similar troublesome phenomena coincident with very deep mining. This modified plan of the caving system calls for the sinking of shafts, preferably in the solid footwall, and drifting on each level to the extreme length of the territory to be exploited. A seven-by-seven drift, well timbered, is too small an opening to seriously endanger caving. Stoping is begun on the top level. at the extreme end of the drift, and stopes are timbered but lightly, stoping working backward toward the shaft, and the ground is permitted to cave behind the miners. By this plan of mining stoping must begin on the upper levels, and continue in steady order toward the bottom of the mine. This plan is thoroughly sound in theory, and, while not in general use, seems certain to grow in popularity, and to give satisfactory results in mines that would be dangerous to work on the old plan.

Ore is blocked out when it has been opened on three sides, and ore in sight, strictly speaking, is ore that has been blocked out, but this term is sadly misused, in many cases, and incidences are not lacking where small mining companies, with stock for sale, have claimed millions of tons of ore in sight, on the strength of a fair outcrop on the surface and a hundred feet or so of shaft or tunnel.

Timbering may be of wood, rock or concrete, but as a rule is of wood. The increasing scarcity of good timber, with consequent rise in price, in most parts of the world where copper mining is followed extensively, is causing vigilant mine managers to utilize other material to an increasing extent. The use of concrete and cement has reached the highest point in Germany, but is gaining ground in the mining fields of many other countries. Timbering may be heavy or light, according to circumstances. Some copper mines, like the Calumet & Hecla and Copper Queen, are forests of timbers, while others, like the Osceola, have but very little timber outside of that required for skip-roads and ladderways in the shafts. Heavy timbering is required from surface to the solid rock ledge, when passing through alluvium. There are many different methods of timbering with wood, but the one in most general use and favor is known as the square set system. A square set of timber has a bed-piece, two legs and cap of the same length, usually eight feet, mortised and tennoned. A similar set at eight feet distance is connected with bed-pieces and caps, and these cubicles may be extended indefinitely in any direction. Lagging usually is placed above the cap-pieces of a square set to prevent the falling in of rock from the roof, and in soft ground bulkheading is required, this necessitating the driving of heavy sticks of 8-foot timber into the ground on either side, to form a solid bulkhead. False sets are used at times, and sprags are utilized frequently. The use of dry-walling is increasing. Dry-walls are built of waste mine-rock, laid without mortar, and when carefully built are very effective in holding the ground above, and have the advantage of disposing of waste rock that otherwise must be hoisted. Ore is anything that will pay to extract for its metallic values, and varies greatly in different fields, and under different circumstances. In some of the Lake Superior mines rock carrying an average of one per cent. copper pays millions in dividends, and rock carrying even one-half of one per cent.

metallic copper is treated at some properties, though the average of the mine necessarily is higher. In other fields ores that carry ten per cent. copper are unprofitable, because of narrow veins, lack of transportation or other serious drawbacks. In Australia the soft mullock broken in the mines is used for filling in cribs, by what is known as the pig-sty system. Concrete seems especially useful for finishing the collars of shafts, and has been tried for the sleepers of skip-tracks, but seems somewhat rigid for the latter use. Courses of brick have been used for finishing the collars of shafts in the Lake Superior district. Steel, mainly in the form of worn-out rails, cut down to short lengths, is used to a considerable extent for timbering in some mines. There is no question that concrete must be used to an increasing extent in mine timbering.

The matter of disposing of water is a problem of importance with most mines. Tunnel drainage is possible with properties opened exclusively above the adit level, and, with mines partly opened by shafts and partly by adits, the water is discharged through the lowest tunnel level. Occasionally large vugs are encountered underground, and small mines have been flooded from the waters contained in such cavities. Limestone, so often met with in copper mines, is readily permeable by water, and one mine may drain an entire basin of considerable area. Good mines are lost sometimes because of the excessive cost of keeping them free of water.

Where a mine must be kept unwatered otherwise than by natural drainage through adits or tunnels, the water may be removed by pumping or bailing. Mine pumps may be divided into two classes, these being movable and stationary. Station pumps usually are of large capacity, and are set permanently in underground stations prepared for them, while sinking pumps are placed on skids and lowered in the shafts by chains or steel cables as required. The great majority of both station pumps and sinking pumps are actuated by steam or compressed air, usually the latter, though steam may be used in shallow mines before the installation of air compression plants, or in a great emergency, but the carrying of steam to a considerable depth is impracticable, owing to excessive condensation. Electric pumps are increasing in numbers and efficiency, and with further improvements should prove the ideal variety of pump for most underground uses. Air-lifts and pulsometers are used to some extent, mainly for sinking purposes. Water also may be removed from mines that have filled through idleness or that have been flooded accidently, by bailing. The bailers, which replace buckets, cages or skips, usually are large cylindrical tanks, frequently old steam boilers, with a valve bottom, and, at a pinch, ordinary skips may be used. The method of unwatering mines by bailing is used only in emergencies, though some attempts have been made at utilizing bailing for regular mine drainage.

All mines show an increase of temperature with depth, after [illegible] few hundred feet of the earth's crust is penetrated, but the ro[illegible] ture varies greatly in different fields. The Lake Superior co[illegible] which are the deepest of any mines in the world, are not [illegible] depths as the mines of most other fields. At the [illegible] feet the rock temperature in the Red Jacket shaft [illegible] Hecla was 87.6° Fahrenheit, but this has been reduced [illegible]

lower levels with other shafts, and by the utilization of compressed air exhaust from the rock-drills. Many sulphide ore mines are extremely hot, owing to the gradual oxidation of sulphur.

Copper mines contain neither choke-damp nor fire-damp, those deadly gases found in coal mines, but nitrous oxide fumes from dynamite are poisonous, and are difficult to dissipate in workings having only one open end. Powerful fans at surface sometimes aid in ventilating the dead workings of deep single shafts. The general use of power-drills, actuated by compressed air, assists materially, not only in furnishing fresh air in dead workings, but also in reducing the temperature in deep mines, as air yields up considerable latent heat when compressed, and robs all surrounding objects of heat when released from compression. In mines of more than a few hundred feet in depth nature provides a system of ventilation as soon as two shafts are connected underground, the shallower shaft becoming a downcast, through which the air is sucked down, with great force, while the deeper shaft—that is the one having its collar on the highest ground at surface—becomes an upcast. The deeper the shaft the stronger the draft, for the same reason that a high chimney gives a stronger draft than a low one. In deep shafts the air currents so called into being are so strong that it is necessary to provide air-doors in the connecting levels.

Fire is a danger to which practically all mines are subject. Even a fire on surface may endanger underground workmen, through the destruction of the hoisting plant, or headgear, and fire from a structure over the shaft may enter the mine by working down the timbering. Underground fires may be divided into two classes, the first occuring in sulphide mines where the ore itself furnishes the fuel, while the other class occurs in mines with heavy timbering that is liable to burn. Heavy damage to a mine, accompanied by serious loss of life, may occur through either form of fire. Timber fires are caused mainly by the carelessness of miners in disposing of candle-ends, lamp-wicks, matches and partially burned tobacco from pipes.

In the Calumet & Hecla mine, which has suffered losses aggregating millions of dollars through five serious mine fires in the past quarter century, great precautions are taken, not only to prevent the occurrence of fires, but to put out mine fires immediately after their inception, and to prevent the spreading of fire throughout the mines. Masonry bulkheads, fitted with fire-doors, permit the cutting off of different portions of the mine. Electric signals and telephones furnish the means for turning in prompt alarms, and water-pipes and fire-hose are kept at underground stations for the fighting of fires that have gained a foothold.

All mines containing large bodies of ore rich in sulphur are liable to spontaneous combustion, but this danger can be minimized by various precautions, though not obviated entirely. The danger of spontaneous combustion is enhanced by the fissuring caused by improper support of ground opened or stoped, as such fissuring produces considerable quantities of pulverized sulphides that are subject to unusually rapid oxidation, and are liable to spontaneous combustion. The St. Lawrence mine, at Butte, Montana, has been on fire for nearly a score of years. There also have been serious fires in the United Verde, Iron Mountain, Wallaroo & Moonta and

other sulphide copper mines. A sulphide mine fire, while dangerous and costly, has the advantage of not destroying values to a large extent, as the copper contained in the ore is leached readily by the natural drainage of the mine, after the burning of part of the sulphur from the ore, and the values can be gained as cement copper on surface, by precipitation from the heavily charged mine waters. A mine fire may be drowned by water, or extinguished by shutting off the supply of oxygen. Carbon dioxide, which is heaver than air, also has been pumped into mines to extinguish flames. This can be generated in large quantites, in old boilers, by treating crushed limestone with dilute surphuric acid, but the process is slow. Perhaps the most successful method yet used in fighting a sulphide mine fire was devised in 1906, at the Iron Mountain mine, in California, where an exhaust ventilating fan was reversed, and used as a blower. The air-current from the blower drove the sulphurous acid gas, given off from the burning stopes, back into the broken ore, thus enabling the miners to remove the face of the ore on fire, ore being mined at temperatures of 160° to 450° Fahrenheit. This plan called for a very careful balance of air pressure, in order to clear the mine workings of foul gases to such an extent as to permit work to be carried on, while insufficient to fan the flames in the fissured ground unmined.

Air-blasts, noted in some of the older Lake Superior mines, are artificial earthquakes, caused in the older and deeper mines by the slipping of superincumbent strata insufficiently supported by mine pillars. One of these air-blasts, in 1906, was of sufficient severity to cause an earthquake that was felt over an area of some thousands of square miles. The liability of mines to this trouble increases with their age and depth. The first symptom of air-blasts usually is given by the violent decrepitation of small particles of rock from pillars that are subjected to excessive strains. Small masses of rock are thrown off violently, with detonations like pistol shots. Such troubles, when once begun, are liable to prove continuous and cumulative.

The lighting of copper mines is mainly by candles or lamps, the fuel in either case being stearic acid as a rule. Electric lights have been tried, but were not liked, the illumination being too powerful, and rendering the miners nervous by giving the roofs the appearance of danger, where careful inspection by the light of lamps or candles showed the ground to be perfectly safe.

The old system of mine signalling was limited to a single heavy wire, running down the shaft and connecting with a bell in the engine-room, which was rung by pulling levers attached to the wire, at the different levels of the mine. Electric signals are now in quite general use, in most mines of importance and telephone systems have been installed in many mines, while a beginning has been made in the use of electric signalling systems displaying semaphore arms and colored lights.

In the actual breaking and removal of rock or ore, the first step is that of drilling holes for explosives. In mines carrying ore in a decomposed talcose gangue it is possible to drill holes by hand, with a breast-auger, but in ordinary rock and ore, holes must be bored with steel drills. Such drills are of varying lengths, and are changed from time to time, as the hole is deepened. There is a considerable variety of cutting faces for

drills, but that in most common use has two cutting faces crossed at right angles. Drills are dulled rapidly, and require frequent sharpening, for which purpose they must be taken to the smithy, on surface. Hand drilling has given way in most properties to power drilling, the machines being actuated by compressed air or electricity, the former agent being in very general use in most important mines. The water-drill is a form of drill, actuated by compressed air, in which a jet of water is fed through a hole in the centre of the steel bit, to lay the dust produced by the drill. The power drill is fixed on a tripod or pillar, to afford solidity, and power drills are worked frequently on timber stagings and rock ledges that would seem inaccessible to anyone but an experienced miner. Electric drills have given unsatisfactory results in many mines where tried, though working excellently in a few properties. The trouble with electric drills is due, probably, to inefficient designing in some makes, and to even a larger extent to inefficient handling, rather than to any inherent defect in the theory of the machine. A set of holes for one blast is known as a round. Much skill is shown by old miners in drilling such holes, which must be driven at such angles, to such depth, and in such number as to break the proper amount of rock with a minimum expenditure of labor in drilling, and with a minimum charge of dynamite for blasting. A skilled miner, who takes full advantage of cleavage, jointing and bedding planes, of varying strengths of different rock forms, and of fundamental principles of physics, will accomplish better results, with half the drilling and half the powder, than can be secured by a beginner or an ignoramus.

Ordinary gunpowder, commonly known to miners as black powder, is useful for blockholing, which is breaking up large masses of rock previously broken, and occasionally for other uses, but dynamite is the principal underground explosive. This consists of nitro-glycerine, taken up by some absorbent, usually wood-pulp, sawdust or diatomaceous earth. The strength of dynamite varies greatly, and should be gauged according to the nature of the rock. Some of the newer high explosives are used also, to a limited extent, in copper mines. In blasting, the dynamite cartridges, which slip easily into the holes bored for them, are placed at the bottom of the holes, in such quantities as required, and in the pasty top of the final cartridge is inserted a copper cap or detonator, holding a single drop of fulminate of mercury, with the end of a fuse firmly fixed within the end of the cap. The fuse is fired by a match or candle, it being timed by the length to which it is cut, and when the fire in the core of the fuse reaches the fulminate of mercury there is a sharp explosion, which in turn explodes the dynamite. Occasionally charges of dynamite fail to explode, and as a round of holes consist of five to a dozen borings, the dynamite in one or two holes may fail to explode. Such missed holes are highly dangerous, and frequently cause explosions later, when the dynamite is reached by the drill in boring other holes. When a mine is worked with a ten-hour shift, blasting is done twice per shift, as a rule, the blasting being timed at about a quarter-hour before the close of the half shift and full shift, this providing an hour and a quarter for the dynamite fumes to dissipate from the workings. Dynamite, fuse and detonators usually are kept underground in boxes, sometimes in large quantities, and carelessness in handling is responsible for very serious accidents at times.

When broken, the ore, or rock, or both must be disposed of, usually by hoisting both ore and worthless rock to surface, except where underground selection is possible, in case waste-rock is used for dry-walling or fills. In the old system of mining the long-handled shovels in the hands of muckers were the main reliance, ore and rock being loaded into tram-cars of wood or steel, which were pushed from the face of the workings to the shaft on light T-rails or strap-rails. In modern practice rock frequently is sent down, through chutes, to bins on the level below the one where broken. The chutes may be of wood or iron, and chutes built of rock are used in some mines. Broken ore or rock usually will clear itself in a chute of 30° to 35° dip, and even with less dip in the case of an iron chute.

Underground haulage plants are used in a number of the larger and more progressive mines, though this system is suitable only to properties that have long hauls, and large ore bodies on the levels where such haulage plants are installed. Underground tramming by power is done by locomotives, actuated by compressed air or electricity, steam locomotives not being suitable, owing to the confined scope of operations, where smoke and gases from the boiler would poison the underground atmosphere. Underground loading-bins are coming into use, and these, which are installed at the shaft, on the various operating levels, permit the trammers to discharge their cars into the bins, and skips can be filled from the chutes of the bins as required. This system obviates delays both in tramming and hoisting, and has much to commend it. A hoisting system installed recently at the Wolverine mine provides for special workmen known as car-dumpers. The trammers leave loaded cars at the shafts, and the dumpers discharge these into the skips, beginning at the top hoisting level, and working down, level by level, to the bottom, then riding up in the skips and beginning anew. In sinking deep winzes the shovel is the main reliance in disposing of ore or rock, which must be shoveled up from stage to stage, in the most laborious manner, unless a donkey-hoist is installed to care for the dirt. For this reason upraises are preferable to sinking, in the opening of winzes, as a rule.

In early days the heavy mass copper of Lake Superior mines, ranging in weight from a ton to 500 tons per mass, was cut up into chunks not too heavy for hoisting, by the use of long-handled chisels, this process being laborious, slow and costly. The work of cutting up masses underground is now done with pneumatic chisels, at about a tithe of the former cost.

The span of life of any mine is a matter of vital importance to its owners, but no general rule can be given for gauging the life of copper mines, as each property is a problem with varying factors that must be worked out individually. The Rio Tinto is the oldest active mine of the world, and until the discovery of the monzonite-porphyry ore bodies at Bingham, had the largest proven ore reserves of any mine of any metal, notwithstanding its having been worked for some three thousand years. The Lake Superior copper mines, operating on stratified beds, will hold indefinitely in depth, but the depth to which successful mining may be done cannot be predicted with any degree of certainty.

CHAPTER V.

THE MILLING AND CONCENTRATION OF COPPER.

As native copper and copper ores usually occur disseminated in gangue rock, the first process of reduction after the ore is brought from the mine is one of concentration. Milling really should begin in the mine, and a little care on the part of the mine superintendent often eases the burden of the mill superintendent and brings about cheaper and closer extraction. The use of excessive charges of dynamite in blasting not only is a waste of explosives, but results also in the making of an unnecessary quantity of fines, causing an excess of slimes in the mill, with consequent labor and expense in extraction, and unnecesarily heavy losses. The mine superintendent also can aid the millman greatly by sending with his ore the minimum quantity of wood, drill-steel, hammer-heads and other material that is rather unpleasantly common in the average ore that reaches the average mill.

The general principles of milling are the same in the concentration of all ores, but local practice varies greatly, according to the nature of the ores of various districts. The practice in general use in the native copper mines of Lake Superior is given at the end of this chapter.

Mills usually are built as near the mines as possible, to save long hauls on ore, and frequently are located immediately at the mines, though at times it is necessary to build the mills at some distance from the workings in order to secure adequate water supply. As a rule mills are located in mountainous districts, where full advantage can be taken of the steep slopes, and modern mills are so planned and constructed that the raw ore is dumped into bins at the top of the structures, and passed gradually through the various processes, the final concentrates being discharged on the lowest terrace, thus taking full advantage of gravity. The elevation of material, once common in all mills, is reduced to a minimum in modern plants, which are nearly automatic, and require much smaller forces of workmen, who, as a rule, are skilled men that understand why as well as how. In most cases a ready-made mill is a serious mistake—the same sort of a mistake that would be made by the laying out of shafts and drifts for a mine by engineers who never had seen the property. Every mine has individual problems that can be solved satisfactorily only by the man on the ground, if he be a competent miner, and the same observation holds as true of the milling as of the mining, at most properties. Much of the trouble in mill practice arises from faulty designing, often [illegible] good mill men, either technical or practical, or both, plan mills [illegible] ores from an unfamiliar district. Local peculiarities require [illegible] ment in milling practice, and it frequently is the case that [illegible] best practice for the milling of ore from one mine is not exactly [illegible] for the milling of ore from even an adjacent property. This matter [illegible] variations is one that cannot be treated except in the broadest outline, or in the fullest detail. The best modern mills are now designed, [illegible] care, to treat the specific ore of an individual property, and

signers frequently make extended mill-tests, and other experiments, before designing either the structure or equipment of a mill. As a result of this care, losses have been greatly reduced at the best mills, and tailings now run nearly as clean as the slags from a well managed smelter.

There is a general haziness regarding the matter of rating milling capacity. It would be well if this could be removed, and that it should come to be clearly understood that a 100-ton mill was designed and equipped to treat advantageously 100 tons of material daily, and that any considerable excess over this quantity of ore, while it might be run through, could not be handled so as to secure thoroughly satisfactory extraction. The average designer is apt to underrate the capacity of his mill, probably under the mistaken impression that a mill rated at 100 tons that proves capable of treating 125 tons satisfactorily is a credit to his professional reputation. The best results never are secured from any machinery that is run to the fullest limit of its capacity. In many cases a hundred-ton mill may be made to put through 150 tons of material, but the work will be slighted at nearly every stage, and the losses will be correspondingly heavy.

Too much stress cannot be laid upon the practical coördination of every process in the mill. Each particular department should have sufficient capacity to handle, to advantage, its due proportion of material, this capacity necessarily decreasing toward the end, as the ore becomes concentrated, and an increasingly large amount of gangue has been eliminated.

Occasionally there arise difficult problems in handling materials of widely varying specific gravity. As a case there may be cited the Shannon mill, in Arizona, which treats ores have the following specific gravities: chrysocolla, 2; azurite, 3.5 to 3.8; malachite, 3.7 to 4; chalcopyrite, 4.1 to 4.3; chalcocite, 5.3, and cuprite, 5.8 to 6.1, while the specific gravity of the quartz gangue is 2.64. While this is an extreme case, it is by no means uncommon for a mill to treat ores of two or three widely varying gravities. It is now possible to handle successfully mixed ores that were worthless even as recently as the close of the Nineteenth Century, because of the impossibility of satisfactory separation. Zinc, especially, is removed from copper ores much more readily than formerly.

In the concentration of ores, hand work is used exclusively at some of the smaller mines that are distant from smelters, where the ores must be brought to a high copper tenor by hand selection. Even in the case of mines having good mills, a limited amount of hand selection may be used to advantage, and hand-cobbing, by which worthless gangue rock is separated from valuable ore, may relieve the mill of considerable work. Many mills have picking-tables or picking-belts. The best form of picking belt is one that carries the material past the workmen, who remove the valuable ore for further treatment, while the worthless material remains on the belt and is dumped automatically at the end, or vice versa. Magnetic separation is used, with success, in a number of copper mills, where the material to be removed is magnetic, or can be made so by roasting.

For almost every milling operation [illegible] of machinery, or process, or both, and advocates of [illegible] or devices usually are loud in the praises of [illegible] are better adapted than others to certain [illegible] milling system being planned [illegible]

handled, and the intelligent carrying out of the theory into practice, than upon the make of the machine that is employed, though this is by no means unimportant. A good millman will secure fair results from indifferent machinery, while an inefficient millman will obtain poor results from good machinery, either through poor grouping or inefficient handling. Only the man on the ground, and he only after repeated experiments, can intelligently adjust even a good mill to fully satisfactory work.

Owing to scarcity of water in many copper mining districts, where it must be used and husbanded with great care, settling ponds are provided, and some great economies are effected, not only in repeated usings of the water, after clarification, but also in minimizing the gross amount of water required for milling ore. The Detroit mill, at Clifton, Arizona, makes extensive use of settlers, and requires only about 300 gallons of fresh water per ton of ore treated.

Large storage-bins for ore are of much advantage to a mill, and the disadvantage of small storage-bins becomes apparent, shortly, to the superintendent of every mill that is so unfortunate as to have them. Large storage capacity for raw ore affords a balance wheel, and takes up slack that otherwise results in occasional mill stoppages, due to temporary mine stoppages, or even to a decrease in the day's output of the mine. Large storage capacity for concentrates is desirable also, in some cases, though not so important as storage capacity for raw ore.

Modern milling practice pays greater attention than formerly to both extremes, beginning with the coarse concentrates and ending with the slimes, and the classification of ore is carried out far more thoroughly than formerly. The advantage of removing concentrates as coarse as possible is that by so doing extensive sliming is obviated. At every operation by which ore is reduced in size, slimes are produced. Some ores slime much more readily than others, according to their structures, but all ores are more or less susceptible to sliming, and sliming easily can be carried to excess by poorly devised milling processes.

Crushing may be done either wet or dry. Where dry crushing is in use a great deal of fine dust gets into the air, and this should be removed by an exhaust fan. On very heavy material it is advisable to divide the crushing into two, and possibly three, operations, as no jaw-crusher can break masses of rock or ore to minimum size advantageously. Crushers are of many makes, but are essentially of two classes, one being the jaw-crusher and the other the gyratory crusher. There is a difference of opinion as to which causes the most sliming, but it is probable that a smaller percentage of slimes is caused by gyratory crushing, in most cases. The jaw-crusher is in more general use, however, than the gyratory. Rolls are used to a considerable extent in milling copper ores, but are not employed so generally as in the reduction of lead and zinc ores.

It is advisable to use a grizzly or trommel between each process of reduction, and the use of a grizzly before the first crushing will remove a considerable percentage of fines from average ore. The intelligent use of grizzlies or trommels not only obviates excessive sliming, but also saves the labor and power that otherwise would be used in unnecessary crushing of fine material. Revolving screens or trommels are of different styles and makes. These usually are of the same diameter throughout, but occasion-

ally are built tapering, though the uniform size seems more satisfactory, as a rule. The material delivered to such screens is carried to the lower end of the trommel by gravity, aided by the rotary motion of the screen. The openings in the screen, through which ore falls, may be of uniform size, from end to end, or may be divided into two or even three sizes of openings, giving the same number of sizes of concentrates. More inclination is required on coarse material than on fine, and more in dry screening than wet. Revolving trommels will handle ore satisfactorily down to particles of two to three millimeters in size, and impact screens will do good work on lumps of ore as small as one millimeter in size. Perforated metal is preferable to woven wire for screens, as the perforations are very slow in wearing, while the woven wire is quite certain to give openings of irregular dimensions after the screen has been used for a short time.

After crushing the ore is passed over jigs, of which there are a great many different designs, though the essential principle is the same in all, the gangue, which is lighter than the ore, being driven off by rapid oscillatory or vibratory movements of the bed of the jig, aided by the force of running water, the vibration and water jets being so carefully regulated as to permit the ore to remain on the bed of the jig while the worthless gangue rock is washed away. No matter how carefully this work may be done a little ore is lost in the tailings and a little rock remains with the concentrates . The Hancock jig has the greatest capacity of any make, and its use is increasing outside of Australia, where it was invented. While not suited to all grades of ore, there are many copper ores on which it can be used to advantage. The jigs usually are worked in series, and are divided for the handling of two or three different sizes of material, these being known as roughing jigs, middling jigs and finishing jigs, or having other names, according to different local usages, for the coarse ore, middlings or raggings, and fines. There is much more regrinding of both middlings and tailings than formerly, and there is much better machinery available for this purpose than even a few years ago.

The treatment of slimes varies greatly, in different mills, but, as a rule, the slimes are put over patented concentrators or tables, of which the Wilfley seems the most effective and in most general use. The Wilfley grades the fine ores and separates them from the finely crushed gangue rock by means of an inclined table having riffles covering about one-half of the surface, these being arranged along a diagonal line from corner to corner, the table having a slight oscillatory movement. Circular tables also are used to some extent. Screen sizing usually is stopped at about three millimeters, and hydraulic sizing begun. This is very effective, in most cases, but is not suitable for fine slimes that already contain an excess of ore, these requiring settling tanks. There is one make of hydraulic classifier, of considerable promise, that utilizes air-jets in connection with water. Hydraulic classifiers are of considerable variety in form, but usually have "V" shaped bottoms, whence the settled fines are drawn off, through further treatment. Slime tanks also are in use in many mills collection of fines. Filter presses are used but slightly for e though in common use in many gold mills. One of the gre made in milling practice, since the beginning of the century, greater saving of slimes, as compared with the older practi

In the matter of sampling, the old and highly inefficien

plan has been discarded, in all modern mills. There are several excellent makes of automatic samplers, that do very accurate work, but, of course, these samples must be assayed both honestly and carefully in order to take advantage of the information that they offer regarding losses in tailings. It is probable that the losses in tailings in old mills were considerably greater than ever were shown by the grab-samples taken under the old methods.

The fines and slimes from the mill are finely comminuted, hence usually require briquetting before smelting, as otherwise a large proportion would be blown out of the furnace as flue-dust. A small quantity of lime, or some other suitable material, may be used for a binder, in briquetting, but this is not necessary in all cases, and in some instances fines and slimes from the mill are briquetted in connection with flue-dust from the smelter, preliminary to furnace treatment.

Oil concentration has been experimented with extensively, but is not yet fully accepted in milling practice, though some excellent results have been secured. In nearly every instance where oil concentration has been carefully tested, the technical results have been very satisfactory, but in many cases the process has not proven commercially available. Given a fairly steady and copious supply of material suitable for oil concentration, there seems no sound reason why the process should not prove a commercial success. There are several processes of oil concentration, but the original and most important is the Elmore system. By this process the ore is first pulped, then passed through a horizontal rotary drum, provided with cross-blades that lift and drop the pulp while propelling it along the drum. With the pulp is admitted a small quantity of viscous oil, left as a residue from the refining of petroleum. This oil, which is the best for the purpose, and also possesses the advantage of cheapness, selects the ore while rejecting the gangue rock. The oiled pulp is discharged, automatically, into spitzkasten, in which the tailings of gangue rock settle down and flow off, while the oil containing the fine ore floats and is drawn off from the top of the spitzkasten, into a centrifugal extractor that removes the oil, which is again used, the loss of oil in the process being quite small.

Various forms of pneumatic concentrators have been devised, from time to time, but none seem to have scored a marked success, though the theory seems good, and pneumatic concentration may become a success, eventually.

Electric concentration has been attempted, at various times and in various ways. The most promising of the electric processes, to date, provides for the utilization of static electricity. Finely crushed ore and gangue come into contact with a metallic surface, charged statically, which repels the particles of high conductivity, while those of low conductivity are retained for a sufficient length of time to be drawn aside and discharged into a separate receptacle. This process, while it does not appear to have come into use, would seem to possess intrinsic merit, for the separation of mixed ores of chalcopyrite, sphalerite and galena, which are of such common occurrence, intimately intermixed, in many fields.

In the Lake Superior district, where copper is found native, the milling process differs somewhat from any in use elsewhere, the principal feature of difference being in the crushing of ore by steam stamps. The native

metal occurs mainly disseminated in small particles through amygdaloidal or conglomerate rock, in quantities averaging only 15 to 30 pounds of copper to the short ton of rock in the amygdaloid mines, and averaging only 45 pounds of copper in the richest conglomerate mine. The metal sometimes occurs in masses that weigh from a few pounds up to hundreds of tons each. The larger masses are cut underground into pieces sizeable for hoisting, and when arrived at surface, are hand-cobbed, to eliminate as much as possible of the adhering gangue, and then put directly into the reverberatory furnaces for smelting.

The preliminary work of a stamp-mill, in the Lake Superior district, is done in the rock-house at the mine. This usually is built in connection with the shafthouse, though one rock-house may care for the production of two shafts. The ore is dumped from the skips, or cages, onto the upper floor of the rock-house, where the small masses are cobbed under steam-hammers, and the balance of the ore, containing fine copper disseminated through gangue rock, is passed over a grizzly, the larger masses going through a powerful jaw-crusher, the product of which descends to the next floor and there is put through smaller crushers, going thence to bins, from whence it is drawn into railroad cars and taken to the stamp-mills.

The modern stamp-mills are of fireproof construction, having steel frames, with cement floors, and are liberally supplied with windows for lighting. The buildings are terraced, so as to take full alvantage of gravity in handling the material treated. The storage bins at the tops of the mills, are connected with trestles, which permit the access of loaded trains, and the bins are of great capacity, holding thousands of tons of rock in the larger mills. Picking-belts are used to some extent in some of the mills.

The first stamps in the mills of the Lake Superior district were of the old Cornish style, crushing by gravity alone. The Ball head is a single stamp, operated by steam, and the entire stamp, including mortar-box, is one machine, set upon a very heavy foundation. Formerly heavy timbers were placed between the foundation and the mortar-box to furnish vibration, but these were found undesirable, and the practice has been discontinued. The ordinary steam-stamp has a piston of 18 to 20 inches diameter, with stroke of about 24 inches, the piston developing a velocity of about 25 feet per second and striking blows of three to four tons, at the rate of 90 to 110 strokes per minute, under a steam pressure of 95 to 120 pounds per inch, in the case of the simple heads, which are driven by engines of 150 to 250 horse-power each. The weight of the reciprocating parts of a steam stamp averages about 5,500 pounds. The economy in steam consumption possible through compounding the simple stamps being readily apparent, cross-compounding was tested thoroughly at the Champion mill for about a year. The results proved a large economy in steam consumption, but the very considerable disadvantages inherent in working four 500-ton stamps as a unit proved too great, and the system was abandoned. The cross-compound stamp was followed by the Nordberg steeple-compound stamp. This has high and low pressure cylinders, mounted tandem one above the other, and in actual practice the steeple-compound stamp has given an increased capacity averaging about 25 per cent., with a saving of about 25 per cent. [illegible] beginning of the last decade of the

Nineteenth Centeury the average crushing capacity of the simple steam-stamp in the Lake Superior district was 350 tons per 24 hours. This has been increased by heavier parts, greater power and the discarding of timber foundations, to 500 and even 600 tons per diem. The steeple-compound stamp is of much greater capacity, one stamp in the Osceola mill having crushed 779 tons of amygdaloid rock in 24 hours, in 1906, with an average for two weeks of 600 tons per day, including all stops. The capacity of the stamps varies considerably, at the different mills, according to the nature of the rock crushed. The conglomerate rock of the Calumet & Hecla is much more refractory than the amygdaloidal rocks of the other mines, and a stamp can treat only 60 to 65 per cent. as much conglomerate as amygdaloidal rock. The conglomerate also is much harder upon stamp-shoes than the amygdaloid. These shoes are of chilled iron, cast by local foundries, which are able to give an 11-inch chill, a statement that may be doubted, but is susceptible of full verification. The shoes weigh about 800 pounds each when cast, but lose half of their weight and become badly worn in four to fourteen days, according to the nature of the rock crushed, and are then discarded. Rock is fed under the stamps in pieces ranging up to a foot or fifteen inches in extreme dimension, with a smallest dimension of about four to six inches.

The system of coarse stamping now in general use was begun at the end of the Nineteenth Century. This process utilizes mortar-grates for discharge having perforations of about ten-sixteenths inch in size, as against the old standard of about three-sixteenths inch only, while revolving screens, with aperatures of about four-sixteenths inch, let out the fines and return the oversize to auxiliary machinery for recrushing. The coarse stamping system has resulted in giving about 50 per cent. of the mill product from the stamps, before jigging, as against 10 per cent. extracted at the heads under the old method, thus affecting important economies in the amount of material handled in stamps and jigs, and reducing the quantity of slimes.

From the stamps the crushed rock is fed to jigs, which are in series, taking coarse and fine sands from the stamps. A portion of the coarse sands, discharged as tailings, is recrushed and rejigged. Various types of regrinding mills are in use, including Chilean mills and other forms. The cost of regrinding Calumet & Hecla conglomerate, which is extremely refractory, has ranged as high as 30 cents per ton in Chilean mills, but in Huntington mills the cost has been cut to 10 cents per ton. The fines and slimes are passed over slime-tables of various patterns, these including the old-style Evans round-table, frequently with two or three superimposed decks, to save floor space, and the Wilfley and Overstrom patent tables, which have given very satisfactory results. The waste sands are washed through launders to some distance from the mill, while the concentrated metal, with its adhering gangue-rock, known locally as mineral, is shipped to the smelters for reduction. Formerly the mill practice of the Lake Superior district called for dressing mineral to a high percentage of metallic contents, but modern practice yields mineral much lower in copper tenor, and the losses in tailings now average only about one-half as much as at the beginning of the last decade of the Nineteenth Century. The mineral produced by the Lake Superior mills varies greatly, ranging

from 50 to 80 per cent. in copper tenor. Most of the mills make several different grades of mineral, these varying in size of material, and also in richness, the coarser grades carrying the larger percentage of copper. In some of the mills the coarser mineral is hand-picked for particles of silver.

Water consumption has been reduced about one-third through coarse stamping and other economies. Owing to unlimited water supply, and the enormous capacity of their pumps, the Lake Superior mills have been very prodigal of water in their washrooms. In the last decade of the Nineteenth Century as much as 10,000 gallons of water was used for washing a ton of ore, but this consumption has been reduced to an average of about 7,000 gallons per ton, and it is evident that considerable further economies are possible.

Owing to the compounding of stamps, resulting in greatly increased crushing capacity, some of the older mills have been unduly crowded in their washrooms, with consequent losses in tailings. The newer mills provide a much larger area of washroom for each stamp, thus allowing for the greatly increased stamping capacity of each head.

The tailings of the Lake Superior mines range from 0.15 to 0.75 per cent. in copper tenor. These figures are low, but are not as low as might be wished, in view of the low average tenor of the original ore. Great improvements have been effected, however, and the losses in tailings now average no more than half those of twenty years ago. Many attempts have been made in the district, and are being continued at the Calumet & Hecla, at reworking the tailings, but so far none have proven commercially feasible. The stamp-sand from the mills is utilized locally for mortar, in building construction, and is excellently adapted to that work. The stamp-sand also is used in making sand-lime brick, and for the manufacture of paving blocks.

CHAPTER VI.

The Hydrometallurgy of Copper.

Readers desiring a detailed exposition of this subject are referred to Eissler's excellent volume entitled "Hydrometallurgy of Copper." This chapter will be found to give a fairly complete outline of the subject, but without any attempt at great detail.

The extraction of copper values from ores by simple leaching processes has been known for many centuries, and probably was discovered by some of the earliest followers of mining and metallurgy. Leaching processes vary, according to nature of the ores, and in minor details. The simplest process is that by which the water from sulphide copper mines is compelled to precipitate its copper values on scrap-iron, after reaching surface. Plants for leaching cupriferous mine waters are simple, usually, and the process is essentially the same, wherever used. At Butte the water from the mines carries .0015 to .0065 per cent. copper, and the seepage water from the tailings piles is very much richer. The oxidation of chalcopyrite in tailings is very slow, but chalcocite and oxidized ores leach much more rapidly. The tailings piles at Butte are leached by water, conveyed in ditches over the surface of the piles, and such leach-water, after leaving the tailings, goes from pond to pond, and then is pumped to precipitating tanks, in series of two or three with grades of 1 to 240 at the beginning, and 1 to 50 at the end, the copper being precipitated on scrap-iron, tin cans and other iron waste, the product being cement copper running from 30 to 90 per cent. in copper tenor. The product resulting from the precipitation of copper from cuprous sulphate solutions upon scrap iron is a very impure mixture of metallic copper with iron, antimony, arsenic, silica, etc., and is washed, sometimes repeatedly, before reduction to blister copper in blast-furnaces.

Lixiviation is especially adapted to sulphide ores of low grade, but not all low grade ores can be handled advantageously by leaching, as it is not adapted to ores containing considerable quantities of ferrous oxide, manganese or lime, while the leaner oxides, carbonates and disseminated sulphides having quartz gangues are especially suited to lixiviation. The initial outlay for a leaching plant is comparatively small, but the process is slow, and, to be even fairly complete, requires much time, for long continued leaching, in the case of average ores. Where applied on a very extensive scale, as in Spain, the principal disadvantage is the locking up of enormous quantities of ore, entailing a heavy investment, but this disadvantage, when once overcome, affords compensation by reason of the immense amount of material in process of leaching acting as a sort of balance wheel, rendering it possible to forecast production to a far greater extent than in the case of mines using ordinary concentration and smelting processes of reduction.

The mines of the Sierra Morena, in Spain and Portugal, have been worked intermittently for about three thousand years, and immense piles of low-grade sulphide ores and refuse have accumulated. At these mines

ered, the sulphides became oxidized gradually, and natural lixiviation was brought about by the rains. The bulk of the copper so leached out was lost, but it was learned, at some remote time in the past, that the copper values could be saved by depositing scrap iron in the path of the leach-water. This process of securing copper from sulphate solutions is now in use at many old and idle copper mines as well as at active properties, in various parts of the world.

The process of natural cementation is well exemplified at the San Domingos mine, in Portugal, where the low grade sulphide ore is cobbed to three or four inch size, and piled in immense heaps, 15 to 40 feet in height, which are provided with valleys for drainage, with brick chimneys at intervals. Pipes are laid over the surface of the heap, and water is applied copiously, at intervals. The water draining from the heaps is collected in sluices, and the metal, carried in solution as copper sulphate, is precipitated on scrap-iron. Some of the heaps at the San Domingos contain as much as a million tons of partially leached low-grade ore, and require eight to ten years for the complete extraction of values to the point of impoverishment where further work, by even this phenomenally cheap plan, is unprofitable.

A modified method, which might be termed artificial cementation, was employed for a long time at the Rio Tinto mine, in Spain, but has been succeeded by a process that will be described later. By this old method broken ore was piled in roast-heaps, called teleras, in quantities of 1,000 to 1,500 tons per heap, the ore ranging from 1.5 to 2 per cent. in copper tenor. The heaps were fired, burning slowly for three to six months, after which the ore, then uniformly and thoroughly roasted, was placed in cement tanks, each about 5 feet deep, 35 feet wide and 100 feet long, provided with false bottoms of square timber. The leach-water from these tanks ran into settling tanks, where the copper was deposited on pig-iron. After five or six successive leachings the ore was removed and piled in heaps, called terreros, and weathered again for further leaching. At one time the Rio Tinto had about seven million tons of low grade ore in terreros, for further leaching.

The present leaching process in use at the Rio Tinto differs somewhat from the method previously described. The bulk of the copper values of the Rio Tinto is contained in chalcocite, distributed in pyrite, and not in chalcopyrite distributed through iron pyrite, as formerly held. The first process in the leaching of low grade ores is exposure to air and moisture, which form some ferrous sulphate, that oxidizes to ferric sulphate, which reacts, with considerable rapidity, on the iron copper sulphides, producing copper sulphate and iron sulphate. About half of the copper values contained originally are changed into the form of sulphate within six months, the final reaction producing copper sulphate and sulphuric acid. About two years are required to extract 80 per cent. of the [illegible] copper remaining in the leach-heaps after the first six months of [illegible]

At the Rio Tinto a site is chosen for a [illegible] ground is concave and sloping, to permit the leach-[illegible] of the heap. The first step is the build[illegible] an internal diameter of about one foot [illegible] chimneys built of rough stones [illegible] size, is spread alternately, in [illegible]

and the surface is leveled, each completed heap containing approximately 100,000 tons of ore. The surface of each heap, after levelling, is formed into squares, by means of ridges of mineral, these serving to distribute the water locally. A system of gutters is arranged for running water over all parts of the mass, and water is run on as the heap is built up. The ore oxidizes rapidly, the temperature of the air in the chimneys rising to 170° to 180° Fahrenheit, and at the latter point the chimneys are closed, to check too rapid local oxidation, and to promote the slow and thorough oxidation of the entire heap. The pile of ore changes to a brownish color, due to the hydration of the yellowish, basic ferric salt. Great care is required to prevent firing the heap, as fire once started is very difficult to extinguish. When oxidation has proceeded as far as safe, water is supplied, at the rate of 50 cubic meters per hour, until the soluble copper is leached out, after which the heap is allowed to oxidize naturally, and the process of leaching is repeated. After about one year the squares on the surface of the heap are rearranged, and gutters are shifted. At the edges of the heap the mineral has become cemented, holding a considerable quantity of copper salts, and the edges are dug down into terraces, and the copper extracted therefrom by washing. When the copper contents have been reduced to about 0.3 per cent., the heap is considered thoroughly leached, and the residue, containing an average of 49.5 per cent. sulphur, is exported as washed sulphur ore.

The copper liquor, as it runs from the heap, has considerable ferric iron in solution, and, to remove this, the liquor is run over a smaller heap of ore, known as a filter bed, laid in a reservoir formed by a masonry dam thrown across a small ravine. The filter bed greatly reduces the quantity of ferric iron carried in solution, and the leached liquor is then run to the cementation tanks, reaching the tanks containing, per cubic meter, about 4,000 grams of copper, 1,000 grams of ferric iron, 20,000 grams of ferrous iron, 10,000 grams of free sulphuric acid and about 300 grams of arsenic, a total of about 3.5 per cent. carried in 96.5 per cent. water. The liquor is run from the reservoirs, at about 300 cubic meters per hour, through the precipitation tanks over pig iron, producing cement copper, the process of cementation being facilitated by warm weather. The precipitation tanks are arranged in series, on the slope of a hill, the leach-liquor passing forward and back, and being discharged from the lowest tank practically free from copper, but containing considerable ferrous iron and free sulphuric acid. This waste liquor coming from the cementation tanks, called salida, is pumped back and mixed with fresh water, for further use on the leach-heaps. Each series contains three parallel tanks, which are about 2¼ feet deep, 5½ feet wide and 320 feeet long, the slope at the bottom varying from one in five hundred, in the first series, to one in ninety in the last series, added velocity being provided in the final series to overcome the tendency of the free sulphuric acid to attack the pig iron more rapidly as copper is deposited from the solution. The tanks are built of lumber and the spaces between them filled in with stone and cement. No metal is used in the construction of the tanks, wooden plugs being used for joining the timbers. Cracks between the boards are filled with oakum and pitch, to render the tanks water-tight, and at each end of each tank there is a drip door. The tanks contain about one ton of pig iron for each foot of length.

The precipitate is taken daily from the tanks, the cement copper being removed from one tank at a time. The rough precipitate is taken to

cleaning and concentration plant, where the precipitate is cobbed from the pig-iron, which is replaced for further use. The crude precipitate so secured, containing an average of about 70 per cent. copper, is fed onto a perforated copper plate, through which it is washed by a strong jet of water from a small nozzle, into a long launder, material not passing the perforations being removed and hand-sorted. The precipitate passing into the launder is washed and concentrated, by the velocity of the water, into different grades. The first few yards of the launder produce a red precipitate, known as No. 1, that assays about 94 per cent. copper and under 0.24 per cent. arsenic. This is followed by No. 2 precipitate, assaying about 92 per cent. copper and between 0.3 and 0.75 per cent. arsenic, while No. 3 precipitate, at the far end of the launder, consisting of very fine grains, averages only about 50 per cent. copper, and up to about 5 per cent. arsenic, including also graphite from the pig-iron, and some antimony and bismuth. Nos. 1 and 2 precipitate are bagged for shipment to the refinery, and No. 3 is moistened with acid liquors, made into balls by hand, dried in the sun and then smelted and bessemerized in the ordinary manner.

A system of combined roasting and leaching, in use in the Sierra Morena district of Spain, consists of roasting copper sulphides with ferrous iron sulphate, which reduces the copper to the form of sulphate, after which it is leached. Iron sulphate is produced extensively in the ordinary cementation process.

Copper sulphides may be converted into chlorides in various ways. By one process the sulphide copper ores are treated with ferric chloride, or with ferrous chloride and hydrochloric acid, decomposition being hastened by saturating the ores under treatment with calcium chloride or sodium chloride, both cheap and common chemicals. Another process, which is quicker, and gives closer extraction, though costlier, consists of roasting the raw sulphide ores with the addition of about 1.75 per cent. salt. The ore so treated is roasted in teleras, after which the chlorurized ore is leached in vats, and the residuum placed in terreros, for further weathering and leaching. A modification of this process is in use near Pittsburg and at several other American points.

The Doetsch leaching process is not in present use, though once employed extensively at the Rio Tinto. By this process raw sulphide ores were mixed dry with about one-half per cent. of ferrous sulphate and salt, the ore being broken to half-inch size and built up into large heaps having channels and chimneys for ventilation. The weathering process required about two years, and about 80 per cent. of the copper contained was secured by leaching and cementation.

The Hunt & Douglas process is a modification of the Doetsch process, but none of the chloride processes are in very general use.

The earlier wet process of Langmade, improved by Henderson in 1860, and since modified slightly, is in quite extensive use in Great Britain. This system is designed for the extraction of small copper values from the cinders remaining from cupriferous pyrites after burning for sulphur used for the making of sulphuric acid.

Metallic copp[illegible]le in cyanide solution, the solubility being in direct [illegible] comminution. Copper carbonates and oxides, in [illegible] effect on the cyanide treatment of gold [illegible] Copper taken into the

solution to a point where affecting its strength for gold solution can be precipitated electrolytically.

A patented hydro-electrolytic process is planned to leach copper direct from the ore and deposit pure metal electrolytically from the solution. By this process ore first must be crushed to size passing a 40 to 80-mesh screen, then calcined and leached in tanks in a solution containing 6 to 10 per cent. of sulphuric acid. It is claimed that one ampere of electrical energy will precipitate one ounce of copper in 24 hours, but this process does not seem to have passed the empirical stage.

New processes of lixiviation for copper ore are numerous, and many new systems have been patented, in different countries. Some of these new processes call for involved and intricate reactions, possible in laboratory experiments, but difficult of carrying out in the actual extraction of copper on a large scale commercially. A fault common to many new leaching processes is that materials too costly in price are required, and such processes, while technically correct, are unavailable commercially by reason of high cost. In practically all developed copper fields only the low grade ores are adapted to leaching, all ores of medium and high grades being treated by smelting, with or without preliminary concentration. Only the cheapest materials are available for leaching processes that will prove commercially successful, and the only two chemicals that seem to have met the tests as to strength and cheapness are salt and sulphuric acid, with salt losing ground in this field, in which it once disputed supremacy with the acid.

CHAPTER VII.

THE PYROMETALLURGY OF COPPER.

Smelting, or the reduction by fire, of metal from ore, has been known to mankind from prehistoric times. The reduction of copper to metallic form is effected by three methods, or combination of methods, these being hydrometallurgy, where leaching processes are employed, pyrometallurgy, where fire is the reducing agent, and electrometallurgy, with electric energy as the agent of reduction. The greater part of the world's copper production is secured with the aid of fire by smelting, but the rough copper so obtained is refined, as a rule, by electrolysis. This chapter is devoted to smelting in its various branches.

The antiquity of copper smelting is evidenced by the finding of copper and bronze in tombs and disinterred cities of very great age, and it is obvious that the copper must have been smelted, because the ancients are not known to have possessed mines of the native metal. The secret of smelting never was lost, but was handed down from generation to generation, and spread from country to country. In Europe there were copper smelters, at very early periods, in Germany, Austria and Sweden, it being obvious that the metallurgical practice of these works was derived from the Romans.

In Great Britain there are fugitive historical references to copper smelters early in Plantagenet times, and it is altogether probable that smelting was done, in a primitive manner, on tin ores, many centuries before the Christian era, and that the improved metallurgical practice introduced to the island by the Romans was never lost entirely, through the troubulous centuries preceding the welding together of numerous petty principalities into one nation, under Alfred the Great, in the year 900. In the Swansea district the earliest recorded smelter is that of the Mines Royal works, dating from A. D. 1584, though it is known that these works were preceded by still earlier smelters. The Taidach works date from 1727, and in Cornwall, copper smelters at Hayle date from early in the Eighteenth Century. The Welsh and English were the first to engage in copper smelting as an independent industry, the practice, from time immemorial, having been to smelt the ore at or near the mines, in primitive works under the same ownership. As a result of the establishment of independent works that bought ore from many mines, the Welsh smelters progressed more rapidly in metallurgical knowledge than their competitors and gained great skill in treating refractory ores. As a consequence of this progress Swansea became the seat of the greatest diversified smelting industry on the globe, the location of the city being favorable for the receipt of ore and matte from foreign countries. The smelting [illegible] though still large and highly diversified, is of much [illegible] the decadence of Welsh smelting having been [illegible] arbitrary restrictions imposed upon the [illegible] height of their prosperity the Swansea [illegible]

with the miners. For a long ton, twenty-one hundredweights of one hundred and twelve pounds each were demanded and received, in addition to which an allowance of three and one-half pounds on three hundredweights was exacted for "draftage," and allowances also were claimed for moisture. No new smelters have been built at Swansea since 1867, though perhaps nearly three-fourths of the world's copper output was smelted at that point about the middle of the Nineteenth Century.

The smelting of copper dates from time immemoral in China, Persia and India, and Japanese smelting was begun about the Seventh Century of the Christian era. In Japan the large and highly important modern copper smelting industry now in existence may be said to date from about 1890, when the first modern machinery and equipment were installed at a Japanese plant.

The change of base of the copper smelting industry of the world dates from about the middle of the Nineteenth Century, when the development of highly important copper industries in Lake Superior, Chile, Australia and South Africa led to the building of smelters near the mines. The smelting industry, so far as copper is concerned, has reverted to the ancient practice of thousands of years, interrupted for a couple of centuries by the rise of the Welsh smelting industry, and the reduction of copper ores is carried on now, as a rule, at or near the mines, though, in the case of electrolytic refining, the greater portion of the rough copper is refined at long distances from the smelters.

In Chile the first reverberatory furnaces were built in 1842, at Coquimbo, by Charles Lambert, and Lambert, who was an extensive operator of Chilean mines, opened the Port Tennant works at Swansea, in 1852, to escape the intolerable exactions of the Associated Smelters. From this declaration of independence may be said to date the decline of the Welsh smelting industry. Charles Lambert built the first Chilean blast-furnaces, at Coquimbo, in 1857, but these were not entirely successful. Chile now has a number of modern smelters, though none of the first magnitude, and a considerable amount of ore continues going to Swansea for reduction.

In Australia the first smelter was built at Port Adelaide, South Australia, in 1851, and the second was erected at Wallaroo, in the same state, in 1861. The first smelter in New South Wales was built in 1874, at Lithgow, and the first in Queensland was built, in 1888, at Aldershot, a suburb of Maryborough, while the first smelter in Western Australia was not constructed until after the opening of the Twentieth Century. In Tasmania the first copper smelting was done at a plant on the east bank of the Derwent, at Smelting Works Bay, shortly previous to 1860, but these works do not seem to have proven a success. The modern works of the Mount Lyell, which are exceeded in size by many plants, but in efficiency by none, date from 1896.

In the United States the smelting industry was slow in gaining a foothold, partially because of the policy of England in forbidding the smelting of copper ore in the colonies. There was a limited production of ore from mines in New Jersey, Vermont and elsewhere, during the Eighteenth Century and in the early decades of the Nineteenth Century, but the first American smelter of which authentic records have been found was the Revere works, at Port Shirley, Boston, Massachusetts, having cupola furnaces, which were built in 1835. The company owning the works was reorganized in 1851, and continued business as a copper smelter until 1868, and remains

in business with a copper rolling mill, though no longer a smelter. It is asserted by Nicol Brown, an eminent English authority, that a copper smelter was built by Crocker Bros. at Taineston, Maine, in 1836, but there is no town by this name in the state of Maine, and verification of the statement has not been obtained. The first thoroughly successful American smelter was built, in 1845, at Baltimore, by the Baltimore & Cuba Smelting & Refining Co., to treat Cuban ores. This plant had reverberatory furnaces, operated by Welsh smeltermen, and treated ores from Cuban mines, and later from South American mines, that previously had been shipped to Swansea for reduction. This plant, now under the ownership of the Baltimore Refining & Smelting Co., remains in existence, and has been in continuous and successful operation for upwards of sixty years.

The New Haven Copper Co. built a small smelter at New Haven, Connecticut, in 1846, and from the opening of this primitive plant dates the great copper and brass manufacturing industry of the Naugatuck Valley, now the first in this line. In New Jersey a small but good copper smelter was built in 1846, at Bergen Point, and this small beginning has resulted in the building up of the enormous copper smelting and refining industry now found on the New Jersey coast along New York Bay. The Orford works, at Constable Hook, New Jersey, were built in 1881, this being the first strictly modern plant in New Jersey.

The beginning of the Lake Superior industry may be said to date from the construction of a small smelter at Pittsburg, Pennsylvania, in 1848, by Hussey & Howe. This proved fairly successful, and the affiliated firm of Hussey & Co. built a copper smelter for Lake Superior ores at Cleveland, Ohio, in 1850. In the same year the Detroit & Lake Superior Copper Co. built a smelter at Detroit, Michigan, and shortly after the same company built the first Lake Superior smelter at Hancock, Michigan, this being located in the heart of the Lake Superior copper district.

The southern copper smelting industry dates from 1854, when two small blast furnaces were built at Ducktown, Tennessee, a reverberatory furnace being built at the same point in the following year. The copper industry of Tennessee was extinguished, temporarily, in 1863, by the American Civil War, and modern copper smelting in that state may be said to date from 1890, with the advent of the Ducktown Sulphur & Copper Co., which has been a leader in the development of successful raw sulphide ore smelting. In North Carolina a small blast-furnace was built at the Ore Knob mine in 1876.

The earliest western copper smelting was done in California, circa 1865, but the bulk of the Californian copper ore production of that day went to Swansea for smelting, and the Californian copper industry suffered almost complete extinguishment shortly previous to 1870. Modern copper smelting in California dates from 1896, when the Mountain Copper Co. erected a fine modern plant at Keswick, in Shasta county. In Arizona some crude smelting was done at an early date, but modern smelting was begun in the Clifton district of Graham county, circa 1873. Copper smelting in Utah is a comparatively recent affair, though this state now h some of the best works to be found anywhere.

In Montana the first smelter was built at Butte, in 1880, by the Bos & Colorado company, and reverberatories for matting were built in

same year by the Parrot mine, and the Meaderville smelter of the Montana company was constructed shortly afterward.

The smelting of copper has made greater progress since the middle of the Nineteenth Century than in all the centuries intervening since the discovery by primitive man that metal could be obtained from copper ore through heat, and this progress is shown in no more striking manner than by the increase in furnace capacity. About the middle of the Nineteenth Century the capacity of an average reverberatory furnace was circa seven tons per diem, while in 1902, the capacity had reached three hundred tons. The blast-furnace had increased, by the year 1900, to a daily capacity of three hundred tons, while in 1907 the capacity of the largest blast-furnace at the Washoe works, was two thousand seven hundred tons.

In smelting gold and silver ores it usually is necessary to provide a metallic carrier for the precious metal values, the proportion, by weight, of the gold and silver being so small that it is necessary to collect these metals in some other metal of less value, but found in the ore in larger quantities. The preference, until recently, has been for lead, as a collector but there is a marked tendency, noted since the beginning of the present century, to substitute copper for lead.

Copper melts at about 2,000° Fahrenheit—2,043° according to Plattner—or approximately 1,100° Centigrade. When heated within 200° of the melting point the metal becomes brittle and friable. Copper, when fluid at white heat, is of a beautiful sea-green color, and volatilizes slowly, combining with oxygen to give a green flame.

The old method of smelting called for reduction of the ore to metal by six stages. In the first stage the ore was roasted in a reverberatory furnace, with the addition of about 15 per cent. of fuel. In the second stage the roasted ore was smelted, with flux and fuel, to a matte of about 35 per cent. copper tenor. In the third stage the low-grade matte was roasted in reverberatory furnaces, with the addition of about 40 per cent. fuel. The fourth stage called for the smelting of the roasted matte, with the addition of about 50 per cent. fuel, to white metal of about 75 per cent. copper tenor. In the fifth process the white metal was resmelted, in reverberatory furnaces, with about 60 per cent. of fuel, to blister copper. The sixth and final process called for the refining of the blister copper by a succession of partial oxidations. The process of bessemer smelting usually is applied to the conversion of high grade matte, as hereinafter explained, but consists essentially of any reduction of ores by means of an oxidizing atmosphere, and both pyritic smelting and semi-pyritic smelting may be considered forms of the bessemer method of smelting.

New smelting processes are of great variety, and are constantly cropping up in considerable number. Most of the new processes are patented, and in theory many are of a revolutionary nature. Unfortunately such processes have a bad habit of working out wrong in actual practice, though frequently successful in theory. The working out of a new theory of smelting, by laboratory experiments, is a vastly different thing from applying such new processes successfully in works handling immense quantities of material. A small mine or a new mine cannot afford to experiment with new and untried processes of reduction. That work should be left to the big smelters, which, with very few exceptions, are managed by experienced

and progressive men, who are ready, at all times, to try out new smelting processes that give promise of resulting successfully. The progress of metallurgy is accomplished, as a rule, by small and frequent advances, rather than by great leaps or by revolutionary inventions.

In treating sulphide copper ores, which predominate in most districts, it is necessary to expel the sulphur, and iron also, where that is connected with the copper, as in most cases. The iron can be slagged by the addition of appropriate fluxes, and, where the ores are deficient in iron, that element must be provided by ferruginous flux, iron being necessary in the formation of free slags in copper smelting. As most of the sulphide ores possess an excess of sulphur, it was customary, until quite recently, to drive off the excess of sulphur by roasting before smelting. This work is done still, at many smelters, while at other works roasting has given way to pyritic smelting, or semi-pyritic smelting, as hereinafter described. Excess of sulphur may be removed from ore by heap-roasting in open air, by roasting in shaft furnaces or kiln furnaces, or by calcining in reverberatory furnaces, usually of a special pattern, with rabbles.

The process of heap-roasting is inherently defective, and seems doomed to gradual extinction, semi-pyritic smelting, commonly known as raw sulphide smelting, being preferable, in most cases. While the theory of heap-roasting is the same in all cases, there are many minor modifications. At the Rio Tinto mine, where heap-roasting has been discarded, the heaps were of enormous size, and were burned with a marvelously small amount of carbonaceous fuel. Under the former practice at this mine, hand-selected rich ores, averaging 8 to 10 per cent. in copper tenor, were piled into heaps of about 400 tons each, and fired with a single cord of wood, burning six to nine months each. At the Tyee mine, in British Columbia, the process of heap-roasting has been carried pretty closely to perfection. Ores are dumped from the railroad hopper-cars into sixteen 100-ton receiving bins, with hopper-bottoms and screen-tops, latter set at angle of 40°, all fines under three-eighths inch mesh falling into separate compartments built in the center of each bin. The level of the roast-yard is about eight feet below the tram-tracks that run under the receiving bins. The yard has six permanent trestles, sixty feet apart from center to center, and at right angles to the permanent trestles are six trenches, each four feet deep and forty feet from center to center. Between the permanent trestles are movable bridges, traveling on wheels, these being trussed so as to clear the roast-heaps below. Both permanent trestles and movable bridges have tram-tracks, with turntables, over which travel side-dumping ore-cars, which thus obtain easy access to every square foot of the roast-yard. Roast-heaps are built up automatically, by dumping the tram-cars, each heap averaging twenty-four by fifty feet in size on the bottom, by seven feet in height, and containing an average of 300 tons. Each roast-heap requires an average of eight cords of wood, and burns about three weeks, reducing the sulphur contents to about 5 per cent. The system works perfectly, cintering being reduced to a minimum. When roasted, ore is shoveled into 4,500-pound ore-cars, traveling on tram-lines laid in the bottom of the trenches before mentioned, the tops of the cars being on a level with the bottoms of the roast-heaps. Roasted ore is trammed to the burnt-ore bins, 1,500 feet distant and just behind the blast-furnace build

ing, there being eighteen fifty-ton bins, with central bottom-discharge gates, emptying into tram-cars running over scales to the charging-floor of the furnace.

In the case of ordinary heap-roasting, where it is not practicable to go to the expense of providing a system so well devised as at the Tyee, ground should be selected with sufficient slope to provide good drainage, and ditches should be dug to carry off rainwater, and also to divert the drainage of adjacent ground, as a large proportion of the metallic values contained originally may be leached out by water in a short time. Usually the ground is surfaced by broken rock or slag, and given a final top-dressing of clay, well rolled or pounded. Above this should be placed a layer of fines, three to six inches deep, to prevent baking the clay, followed by its inclusion with the roasted ore when the latter is removed. On this surface of fines the roast-heap proper is built. There is a first layer of wood, much or little according to the nature of the ores, and usually more than really is needed. The worst wood available will do very well, if care is taken to furnish a little good wood for kindling the fire. Channels are provided, so that after the wood has burned out there is draught through the heap. Chimneys of boards are built at various points, the number of channels and chimneys depending on the size of the heap. In American practice a cord of wood is used for an average of 30 to 50 tons of ore, the percentage of fuel growing less as the size of the heap is increased. The first layer of ore is in coarse lumps, two to six inches in size, or even larger, surmounted by a layer of ragging, or medium-sized lumps, and topped with a layer of fines. The greater the percentage of sulphur, the lower the height of the pile. The shape of the heap on the ground may be square or oblong, usually the latter, to facilitate upbuilding and removal. In a roast-yard it is necessary to have a considerable number of heaps, so that the process may be continuous. The heap is fired, after building, and the wood gradually ignites the sulphur in the ore, which continues to burn for many weeks. The success or failure of the process depends mainly upon careful handling, the heap requiring a small but steady supply of air, for even roasting, while too much air allowed to enter the heap will result in matting part of the ore. Heap-roasting requires much hand-labor, and has various objectional features tending to restrict its use.

Matte is sometimes heap-roasted, requiring several successive burnings, but the practice is of very doubtful utility.

The fuels used in smelting copper are of a great variety, choice depending largely upon availability and prices, as well as upon individual requirements. Bituminous coal is used extensively, and anthracite coal sparingly. Anthracite is a very good fuel, but unobtainable at reasonable prices in most copper fields, while bituminous coal is the most objectionable fuel, and, next to charcoal, the least used, though there is a great difference in the varieties of bituminous coal, some of which work well in partial or complete fuel charges, while others give most unsatisfactory results. Coke, which is the most common fuel, was utilized first at Freiberg, in 1818, and proved an immediate success. For satisfactory work, in either reverberatory or blast furnaces, coke should develop not less than 10,000 British thermal units. Wood is used extensively in Chile, and in

some other districts. Charcoal sometimes is employed in blast furnaces, but for this use should not be burned dead in the kilns or pits, as in such case combustion is too rapid in the furnace, leaving a frozen charge. Where wood or charcoal must be burned for fuel, on account of local conditions, wood-burning reverberatories are preferable, as a rule. Petroleum sprayed into the firebox has been utilized in reverberatory furnaces, and in Transcaucasia is the principal fuel, giving thoroughly satisfactory results. Apparently petroleum is not well adapted to blast-furnaces, as experiments along that line have not proven successful. Gas is used to a limited extent in reverberatory furnaces, giving satisfactory results.

The nature of the charge placed in a furnace depends, necessarily, first upon the ores available, and secondly upon the nature of the principal ore or ores to be smelted. Some ores are so constituted as to be self-fluxing, containing in themselves the necessary iron, silica and limestone. In most cases it is desirable to blend the various copper ores, where the required grades can be secured, rather than to add barren fluxes, but this process depends largely upon the availability of the ores desired. One of the principal reasons for the success of big custom smelters lies in their ability to mix varying ores, from different districts, so as to lessen or entirely obviate the use of barren limestone, silica or iron ore, for fluxing. The use of "sweeteners" is to be commended, where such ores are obtainable at reasonable prices. Ores that are excessively silicious require fluxing with ferruginous copper ores, or with iron ores that are barren of copper, and vice versa. Local conditions regulate practice, and the soundest theories must step aside, at times, in the presence of prohibitory freight rates, which, unfortunately, seem entirely too common, in many of the important copper districts of the world.

In the use of silicious fluxes it should be borne in mind that all silicates are not SiO_2, which is pure silica. Quartzite or some other form of SiO_2 is much preferable to bisilicates or trisilicates, and, of course, the best silicious flux of all is a low grade ore, with gangue composed mainly of SiO_2 carrying appreciable values in gold, silver or copper, or some combination of these three metals. Barium sulphate is difficult of reduction, and ores having a heavy barite gangue are refractory in smelting. Excellent results have been secured at the Ladysmith smelter on burnt ore averaging 38.87 per cent. barium sulphate, a general average analysis of slags from this heavy barite ore giving only 0.37 per cent. copper.

In the case of native copper from the Lake Superior mines, which reaches the smelter with only 20 to 50 per cent. gangue rock adhering, the process of reduction is simple. Oxide and carbonate ores are smelted readily, but with sulphide ores it is necessary to utilize different methods as hereinafter explained. Pyritic and semi-pyritic smelting are employed successfully in some works treating sulphide ores, but the usual process of reduction calls for preliminary roasting, in yards, or, more frequently calcininations in reverberatory furnaces, before charging for smelting. T full treatment of sulphide ores is given later, in this chapter.

Fines, coming either as fine concentrates, slimes or flue-dust, best c be smelted in reverberatories, on account of the heavy draft of the bla furnace blowing out large quantities of the fines as flue-dust, but fines c be smelted with fair success in blast-furnaces by briquetting before cha

ing. The briquettes made from slimes frequently include flue-dust, and are charged while moist, or the briquettes may have lime or other material for a binder, if necessary. Fines charged directly into blast-furnaces cause the growth of crusts on the sides of the furnace, together with the formation of excessive quantities of flue-dust, thus reducing the output both through losses in fumes and reduced capacity of smelting. Cement copper is a reddish precipitate, composed of metallic copper and sundry impurities, requiring smelting and refining before use. Copper bottoms are alloys of metallic copper and metals existing in the matte as impurities, formed in matting.

Ore bedding is a system by which ores of various grades are stocked near the furnace, and used as required, for mixed charges. In using this system concrete or stone-lined pits, shallow and narrow, but long, are built beside railroad tracks, and ore is dumped into them from railroad cars coming from the mine. Different grades and varieties of ore are kept in different pits, and these, as needed, are scooped up by a steam-shovel and loaded into cars for carrying to the furnaces. The system is suitable only for large works that can afford a steam-shovel, and the value of the method is dependent largely upon the thoroughness with which the plan is carried out.

Mechanical charging is preferable to hand charging in all but small works, and is in very general use. For blast-furnaces, charging is best done by means of side-dumping cars. For reverberatory furnaces the best method of charging is through hoppers in the roof, near the firebox end, and, in the case of the larger reverberatory furnaces, the process is semi-continuous. In Lake Superior smelting with reverberatories the mineral is loaded into one or two-ton side-dumping tram-cars having V-shaped bottoms. These are loaded transversely on railroad flat-cars, and are unloaded onto trestles leading into the smelters, the dump-cars being discharged either into bins, for storage, or direct into the hoppers above the reverberatories.

Furnaces for copper smelting are of two classes, the first being the blast-furnace, which has a powerfully reducing atmosphere, and the second being the reverberatory furnace, where the reflected flame gives a neutral atmosphere. The comparative availability of these two classes of furnaces depends largely upon local conditions, and in many plants both forms are found. The choice of kinds of furnace should be based upon a careful consideration of all the circumstances of each individual case. There is no large difference in cost of equipment between blast and reverberatory furnaces, though as a rule the latter are somewhat more costly. Blast-furnaces and their adjuncts occupy only about half the space required for reverberatories. Blast-furnace slags usually run a little higher in copper than reverberatory slags, under similar conditions, but there is a considerable variance according to the circumstances of each case. Reverberatories make very much less flue-dust, as they lack the blast that is such a powerful agent in carrying off fine particles of solid matter in the gases from blast-furnaces. Reverberatories require only about 50 per cent of the power of blast furnaces, and a slightly smaller force of workmen for an equal capacity.

The blast-furnace was the earliest smelter of any sort, and its age is

greater than that of history itself. Crude forms of the blast-furnace are found in use still, in remote portions of Mexico, South America, the Philippines, China and elsewhere. In the original form the blast was supplied through hollow tubes from human lungs. In fact, iron is made, to this day, in remote oases of the Sahara desert, with the aid of human blast. The next step was the invention of a crude bellows, and to supply continuous blast, two bellowses were used, worked alternately, the blacksmith's forge of today being merely a slightly improved form of the blast-furnace of prehistoric times. In its crudest form the blast-furnace is an open pit, or shallow depression in the ground. The next step is a small oven of stone, into which ore and fuel are charged. The development of the blast-furnace, to its present size and efficiency, has been accomplished by a steady succession of little improvements, covering many centuries, rather than by single strides, yet it may be said, with safety, that blast-furnace smelting has been improved more in the three past decades than in the five preceding centuries. Increase in the number of tuyeres was begun at Freiberg in 1845. The movable forehearth, now in general use, is an American invention, of comparatively recent date. The growth of the blast-furnace in capacity has been marvelous during the past few years. In 1900, the closing year of the Nineteenth Century, the largest blast-furnace in existence had a daily capacity of about 300 tons only, yet in 1907 the largest blast-furnace in use, at the Washoe works, Montana, had a length of 84 feet and a daily capacity of 2,700 tons. This single furnace, running on 1 per cent. ore, which probably was about the average of copper ore smelted at the beginning of the Nineteenth Century, could have turned out, in less than 60 days, all of the copper produced in the world in one year one hundred years ago. The big blast-furnace at the Washoe works, made by cutting out the end-plates and joining a number of contiguous cupolas into a single furnace, has resulted in a very considerable decrease in the consumption per ton of ore treated.

The date of invention of the water-jacket blast-furnace is a subject of dispute. A ten-ton blast furnace of two feet diameter was by Wendt, in 1876, was given a water-jacket. Two years [illegible] 1874, a water-jacket was installed at the Longfellow [illegible] which was 800 miles from a railroad, at that time, with [illegible] one dollar each and of short life, the ore being highly [illegible] states that the first water-jacket blast-furnace was [illegible] smelting works previous to 1864. While blast-furnaces [illegible] sionally with fire-brick linings, water-jacketed cupolas [illegible] universally. Despite the considerable loss of heat [illegible] culation of water between the inner and outer shell [illegible] proven itself both efficient and economical. Furnaces [illegible] lar, though occasionally circular or oval, with shells [illegible] iron or even cast-iron, and occasionally of copper.

The smelting of copper ore in a blast-furnace [illegible] the metal from its ores by the use of [illegible] cupola having a blast of air, which may be [illegible] phere, or heated before passing into [illegible] Blast-furnace smelting is adapted to [illegible] commercial ores of copper, though [illegible]

furnaces are to be preferred. Fuel and flux, in the quantities demanded for reduction and slagging, are added to the ore, the flux being barren, or containing metallic values, as circumstances may dictate.

Preheated air for the blast was used first by J. B. Neilson, in 1828, at an iron furnace, and was used first on copper at Freiberg, in 1837, but did not prove fully successful there, though utilized permanently at Kongsberg, where it was installed shortly afterward. The rotary Roots blower was the first in American use, and remains the principal producer of slightly compressed air for blast-furnaces. The pressure under which blast is furnished depends mainly upon the depth of the bath, it being evident that increased pressure is required to force air through an increased depth of molten matter, the average pressure being 14 to 16 ounces per square inch. Blast is heated to greatly varying temperatures, ranging up to 800° Fahrenheit at some works, and the heating may be done in several ways, the most economical method being the heating of the blast by waste gases from the furnace itself.

The date of invention of reverberatory furnaces seems uncertain. The earliest British record of furnaces of reverberatory type is dated 1765. Furnaces of this class can be made, at a pinch, of adobes or sun-dried brick, and these, while crude, and not recommended for use where better material can be had, give fairly satisfactory results in the hands of a first-class smelterman. In the reverberatory furnace the flames from a lower grate, on which the fuel is burned, are reflected back upon the ore, lying on a bed above, thus giving a neutral atmosphere. The forehearth is brick-lined, and movable, and the air entering the furnace may be preheated, though this is not customary. In the best average practice five to seven tons of ore are smelted per ton of fuel burned, the larger furnaces giving the lower ratios of fuel consumption. In the case of sulphide ores the reverberatory furnace produces a richer matte than from the same ores reduced in a blast-furnace.

During the past thirty years the reverberatory furnace has gained tremendously in size. In 1878 the capacity of the average American reverberatory was 12 tons only, but had increased to 24 tons in 1887, and, in the case of the larger furnaces, had increased to 50 tons in 1894, 150 tons in 1899, and 300 tons in 1902. The largest reverberatory furnace in existence is at the Washoe works of the Anaconda mines, in Montana, this being 19 feet wide and 116 feet long, with a daily average capacity of about 300 tons.

In the Lake Superior district the smelting of copper mineral is done in reverberatories. The charge is first melted down, with fuel and flux, anthracite coal and coke constituting the fuel and limestone the flux. The products of the first fusion are slags rich in copper, which are resmelted, and impure copper, which is tapped to a refining furnace, where rabbled by blowing air through a gas-pipe, this process having an oxidizing effect on the charge. The copper is then poled with staddles of green wood, to bring it to the proper pitch, when it is dipped and moulded by hand, or tapped into mechanical casting machines. It is possible to perform the entire operation of fusion and refining in the refining furnace alone, but in practice it is found profitable to separate the work into the two operations previously noted. The standard Lake Superior reverberatory furnace is 13x17 feet and the largest in the district, previous to the building of the Michigan smelter,

was 17x28 feet. At the Michigan works a furnace 20x50 feet was built, but, after repeated trials, this was found too large to hold the heavy charges of mineral, and was cut down to 16x35 feet in size, and furnished with a 24-inch ventilated bottom.

The bulk of the world's copper supply comes from sulphide ores, and, while leaching processes are used to a considerable extent, the far greater part of the sulphide ores is reduced by heat alone. Unless pyritic or semi-pyritic smelting be employed it is desirable that as much as possible of the sulphur be eliminated before the ore goes to the smelter. Preliminary roasting or calcining may be done in the open air, by heap-roasting, as previously described, or by roasting in stall, shaft, or kiln furnaces. The roasting of sulphide ores may be reducing or merely oxidizing in nature. The calcination of copper ores is a simple process, in theory, but in practice requires nice discrimination and care, to secure the best results, owing to the varying proportions of copper, iron, sulphur and other elements found in the raw ores. The skill with which the calcining is done greatly affects the success and cost of the future processes of reduction. As the combinations of ore vary greatly in different districts, the practice also varies to a considerable extent, and the best practice for the calcination of a given ore is determined, first by theory, and secondly by actual work.

Calcining may be done in hand-furnaces, but automatic devices are more economical, and are in general use in all but the smallest and least modern works. Hand reverberatory furnaces, with the hearth heated by a fireplace separated from the furnace by a bridge-wall with side openings, give as good satisfaction as can be secured with hand furnaces. Muffle furnaces are used occasionally, though not extensively, giving a very equable heat, but proving expensive in operation. Hand power cylinders are used at times, but are not so economical as mechanically operated calciners. The Brückner automatic intermittent discharge cylinder, invented 1864, has a greater diameter and shorter length than other varieties of cylindrical calciners, hence it takes less floor space, and is automatic and efficient in operation, being in quite general use. The Douglas muffle cylinder calciner, with continuous discharge, has a central flue of tile, which takes combustion products direct to the chimney. This calciner, while suitable for general work, is especially adapted to the economical and cleanly saving of sulphur fumes for the making of acid.

The principal form of calciner is the automatic reverberatory, of which there are a number of varieties, mainly patented, all of more or less value. These consist essentially of stationary reverberatory furnaces, through which plows are dragged, to rabble the ore under calcination and to remove the calcined ore. One of the most efficient forms is the turret furnace in which horizontal revolving plows are actuated from a central shaft, the ore charge being fed automatically from hoppers above. The turret furnace is economical of floor space and attendance, and may be built with a number of decks. The four-hearth Welsh calciner has hearths of 16x16 feet. The O'Hara calciner, with straight hearth, was the first to use mechanical rabbling, with plows set on horizontal arms attached to an endless chain. The turret calciner of Pearce, with superimposed hearths, came out in 1892. The McDougall mechanical calciner, invented 1891, is the type found in most general use. This has numerous superimposed hearths, some furnaces having

as many as six, each rabbled by rotating arms carrying plows. The Argall furnace has a hearth with reciprocating movement, rabbles being lifted automatically when the hearth makes the return movement.

Ores are roasted also in kilns, stalls and shaft furnaces. A stall furnace is merely a perfected form of heap-roasting, wherein brick, stone or slag-block walls are built about the roast-heaps, giving perfect regulation of air currents. Where necessary a roof is built, to prevent the access of rainwater, which would leach out a considerable part of the copper values. In the most modern forms of stall furnaces, paved or grated floors are added, and stalls grade into furnaces by the addition of flues and chimneys for the carrying off of roast-gases. The Gerstenhöfer shaft furnace, utilizing the sulphurous fumes for making sulphuric acid, consists of a vertical shaft with a mechanical device for feeding the charge from above, and the fresh pulverized ore is intercepted in its downward progress by projecting ledges, permitting its partial oxidation. Kiln roasting also is employed where sulphurous fumes are saved for making acid, the kilns being of shaft-like form. The advantage of kilns and shafts is found mainly in the saving of the sulphurous fumes, but the process of desulphurization is more complete than is possible in heap-roasting or stall roasting.

Matting is the process of making a semi-metallic compound from sulphide ore, materially richer in copper than the ore treated. In the process of matting a considerable proportion of the sulphur in the ore is thrown off in fumes, and a large part of the original gangue is eliminated as slag. A definition of matte, or regulus, as it sometimes is called, is exceedingly difficult to give, for the reason that matte may contain greatly varying proportions of any of its elements, and a considerable variety of elements of which sulphur always is necessary, copper being necessary, of course, in a copper matte, and lead in a lead matte, while iron, arsenic and a number of other impurities, some valuable and others damaging, are found in greater or less number and proportions in different mattes. Copper matte may contain as little as 15 per cent, or as much as 75 per cent. of the metal, though usually rainging from 25 or 30 per cent., in the lower grades, up to 50 or 55 per cent. in the higher grades. Copper matte is an intermediate product between raw or calcined ore, usually the latter, and the finished copper product. Matte is variously considered as an alloy, a mechanical compound or a mechanical mixture. It obviously is a semi-metallic product, possessing certain metallic characteristics, such as malleability, which is quite marked in the case of some high grade mattes. The mattes of high grade have specific names, according to their copper tenor. Blue metal is a matte containing 60 to 65 per cent. copper; white metal runs 70 to 75 per cent. copper; pimple metal carries 80 to 85 per cent. copper. Black copper is impure metallic copper carrying 1 to 5 per cent. sulphur, also sundry metals and metalloids, the name coming from the oxidation of the surface to a dull black. Blister copper is the highest grade of unrefined metal, carrying 98 to 99.5 per cent. copper, with one per cent. or less of sulphur, and small variable quantities of other impurities. Its name comes from the blebs or vesicles, in which the bubbles of gas, from sulphur and other volatile elements, are retained as the copper hardens. Blister copper looks well, and is suitable for many uses, but, with the exception of the unusually pure metal from Lake Superior mines, blister copper is red-short, as a rule, though

not cold-short in most cases. The quality of blister copper varies greatly, the purer brands being of good commercial grade, while the baser qualities are suitable for rough copper uses only.

The tendency of present practice is away from the old plan of blowing up a matte to blister copper by easy stages, and in the most modern plants only two fusions are required between calcining and bessemerizing. The separation of matte from the slag depends mainly upon specific gravity, hence the separation is imperfect when heavy basic ferruginous slags are produced, while light silicious slags usually are quite free from matte. Copper bottoms are alloys of metallic copper and other metals existing in the matte as impurities. The formation of the bottoms purifies the matte, and such bottoms are resmelted. In matting it is found that small furnaces are exceptionally liable to freeze. The product of the first fusion in the reverberatory matting process is of low grade, ranging from 15 to 50 per cent., usually 25 to 40 per cent., in copper tenor. If the charge is blown up to more than 50 per cent. copper at the first fusion, the slags are almost certain to carry considerable copper, entailing direct losses, or necessitating resmelting.

Blast-furnace slags, as a rule, run a little higher in copper than reverberatory slags produced from the same ore. The chemical composition and physical properties of slag vary according to the nature of the ore and fluxes, but usually slags are rich in both iron and silica. In Lake Superior smelting practice the reverberatory slags run 10 to 25 per cent. in copper tenor, and are resmelted in blast-furnaces, which, in turn, give slags carrying only 0.75 to 1 per cent. copper. An average of 10 per cent. copper in reverberatory slags is considered good practice in the Lake Superior district, the nature of the material treated differing greatly from the ores of other districts. The rich slag, containing much cuprous oxide, is skimmed off at the end of poling.

The scoria, or slag from a smelter, accumulates in large quantities, and its disposal sometimes becomes a matter of difficulty. Various systems are in use for disposing of slag, the simplest being to let it run outside and care for itself, but this is possible only where there is a sharp incline and plenty of room, conditions frequently lacking about a modern smelter. Where it is impossible to permit the slag to care for itself, the cheapest method of disposal usually is by granulation, which is accomplished by running the molten slag into a trough conveying a small stream of rapidly running water. The slag granulates instantly, and is washed away by the water and deposited by gravity at any point desired, granulated slag being sluiced in water almost as easily as coarse sand. Slag may be disposed of also by removal from the furnace in slag-pots, transported by hand, horse or mechanical power, or may be run out in gutters, while liquid, though somewhat difficult of handling by this method because of its viscosity. At a number of smelters slag-bricks are made, and while these are not suitable for general building purposes, they are available, to a considerable extent, about a modern reduction plant, and make satisfactory brick for almost any rough use.

In calcining or smelting copper ores, varying proportions of the metal are volatilized and carried off with the roast-gases, while fine particles of unsmelted ore may be carried out of the smelting zone by the powerful draft of a blast-furnace. Formerly the copper blown out in fine particles, and

volatilized by intense heat, was lost, but in all modern plants the greater part of such furnace loss is regained by deposition in dust chambers. It has been found advantageous to make the dust chambers of great length, which permits the settling of the small solid particles from the fumes, and the sublimation of the volatilized copper along the course of the flue. Dust chambers are found in all modern plants, and as a rule are merely enlargements of the flue, having transverse partitions permitting the gradual settling of the dust from the furnace fumes. In the larger plants the flue-dust is removed from the dust chambers through hoppers underneath, which load into tram-cars. As flue-dust usually is high in arsenic and antimony, volatile elements that are highly deleterious to finished copper, flue-dust commonly is smelted by itself, though sometimes mixed with matte or briquetted with fines previous to resmelting.

Fumes from sulphide ores are injurious to vegetation, and lead to much litigation. There is no question that much damage is caused to agricultural interests by smelter fumes, and equally there is no question that an industry of mulcting smelters has grown up among agriculturists in various smelting districts. The courts usually hold with the farmers, and increasing trouble is caused the smelters, with prospects of still more serious trouble in the future. It has been suggested that smelter fumes be concentrated and turned into the streams, but this suggestion is not practicable, as the damage would be far greater than now caused by dissipating the fumes in the air. The sulphur fumes from roast-heaps are especially objectionable, as they lie low on the ground, doing far more damage than the fumes thrown off from high stacks. Owing to the increasing difficulties of smelters with surrounding agriculturial interests, because of noxious fumes, it is certain that the sulphur contents must be used, to an increasing extent, in the manufacture of acid.

One ton of sulphur combined with oxygen and water makes three tons of sulphuric acid, which is the basis of all other inorganic acids, and may be called the foundation of commercial chemistry, as there is scarcely a single branch of chemical manufacture that does not depend, directly or indirectly, upon sulphuric acid. Previous to 1838 the volcanos of Sicily were practically the sole producers of sulphur for the making of acid, but owing to a short sighted attempt at unduly raising prices, the cost of sulphur was made almost prohibitive, leading to the utilization of the sulphur contained in iron pyrites, more especially the cupriferous pyrites of Cornwall, Wales, Ireland, Portugal and Spain, incidently having a strong influence in reopening the principal copper mines of the Iberian Peninsula, which are notably rich in sulphur. Sulphuric acid can be manufactured easily by passing sulphurous acid fumes, given off from sulphide ores roasted in shaft-furnaces or kiln-furnaces, through lead-lined acid chambers, where the fumes are taken into solution by water. The contact acid process, a comparatively new invention, is available for making sulphuric acid from fumes containing only a small percentage of sulphur dioxide. The United States lags behind Great Britain and Germany in this detail of the copper industry, and, as has been pointed out by Prof. Douglas, the United States, while leading the world in some branches of metallurgical practice, is by no means well to the front in the fullest possible utilization of by-products.

The process of conversion, or bessemerizing, now in very general use in

copper smelters treating sulphide ores, which reduces high grade matte to blister copper, dates, in its inception, from 1855, when the first patent for making steel from iron by his new process was taken out in England by Sir Henry Bessemer. The first attempt at utilizing the Bessemer process for the conversion of copper was made at the Bogoslovsk mine, in the Ural Mountains of Russia, by Seminikov, who did not succeed, however, in producing metallic copper. In 1880 Pierre Manhes begun experiments at Verdennes, near Avignon, France, and the process of bessemerizing, as applied to copper, was brought to a commercial basis by Manhes, though somewhat improved by Paul David in 1881. The first successful converters made by Manhes, at Lyons, France, took 3-ton charges. The process was brought into the United States in 1883, by Franklin Farrell, who installed a Manhes plant for conversion at the Parrot mine, in Butte, Montana, considerable improvements in the practice being made at the Parrot plant. Since then the process has enjoyed great growth, having come into practically universal use for the final smelting of sulphide ores.

The first converters utilizing the Bessemer process were very small in size, treating only 2,000 to 3,500 pounds of matte at a charge, and were rotated by hand, the operation requiring two stages. Converters now in use run 12 to 15 tons in size, as a rule, though the Washoe plant of the Anaconda has trough converters 96 x 150 inches in size, and the largest converter ever built is at Butte, Montana, being of the tremendous and somewhat unwieldy size of 8x20 feet. The weight of charge in a converter varies greatly, the first charge in a newly lined shell being much smaller than the last, owing to gradual destruction of the lining.

Bessemer converter plants vary greatly in size, at different works, but the essential plan is the same in all cases. A single unit consists of a stand, one or more movable shells, and an air-compressor to furnish blast. As a rule there are about two shells for each stand, as shells must be newly lined from time to time. The stands, built of steel, hold the shells containing the charge, which are mounted on trunnions, and the stand is provided with devices for tilting the shell. Hand power for tilting is used at some of the smaller installations, but in all larger plants mechanical power is employed, rotation usually being accomplished by electric or hydraulic power. A blast of varying strength, averaging about 15 pounds per square inch, is furnished by an air-compressor connecting with the shells through ball valves, which have replaced the old style plugs. The number and size of the tuyeres through which the blast enters the retort vary according to the style and size of the converter.

The retorts, or shells, are made of boiler-plate steel, in three parts, with flanges which are strongly bolted together. Shells are of widely varying sizes and types, the principal styles being the barrel type and the upright round type. The barrel type being easier to handle, both on and off the stands, is in most general use. The shells are lined, sometimes with firebrick, though this is going out of style, the usual lining being silicious material thoroughly tamped in and dried. The most common converter lining is made of quartz and clay, the latter serving merely as a binder. In some cases it is advisable to use silicious low grade ores for linings, to save the mineral values, but such linings rarely give us good results as those made of pure silica. Magnesite linings have been used with success, at Butte, and are said to have given unusually long service. The lining of longest aver-

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age life seems to be that made from quartzite containing about 85 per cent silica and 10 to 12 per cent. alumina, bonded with clay. The life of linings varies greatly according to different factors, high grade matte containing little iron being least destructible to linings. The usual lining consist of practically pure quartz, or gannister, containing 98 to 99 per cent. silica, bonded with a little clay. The quartz or other silicious material usually is crushed in rolls to pass a ⅝-inch trommel, or may be crushed in a Chilean mill or grinding pan. Quartz and clay are dumped into large bins, in the lining department of a smelter, and are withdrawn and mixed as necessary in a mixing pan, or trough. The lining is done in sections, the lower section being tamped with a mixture of about one part clay to five or six parts of quartz, mixed rather dry, while the upper portion is lined with a softer mixture. The lining is tamped in, sometimes by hand, but mainly mechanically, with heated bars, and the linings, when completed, vary in thickness from about 30 inches, at the tuyeres, to extinction at the mouth of the shell.

In the actual process of conversion at the best arranged plants the high grade matte is run direct from the cupola well of the furnace into the converter shells. Blast is turned on automatically, by rotating the filled shell to its normal upright position, and the powerful blast, working its way upwards through the molten matte, causes the sulphur to unite with the oxygen in the air and pass off as sulphur dioxide. The converter blows off, with a tremendous roar, into a hood that connects with a flue running to the dust chamber. More or less copper is volatilized by the powerful blast, but nearly all of the metal so driven off is saved in the dust chambers, and resmelted at flue-dust. The blowing of a converter charge is a delicate process, and considerable experience and care are required to secure the best results. If the charge is overblown the slag becomes high in copper oxide, while if underblown the process of conversion is not carried out fully, and the resulting blister copper will contain an undue percentage of impurities. Owing to the greater specific gravity of gold and silver, the precious metals tend toward the bottom of the converter, and can be saved therefrom to a considerable extent, if desired, but as practically all bessemerized copper now is refined electrolytically, and gold and silver values are recovered much more perfectly by electrolysis than by any possible method of metallic segregation, the separation of gold and silver in the process of conversion is now attempted at but few smelters.

The ferric oxide formed during the combustion of the matte robs the converter linings of silica to form slag, and the life of the lining is long or short in proportion to the slow or rapid destruction of its silicious material through uniting with little or much iron in the matte to form slag. In average practice linings last for six to eight blows, though in some instances the life is much longer, and occasionally considerably shorter. The iron in the matte is eliminated before the sulphur, the oxidation of the sulphur contained in the charge being the final process. Zinc is oxidized from the matte to a considerable extent, while arsenic is eliminated but slowly in the earlier stages, and antimony remains practically intact in the matte until the final process, when it is largely eliminated in the last few minutes of blowing. The copper oxide in the matte is reduced by the copper sulphide, the sulphur becoming oxidized and passing off in fumes, while the metallic copper, as formed, sinks to the bottom of the shell. The flames

from the mouth of the shell change in color, at different stages, and are watched closely by an experienced man in charge of the process. At the start lambent greenish flames, mingled with yellow, are noted playing over the surface of the charge. At the period of skimming the slag, which is when the matte has reached the white metal stage, with a tenor of about 75 per cent. copper, blue flames are noted. When blue flames become prominent the blast must be shut off, or foaming and explosion are almost certain to be caused by violent chemical reactions that produce large volumes of sulphurous anhydride. In the best practice ten to fifteen ton converters handle full average charges, and turn out finished blister copper of better than 99 per cent. tenor, in 45 to 75 minutes. The blister copper produced must be refined electrolytically, in nearly all cases, to eliminate a considerable variety of impurities, present in the metal to only a limited extent, but highly deleterious to finished copper.

In order to prolong the life of the linings, pulverized silicious material sometimes is blown into the charge through the mouth, or placed in the bottom of the shell before charging with matte, such material furnishing a portion of the silica required for slagging the iron, and thus prolonging the life of the lining. Such pulverized material should be thoroughly dried before charging, as it may cause serious explosions if even slightly wet, when coming into contact with the molten matte.

At the British Columbia smelter, in 1906, it became necessary, while rebuilding the plant, to convert cold matte in the shells. This was accomplished by lighting a wood fire, which, when thoroughly ablaze, was covered by a charge of 1,500 pounds of coke, and a light blast turned on. When the coke reached red heat, three tons of cold broken matte were added, and full air pressure turned on. The matte melted quickly, and further broken matte was added. The slag was partially skimmed, and further matte added from time to time, until the shell was fully charged. The entire process required 3½ hours only, and 15 tons of 40 to 50 per cent. matte were converted, in one stand, in a single shift. Matte up to 55 per cent. in copper tenor was converted, but was found more liable to freezing than matte of lower tenor. The process was not economical, though necessary under peculiar circumstances, but demonstrated latent possibilities.

The casting of copper, after the final process of smelting or conversion, may be done by hand or machine. In hand work the copper must be dipped in ladles and cast into moulds by hand labor. The machines are mainly of two types, one having an endless chain, with automatic tripping of ingots into water for cooling, the second type being the Walker casting machine, in which moulds are carried on a circular platform, copper being cast through a tapping-ladle direct into moulds. Some cuprous oxide is sure to be formed in casting. Copper shrinks in casting 0.1875 inch per foot, or 1.56 per cent, as compared with 1.32 per cent. for brass, 2.6 per cent. for zinc and lead, 1.69 per cent. for aluminum and 1.04 per cent. for iron. Eutectic copper is a mutual mixture which freezes out last in casting, after ingredients in excess have been removed by gradual cooling. Eutectic copper is a mixture of metal with about 3.4 per cent. of cuprous oxide, containing about 0.38 per cent. oxygen. Under the microscope eutectic copper can be seen as a thin groundmass surrounding grains of pure copper. Eutectic copper is transparent, with blue color by reflected light and is red in transmitted light. Eutectic copper may be a

source of weakness in castings requiring tensile strength, especially in copper tubes that carry hot and reducing gases, which may react on the eutectic copper in the tubes, with the result of forming fine cracks.

The principal features of general copper refining, including impurities, are treated in the following chapter on the electrometallurgy of copper, as it seems desirable to cover the subject in one chapter, rather than in two, and the bulk of the world's copper production now is refined electrolytically.

In the middle of the Nineteenth Century refining furnaces for the refining and casting of blister copper were about 5x10 feet in size, taking average charges of seven to ten tons. The average size now is about 18x36 feet, with average charges of seventy-five tons. The oxidation of impurities contained in the copper can be accelarated by means of an air blast playing upon the surface of the molten metal. The "direct method" of copper refining consists essentially of the fusion of a mixture of raw and calcined matte, of about white metal grade, the resultant product being blister copper.

Pyritic smelting practically was invented by John Hollway, in 1878, though he did not succeed in bringing the process to do satisfactory work. The experiments of Hollway were made in an endeavor to smelt Rio Tinto copper sulphides by heat generated through the oxidation of their sulphur. The first attempts along this line in the United States were made, circa 1887, at Toston, Montana, where a partial success was scored. The first absolutely successful pyritic smelting was done by Robert Sticht at Mount Lyell, Tasmania, in the early years of the present century.

While pyritic smelting is rather closely allied to raw sulphide, or semi-pyritic, smelting, it differs considerably in theory from that process. Full pyritic smelting practically is a bessemerizing process from the start, carried out in blast furnaces, rather than in converters, in its earlier stages. The process consists of the reduction of sulphide ores without the use of other fuel than the sulphur contained in the ore itself, whereas semi-pyritic smelting is the reduction of sulphide ores to matte with extensive use of the fuel values of sulphur contained in the ore, and with a minimum charge of carbonaceous fuel. In theory pyritic smelting is applicable to any raw sulphide ore not carrying lead. The roasting or calcining of sulphide ores drives off, by oxidation, large quantities of sulphur, which undoubtedly is a valuable fuel, providing it can be so burned as to give an oxidizing or reducing atmosphere in a furnace. Sulphide ores occasionally require a small addition of oxidized ores to serve as fluxes.

In theory one pound of pyrite, burned in a furnace, is equal to 2,025 British thermal units, this being about 35 per cent. of the calorific value of a pound of average carbonaceous fuel, but in practice the percentage of value in pyrite probably is considerably smaller. Making all reasonable deductions, one pound of pyrite probably carries fuel values equivalent to 15 to 20 per cent. of the fuel values contained in a pound of coke. The fuel value of a unit of pyrite burned to FeO and $2SO_2$ is calculated by Lewis T. Wright as 1.926, while given by other authorities as only 1.29, this comparing with 8.08 calories secured from the combustion of one unit weight of carbon burning to CO_2. It is probable that Mr. Wright's figures are a very close approximation to the actual calorific value of pyrite.

One of the principal disadvantages, and probably the greatest disadvantage, encountered in full pyritic smelting, is that sulphur will burn only in the presence of an excess of free oxygen, which greatly lowers the temperature of the smelting zone. Sulphur, when pyrite is the fuel, burns in three stages. In the first stage of combustion, pyrite, which consists of one atom of iron and two of sulphur, chemically united, loses one-third of its sulphur and forms Fe_2S_4. In the second stage there is a loss of one-sixth of the original sulphur contents, leaving a residue of FeS. In the third and final stage of combustion the single atom of sulphur is dissociated from the single atom of iron in the FeS, completing the work of reduction. This process of three-stage combustion is long drawn out, lowering the temperature of the smelting zone, and causing scaffolding, and the building up of concretions of semi-fused charges on the sides, through which the blast cannot penetrate. In theory the ore should furnish its own fuel in the sulphur contained, but in actual practice it is, of course, necessary to use a little coke, to start the process of combustion, just as it is necessary to use kindling to start a fire of anthracite coal, but in full pyritic smelting no carbonaceous fuel is required, after the initial warming up of the furnace and charge.

The most successful application of the theory of pyritic smelting has been made at the Mount Lyell mine, Tasmania, by Robert Sticht. The Mount Lyell pyrite averages about 46 per cent. sulphur, 40 per cent. iron, 4.5 per cent. silica, 1.5 per cent. barium sulphate, 2 per cent. aluminum sesquioxide and 2.35 per cent. copper. To this ore is added silicious bornite, purchased from other mines, with quartz for flux. The ore is smelted without previous roasting, and without carbonaceous fuel, other than is required for preliminary warming of the furnace and charge, to a matte of 15 per cent. copper tenor. Formerly 3 per cent. of coke was used, and a hot blast of about 525° Fahrenheit was employed, but the use of coke has been abandoned and the blast is only warmed. The first fusion product, 15 per cent. matte, represents the putting of 7 tons of raw ore into one ton of low grade matte, and the process, in addition to affording a remarkable technical success, is highly successful from a commercial point of view, by reason of its cheapness. The 15 per cent. matte is recharged and brought, in the second fusion, to a copper tenor of 45 to 50 per cent., a small percentage of limestone and coke being used for the second fusion, with a cold blast. In both fusions the charge is subjected constantly to an oxidizing rather than to a reducing process. The total consumption of carbonaceous fuel averages 3.25 per cent. only, for the double smelting, all of the coke, except the preliminary warming charge, being used in the second process.

Much valuable work in pyritic smelting has been done by Lewis T. Wright, at the Iron Mountain mine, California. He found that with a cold blast the sulphur gave rather less than one-third of the total calorific power of the sulphur volatilized, while the warm blast diminished the percentage of coke in accordance with the heat generated by the increasing quantity of sulphur burned. Mr. Wright's experiments showed 39 per cent. of the total heat generated to be carried off by gases, 25 per cent. to go in slags, and the balance of 36 per cent. to pass off in radiation from the furnace and in the molten matte produced. Air to the extent of about 350 cubic feet was required for each pound of charge. The difficulties in the way of

where the constituents separate according to their specific gravities, the dissolved copper and iron sulphides floating to the surface. When the mould has solidified the parts are separated by fracture, and the tops, containing copper and iron sulphides, are recharged into a smelting furnace, where the sodium sulphide is fluxed for an iron slag. The bottoms of the moulds, containing nickel sulphide, but with more or less copper and iron sulphides admixed, are resmelted by the same process as before. Formerly four or five successive smeltings were necessary to bring the nickel sulphide to sufficient purity for the refining process, but by a recent improvement a longer smelting period is given, causing more complete dissolution of the copper and iron sulphides, and two treatments are sufficient, in an open-hearth reverberatory furnace, to effect fairly complete separation of the nickel and copper, 50-ton charges requiring four to five hours heating, after complete fusion.

The Mond process of reducing nickel-copper matte takes a bessemerized matte that is dead-roasted, which is treated with a little sulphuric acid, permitting the extraction of about two-thirds of the copper contents. The full process of securing the nickel is described in the article on the Mond Nickel Co., Ltd.

CHAPTER VIII.

The Electrometallurgy of Copper.

For many years the possibility of electric smelting has excited the interest and efforts of scientists and practical metallurgists. Much experimental work has been done, and substantial progress has been gained, though no process of electrical smelting has been demonstrated fully successful. The first serious work in this line was done by Héroult, whose initial experiments on 7% sulphide ores gave mattes up to 45 per cent. in copper tenor, with slags carrying only 0.1 to 0.2 per cent. copper. Electrodes of carbon are used in smelting, and one of the principal difficulties encountered in actual work results from arcing, troubles from short-circuiting having given the most serious difficulties encountered in efforts at electrical smelting. Basing the figures upon the experiments of Héroult, about 3,000 horsepower are required for the operation of a hundred-ton furnace, and the consumption of carbon electrodes is 6 to 7 kilograms per ton of ore treated. Many electrical furnaces have been patented, but none are in commercial use as yet, on copper ores, though substantial progress has been made in the electrical reduction of iron ore. As yet there remain serious practical difficulties in the way of successful copper smelting by electrical energy, though these are being overcome, gradually, but the process, even if perfected, remains too costly for general use. It seems probable, however, that some form of electric smelting will become sufficiently perfected, within a comparatively short time, to permit its use in districts where large water powers can be harnessed at cheap cost, and where carbonaceous fuel is unusually costly.

There have been numerous attempts at the direct reduction of copper ores by electrolysis, and some of the experiments have given encouraging results. The Borchers process provides for the direct electrolytic reduction of 80 per cent. copper matte, but it does not seem that matte would furnish very satisfactory anodes. The most promising of the electrolytic direct reduction processes is that of Dr. Laszczynski, which was being utilized, in 1907, in Poland and near Semipalatinsk, Siberia. By this process ores are first crushed, then, if sulphides, are briquetted and roasted, to produce a mixture of copper oxide and sulphide. The roasted ore is then leached with dilute sulphuric acid, the product being a solution of copper sulphate, which is subjected to electrolysis, with the use of insoluble anodes. By means of an electric current the copper sulphate is separated into copper and SO_4, one atom of oxygen from the SO_4 escaping, leaving sulphur trioxide, which combines with water to form sulphuric acid. The ferrous sulphate in the anode, or rather in the electrolyte, is converted into ferric sulphate, which exercises upon the cathode a dissolving force equal to that of dilute nitric acid, reducing precipitation by fully one-half and giving a low grade and brittle metal in the cathode. The iron salts exist, necessarily, in the bluestone in large quantities, and are decidedly pernicious, but the process provides for the continuous making of sulphuric acid in the electrolyte. The anodes are of sheet lead, covered with thick cotton cloth.

and has greater tensile strength than pure copper, but should not contain more than traces of lead or antimony.

Nickel, in very small quantities, is a common impurity of copper, and has about the same effect as iron, reducing electrical conductivity slightly, but having no other apparent bad effect. Copper containing 2 to 3 per cent. nickel is harder and of higher tensile strength than pure copper, but should not contain more than traces of lead or antimony.

Oxygen unites with copper readily, in the form of cuprous oxide, and practically all refined copper contains a small fraction of one per cent. cuprous oxide. Up to one per cent. cuprous oxide does not affect malleability, if no other impurity is present in considerable quantities. Cuprous oxide will melt at red heat, without decomposition, and frequently becomes a component part of the refined copper. Cupric oxide in small quantities has no apparent effect on the metal, but in quantities of one-half per cent. or more lowers ductility, though not injuring the metal in other respects, even in quantities up to 10 per cent. The factor of ratio in reducing the conductivity of copper is 25, oxygen usually being found in the metal in the form of cuprous oxide.

Phosphorus, to the extent of 0.2 per cent., gives copper that can be rolled hot, and is highly malleable, but in small quantities renders copper cold-short, and, if present to the extent of 0.5 per cent., causes red-shortness. Phosphorus copper, which is harder than pure metal, should contain 99.7 per cent. to 99.8 per cent. copper, 0.05 to 0.1 per cent. phosphorus and not more than 0.04 per cent. oxygen. Phosphorus is the most deleterious element known, so far as affecting the electrical conductivity of copper, and if present in copper to the extent of 0.08 per cent. lowers conductivity to 52.3 per cent., the factor of ratio for reduction of electrical conductivity of copper being 3,000, the highest known.

Selenium occurs occasionally in crude copper, but can be eliminated quite thoroughly by electrolysis. It would seem that the peculiar physical properties of selenium should give it a greatly increased market, and in such case the metal can be secured in considerable quantities, as a by-product from electrolytic refineries.

Silicon, in even small quantities, renders copper red-short, but up to 2 per cent. does not affect ductility. Three per cent. causes brittleness, and copper containing above 5 per cent. silicon is too brittle for any ordinary use. Silicon to the extent of 0.007 to 0.042 per cent. reduces the electrical conductivity of copper less than 1 per cent., the factor of ratio for lessening the electrical conductivity of copper being 70.

Silver, which is quite thoroughly eliminated by the electrolytic process sometimes is found in electrolytic copper to the extent of an ounce or so per short ton, and in commercial blister copper frequently is present to a much greater extent, especially in Lake copper. Silver in small quantities has no appreciable bad effect on finished copper, except for a very slight reduction of electrical conductivity, the factor of ratio for lessening the electrical conductivity of copper being only 6.

Sulphur usually is found in blister copper in the form of barium sulphate. When present to the extent of 0.25 to 0.5 per cent. sulphur causes cold-shortness, but the injurious effect may be offset by the addition of manganese or aluminum. The factor of ratio of sulphur for reducing the electrical conductivity of copper is only 8.

Tellurium, to the extent of even 0.001 per cent., renders copper appreciably red-short, and slightly larger quantities render the copper both red-short and cold-short. Tellurium has much the same effect as arsenic on copper, but to an intensified degree, and when present to a very small extent renders copper of wonderful hardness. Its use is recommended to those who are endeavoring to temper copper. Tellurium does not greatly affect the ductility of copper, and Sperry states that tellurium in high brass does not affect rolling, unless present in quantities of more than 0.1 per cent., when the brass cracks in rolling. The factor of ratio for lessening the electrical conductivity of copper is only 4.

Tin, in small quantities, renders copper red-short and brittle, but ductility can be restored, at least partially, by heating to cherry red and cooling suddenly. Copper containing 0.2 per cent. tin can be rolled hot, and is highly malleable. When present to the extent of 1 per cent. or upwards, tin materially lessens the ductility of copper. The factor of ratio of tin in reducing the electrical conductivity of copper is 67.

Zinc, as an impurity in copper, causes trouble in smelting, though not a highly deleterious impurity in the final product. When present in copper, to the extent of 0.2 per cent., zinc causes the sheets to crack at the edges when rolled, and in considerable quantities lessens ductility. The factor of ratio of zinc in reducing the electrical conductivity of copper is 30.

The great bulk of the world's copper production, with the exception of the Lake Superior output, is refined electrolytically. The principal advantages of electrolytic refining are that gold and silver values contained in the blister copper are saved, practically intact, while the product of the electrolytic refineries is a copper of unusual purity. The principle of electrolysis, or the parting of metals and the redeposition of one selected metal by the aid of a continuous electric current, was discovered in 1835, by Michael Faraday. As early as 1836 Becquerel planned works for the electrolytic recovery of copper and silver, but, owing to the prohibitive cost, the effort was abandoned. The first patents relating to electrolytic refining were taken out by Elkinton, of Birmingham, in 1865 and 1869, and in 1870 a plant was built at Swansea to utilize this process. A little later several small electrolytic refineries were built in Germany and France, and in 1879 the first American refinery to use electrolysis was erected in Phoenixville, New Jersey, this being followed, in 1881, by the construction of the Balbach works, at Newark, New Jersey, the latter named plant being the first to do electrolytic refining of copper on a considerable commercial scale. Shortly after the construction of the Balbach works, new plants of considerable importance were built in both France and Germany, followed, at a slightly later date, by the construction of new electrolytic plants in England and Wales. Previous to the opening of the great Boston & Montana electrolytic plant, at Great Falls, Montana, in 1893, electrolytic copper was produced mainly in Europe, but America now furnishes more than half of the electrolytic copper production of the world, doing electrolytic refining of blister copper from South America and Australia, as well as from the United States, Canada and Mexico.

Considerable secrecy regarding processes is maintained at many electrolytic refineries, but while the practice varies at different plants, the fundamental principles are the same in all works, and are understood by all competent operators. There are two principal systems of electrolytic refin-

ing, with numerous minor modifications. The series system uses rolled sheets, requiring a special rolling mill, and has electrodes in series and tanks in series, or, more frequently, in multiple series. The multiple system uses cast anode plates of 1 to 2.5 inches thickness, requires a much smaller electromotive force than the series system, and is in much more general use.

The tanks in which the process of electrolytic segregation and redeposition is carried on may be of wood, lead or slate, usually the former, though lead seems preferable. The wooden tanks usually are lined with lead, tarred felt or asphalt. The tanks may be set upon the floor, usually of cement, or may be sunk, leaving the tops about flush with the floor, to permit easier handling of the material. Tanks are terraced, in series, providing for a natural circulation of the electrolyte, which is pumped into the upper tanks and flows thence, by gravity, from tank to tank, until the bottom terrace is reached, when again pumped to the upper tanks. The Baltimore refinery uses tanks 9x2x2.5 feet in size, containing 130 electrodes of two plates each, giving a total weight of 5,700 pounds of charge, the process being carried on at a temperature of 20° Centigrade, with a power cost of about twenty dollars per horsepower year.

Connections between dynamos and tanks are made of high conductivity copper, necessarily of large size, to carry the heavy current used, and are of varying forms in cross-section, overlapping slabs of high conductivity copper being used at some plants.

The crude copper, mainly blister copper produced by bessemer conversion, may reach the works already cast in anodes, but usually arrives in pigs, and the anode bars usually are cast from blister copper melted in a cupola furnace, kept running for the purpose, and are cast in a variety of forms, usually in thin plates with projecting lugs that rest on the sides of the tanks, one lug resting on the electrical conductor, while the other is insulated. Lugs of anodes and cathodes vary in width, permitting each to make direct contact with the poles. The average American anodes average 98 to 99.5 per cent. in copper tenor, and the auriferous and argentiferous varieties carry up to 40 ounces gold and 300 ounces silver per short ton, with from a trace to 2 per cent. arsenic, and with variable quantities, usually small, of iron, nickel, antimony, bismuth, sulphur, silicon, selenium and tellurium, and with occasional minor impurities. After the process of electrolysis has been carried on until the anodes, usually rectangular in form, are worn down to about 15 per cent. of their original weight, the remaining portions are removed, melted down and recast.

The composition of the electrolyte, which is the fluid in which the process of electrolysis is carried on, varies at different works, carrying 5 to 10 per cent. sulphuric acid and 15 to 20 per cent. bluestone, added to 70 to 80 parts of water. The average composition is 6 to 9 parts of acid and 16 to 18 part of bluestone. It is desirable that the electrolyte have a sufficiently high percentage of sulphuric acid to render its specific resistance very low. The electrolyte frequently carries a very small percentage, as low as one part in two hundred millions, of some soluble chloride, usually sodium chloride, for the purpose of precipitating silver in chloride form, sodium chloride also tending to slime antimony in the form of an oxychloride. When the electrolyte becomes too foul for satisfactory use it is purified,

brought up to the proper standard and pumped back into use. Purification usually is accomplished by working up, at regular intervals, a certain quantity of electrolyte into bluestone, and adding fresh acid. The solution deteriorates more rapidly at the higher temperatures and the low current densities, apparently in direct ratio to anode loss and cathode gain. Nickel sulphides go into the electrolyte to some extent from nickeliferous copper anodes, and arsenic also passes into the electrolyte to a considerable degree, causing trouble in elimination. The easiest method of eliminating arsenic is to reduce the electrolyte to bluestone before purification.

In the process of electrolysis metals are dissolved at the negative pole of a battery, taken into solution in the electrolyte and redeposited from the electroylte at the positive pole, where free circulation is permitted in a favorable solution, with a proper electric current. Varying currents give varying effects, and some metals pass over more freely than others, copper being one of the first to pass over. Apparently the impure metallic copper of the anode is first broken into cuprous sulphate, from which are derived the molecules of practically pure metal that are deposited on the cathodes. In actual work there is a slight redissolution of the metal from the cathode, but this is not of sufficient extent to prove seriously detrimental. Good adherent copper can be obtained on the cathodes at almost any current density, providing there is a sufficient rate of circulation of the electrolyte. Current density is employed up to 3.5 amperes per square decimeter, but the usual ratio is a current density of 14 amperes per square foot, at a temperature of 50° Centigrade. As the unrefined copper in the anodes concontains a variety of metals and metalloids, it is important that the electrical current be so regulated that the minimum of other elements pass over to the cathodes at the same time as the copper. The adjustment of the varying factors of composition and circulation of the electrolyte, current density and temperature, call for nice discrimination, to be secured only by experience and care. The matter of temperature is one of prime importance, as the cost of power decreases with rising temperature, within certain limits, and the heating of the electrolyte not only facilitates the process of decomposition, circulation and redeposition, but produces also a smoother deposit of copper on the cathodes. Covered tanks are used extensively, to increase the temperature at which the work is done, and the best results seem to be secured at a temperature of about 70° Centigrade, equal to 158° Fahrenheit.

The cathode plates are made of strips of rolled copper, of one-eighth to one-fourth inch thickness, cut into varying sizes and forms, though usually rectangular. The cathode plates are oiled and coated with fine graphite, to promote deposition, and sometimes have lead lugs soldered onto them for handling.

While the copper and minute quantities of other impurities pass over to the cathodes, the great bulk of the impurities contained originally in the anodes is first taken into circulation in the electrolyte, and then precipitated to the bottom of the tank, as sludge or slimes. If more than traces of impurities are carried over to the cathodes it is because the electrolyte has become foul, or the current is wrong. Constant watchfulness is necessary, as apparently slight causes may bring about serious disarrangements of the process, at any point. The sludge precipitated to the

CHAPTER IX.

The Alloys of Copper.

The work of alloying the metals is a special branch of the metallurgical art, requiring much technical skill and experience, owing to the different melting points of the component metals, and their different capacities of oxidation and volatilization. Insufficient heat causes segregation of the different constituents, in the case of many alloys.

Zinc is the metal most commonly alloyed with copper, the product being brass. The proportions of the two metals vary greatly, ranging up to equal quantities, in the case of very high brass. Ordinary high brass is composed of two parts copper and one part zinc, and is of a light yellow color. Low brass ranges from 75 to 88 per cent. copper and 12 to 25 per cent. zinc, and is considerably ruddier in color than high brass. The addition of lead, to a small extent, usually not exceeding 5 per cent., gives an improved color to brass, and renders the metal more suitable to machining, as well as slightly reducing the cost. Ordinary commercial brass frequently contains 2 to 5 per cent. tin, which gives added strength and density. There also are special brass alloys containing lead, aluminum and manganese, in addition to copper and zinc. Brass is a much poorer conductor of heat and electricity than copper, and is more easily fusible.

Tin is mixed with copper in a variety of proportions, giving a considerable range of bronzes, with rather remarkable variations in their physical characteristics. Bronze probably is the most ancient alloy known to man. An alloy of 97 per cent. copper with 3 per cent. tin, practically a bronze, makes good sheathing metal. A small quantity of tin added to copper causes it to become brittle, but the ductility can be restored, at least partially, by heating to a cherry red, and cooling suddenly. Ancient bronze for tools and weapons ranges from 85 to 92 per cent. copper and 8 to 15 per cent. tin. Ancient bronze medals carry 8 to 12 per cent. tin. Ancient bronze mirrors contain 20 to 30 per cent. tin. Flexible bronze contains about 95 per cent. copper and 5 per cent. tin. Gun metal ranges 90 to 91 per cent. copper and 9 to 10 per cent. tin, and if the percentage of copper is increased the gun metal becomes liable to liquation. Bell-metal contains 80 to 84 per cent. copper and 16 to 20 per cent. tin. This is highly sonorous, when cast in bells, and makes good castings, but is decidedly hard, brittle, and difficult to work. Sudden cooling reduces the brittleness and restores the hardness. Bell metal is malleable at a low heat and can be forged, if handled very carefully. Speculum metal contains about 75 per cent. copper and 25 per cent. tin, and is harder and whiter than bell metal, and even more brittle and difficult to work.

Brass-bronzes are used for a variety of purposes, and for certain specific uses alloys composed of copper, tin and zinc are preferable to either brass or bronze. Bearing brass is much harder than common brass, and contains 80 to 82 per cent. copper, 10 to 14 per cent. tin and 2 to 4 per cent. zinc, being a brass-bronze rather than a brass. A cheaper and less efficient

bearing brass contains a smaller percentage of copper and a greater proportion of zinc. Muntz's metal is brass containing 60 to 62 per cent. copper and 38 to 40 per cent. zinc, and commonly carries about 0.2 per cent. in iron, nickel, tin, arsenic, or manganese, usually as a combination of several of these elements. There are a number of proprietary anti-friction metals having copper as a base, with varying proportions of tin and zinc, these being as a rule more closely allied to bronze than to brass, though a cross between the two metals.

Aluminum is the base of a number of important copper alloys, and the tensile strength and ductility of aluminum wire are much improved by the addition of as little as 1.5 per cent. copper. Aluminum bronze is a bronze containing about 3 per cent. aluminum, used largely for water-tube boilers. Several varieties of aluminum bronzes show high tensile strength, and an alloy of 96 per cent. copper and 2 per cent. aluminum gives a strong and fairly rigid metal. Albradium is an alloy having aluminum for its base, with the addition of copper, nickel, zinc and phosphorus. This alloy takes a very high polish and has good tensile strength. Aluminum alloyed with small quantities of nickel and copper has shown a tensile strength of 40,000 pounds per square inch.

Nickel copper, containing 2 to 3 per cent. nickel, is harder and of higher tensile strength than pure copper, but should not contain more than traces of lead or antimony. Monell metal is a natural alloy of copper and nickel, made from the nickel-copper ores of the Sudbury district. German silver is an alloy of 5 parts copper, two parts zinc and one part nickel.

Steel has been alloyed with nickel and copper, the latter to the extent of about 0.5 per cent., for the facing of compound armor plate, and this metal is said to resist corrosion as well as wrought iron.

Manganese, to the extent of 2 to 3 per cent., alloyed with copper, gives a product that is harder and of higher tensile strength than pure copper, if containing no more than traces of lead and antimony.

Arsenic alloys readily with copper, such alloys offering phenomena that are not fully explained by the chemical and metallurgical knowledge of the present day. Alloys of copper and arsenic are known usually as blanched copper, or speiss. Arsenical copper should contain at least three times as much arsenic as lead and bismuth combined, but should not exceed 0.6 per cent. arsenic, unless it be considered an alloy. Experiments on binary alloys of copper and arsenic show that arsenic lowers the melting point, down to about 20 per cent. arsenic, reaching the lowest point of fusion at 685° Centigrade, with an alloy of 19.2 per cent. arsenic, corresponding to the formula Cu_4As. With increase of arsenic the fusion point is raised to 747°. Centigrade with 28.34 per cent. arsenic, which corresponds to the empirical formula Cu_3As, and to 810° Centigrade with 32.2 per cent. arsenic, corresponding to the formula Cu_5As_2, an alloy with 37.4 per cent. arsenic giving the formula Cu_2As. The practical limit of the direct binary compound of copper and arsenic was reached with 41 per cent. arsenic, corresponding to the formula Cu_1As_1. The alloy of 19.2 per cent. arsenic gave a surface of pale blue color, the alloy of 28.34 per cent. gave a deep blue, 30 per cent. gave light purple, and 32.2 per cent. gave a reddish purple color to the surface of the alloy.

Mercury alloys with copper in the proportion of three parts of copper

to seven parts of mercury, making a copper amalgam known as Viennese metal cement.

Phosphorus, in small quantities, renders copper considerably harder than when pure. Phosphorus copper should contain 99.7 per cent. to 99.8 per copper, 0.05 to 0.1 per cent. phosphorus, and not more than 0.04 per cent. oxygen.

Strontium and tungsten, in small quantities, alloyed with brass, give a golden metal of great tensile strength, strongly resistant to atmospheric influences. The alloy contains 60.8 per cent. copper, 37.6 per cent. zinc, 0.4 per cent. tin, 0.3 per cent. strontium, 0.3 per cent. tungsten, 0.3 per cent. aluminum, 0.2 per cent. manganese and 0.1 per cent. iron.

Tellurium, in small quantities, renders copper of wonderful hardness, though also causing it to become red-short, having much the same influence on the metal as arsenic, but to an intensified degree.

Gold and silver are alloyed with copper for coinage purposes, and for trial plates and medals.

Imitation gold, bearing a striking resemblance to the real article, is made by an alloy of copper, tin, nickel, silver and aluminum.

CHAPTER X.

THE BRANDS AND GRADES OF COPPER.

Copper is placed on the market in a variety of grades and shapes, descriptions of which are appended.

Lake copper is the product of the native copper mines of Lake Superior. Lake copper varies greatly in characteristics, and materially in price, the Calumet & Hecla brand being nearly as free from impurities as the best electrolytic copper, while the Copper Range metal is highly arsenical, and between these grades there is a great variety of brands made by different mines. The lake copper is the toughest that is made, hence is especially suitable for wire-drawing or cold-stamping. The best brands of lake copper command a premium over electrolytic, this varying from time to time, but averaging about one-eighth cent per pound. The standard of conductivity of lake copper is 99.5, but there is a considerable range of conductivity among the various brands, this running as low as 91 per cent. in Wolverine copper and as high as 101 per cent. in the metal from the Quincy and Michigan mines. Lake copper possesses greater tensile and torsional strength than is found in other brands. In addition to the domestic market, lake copper finds a limited but steady demand in Europe, for all uses where copper of special toughness is required, as in the making of cartridge cases, metallic buttons, etc.

Electrolytic copper is copper from any source that has been refined electrolytically, and the cathodes average about 99.93 per cent. fine. Copper made by this process is the purest chemically that is on the market, and is the best conductor of electricity, having conductivity up to 103, but lacks the toughness of lake copper, hence is not so suitable for wire-drawing or cold-stamping, but for some other uses is preferable, and for most purposes there is little choice between lake and electrolytic.

Approved brands of copper are those that have been approved by the London metal market, and include practically everything that would pass as standard copper.

Best selected copper averages about 99.75 per cent. fine, and is used largely by brass foundries for making brass castings, rolling brass sheets and drawing brass tubes.

Tough cake is practically the same as best selected copper in the English market, prices being the same, and is used mainly for rolling and for tube and cylinder making. The average tenor is about 99 per cent. copper, and this grade usually contains a little lead, which is no particular detriment for the uses noted.

Tough copper is practically the same as tough cake, and is used for wires and sheets.

Ingot copper is [illegible] market with tough cake, and is practically [illegible]

G. M. B. copp[illegible] merchantable brands.

Good merc[illegible] used extensively in the Engli[illegible] copper. The

old title was so misused that it deteriorated sadly, and became very indefinite, in time including almost anything that could be called copper.

Chili bars are bars of blister copper from Chile ranging 95 to 99 per cent. in copper tenor. The term is in much less general use than formerly and most of the Chili bars are sold as standard copper.

Standard copper covers almost anything carrying 96 per cent. copper and includes considerable metal that is decidedly inferior, much of it containing very undesirable impurities. The price ranges two to three pounds sterling per ton under the market price of tough copper. The average tenor of standard copper probably is about 97 per cent. Standard copper is more a standard for speculation, in the metal market, than a grade for actual consumption, as most of the low-grade copper included under this name is used either as casting copper, or is brought up to high grade by electrolytic refining.

Rough copper is practically the same as standard copper.

Casting copper is rough metal, not suitable for the manufacture of wires or sheets, containing considerable impurities of a serious nature, being suitable only for casting purposes.

Tile copper is brittle, and is suitable for casting only, hence usually is graded as casting copper, in the English market.

Scrap copper is the remnants from the manufacture of sheets, wire, etc., and is of good average grade, though in undesirable form, but can be melted down into cakes or ingots.

Copper is placed on the market in a variety of forms, which are listed as follows:

Ingots are cast in two sizes, the standard weight being about 56 pounds avoirdupois. Copper is put up in this form mainly for casting purposes, the two deep depressions in the top of the ingot being provided to facilitate the cuting of the ingot into three parts.

Wire bars are cast 3 to 4 inches square and 3 to 7 feet in length, averaging in weight 300 to 400 pounds, and, as the name implies, are used for wire-drawing.

Cakes are cast square, in weights of 100 pounds or upwards, some special cakes for the Russian market weighing as high as 4,000 pounds each. Copper in this form is used almost exclusively for rolling into sheets.

Moulds are somewhat similar to cakes, and are used mainly for rolling into sheets.

Anodes are cast in plates about 2 by 3 feet in size, and have an average thickness of about 1½ inches, with an average weight of about 250 pounds. Crude copper from the furnaces is cast into anodes for electrolytic refining.

Cathodes are of approximately the same size as anodes, except that they are much thicker at the top than at the bottom, and while the copper contained is exceptionally pure, it is in crystalline form, and the cathodes are melted down and run into other shapes, cathodes rarely appearing on the finished copper market.

Flat bottoms are circular copper sheets, used for making copper boilers, pans, etc., and in the English market command a slight premium by reason of being partially manufactured shapes.

Sheet copper is cold-rolled metal, and commands a premium by reason of being partially manufactured.

Sheathing copper is hot-rolled metal; and, like sheets and bottoms, commands a premium over ordinary brands by reason of being partially manufactured.

The various alloys of copper, some of which are of considerable commercial importance, are treated in the preceding chapter, devoted to alloys.

Tempered copper is a will-o-the-wisp that is referred to frequently. Many inventors, usually poorly equipped with technical skill, have wasted much time in efforts to rediscover the "lost art" of tempering copper, and, on an average of once yearly, the American press contains long articles giving hazy details of a rediscovery of the process of tempering copper to the hardness of steel, such wonderful discoveries usually being made by blacksmiths in Maine, cobblers in Pennsylvania, farm-hands in Illinois or cow-punchers in Texas. A typical example of one of these processes is furnished by a lady in the state of Washington, who puts a razor edge on copper tools by adding an ounce of bluestone to a hundred pounds of copper, while molten, and, if an especially fine edge is desired, an ounce of bichromate of potash is added to the charge. The lady inventor evidently is a homœopathic metallurgist. It is doubtful if the mound-builders of America possessed any special art of tempering copper, as it has not been proven that the copper tools of the ancients were harder than those made from modern copper. If tempered copper were greatly to be desired, it is probable that it might be furnished with the aid of tellurium, a small quantity of which renders copper exceedingly hard, but as tempered copper merely would replace steel, in most instances, and as steel is very much the cheaper of the two metals, a perfect process for tempering copper seems unnecessary.

CHAPTER XI.

The Uses of Copper.

Iron, copper and zinc are the three indispensable metals of the present age. The less of tin, or lead or even of nickel or aluminum would be a severe blow, working great hardship, and, even were we to be deprived of such apparently insignificant metals as antimony, cobalt, manganese and platinum, the industrial world would suffer a loss entailing disastrous consequences. The taking away of gold and silver, and that useful thief-taker, mercury, which catches most of the world's gold supply, would reduce the finances of the globe to chaos. Iron and copper, however, are the main pillars of the metallic structure, while zinc, in addition to many other virtues, possesses the unique quality of being the only electrically negative metal, and, without it, copper, for electrical uses, would be much like a "pair" of scissors with but a single blade.

Many great industries are dependent upon the metal copper, which, directly and indirectly, affords employment of some hundreds of thousands of persons, mainly skilled workmen, and adds nearly or quite five hundreds of millions of dollars yearly to the wealth of the world. Copper is nearly as indestructible as the precious metals, and its life is infinitely longer than that of iron or steel, as has been brought to attention by more than one archæological discovery, in which bronze weapons or implements were practically intact, while those of iron or steel were represented merely by streaks of rust.

The engineering trades take nearly half of the total copper production of the world, and, until about 1890, used nearly or quite four-fifths of the entire output of this metal. Since that time has been witnessed the wonderful development of the various branches of the electric industry, and, at the present time, electricity, in some of its various forms of energy, is the largest single user of the metal, with every indication that the electrical requirements of the future will continue to expand, almost indefinitely.

Electrical machinery, as dynamos or motors, is a heavy consumer of copper and brass, but the principal consumption of copper for electrical uses is in the form of wire, for the transmission of energy to be used for power, traction and lighting, and for the electrical impulses providing the conveyance of messages. Copper is an integral factor of prime importance in all electric installations, and for the transmission of power, light and telegraphic or telephonic impulses, is a necessity. It is true that iron wires were used by the pioneers in the telegraphic and telephonic fields, but these are giving way rapidly to strands of copper. Iron is of low electrical conductivity. rendering it an inefficient and costly medium for transmission, and its lack of ductility, and the ease with which it is rusted, render it far less desirable than copper, though it is used at times because of its greater cheapness.

The life of copper wire is as yet undetermined. When laid under-

ground it is affected by electrolysis, but to nothing like the same extent as iron, and copper wire, in the atmosphere, while undergoing some surface oxidation from carbon dioxide and sulphur vapors, is but slightly affected thereby.

The trolley line of the present day, threading its way through the mazes of every city and town of any importance, and weaving a spider's web over most of the thickly populated sections of the United States, is a strictly modern affair, and may be said to date from about 1890, the earlier lines having been few in number, short in length, and of an experimental and usually unsatisfactory nature. At the end of 1906 there were upwards of 40,000 miles of trolley lines in the United States, requiring upwards of 40,000 tons of copper for power transmission alone. The average weight, in that year, of trolley wire in the United States, was 1,688 pounds per mile for short lines and 2,687 pounds per mile for long-distance power lines on interurban and well-equipped city roads. The trolley line is as yet in its infancy, and the time will come, unless some superior means of traction shall be invented later, when the United States alone will have more than a million miles of electric roads, wild as this prediction may sound at the beginning of the Twentieth Century. Furthermore, the trolley line must grow more popular in all other countries. The United States has led in the electrification of transportation lines, but the cities of Europe are now possessed, in most cases, of modern electric street railways, and it is but a question of time when interurban lines will supplement urban transportation facilities in Europe, as they now do in the United States.

In addition to the large quantities of copper required for power transmission lines, the metal is used very extensively in the motors of the cars themselves. The weight of copper in a street railway car ranges from a minimum of about 250 pounds to a maximum of nearly one ton, a forty horse-power trolley-car motor containing an average of about 800 pounds of the metal.

The electrification of steam railroads has been discussed academically since the trolley-car first became a factor of importance in the field of transportation. The work of electrifying the steam lines has proceeded but slowly, much to the disappointment of many urgent advocates of such a change, but the reasons for this slowness are not difficult to find. Thousands of millions of dollars have been invested in steam railroads, in the United States alone, and it would be folly, or worse, for those in charge of these lines to discard an old and proven motive force for a newer power, until the latter had demonstrated fully its ability to do t more cheaply and advantageously.

In the war now on between the steam roads and trolley urban and suburban passenger business, the trolleys have had the better of the battle, and are now forcing the fight into the the enemy, by means of linking together various interurban lin which plan long stretches of road have been brought into sing On some of these lines dining and sleeping cars have been but the latter seem to be more in the nature of an advertis boast, than for practical use. The steam locomotive and trolley-car have been running side by side for a sufficient leng

in a sufficient number of fields, to afford fair basis for comparison, and a dispassionate survey of both fields leads to the conclusion that neither is supreme, and that, for at least many years to come, the steam locomotive will hold its own, on many lines. Each method of traction has its advantages and disadvantages. It is possible to build an electric motor that will compete with any steam locomotive, as to speed and tractive power, but this would require feeding from a much heavier wire than now in use on any trolley line. For long hauls and great speed between distant points, the trolley cannot yet be held a serious competitor of the steam locomotive, while for short distances, immediate access to centers of population, and frequency of trips, the electric line has proven its great superiority to the steam road.

Electrification of tunnels and terminals has been undertaken by a number of railroads, and electric traction offers so many points of superiority for these special uses that it is certain to dispossess the steam locomotive, in the majority of cases.

It is now possible to distribute electric energy for great distances, without serious impairment or waste, and it would be folly to attempt to set a limit to the future possibilities in this field. Eventually it may be found practicable to transmit electric energy from great central stations, located at available water-powers, or in coal-fields, along many hundreds and even thousands of miles of railway line, and when that time arrives, the steam locomotive will have met its Waterloo. That steam ultimately will be displaced by electric power, in many, and probably in the majority of cases, may be accepted as a reasonable probability, but this process will be gradual, and due allowance must be made for the influence of future inventions, which may give an entirely new phase to the situation. It should be borne in mind, in this connection, that the past decade has witnessed some marvelous developments in the production of power, entirely outside of the electrical field, these including the perfection of the turbine steam-engine, great improvements in turbine water-wheels, the vast increase in scope and power of internal combustion engines, and the utilization of producer-gas. The prophet who attempts to peer too far into the future may strain his reputation, as well as his eyesight.

Hydro-electric power installations are becoming very common, throughout the world, and from these plants electric energy is distributed for distances of fifty to one hundred miles, and even for one hundred and fifty miles in the case of some of the later installations. In transmitting power for long distances, a high voltage is used, almost invariably, the current being stepped down at the point of utilization. Water power, which was the principal mechanical force of the world, one hundred years ago, but which fell into very general disuse about the middle of the Nineteenth Century, is coming into its own again, and where a stream was made to furnish a few hundred horse-power, by means of a wasteful overshot water-wheel, fifty or seventy-five years ago, the same stream now gives thousands of horse-power by means of the economical water turbine. The utilization of water power is revolutionizing the location of industries, which, for the past three generations, have been located near fuel supplies, or along the lines of least resistance in the distribution of fuel.

Electric lighting has ceased to be a novelty or a luxury, and is now

a necessity in every progressive community. There can be no question that eventually electric energy for both lighting and power purposes will be transmitted throughout the country, to such an extent that rural, as well as suburban populations, will benefit fully from its use. In 1902 the American Census Bureau reported 125,143 miles of main and feeder wires connected with electric lighting and power plants, and this network of wires must have reached nearly or quite 200,000 miles in 1907.

The telephone, invented in the last quarter of the Nineteenth Century, and not in general use until after 1880, is now found scattered throughout the length and breadth of every civilized land, and in many countries that only by a stretch of imagination could be termed more than semi-civilized. Greater New York alone possesses nearly a quarter of a million telephones. At the end of 1906 the various affiliated companies of the American Bell telephone system had in use about 375,000,000 pounds of copper wire, of which more than 50,000,000 pounds were added in 1906, the increase for that year having averaged almost exactly 1,000,000 pounds per week. In addition the thousands of smaller independent telephone systems throughout the country use tens of millions of pounds of copper wire yearly. At the beginning of 1907 the Bell system of the United States had in use sufficient wire to girdle the earth thirty-eight times, at the equator, if the wire were standardized to the size used for long-distance transmission. In addition to the requirements of the telephone companies for wire, the instruments themselves contain considerable brass, and modern desk-phones are made of brass, nickel-plated. Furthermore, an immense amount of copper is required for the big switchboards of the telephone companies, and the mammoth switchboards of the electric light, power and traction lines also are consumers of enormous quantities of the metal.

In the beginnings of telegraphy, iron wire, because of its lower cost, was used very generally, but the lower conductivity of iron, and its lack of ductility and proneness to break under stress of wind or sleet, renders iron wire, while cheaper in the first cost, much dearer in upkeep than copper, and the present tendency of the telegraph companies is to replace iron with copper wire, wherever possible, the greater initial cost being more than offset by the far greater life and assurance of good service given by copper. The various ocean telegraph cables, of which there are approximately 200,000 miles in use, require many thousands of tons of copper. The government cable, between the United States and the Philippine Islands, is 8,200 nautical miles in length and in making required 19,000,000 pounds of iron and steel wire, and 3,600,000 pounds of copper wire. In addition to the wires, all telegraph instruments are made of heavy brass, and copper sulphate is used in enormous quantities for batteries, furnishing power for the transmission of the electric impulses.

In addition to the power, light and traction lines, and the telegraph and telephones, copper wire is used to the extent of millions of pounds minor electrical systems, these including messenger call systems, fire-al systems and burglar-alarm systems for banks and private reside These systems not only require much wire, but also are considerable sumers of brass for their annunciators and other instruments.

Electric heating and cooking are as yet in the experimental s to the extent that while their feasibility has been demonstrated,

cost remains prohibitive, in most cases. It is probable, however, that further inventions will reduce the cost to a point where the electric current will come into quite general use, for these purposes. The immediate availability of the electric current, which may be turned on or off by the mere touch of a switch, has brought about the very general use of electric lighting, and will bring about as wide a use for cooking and heating purposes, as soon as the march of invention will permit the furnishing of the current at lesser cost, for such uses.

In addition to its use for the transmission of electrical impulses or energy, copper wire is utilized for other purposes, in a great number of industries, though the electric trades consume more than ninety-five per cent. of the copper wire that is drawn.

Brass, an alloy of copper and zinc, is one of the most useful metals known to man, being the most valuable of all alloys, and probably is consumed to a larger extent than all other alloys that are made. The engineering trades are the heaviest consumers of brass, and, notwithstanding the immense consumption of copper for electrical purposes, it is probable that the engineering trades remain the heaviest single consuming interest in the copper trade. Every modern steam engine has brass oil-cups, and many have brass, gun-metal, bronze or composition copper bearings. Copper and brass boiler-tubes are used in locomotives and other high-pressure boilers, and every locomotive requires a large amount of brass in its trimmings. Copper tubes are used almost exclusively in marine condensers.

The ship-building trade is one of the very best customers of the copper mines. Until the era of iron vessels, prudent ship-owners sheathed the hulls of their vessels with copper, which kept the bottoms clean, and within the past few years this practice has been renewed, with modern steel steamers, on which it is necessary to plank over the hull, below the water line, in order to give a backing for the riveting-on of the copper sheets. The loss in speed, and consequent loss in time and fuel, brought about by barnacles gathering on iron and steel bottoms, is very great, and this can be obviated only by dry-docking and scraping, at considerable expense and loss of time, or by copper-sheathing below the water-line, and the latter plan is considered the cheaper. In all likelihood some method will be devised, eventually, for the plating of copper directly on the steel bottoms of boats. Every modern passenger vessel and warship of great size is a consumer of hundreds of tons of copper, in the form of brass for engines, copper and bronze for fittings, copper and brass for dynamos and motors, and in wires for telephone, telegraph and electric light systems.

In the line of land transportation, the use of copper for roofing and sheathing passenger coaches of railroads is spreading. The underground railway cars in New York are sheathed throughout with copper, which proves more durable than wood; and this utilization of the metal is likely to increase steadily, as old-style cars of wooden frame give way to steel cars. The ideal passenger car of the future will have a steel frame, copper roofing and sheathing, wooden interior finish with brass fittings, and paper wheels.

Wherever there are waterworks, brass faucets and valves are found. The

consumption of brass for valves is enormous, and for very many uses these valves, while very costly in the larger sizes, prove economical in the end.

In the arts and manufactures, copper plays a highly important part. The great vacuum-pans of the sugar factories and refineries are made of copper, and there are copper vats in pulp and paper mills. The worms and stills of distilleries are of copper, and the copper brewing kettles in which beer is made are of immense size, and are numbered by thousands. There is scarcely a branch of manufacture that does not make use of copper or brass, usually to a considerable extent, in one or many of the various processes employed. In the textile trades, copper rolls for stamping patterns on print-cloths are consumers of hundreds of tons of the metal.

Perforated metal screens of brass and copper are in use in many industries, and these, while considerably higher in first cost than similar screens of iron, are more economical for many uses. Similarly, woven wire screens of brass are replacing steel wire-cloth for many uses, the first cost being higher, but the life much longer.

The automobile may be termed a strictly Twentieth Century invention, as the modern machines date from but a few years back, even though their forbears were seen, as a rarity, in the closing years of the previous cycle. An average automobile requires about 100 pounds of copper, mainly in the form of brass, for lamps, horns and other parts and accessories. The world's consumption of copper for automobiles probably reached nearly or quite ten million pounds in 1907.

The motor-boat is another Twentieth Century invention, even more recent than the automobile, and is gaining rapidly in popularity. These boats require from fifty to two hundred and fifty pounds of copper each, according to size.

In building construction, the uses of copper are extensive and increasing. Copper roofs for buildings, with the metal in either sheet or tile form, are quite common, and the use of copper for cornices is general, these having much longer life than cornices of galvanized iron. Copper is more costly, but its freedom from corrosion and its rich appearance render it desirable for ornamental trimmings and cornices on the better class of buildings. Bronze gates and doors for churches and public buildings are highly ornamental, and of practically perpetual life. Bronze grille work is in high favor, both for its rich appearance and its durability. In some recent buildings, copper sheets have been used almost exclusively for outside walls and facings, in place of brick or cut stone. The use of this metal for sheathing interior woodwork, where exposed, as in baseboards, window-sashes, doors, etc., is increasing. In the destruction of San Francisco, in April, 1906, through an earthquake shock, followed by fire, the Kohl building, an eleven-story office structure, suffered comparatively little damage, being the only tall building in the city that was not badly injured. In this building all interior woodwork was protected by sheet copper, and it was this protection that allowed the building to escape with the minimum of damage. This use of copper is certain to increase, as the severe trial imposed in San Francisco proved the value of metallic sheathing for interior wood finish, and architects and builders have been greatly impressed by the advantages of this feature of construction. The San

Francisco earthquake and fire also proved the great danger to pedestrians resulting from the use of concrete and terra cotta cornices. There is a growing use of copper for windows and sashes made from sheet metal, and one firm in Maine turns out over one million copper-wire window-screens yearly, these costing about three times the first price of steel woven wire, but proving cheaper to the user in the long run.

In builder's hardware, brass, bronze and copper locks, knobs, butts, bolts, catches and drawer-pulls are in steadily increasing favor and use, and because of the superior durability and appearance of copper and its alloys, will continue to displace iron to a greater extent, as wealth increases and the standard of living is raised. In modern office and apartment buildings and in hotels, the mailing chute, made of brass and glass, is becoming a necessity, rather than a luxury. There is a large consumption of high-grade brass pipes and castings for gasoliers and electroliers, which are rapidly displacing the crude and often semi-barbarous iron devices of the preceding generation. Brass pipes and faucets, usually nickeled, are used in the best plumbing, for bathrooms and lavatories, on both land and sea.

The domestic uses of copper and brass are numerous and varied. Brass beds and furniture attract by their cleanliness, beauty and durability. Brass rods are used in millions of homes for stair-carpets, and for the suspension of portieres and curtains. Brass or copper lamps for burning kerosene oil are more durable than those of glass and pottery, and far safer. In the kitchen, the brazen kettles of earlier days are losing ground; there is no better material in use for cooking, when carefully cleaned, and none that may cause so much trouble if neglected.

The use of copper, in the form of bronze, for statuary, dates from prehistoric times. The ancient Greeks used mainly Pentelican marble for statues, and terra cotta for statuettes, but the modern world makes its statues and bas-reliefs almost exclusively of bronze. Iron turns to rust, wood decays, and marble is mutilated and discolored, but bronze retains the beauty and finish imposed upon it by the sculptor, being subject to slight corrosion only, in the course of ages, when buried in the earth. For general decorative purposes bronze is much used for vases, urns and similar ornamental receptacles.

The best bells are of bronze, in which copper is the principal component. In addition to perhaps a million church bells, there is a considerably larger number of smaller bells, mainly made of brass, in use in practically every power plant, and in fire, burglar and messenger alarms.

Copper is used extensively for munitions of war, the largest single requirement being for cartridge cases, with small but appreciable quantities used for buttons, and for a variety of other uses. The brass cannon, so popular fifty years ago, are in the present age used mainly for firing salutes, ornamenting public squares and trading to the heathen. Notwithstanding this disuse of the metal for ordnance, except in small salute-guns for yachts, more copper is used now, for munitions of war, than ever was consumed in the casting of cannon. Brass and copper cartridge-cases, cold-stamped from tough sheets, are consumed annually, by the world's armies, to the extent of hundreds of millions, for machine guns and small arms, and to a scarcely smaller extent by hunters. Hundreds of tons of

the best tough metal are used annually, merely to make the brass buttons for decorating the uniforms of the world's armies and navies. Brass fittings and buckles for men and horses, brass canteens, drinking cups and cooking utensils, also require much copper for the followers of Mars, though aluminum, by reason of its superior lightness, is displacing copper for the smaller metallic articles required by troops. The copper exploders, used in every metal mine where modern methods are employed, afford another use, apparently trivial, yet which is one of the scores of minor demands that in the aggregate consume thousands of tons of copper yearly. The amount of the metal consumed by the world, for munitions of war, cannot be much short of ten thousand tons yearly, in times of peace, and several times as much in season of great wars.

Copper and its alloys have been employed for coinage from time immemorial. Originally copper was a purely money metal, like silver and gold, and each copper coin, unless debased by the short-sighted cunning of the petty tyrant, oligarchy or democracy of the day, represented upon its face merely the intrinsic value of the metal it contained. Eventually the inherent impossibility of keeping three separate metals upon any fixed basis of parity led to the relegation of copper to the status of token money, for the same reason that silver coins have been made merely token money, by the leading nations of the globe, during the past hundred years. The Chinese continued to give honest values in their brass money until 1904, when the possibility of debasing the coinage, to the great profit of the provincial officials, suggested itself so forcibly to the astute minds of some of the governors that several of the Chinese mints were worked with feverish activity, in turning out new copper cash, but, as invariably is the case in any debasement of coinage, the work was overdone, and much confusion and loss has been caused by the excessive issue of copper coins, in several of the provinces. In 1904 the four mints of Tientsin, Wuchang, Canton and Foochow, emitted 3,997,710 twenty-cash pieces, and 371,916,330 ten-cash pieces, consuming therefor 13,718 long tons of copper. The total amount of copper consumed for Chinese coinage, in the three years 1903 to 1905, inclusive, probably was between thirty thousand and forty thousand long tons, though possibly greater, and the coinage requirements of 1905 alone have been estimated as high as 59,000 long tons, but this, without question, is excessive. For the fiscal year 1906 the United States government consumed about 825,000 pounds of fine copper for coinage, this including the metal for bronze cents and the copper used for alloying gold and silver coins. The monetary systems of practically all civilized countries include the use of copper for the smaller coins. It is estimated that nearly £1,000,000 in copper coins is locked up, constantly, in the penny slot-machines extensively used in Great Britain for gas-meters, and for the automatic vending of many other articles. In the United States, France, Germany and many other countries, automatic vending machines are very common, and have necessitated, in all such countries, a considerable increase in the coinage of copper money, to maintain the supply of minor coins, so heavily drawn upon by the automatic machines.

Practically the entire works of a modern clock are made of brass, and in the case of the Yankee dollar clocks, now to be found in the most re-

mote corners of the earth, practically everything but the glass front and the hands are made of brass, though the case is nickeled. The gear wheels and pinions of watches, whether of the dollar variety or of the highest grade, are made from brass, and the dials of watches also are made of brass enameled. A single firm, in the Naugatuck valley of Connecticut, stamps out one hundred thousand watch dials daily, and buys Calumet & Hecla copper in lots of five to fifteen tons therefor.

Instruments of precision used in the scientific world are composed mainly of brass. Miscroscopes and telescopes, surveyor's transits and draughtsman's protractors, and hundreds of other strange instruments, of marvelous variety and complexity, that do human work without the element of human fallibility, are composed almost exclusively of brass.

In ceramics, copper and cobalt, often found associated in nature, are the principal metals used for coloring, and an infinite variety of colors and shadings of the utmost delicacy are secured, in glassware and the higher grades of pottery, from the ores and compounds of these metals.

In the business world, the uses of copper are numerous. Signs of copper, brass and bronze stare at us from every corner of crowded city streets. Copper leaf is used by sign-writers, and in various other ways, and comminuted copper is used in bronzing. Brass rods are utilized for window displays and in various mechanisms used for exhibiting goods in retail business houses.

In offices and for clerical work, copper is consumed to an extent far beyond the wildest guess of anyone who has not given thought to the subject. Brass platens are used on typewriters, for heavy manifolding, and the best numbering and dating machines have their figures cut upon brass wheels, and brass is used in other parts of such devices. Brass wire for stapling papers is consumed extensively, as are brass paper fasteners, and the little brass clips, so easily attached to or detached from masses of papers, are used by the hundreds of millions yearly, a single set of files of the dozen or more required by the Copper Handbook, consuming about fifteen thousand such clips in every year. Hundreds of tons of copper are consumed in the manufacture of metal tips for lead pencils, these being almost invariably of brass, with a thin plating of nickel, and for metallic tips for penholders, metallic pencilholders and miscellaneous office devices and fittings.

Practically all of the high grade American toilet preparations now are put out in glass bottles, or nickeled cans. These cans, formerly of tin, now are almost invariably of brass and copper, lightly plated with nickel. A single manufacturer of talcum powder alone used more than six million small cans for his product, in 1906.

Several thousand tons of copper are consumed yearly, in the United States alone, for the manufacture of so small but necessary an article as the pin.

A single Connecticut firm uses an average of about twelve thousand pounds of copper daily for making eyelets, bals and vamps for shoes.

Brass mountings are used extensively in the manufacture of harnesses for horses, either appearing in the natural color, or plated with nickel, silver or gold. Copper is used frequently for card cases, cigarette cases and for mounting ladies' fine pocketbooks, wrist-bags, and chatelaines.

either appearing as the natural metal, or plated. Copper is used also, to a large extent, for the heads of umbrellas and canes, and is used frequently for backing combs, brushes and mirrors.

The use of copper for ornaments is very general among all savage tribes where the metal is available, either through aboriginal production or by reason of purchase from traders. Copper wires, made from ore smelted in crude furnaces, and drawn through stone mandrels, are found in Central Africa, in the vicinity of Lake Tanganyika, and are used extensively for arm and leg bracelets, ear-rings, nose-pieces and other embellishments for the person of the untutored savage. The dark-skinned Hindoo, and the darker-skinned native of Central and Southern Africa, evince one failing in common, this being a great fondness for jewelry and ornaments made from telephone and telegraph wires, but when these are succeeded, as is commonly the case, by high voltage power transmission lines, such depredations cease, after about the third consecutive funeral. Some of the telegraph and telephone companies, operating in districts where natives are unduly fond of copper wire, have found it necessary to protect their wires by currents of sufficient voltage to give severe shocks, without causing death to wire thieves.

The uses of copper enumerated in the preceding paragraphs of this chapter are for the metal and its alloys, brass and bronze. There are other alloys, not previously mentioned, such as nickel-copper, arsenic-copper, aluminum-copper and others, that are used for a variety of special purposes.

Malachite, the green carbonate ore of copper, when found massive, is a semi-precious stone of great beauty, and is much in demand for table tops and interior architecture, and also is an exceedingly beautiful stone for brooches, pins and buttons. Chrysocolla, a silicate of copper, vies with malachite in beauty and utility, and turquoise owes its beautiful blue color to the small amount of copper contained therein. Other ores of copper are ground up for pigments, many beautiful shades, especially blue and green, being secured from mixtures having copper ores as bases.

The most important copper mineral, for other uses than the production of metal therefrom, is copper sulphate, the common bluestone or blue vitrol of commerce. This is found in nature as chalcanthite, but, as a rule, is a product of manufacture. This compound is one of the most important chemical agents known to science and the arts, and is a necessity in the electrolytic refining of crude copper. It is a component part of all wet batteries, and, as such, rings our door-bells, carries our telegrams, and is the energizing agent that permits the transmission of the human voice over the wires of the telephone. In electroplating, electrotyping and kindred industries, it is the prime factor. As an insectide it stands without an equal, dilute solutions of sulphate of copper having stayed the ravages of the phylloxera, when the vineyards of France seemed doomed. It is probable that not less than one hundred thousand tons of copper sulphate, containing a quarter of its weight in metallic copper, are consumed yearly in spraying the vines and fruit trees of Europe and America, and thus it may be said that it is to copper that we owe the sparkling wines of France, the peerless American apple and the blushing peach that reaches perfection on every continent.

The consumption of sulphate of copper is not confined to horticulture and the electrical industries, as it is used, to the extent of thousands of tons monthly, in the textile factories, in the chemical industries and in manufactures of greatly varied lines. Bluestone, for the past few years, has found a new and valuable use, as a destructive agent in eliminating the algæ from domestic water supplies, and it is asserted, apparently with reason, that the typhoid fever germ is destroyed by adding bluestone to water in the proportion of one to ten millions. A bluestone solution of one to five hundred thousand is effective in killing the larvæ of mosquitos, when young.

During the Nineteenth Century the production and consumption of copper increased by more than forty-fold, and the end of the century found the metal used for nearly forty times as many purposes as were known one hundred years before. What another century may bring forth, no man can tell, but that the metal will be in strong demand, in ever-increasing quantities, for an ever-widening variety of uses, seems open to no doubt.

CHAPTER XII.

SUBSTITUTES FOR COPPER.

For many uses copper is unrivaled, while for other uses there are substitutes of greater or less utility that may become available under certain circumstances. The displacement of copper by other materials increases, in many lines, almost in direct ratio to the increase in price of copper, but while higher prices for the metal cause considerable substitution, lower prices invariably drive the substitutes, partly or entirely, out of the field.

In building construction, for making cornices and similar uses, galvanized iron is a cheap but not altogether satisfactory substitute for sheet copper. Iron remains a competitor of copper also in the wire trade, for telegraph and telephone lines, but owing to its low conductivity is not available for power transmission.

Copper wire laid underground, and not protected by tubing, is affected by electrolysis, but to nothing like the same extent as iron, and copper wire in the atmosphere undergoes some surface oxidation from carbon dioxide and sulphur vapors, but such oxidation is merely superficial. Apparently the life of a good copper wire, in ordinary use, is of indefinite and practically everlasting duration. Iron is low in electrical conductivity, rendering iron wires an inefficient and costly medium for the transmission of electrical impulses, and out of the question for the transmission of electrical energy. Iron also is subject to rust, and its lack of the ductility that is such a strong characteristic of copper, causes iron wires to break from winds and sleets that would not injure lines of copper wire. Telegraph and telephone wires of iron remain in use to a much larger extent than generally supposed, owing to the cheap initial cost of installation, but the cost of maintenance and repairs renders it certain that iron must give way to copper, sooner or later, at practically all points in this field. Many local telephone systems are installed with iron wires, but so certainly as such installations become successful, the replacement of iron by copper wires is certain to begin. Iron wires for telegraph lines are in quite general use on branches, but the principal telegraphic trunk lines are of copper.

Metallic sodium has been tested for overhead transmission. Owing to the great affinity of sodium for oxygen, it is necessary that it be protected from the air by being run into wrought iron pipes, which in turn are protected by weather-proof paint. It is claimed that, for the same conductivity, the cost of building a sodium conductor is only about 40 to 60 per cent. that of a copper conductor, but these figures are viewed with suspicion, and while sodium may become a serious competitor of copper for power transmission, in time, the prospects of strong competition from this source do not seem alarming.

Copper has but one really formidable competitor, this being aluminum, and in view of the very considerable substitution of aluminum for

copper, in certain fields, and the threat of even more strenuous competition, serious inquiry into the subject seems warranted in a work devoted to copper.

The electrical conductivity of aluminum is 63, compared with 101 to 103 in the best grades of copper. As compared with copper, aluminum has fair electrical conductivity, but lacks tensile strength. The latter defect, however, is overcome to a large extent by the greater lightness of aluminum, its atomic weight being 27, as compared with 63.2 for copper. Aluminum does not oxidize readily in the atmosphere, but when brought into contact with iron an electroytic action is brought about that causes rapid deterioration. The use of aluminum transmission wires, where exposed to the action of salt water, is impracticable, owing to rapid corrosion, and for the same reason this metal cannot be used for sheathing vessels. Aluminum wires are claimed to be superior to copper for damp places, or for withstanding acid fumes and moisture in the air or soil, these having but slight effect on aluminum.

One of the principal defects encountered in the use of aluminum for transmission wires is found in the great difficulty experienced in making good joints, although it has been stated, repeatedly, that this trouble has been overcome. Owing to the difficulty with which joints are soldered or brazed, the connections are mainly in the form of a three-way sleeve, giving a straight joint equivalent to a straight splice. In the case of large wires, dove-tailing is adopted, and, in smaller wires, a flattened tube is used occasionally. The conductivity of aluminum transmission lines is impaired somewhat by slight oxidation at the joints.

Aluminum being much lighter than copper, the number of poles required for a transmission line can be reduced, but owing to the large coefficient of expansion, aluminum wires sag heavily in warm weather.

The principal electrical use of aluminum is found in power transmission lines. This metal having lower conductivity and considerably less tensile strength than copper, its use necessitates bars or wires of considerably larger section, which disadvantage is balanced by the much lighter weight, but wires of aluminum are much more apt than those of copper to suffer from the stresses of snow, ice and wind, because of lesser tensile strength. Aluminum cables are in use in a California transmission line that carries power for a distance of 154 miles, to San Francisco. The longest transmission line is from Niagara Falls to Syracuse, a distance of 162 miles. This latter installation includes nine aluminum cables, each containing nineteen wires, giving a total length of about 28,000 miles of wire, the cables carrying a voltage of 60,000. The general concensus of opinion among those who have used both aluminum and copper wires, for power transmission, is that aluminum is materially cheaper in first cost, but not so satisfactory in operation, being more subject to accidents, and requiring greater outlay for upkeep.

The use of aluminum in electric railway systems is limited practically to high-tension lines for feeder cables, as it cannot be used for trolley lines because aluminum will not solder or braze satisfactorily, and trolley wires require carefully soldered or brazed joints made smooth. If a satisfactory method of brazing or soldering aluminum can be invented, and this would seem probable to come in time, aluminum will become a competitor

of copper in the trolley field, on practically the same terms as the metals now compete in the field of long distance power transmission. For high-tension feeder wires on trolley lines aluminum possesses one marked advantage over copper, in that it does not melt when short-circuited, as copper does.

Although extensive tests have been made with aluminum wires for telegraph and telephone lines, these have not proven satisfactory, and the metal is but slightly used for these purposes, aluminum wires being found lacking in tensile strength. The telephone and telegraph companies prefer steel wire to aluminum, and copper wire to either.

The weight of aluminum rolled is 162 pounds to the cubic foot, and for copper, 555 pounds per cubic foot. In electrical capacity for power transmission, one pound of aluminum is nearly but not quite equivalent to two pounds of copper, hence in figuring a parity between the metals, for power transmision purposes, the base can be secured by doubling the market price of copper and comparing same with the market price for aluminum, but for the purpose of final comparison, allowances must be made for the cost of drawing the wires and further allowance made for the added expense and difficulty of securing satisfactory joints in the aluminum transmission lines.

Aluminum was given an excellent opportunity of demonstrating its capacity to replace copper, during the era of high prices of the latter metal that culminated in the market break of July, 1907, but it cannot be learned that there was any very general substitution of aluminum for copper, on account of the high price of the later metal, although advocates of the substitution of aluminum for copper claimed that with copper at 26 cents and aluminum at 39 cents there was an economy of 50 per cent. in price, and of 55 per cent. in weight, in favor of aluminum.

Aluminum is becoming a serious competitor of brass in the manufacture of light castings, but for heavier work does not seem to have made much headway as yet. The aluminum castings have superior lightness, but lack the tensile strength of brass. The principal use of aluminum castings has been made by the automobile trade, but such castings do not seem to have been entirely satisfactory to some manufacturers, although well liked by other makers. Aluminum seems to be a very satisfactory substitute for copper and brass in the making of pans, kettles and boilers for various industrial uses, such as sugar manufacturing, wax refining, fruit canning, etc., and for kitchen utensils is much preferable to copper or brass. For certain uses, such as buckles, buttons, canteens, cups and other equipments for troops, the extreme lightness of aluminum renders it preferable to brass or any other metal.

For some uses various alloys of aluminum possesses considerable advantages over the pure metal, but some of the much-touted alloys of aluminum have given results falling far short of the promises made for them. There are, however, several aluminum alloys of marked value. Alloyed with about 1.5 per cent. copper, aluminum wire gains materially in tensile strength and loses nothing in ductility, wire so alloyed permitting spans of 150 feet in length, for long distance transmission lines carrying high-voltage currents.

The present production of aluminum is only a trifle more than one

per cent. that of copper, and is about the same in tonnage as the copper production of a century ago. It is probable, however, that the production of aluminum will show a larger proportionate increase than that of copper, for the next decade.

As matters now stand, with aluminum around its present range of prices and production, it scarcely can be considered a serious competitor of copper in any single field, with the exception of long-distance power installations, but given a material decrease in the cost of production of aluminum, through improved processes which are possible, though not yet in sight, a largely increased production would be assured, as the supply of raw material is absolutely inexhaustible, and were the metal to be sold at a price corresponding to a considerably reduced cost of production, which might not be the case immediately, if the new processes were controlled by a monopoly, but would be certain to come in time, aluminum would become a competitor to be reckoned with seriously by all the other commercial metals, but the brunt of the fight would be borne by tin and copper, and probably tin would be the greater sufferer of the two, in the long run. Apparently the supremacy of copper in its leading fields is not severely threatened by aluminum, which metal will make a place for itself in the industrial world, having certain advantages that must greatly extend its present use, and certain limitations as well, which, in all probability, will operate to prevent its becoming a dangerous competitor of copper.

CHAPTER XIII.

GLOSSARY OF MINING TERMS.

The following glossary of mining, milling and trade terms first appeared in Vol. II of the Copper Handbook, and has been amplified in 1903 and 1907. It will be found fairly complete.

ACICULAR. Needle-shaped.

ACID. An acid rock is one in which bases are combined with acids, forming salts. The antithesis of basic.

ADIT. A mine opening, driven from the surface into a hill or mountain, on practically a horizontal plane, only enough rise being allowed to provide for natural drainage and to allow the easy removal of cars bringing rock from the breast of the working. An adit can be driven only where the surface is mountainous or quite hilly.

ADOBE. Sun-dried brick.

AIR-BLAST. A violent explosion, caused by the escape of air compressed by the settling of the upper workings of a deep mine.

AIR-COMPRESSOR. A machine for condensing air to a pressure sufficient to actuate machinery, when delivered underground, or elsewhere, at a considerable distance.

AIR-DOORS. Owing to strong currents of air frequently found in the depths of mines, it is sometimes necessary to build a little chamber in a drift connecting two shafts, with a door at either end, to prevent extinguishment of the lamps and candles of the miners by strong air currents.

AIR-DRILL. A power drill operated by compressed air.

AIR-SHAFT. A shaft sunk solely to provide ventilation for deep workings, or an old shaft kept open solely to furnish air to the mine. Nature provides a means of ventilating even very deep mines. Two shafts, one of which is sunk on slightly higher ground than the other, will provide natural ventilation underground, when connected by a drift, the longer shaft becoming a chimney, and the shorter an inverted syphon, down which the air is sucked with great force.

ALKALI. An alkali is a lye—the opposite of an acid.

ALLOY. Two or more metals united mechanically, but not chemically, by fusion.

ALLUVIUM. Soil or broken rock deposited by the action of water.

ALTERED. An altered rock is one that has undergone changes in its chemical and mineralogical structure since its original deposition.

ALUMINOUS. A rock having aluminum as a base or prominent constituent element.

AMALGAM. A union of mercury with other metals, such as gold, silver or copper. Mercury will not amalgamate with iron.

AMALGAMATION. The process of uniting gold, silver or copper with mercury. The quicksilver is expelled later, by heat, and recovered for further use.

AMORPHOUS. Without structural form.

AMYGDALOID. A trap rock, of igneous origin and frequently of highly complex structure, the name coming from the little pits or amygdules of softer rock-material found therein. In the Lake Superior copper district the copper-bearing amygdaloids frequently show the native copper in the amygdules left by the leaching out of the softer rock originally contained therein.

AMYGDALOIDAL. Of the nature of or akin to amygdaloid.

ANALYSIS. A complete chemical test of any given substance.

ANHYDROUS. Devoid of water.

ANTICLINE. A fold of rock-strata bulging upwards, in saddle-shape. The reverse geologically of syncline.

ANTICLINAL. An anticline. Of the nature of an anticline.

ANTIGUA. In Mexico, is a mine worked by Spaniards or Mexicans at a time so remote—from 50 to 300 years—that particulars have been forgotten. Sometimes valuable.

APARTADO. Apartado de correos is Spanish for postoffice box. Usually written apartado only or abbreviated to Ap.

ANTIMONIDE. An ore of any metal chemically united with antimony.

APEX. That part of an ore vein at or nearest surface. In the United States usually requires opposing experts and several lawsuits to determine. In case of litigation, rightful title to the apex usually rests in the litigant having the most money.

APICE. Apex.

ARENACEOUS. Of a sandy nature.

ARGENTIFEROUS. Silver-bearing.

ARGILLACEOUS. Of a clayey nature.

ARASTRA. A Chilean mill. A circular trough, in which broken ore is pulverized by a revolving wheel or mill stone

ARROYA. A gulch.

ARROBA. A weight of varying heft. Spanish, 25.36 pounds avoirdupois; Portuguese, 32.38 pounds.

ARSENIDE. An ore of any metal, of which arsenic is the other constituent.

ARSENOPYRITE. An ore of any metal with which arsenic and sulphur are chemically united.

ASSAY. A chemical test of ore or metal to determine its exact content and value in any given metal or metals.

ASSESSMENT WORK. The amount of work required annually by the United States government, from the holders of an unpatented mining claim.

ATTLE. Cornish term for waste rock.

AURIFEROUS. Gold-bearing.

AUXILIARY. An auxiliary engine or machine is one kept in reserve for use when the principal machine is out of commission.

AVERAGE PRODUCE. Cornish term for percentage of copper in ore.

BACK. The roof of rock above any mine opening driven on a horizontal plane.

BAD AIR. Air in which miners cannot work, owing to powder fumes, noxious gases or insufficient ventilation.

BAL. Cornish for mine.

BALANCE BOB. A counterweight for pump rods.

BALL HEAD. A steam stamp, named after its inventor.

BALL STAMP. A Ball head.

BARRANCA. A deep gulch or cañon, with precipitous sides.

BARILLA DE COBRE. Spanish term for native copper, dressed but unsmelted. Equivalent to the "mineral" of Lake Superior mines. Used mainly in Bolivia.

BARREL WORK. Copper in small masses, detached from its rock-matrices at the rock-house, and shipped in barrels direct to the smelter.

BARROW. A wheelbarrow; also same as burrow.

BARTLETT. A Bartlett concentrating table.

BASALT. A trappean rock.

BASE. An alkaline element.

BASE BULLION. Copper or lead carrying much gold or silver.

BASE METAL. Any of the more common metals except gold, silver and platinum.

BASIC. Of an alkaline nature.

BASIN. A syncline; a trough in the earth's surface.

BATTERY. A set of gravity stamps, usually five in number.

BEARING. The bearing of a mineral outcrop is its strike.

BEATING AWAY. To cut down or stope a mineral body.

BED. A stratified rock formation. Used in some mineral districts for veins or lodes lying horizontally, or approximately so.

BEDDED VEIN. A vein parallel with the stratification of country rock.

BED ROCK. The solid rock, as differentiated from loose or surface rock. The ledge.

BELLS. Signals for lowering and hoisting the bucket, skip or cage in a shaft usually are given by bells, the number of strokes indicating the nature of the load, the place for stopping, etc.

BIT. A steel drill; a short hollow cylinder of soft steel, used in diamond drilling. The diamonds are set around the inner and outer edges of the bottom of the bit, boring the most refractory rocks when the bit is rotated.

BLACK COPPER. Copper partly smelted, but containing impurities requiring refining.

BLACK JACK. Sphalerite, zinc blende of dark color.

BLANCHED COPPER. Copper containing a large amount of arsenic, practically forming an alloy.

BLAST. (N.) Air forced through tuyeres into a blast furnace or bessemer converter. (V.) To explode gunpowder or dynamite.

BLASTED. A blasted miner is one who has been injured by the explosion of a charge of dynamite or gunpowder.

BLAST FURNACE. An oven in which ore is smelted, with the aid of air pumped in under pressure.

BLASTING. The breaking of rock by means of high explosives, inserted in holes bored in the rock for the purpose.

BLENDE. Zinc blende; sphalerite.

BLIND DRIFT. A drift connected with other workings of the mine at one end only. A cul de sac.

BLIND LODE. A lode not outcropping at surface.

BLISTER COPPER. Copper of 96 to 99 per cent. tenor.

BLOCKING OUT. Opening the ore in a mine so that it can be won merely by stoping. Properly speaking, ore is not blocked out for stoping until opened on three sides.

BLOSSOM. The outcrop of an ore body altered by weathering.

BLOW. A blossom.

BLOWER. A fan used to force air into a mine; a blowing engine.

BLOWING ENGINE. A rotary engine for forcing air into blast furnaces under an average pressure of about one pound avoirdupois per square inch.

BLOWING IN. A smelting furnace is blown in when charged and the process of reduction by fire is begun.

BLOWING OUT. A smelting furnace is blown out when the metal and slag are tapped out, and the fires are allowed to die out.

BLOWOUT. An outcrop larger than the ore-body beneath.

BLUESTONE. Copper sulphate.

BOILING SHAFT. A sand-shaft in which quicksand and water boil up from the bottom.

BONANZA. A body of exceptionally rich ore. Commonly applied to silver mines.

BONNET. The cover or roof of a cage; also a steel casting connecting the piston-rod with the upper end of a stamp-shaft.

BORE HOLE. A drill hole bored for test purposes.

BORT. A form of crystallized carbon between the diamond and the black diamond.

BORTZ. Bort.

BOTRYOIDAL. Shaped like a bunch of grapes.

BOTTOM. A mass of impure copper formed below the matte, in matting copper ores.

BOULDERS. Detached masses of rock, rounded by attrition, usually found at or near surface, in alluvial deposits lying above rocks in place.

BOX CAÑON. A cañon closed at one end.

BRANCH. A vein branching off from the main ore body.

BRATTICE. A screen for the regulation of air currents in a mine.

BREAST. The face or working end of a drift, stope or adit.

BRECCIA. A conglomerate rock, in which angular fragments of rock are cemented together.

BRECCIATED. A rock stratum made up of sharply broken fragments, partially or wholly cemented together.

BROKEN. A vein is broken when lacking clearly defined walls or characteristics of regularity.

BROKEN GROUND. Rock strata where the walls are poorly defined and the general formation unsettled.

BROOD. Cornish for waste ore, such as mundic or zinc blende, when found in connection with copper ores.

BUCKET. A kibble. An iron or steel bucket used for hoisting in a mine. In a vertical shaft a bucket swings free in ascending and descending, but in an incline shaft the bucket runs on a skidway of plank timbers, or ride a trolley cable.

BUDDLE. A conical table on which ore is dressed. Machine and name both growing obsolete.

BULKHEAD. A wooden or masonry partition walling off a mine opening, or protecting mine sets against soft or creeping ground.

BULLION. Refined gold or silver. Sometimes erroneously applied to copper.

BULLION BARS. Unrefined gold and silver secured by melting the precious metals precipitated to the bottom of the tank in the electrolytic refining of argentiferous and auriferous copper anodes.

BUNCH. A pocket of exceptionally rich ore.

BUNCHY. An ore body given to considerable variations in width or values, or both.

BURDEN. Overburden.

BURROW. A rock burrow.

CABLE. The steel wire rope used in shafts for hoisting buckets, skips or cages.

CAGE. The elevator used in vertical shafts for hoisting mineral and for lowering men, timber, etc.

CAKES. Copper cast in the form of cakes.

CALCAREOUS. Of a limey nature.

CALCINE. To drive off sulphur or other volatile constituents of an ore by heating.

CALCINER. A calcining furnace.

CALCINING FURNACE. A furnace for roasting ore to drive off sulphur, previous to smelting.

CALCITE. Crystals of calcium carbonate.

CAM. A curved tooth, fixed on a shaft, for lifting the pistons of gravity stamps.

CAMP. A mining town.

CAÑON. (pronounced canyon). A deep gorge with precipitous walls.

CANYON. A cañon.

CAP. The top piece of a framed set of mine timbers; copper caps containing fulminate of mercury, used to explode dynamite in blasting rock.

CAPPING. The rock or other ground overlying the mineral body of a mine.

CAP-ROCK. Capping.

CAPTAIN. In most mining fields where Cornishmen are found, the man in charge of mining work is termed a captain. The mining captain is the executive officer underground.

CARBONACEOUS. Of the nature of coal; containing carbon.

CARBONATE. An ore of any metal or metals with which carbon and oxygen are chemically united.

CARBONATES. A term commonly applied, in the western part of the United States, to ores containing a considerable proportion of lead carbonates, usually argentiferous.

CARBONIFEROUS. Rocks of the geological ages usually associated with coal measures.

CARGA. A Mexican weight equalling 300 pounds avoirdupois.

CARTRIDGE. Dynamite put up in cylindrical cases of oiled paper to fit the holes bored by drills.

CASING. The wooden lining of a shaft; an iron pipe put down outside of a diamond drill hole when passing through soft or broken ground, to prevent the hole becoming clogged by matter intruding from outside.

CASTING COPPER. Impure copper better suited for casting into various forms than for drawing into wires or rolling into sheets.

CAVE. A natural opening or "vug" in a rock formation; the partial or complete falling in of a mine.

CAVING SYSTEM. A plan of mining, by which the worked out upper levels and surface are allowed to subside gradually, as the mine workings are deepened.

CEMENT COPPER. Regulus. The impure metal obtained from ores by leaching processes.

CERRO. Spanish for a hill showing rock outcrops.

CHAMBER. A large stope.

CHAPEAU DE FER. French for gossan or iron hat.

CHARGE. The amount of ore, flux and fuel required for one filling of a furnace.

CHIMNEY. An ore body of pipe shape in an approximately vertical position.

CHERT. A coarse flint containing calcium.

CHILEAN MILL. An arastra.

CHILE BARS. Bars of Chilean blister copper, weighing about 200 pounds each.

CHLORIDE. The ore of any metal united chemically with chlorine.

CHLORIDES. Commonly applied, in the western part of the United States, to chloride ores of silver.

CHURN DRILL. A drill having a churning motion, used for boring test-holes, or wells.

CHUTE. A section of a lode or vein differing by being much richer or leaner than the average; also a trough for dropping ore or waste to lower openings in a mine.

CIRCA. Approximately.

CLACK. A pump valve.

CLAIM. Public land staked off and claimed by a prospector or miner. Size of claims varies in different countries.

CLAY COURSE. A seam of clay between vein and wall.

CLAY PARTING. A clay course.

CLAY SLATE. An argillaceous slate.

CLEAN-UP. The cleaning up of accumulated ore or metal in a mill or smelter.

CLEAVAGE. The parting of rock along more or less regular lines of least resistance.

CLEAVAGE PLANES. The lines along which rock cleavage occurs.

COARSE JIGS. The jigs used to handle the heavier grades of ore or metal.

COARSE METAL. Matte resulting from the first smelting.

COBBING. Breaking masses of ore into lumps by hand hammers.

COLLAR. The top of a shaft; the surface timbering of a shaft.

COMPANY ACCOUNT. Miners and other underground employes working on fixed wages per shift or month usually are called "company 'count men" to distinguish them from miners working on contract.

COMPARTMENT. Mining shafts usually are divided into two or more compartments, separated by framed timbers and planking.

CONCENTRATES. The concentrated ore or metal, after partial or complete elimination of gangue rock.

CONCENTRATION. The process of separating native metal or ore from its gangue of worthless rock.

CONCENTRATING TABLE. A concentrator.

CONCENTRATOR. A plant where ores are concentrated; a jig, or machine for separating ore or metal from gangue-rock, the process usually employing a rocking or oscillating motion, aided by jets of water, whereby

the worthless gangue is driven off and the heavier mineral retained by specific gravity.

CONCHOIDAL. A fracture resembling in form the shell of a bivalve mollusk.

CONCRETIONS. Nodules formed by aggregation of mineral matter.

CONDUCTIVITY. Electrical conductivity is measured by the resistance offered to the passage of an electrical current.

CONGLOMERATE. A rock stratum formed of pebbles and rounded boulders cemented together. Sedimentary conglomerates are ancient seabeds; volcanic conglomerates are called tuffs, and consist of scoriaceous matter ejected from volcanic vents and cemented to rock, under pressure.

CONSTRUCTION ACCOUNT. Many of the Lake Superior copper mines summarize their finances so that the cost of operation is divided into two classes, one being for general working expenses and the other for construction account. The latter includes new buildings and machinery on surface, and frequently new mine openings. In effect the construction account of a mine is like the stock account of a merchandise firm, and sometimes, like charity, "covers a multitude of sins."

CONTACT. The junction of two dissimilar bodies of rock.

CONTACT VEIN. A mineral body found between two unlike rock strata.

CONTORTION. The distortion of a rock body.

CONTOUR. The outline or configuration of any given tract.

CONTRACT. Many miners work on contract, agreeing to sink, drift or stope at a fixed price per running foot, or per fathom. These are known as contract miners, and are usually the more skilled workmen.

COPPER ORE. See detailed descriptions of copper ores and copper-bearing minerals in chapter on chemistry and mineralogy.

CORE. A drill core.

CORNISH PUMP. A form of mine pump actuated by long rods reaching from surface down the shafts.

CORNISH STAMP. A gravity stamp, in which the heads are raised by cams and dropped by gravity.

COST-BOOK SYSTEM. A plan of mine operation, used in Cornwall only, by which shares are subject to unlimited assessment. A sort of unlimited partnership.

COSTEANING. Proving an ore body by trenching across its outcrop at approximately right angles.

COUNTERBALANCE. Hoisting plants usually are worked in counterbalance for deep shafts. The weight of the descending cage or skip is used to partially offset the weight of the ascending cage or skip.

COUNTER VEIN. A cross vein, running at approximately right angles to the main ore body.

COUNTRY ROCK. The predominant rock form of a given district.

COURSE. The direction or strike of a mineral body; a stretch of mineralized matter in an ore vein.

CRAB. A hand winch.

CREEPING. The movement caused in mines by the pressure of superincumbent and adjacent rock masses.

CRETACEOUS. Of a chalky nature; limestone of a certain geographical horizon.

CRIBBING. The lining of a shaft; frameworks of timber to support an underground roof.

CROPPINGS. Outcrops.

CROSS COURSE. An intersecting vein.

CROSSCUT. An opening similar to a drift, except that the crosscut is sent at approximately right angles to the formation, while a drift follows the trend of the lode or vein.

CROSSCUT TUNNEL. A tunnel driven at approximately right angles to the ore body.

CROSS VEIN. An intersecting vein.

CRUCIBLE. A vessel of refractory material, used to contain ores and metals for assaying or smelting.

CRUSHER. A rock crusher.

CRYSTALLINE. Showing crystals.

CRYSTALLIZED. Having plainly defined crystals.

CRYSTALS. Geometrical forms, with plane faces, of infinite variety, assumed by the majority of minerals.

CUPOLA. A furnace in a smelter.

CUPRIFEROUS. Copper-bearing.

CUT. To intersect an ore body; the portion of a working face of mineral removed at one operation.

CUTTING DOWN. To enlarge a shaft.

CWT. A hundredweight, or 112 pounds aveirdupois.

DAM. A masonry barrier, built underground, to hold back water.

DATUM LEVEL. The level (usually sea-level or mean level of nearest considerable body of water) from which altitudes are measured in surveys.

DEAD ROASTING. Sulphide ores are dead roasted when all the sulphur possible to drive off by roasting has been eliminated.

DEAD WORK. The opening of new shafts, drifts and winzes, preliminary to the stoping of the mineral bodies.

DEBRIS. Broken down rock material.

DECOMPOSED. Rock or ore broken down by elemental action.

DECREPITATE. To break into fragments with violence, under the blowpipe or great heat.

DENDRITE. A mineral crystallized in form similar to the branch of a tree.

DENOUNCEMENT. In Mexico, the formal filing of a claim to mineral land.

DENUDATION. The uncovering of rock strata by the weathering of wind or water, or both.

DEPOSIT. A term, loosely used, meaning a mineral body.

DERRICK. A mast, freely rotatable, carrying a boom or yard-arm, at the end of which is a sheave-wheel. In mining is used mainly for open pit work.

DESSICATION. The drying out of water from any given substance.

DETRITUS. Debris. Broken down rock.

DEVELOPMENT WORK. Dead work.

DIAMOND DRILL. A machine for boring holes in rocks, taking its name from the black diamonds or bort used to form cutting surfaces on the inner and outer edges of the hollow cylindrical bit.

DIE. The iron block in the mortar, onto which the ore is fed for crushing under the stamp.

DIORITE. Greenstone; a crystalline spathic hornblende.

DIP. The angle at which a lode or vein descends from the earth's surface.

DIP COMPASS. A compass having the needle fixed to swing in a vertical plane.

DIRT. Frequently used to designate ore broken underground.

DISINTEGRATION. The breaking down of rock forms, usually through weathering.

DISSEMINATED ORE. Ore found scattered through a gangue of valueless rock.

DISTURBED. An ore body is disturbed when lacking defined walls and settled character.

DOLLY. A crude prospecting stamp set on a spring pole.

DOLOMITE. Magnesian limestone; carbonate of calcium and magnesium.

DONKEY HOIST. A small auxiliary hoisting engine, usually operated underground and actuated by compressed air, or used for preliminary work at new shafts or exploring pits.

DOWNCAST. A shaft having a downward air current.

DRAFTAGE. An arbitrary allowance claimed by some British smelters, to cover loss of weight in transport.

DRESS. To separate ore from gangue rock by hand or machinery.

DRESSING FLOOR. A floor or dirt surface where ore is dressed by cobbing and other hand-work.

DRIFT. A horizontal opening in a mine, following the direction of the lode or vein; loose alluvial matter, such as sand, pebbles and boulders.

DRIFT COPPER. Native copper found in alluvium, far from its original rock matrice, whence carried by glaciers.

DRIFTING. Opening drifts. Driving.

DRILL. A steel bar for boring in rock, having a single sharp cutting face, or two cutting faces crossed at right angles.

DRILL-CORE. Solid, cylindrical cores of rock, are cut by the operation of the diamond drill. These are raised to surface and form a valuable permanent record of the strata through which the drill has passed.

DRILL HOLE. A hole bored by a drill.

DRIVE. A drift.

DRIVING. Drifting.

DROP SHAFT. A shaft, usually of heavy framing sunk by weight, through sand or similar material.

DRUM. The cylinder of a hoisting engine, around which the cable winds.

DRUSE. A vug.

DRY ORE. Argentiferous lead ores containing insufficient lead for fluxing in a smelter.

DUCTILE. That which is capable of being extended in length by tension.

DUCTILITY. The capacity of a metal to elongate, when under pull from the ends, without cracking or breaking.

DUMP. A place for depositing rock taken from a mine. An ore-dump contains good mineral, and a waste-dump the worthless rock hoisted from underground.

DYKE. A fissure in the rock formation, usually transverse, filled with igneous matter. When mineralized, dykes are called cross or counter veins.

DYNAMITE. Nitro-glycerine absorbed by wood pulp, infusorial earth, or some similar article, to render it safer in use. Power varies greatly according to percentage of nitro-glycerine contained.

EISENER HUT. German for iron hat, or gossan.

EECTRIC DRILL. A power drill operated by an electric current.

ELECTROLYTE. The solution in which electrolytic separation of metals is carried on.

ELECTROLYSIS. The separation and redeposition of metals by electrolytic action.

ELECTROLYTIC. Term applied to copper means copper gained from impure metal by electrical decomposition and redeposition, whereby the copper is taken from an impure bar and redeposited in a pure form at the opposite pole of the battery, while other metals are precipitated to the bottom of the solution in the tank in which the work is done.

ELVAN. Cornish name for the dyke rocks of Cornwall, usually greenstone or porphyrite.

EROSION. The wearing away of surface masses of rock and soil by the elements, or by glacial action.

ERUPTIVE. Rock matter deposited in molten form by volcanic action.

ESCARPMENT. A rock wall, nearly or quite vertical.

EXFOLIATION. The separation of thin leaf-like layers from the main body.

EXPLODERS. Fulminating caps, for setting off high explosives.

EXPLOITATION. Development work and production.

EXPLORATION. Prospecting work.

FACE. The breast of a drift. A face of ore is the ore shown at the working end of a drift or stope.

FAHLBAND. A banded crystalline rock, carrying finely disseminated ores.

FALL OF GROUND. Rock falling from the roof into a mine opening.

FALSE SET. A temporary set of timber.

FAN. A machine for forcing air into a mine.

FATHOM. Six feet. In stoping, a fathom is a cube of six feet.

FAULT. Dislocation of a rock stratum by which continuity is lost.

FEE. The ownership of land in fee-simple.

FEE-OWNER. The owner of land in fee-simple.

FEEDER. A branch ore vein.

FERRUGINOUS. Carrying iron.

FILLING. Occupying old stopes or chambers with waste rock; allowing a mine to fill with water.

FINES. The finer ore or metals saved in concentrating processes.

FINISHER JIGS. The jigs used to save the fine ores or metals in a concentrator or stampmill.

FIRE. The miner's warning cry when a blast is to be set off, is "fire."

FISSILE. That which easily may be split.

FISSURE. Rock matter deposited at a later period, in a crack in the original rock.

FISSURE VEIN. A fissure, containing ore, usually disseminated in a worthless gangue.

FLAKE COPPER. Very fine scales of native copper.

FLEET-GEAR. A compensating device for taking up slack and paying out rope where a hoisting system is worked in counterbalance. Several turns of the cable are taken around each drum of the hoist, and the bight of the cable is carried to the rear and around a large sheave-wheel lying horizontally and traveling on trunnions, allowing the taking up or paying out of the cable.

FLOAT. A particle or boulder of ore or rock, dissociated from its matrix.

FLOAT COPPER. Drift copper.

FLOAT ORE. A detached ore mass found at a distance from its matrice.

FLOOR. The floor of a drift or other horizontal mine opening; the underlying rock stratum.

FLOUR COPPER. Very fine native copper that floats on water and is very difficult to save in milling.

FLUCCAN. A seam of clay, found in ore bodies, or more frequently, between the ore and walls of country rock.

FLUKAN. Fluccan.

FLUME. A launder or pipe line for carrying water.

FLUX. Any mineral used in the furnace to aid in fusing the gangue rock and worthless elements, which combine with the flux to form slag.

FLUXING ORE. An ore containing appreciable metallic values, but smelted mainly because containing fluxing agents required in the reduction of richer ores.

FOLIATED. Having a laminated structure.

FOOT. The foot-wall.

FOOT-WALL. The stratum of rock underlying an inclined mineral lode or vein.

FORK. To pump water from a mine; the branching of a vein.

FORMATION. A term used to imply the general geological conditions of a given district.

FOSSICKING. Extracting ore from old mines or waste-burrows.

FOUNDERS SHARES. The few shares necessarily issued to individuals organizing a stock company. In case of companies owned outright by other companies, founders shares are issued to as many individuals as are required to incorporate and hold the offices required for corporate management, as the laws do not permit a corporation, which is an artificial person, to form another corporation, or to serve as a director of another corporation.

FRACTURE. A break.

FREE. A metal is free when virgin or native, and not combined chemically with any other element.

FREE MILLING. A metal or ore that is separated readily from its accompanying rock by mechanical means.

FREEZE. A furnace freezes when the heat falls sufficiently to permit the molten charges to solidify.

FRIABLE. That which may be pulverized easily.

FROZEN. A furnace is frozen when its molten charge solidifies.

FURNACE. An oven for the smelting of ore.

FUSE. A cotton cord with a gunpowder core, so made as to carry fire to an explosive placed for use.

FUSIBLE. That which may be melted.

FUSION. Melting. Alloying metals while liquid, through heat.

GRABBRO. A rock composed mainly of plagioclase feldspar.

GAD. A small wedge or chisel.

GALENA. Lead sulphide, frequently found associated with sulphide copper ores.

GALLERY. A drift.

GALLOWS FRAME. A framework over the mouth of a shaft, carrying a sheave-wheel, over which the hoisting rope passes to the engine.

GANGUE. The foreign rock matter in which ore or metal is disseminated, the gangue rock being mechanically and not chemically united with the ore or metal.

GASH VEIN. A shallow fissure vein, rapidly narrowing to extinction.

GEODE. A hollow nodule of rock.

GEOLOGICAL HORIZON. Geological age.

GEOLOGY. The science of the formation of the earth.

GIANT POWDER. Dynamite.

GLACIATION. The erosive effect produced by glaciers.

GLANCE. Any metallic sulphide showing a bright, shining surface. Copper glance is chalcocite.

GLORY HOLE. A large open pit from which pay ore is or has been extracted.

G. M. B. "Good Merchantable Brands"—an English grade of refined copper. Term becoming obsolete.

GNEISS. A banded, slaty granite.

GOB. Mud above a mine; refuse in worked-out openings.

GOPHERING. Prospecting work confined to digging shallow pits or starting adits. Term used from similarity of this work to the crooked little holes dug in the soil by gophers.

GOSSAN. Iron hat. A rock capping, usually quartzose, showing yellow to reddish brown iron stains, from disseminated limonite or hematite. Frequently is found overlying veins of copper ore.

GRADE. The percentage, or value, of ore bodies and partly refined metals; the percentage of rise in roads or mine openings driven on an approximately horizontal plane.

GRANITE. A dense, granular rock, composed of varying proportions of quartz, feldspar and mica.

GRANULATED. In the form of grains.

GRASS ROOTS. At surface.

GRAVITY STAMP. A stamp, usually set in batteries of five, in which the piston is raised by a cam, the stamp crushing the charge in the mortar by its weight, when allowed to fall.

GREENSTONE. Diorite, or gabbro.

GRIZZLY. A grating of heavy iron or steel bars, through which fall the smaller pieces of rock or ore.

GROSS TON. A long ton of 2,240 pounds avoirdupois.

GROUNDSILL. The bed-piece of a set of mine timbers.

GUIDES. Perpendicular wooden stringers for guiding cages in vertical shafts.

GUT. To rob.

HACIENDA DE BENEFICIO. Spanish for milling plant.

HACIENDA DE FUNDICION. Spanish for smelter.

HADE. (American). Dip of a vein from the zenith. (English). Dip of a vein from the horizon.

HALVAN. Cornish for refuse copper ore.

HANGING. The hanging-wall; the stratum of rock overlying an inclined mineral lode or vein.

HARDHEAD. A lump of partly smelted ore, carrying high percentages of refractory elements, such as iron, antimony and arsenic.

HAT. The capping of a mineral body.

HAULAGE PLANT. A mechanical installation for the underground tramming of rock, operated by ropes, compressed air or electricity.

HEAD. Water pressure.

HEADGEAR. A building, or framework, fitted with sheaves, over the mouth of a shaft.

HEAP-ROASTING. Burning the sulphur out of ores piled in heaps, with a small amount of wood or other fuel.

HEAVE. A fault. The rolling out of line of dip by a lode in making depth.

HEAVING. Rolling.

HECTARE. A metric measure of area equalling 2.471 acres.

HECTAREA. Spanish for hectare.

HOIST. An engine for raising ore from a mine, and for lowering men and material thereinto.

HOISTER. A hoist.

HOLE. Any opening in the ground; a hole drilled for explosives.

HOLING THROUGH. A drift or other mine opening is holed through when a connection is made between two separate sections working toward each other.

HORIZON. The sky-line, commonly used in the sense of absolutely flat, as shown by a spirit level. Geologically, all rock strata of the same geological period.

HORSE. An intrusion of country rock into a mineral body; sometimes used as synonymous with dyke.

HORSEPOWER. One horsepower is rated as equivalent to raising 33,000 pounds avoirdupois, to a height of one foot in one minute.

HORSE-WHIM. A windlass operated by horse-power.

HOT BLAST. Heated air supplied to a blast furnace.

HUEL. Wheal.

HUNGRY. Nearly or quite barren of mineral value.

HUNTINGTON MILL. An improved Chilean mill.

HYDRATED. Containing water of crystallization.

HYDRO-METALLURGY. The reduction of ores by wet processes.

HYDROUS. Containing water of crystallization.

IGNEOUS. Of volcanic origin.

IMPREGNATED. Containing ore. Properly used in referring to country rock carrying mineral similar to that in the vein.

INCH. One-twelfth of a foot. See Miner's inch.

INCLINATION. The dip of a vein from the horizon, measured in degrees.

INCLINE SHAFT. A shaft sunk at any except a vertical angle with the horizon.

INCRUSTATION. A solidified coating, usually crystallized.

INFILTRATION. The deposition of a mineral matter from percolating waters.

INGOT. A mass of metal cast in a peculiarly formed mold; applies only to gold, silver or copper. Iron and lead are cast in pigs.

IN PLACE. Rock matter in the position where deposited by nature.

IN SITU. In place.

INTAKE. The opening for water to enter a pipe or flume.

INTRUSIVE. Igneous rock masses pushed up through other and older rock formations.

IRIDESCENT. Showing the colors of the rainbow.

IRON HAT. Gossan.

JACK. A miner's name for sphalerite. Is called black jack, ruby jack or rosin jack, according to color.

JIG. A machine for concentrating ore or mineral by means of oscillatory or vibratory motion, aided by jets of water, separation of the ore from its gangue being effected by utilizing the greater specific gravity of the former.

JIGGER. A crude jig.

JIGGING. Concentrating ore by the use of a jig.

JUMP. To take possession of mineral lands held or claimed by another party.

JUMPER. A churn drill; one who jumps a mineral claim.

JUNCTION. The uniting point; the point of contact between disaimilar rock forms.

KEWEENAWAN. Pertaining to or of the Keweenaw formation, in which the Lake Superior copper mines are opened.

KIBBLE. A bucket used for hoisting material in a shaft.

KILLAS. Clay slate or shale.

KILO. A kilogram.

KILOGRAM. A metric weight of 2.2046 pounds.

KILOMETER. A measure of distance equalling 0.621376 miles. For rough computations may be figured as five-eighths of a mile.

KIN. A Japanese weight of 1.31 pounds avoirdupois.

KINDLY. The appearance of rock carrying or promising to carry good mineral values.

LADDER ROAD. A ladderway.

LADDERWAY. The series of ladders giving ingress and egress to a mine shaft; the compartment in which the ladders are.

LAGGING. Timber, usually of small diameter, placed over the cap-timbers of incline shafts and drifts, to prevent damage from falling rock.

LAMINA. A thin plate. Plural is laminae.

LAMELLAR. In thin sheets of laminae.

LAMINATED. Lamellar.

LANDER. The man at the mouth of the shaft, who receives signals from below, and attends to the unloading of rock sent up in buckets, skips or cages.

LAUNDER. A wooden flume or sluice, used to convey water, or tailings held in solution in water.

LAVA. Rock formed of flows from volcanoes.

LEACH. To dissolve minerals from ore by water, or acid, or both.

LEACHING. Lixiviation.

LEAD. A mineral body; the metal.

LEADER. A small vein running to a larger one.

LEDGE. The solid rock where encountered at or nearest surface.

LEG. An upright timber supporting the cap of a set of timber.

LEG-PIECE. A leg.

LENSE. An ore body of lenticular form.

LENTICULAR. Having the shape of a double convex lense.

LEVEL. A horizontal opening in a mine. Levels commonly are opened at stated intervals as depth is gained—usually at 100 feet in modern mining practice. The word "level" frequently is used interchangeably with the word drift, but is more comprehensive. Both drifts and crosscuts may be opened on a level, but a crosscut is not a level.

LIGNEOUS. Of a woody nature.

LIMESTONE. Calcium carbonate.

LIXIVIATION. The process of leaching out mineral values from ores.

LOCATE. To make formal claim to public mineral lands.

LOCATION WORK. Labor required by law to be done on mining claims when located.

LODE. Variously used in different mining fields. In Lake Superior refers to the mineralized stratified beds. Is used locally, in many fields, as synonymous with vein. Sometimes is used as meaning an aggregation of mineralized veins.

LONG TON. A gross ton of 2,240 pounds avoirdupois.

LOW GRADE. Carrying mineral values but sparingly.

MAGMA. An originally molten mass of rock coming to the earth's crust from depth.

MAGMATIC. Of the nature of or pertaining to magma.

MAGMATIC SEGREGATION. The process by which the different constituents of molten rock masses crystallize at varying temperatures,

with a tendency to separate themselves, so far as circumstances allow, from the other compounds.

MALACATE. A whim with vertical drum used for hoisting in Mexico. Sometimes is called a Zacatecas malacate.

MALLEABLE. That which may be made to change form, without fracture, under a hammer.

MAN-CAR. A skip-truck having tiers of circus seats, used for carrying miners to and from work in mines operating deep inclined shafts.

MAN-ENGINE. An appliance for raising and lowering miners in deep incline shafts. Consists essentially of two long beams, worked in counterbalance and having platforms at stated intervals.

MASS. A solid chunk of native metal.

MASSIVE. Rock without defined lines of cleavage; ore occurring without appreciable gangue, as contradistinguished from ore disseminated throughout a gangue.

MATRICE. The rock surrounding an imbedded object, such as a particle or mass of ore or native metal.

MATRIX. Matrice.

MATTE. Regulus. A product between sulphide copper ore and blister copper, varying greatly in the percentage of metal contained. Is obtained by eliminating more or less sulphur and other elements from sulphide copper ores.

MATTING. The process of converting sulphide ores into matte.

MATTOCK. A miner's pickaxe.

MESA. Spanish for a tableland or plateau.

MESH. The size of openings in a screen.

METALLIFEROUS. Carrying metal.

METALLURGY. The science and practice of reducing metals from ores and minerals.

METAMORPHIC. Rock that has been metamorphosed.

METAMORPHOSIS. The process by which changes in structure are effected in a rock form by heat or percolating waters.

METER. A metre.

METRE. A linear measure of 39.37 inches.

METRIC TON. A weight of 2,204.6 pounds avoirdupois.

MILLING. Dressing ore in a mill; also running ore in a mine through a winze for loading into tram-cars or wheelbarrows on a lower level than the one where broken.

MILL RUN. A mill test.

MILL TEST. The determination of the metallic contents and recoverable values in any given ore by the milling of a sufficient quantity to afford average milling conditions.

MINE. An open pit, or underground opening or openings, from which mineral values are extracted.

MINER. In strict construction, the man that does the drilling and blasting in a mine. In a broader sense, all men working underground.

MINERAL. Ore or rock containing metal. In the Lake Superior district the term mineral has a special use, being employed to designate the native copper, with its adhering gangue of amygdaloid or conglomerate rock, as it comes from the mill, before going to the smelter.

MINERAL BELT. The mineralized territory in a given formation or district.

MINERAL DE COBRE. Spanish for copper-matte.

MINERALIZED. Carrying metalliferous values.

MINERALOGY. The science of minerals.

MINERAL RIGHT. The ownership of the right to mine under the surface of land owned by another holder. Mineral rights sometimes are reserved in selling the surface of land in some districts.

MINERS INCH. The amount of water that will flow through an opening one inch square under a six-inch head, which is 2,274 cubic feet in 24 hours, or 94¾ cubic feet per hour, equal to 655 wine gallons or 593 imperial gallons hourly.

MINING ENGINEER. Any man having sufficient ability to pass intelligently upon mineral values, and to open and operate a mine, whether such ability was gained in a school or by practical experience. Graduates of technical mining schools usually are given the degree of engineer of mines and sign the letters E. M. after their names. The letters M. E. stand for mechanical engineer, when given by a school, but are often used by men engaged in mining, who lack scholastic degrees, as an abbreviation for mining expert.

MISSED HOLE. A drill hole, charged with explosives which fails to be set off by the fulminating cap.

MOIL. A steel bar, like a drill, except that it is sharpened to a point instead of having a cutting face.

MOLDS. Copper cast in molds.

MOMME. A Japanese weight equal to 3.75 grams or 2.4113 pennyweights.

MONOCLINE. A specific portion of the earth's crust in which the strata have a practically uniform dip.

MORAINE. A mass of boulders and detrital material marking the limits of a former glacier.

MORTAR. An assayer's mortar in which rock or ore is crushed with a pestle; a mortar-box.

MORTAR-BOX. The iron box under the stamps, into which ore or rock is fed for crushing.

MOUTH. The opening, at surface, of an adit, tunnel or shaft.

MUCKER. A trammer.

MULLOCK. Australian for waste-rock broken underground.

MUNDIC. Pyrite.

NATIVE. A virgin metal—not an ore.

NICKELIFEROUS. Carrying nickel.

NODULE. A small mineral mass of approximately spherical form.

NON-CONFORMABLE. Rock strata not associated originally in the position now occupied.

NUGGET. A lump of native metal. Term usually applied to gold.

OPEN-CAST. A mine worked as a quarry, without underground openings.

OPEN CUT. Open cast.

ORE. A chemical union of one or more metallic elements with other elements, usually non-metallic, of which oxygen, carbon and sulphur are the most frequent. For the various ores of copper, see chapter on chemistry and mineralogy.

ORE CAR. A mine car for carrying ore or waste rock.

ORE CHUTE. A specific portion of an ore vein carrying increased values. Usually has a vertical or diagonal dip on the plane of the dip of the ore body.

ORE DUMP. A dump for ore.

ORE SHOOT. An ore chute.

ORTHOCLOSE. Silicate of potassium and aluminum. An acid feldspar.

OUTCROP. The ledge of a lode or vein that is exposed on the surface of the earth.

OUTLIER. An isolated rock or group of rocks lying at a distance from the main body, and separated therefrom, on the surface of the earth, by a different rock formation.

OUTPUT. Production.

OVERBURDEN. Superincumbent material, usually drift or alluvium.

OVERHAND STOPING. Removing ore in ascending steps.

OXIDATION. Process of conversion of other minerals into oxides by weathering, or by the chemical effects of underground waters.

OXIDE. An ore of any metal or metals chemically united with oxygen.

OXIDIZE. To unite with oxygen. Many minerals and most metals oxidize with greater or less rapidity when exposed to air or water.

PARE. Cornish for a gang or shift of miners.

PARTING. The separation of two or more metals mechanically admixed by electrolysis, cupellation, use of acids or other chemical or metallurgical processes; a fluccan.

PASS. A winze.

PATENT. Direct title, from the government, to mineral lands.

PATIO. A walled yard with paved floor where finely crushed argentiferous ore is amalgamated.

PAYSTREAK. A portion of a vein or mineralized bed carrying workable values, occurring on either wall, or, occasionally, in the center of the mineral body.

PENTHOUSE. A shed-roof erected in the bottom of a shaft, when sinking, to protect miners from accidental fall of rock, timber or tools from above.

PENTICE. An erroneous spelling of penthouse.

PEROXIDE. The oxide of any metal containing the greatest proportion of oxygen.

PERPENDICULAR SHAFT. A shaft sunk vertically.

PERTENENCIA. One mineral claim in Mexico; area, one hectare, or 2.471 acres.

PETERING. Pinching.

PETER OUT. To pinch out.

PETROLOGY. The science of rocks.

PHOSPHATE. An ore of any metal or metals with which phosphorous and oxygen are chemically united.

PICK. A pick axe.

PICUL. A Chinese weight of 133 1-3 pounds.

PILLAR. A section of rock or ore left in place to support shafts or roofs.

PINCHING. The narrowing of a vein.

PINCHING OUT. The narrowing of a vein to extinction.

PIPE VEIN. An ore body of chimney form, deposited in the vent of an extinct volcano.

PIT. An opening in the earth's surface, usually shallow.

PITCH. Synomymous with "dip," but occasionally used to designate the angle of decline from the horizon, measured along the strike of the lode or vein.

PLAIN. A flat, champaign country.

PLANE. A level surface bounded by straight lines.

PLANT. The machinery equipment of a mine or reduction works. In general use the term includes buildings housing machinery.

PLAT. The enlargement of a shaft at a level, to give extra space for loading and unloading the cage, skip or bucket.

PLATEAU. An elevated plain.

PLUMBIFEROUS. Carrying lead.

PLUTONIAN. Plutonic.

PLUTONIC. Rock strata of volcanic origin.

POCKET. Underground, an ore deposit, usually of small extent. On surface, a bin at shaft-house or mill, in which ore, flux or fuel is stored.

POCKETY. Carrying only occasional bunches of good ore.

POLING. The process of adding carbon to a charge of molten copper in a reverberatory furnace by stirring with long poles.

POLL-PICK. A tool having a pick on one end, and a poll, or hammer head, on the other.

POOD. A Russian weight of 36.112 pounds avoirdupois.

POPPET-HEAD. Framework over a shaft for a sheave-wheel.

PORPHYRITIC. Of the nature of porphyry.

PORPHYRY. Like charity, covers a multitude of sins, and quite commonly is used to describe any crystalline rock. Properly, is any crystalline rock showing larger crystals upon a ground-mass of smaller crystals. Porphyry may be granite, quartz or one of several other rocks.

POUND. The troy pound is used for gold, silver and platinum only, the avoirdupois pound being used in weighing the other metals and other commodities in English-speaking countries.

POWER-DRILL. A machine for drilling holes in rock, actuated by compressed air, steam or electricity.

PRILL. Cornish for selected ore secured by cobbing.

PRIMARY. The first; the oldest rock formations.

PROP. A heavy timber placed with its foot against the floor of a mine opening, and its top against the roof, to support the rock above.

PROSPECT. To seek for mineral; a new mining property that has not yet earned the right to be called a mine.

PROSPECTOR. A searcher for mineral.

PROTOXIDE. The oxide of any metal containing the least proportion of oxygen.

PUDDINGSTONE. A coarse conglomerate showing rounded pebbles.

PULLEY-STAND. A temporary tripod or other light frame construction, holding a pulley, over which passes the rope used in hoisting.

PULP. Pulverized ore or concentrates.

PULVERIZE. To crush to powder.

PULVERULENT. That which easily may be reduced to powder.

PYRRHOTITE. Magnetic iron sulphide.

PYRITE. Iron disulphide.

PYRITES. Sulphide ores; more properly iron disulphide.

PYROGNOSTICS. Characteristics of a mineral under the blowpipe.

QUARRY. An open pit, of varying size, sometimes several acres, from which stone or ore is mined.

QUARTER-SECTION. In the United States a quarter of a square mile; 160 acres, laid out in a parallelogram, each side of which is one-half mile in length.

QUARTZ. Silica. Dioxide of silicon, frequently containing traces of iron and other minerals, and often the gangue of gold and other metals.

QUARTZ CLAIM. In the United States mining claims are divided into two classes, the first being placer claims, carrying mineral, usually gold, in alluvium, and quartz claims, this name being applied to any prospect carrying metalliferous bodies in place.

QUARTZITE. An oxide of silicon, with other minerals in varying quantities, partly granular and partly crystalline in structure.

QUARTZOSE. Rock having much quartz in its composition.

QUICKSAND. Fine sand, which flows easily when wet.

RAGGING. Cornish for rough cobbing; broken lumps of ore of medium size.

RAISE. A shaft or winze that is being opened from below. Sometimes called upraise or uprise.

RAKE VEIN. A vein cutting through stratified rocks.

RANGE. A mineral belt, also in many American states a surveyor's term for describing and locating lands. The state is surveyed in sections (with their subdivisions), towns and ranges. A town (or township) comprises 36 sections and is a square of six miles. Each township receives a double number, one for the town and one for the range. The towns are numbered consecutively from south to north, and the ranges are similarly numbered from east to west.

RAW ORE. Ore before treatment.

REAMER. A tool like a bit, used to enlarge a hole previously drilled.

REDUCTION. The separation of metals from their ores.

REEF. A stratified mineral-bearing rock formation.

REFINING. The elimination of impurities from crude metals, or separation of metallic alloys obtained in the reduction of ores.

REFRACTORY. A refractory ore is one that cannot be smelted by ordinary metallurgical processes. A refractory stamp-rock is one that is pulverized with unusual difficulty.

REGULUS. Copper matte.

RENIFORM. Kidney-shaped.

RESERVES. Bodies of mineral-bearing ground opened in a mine ahead of immediate requirements.

REVERBERATORY FURNACE. A smelting furnace in which the flame from the grate below is reflected back by the roof, on the charge of ore above.

RISE. A raise.

ROASTING. Driving off sulphur and other volatile elements from ore, by heat. When done in a furnace, under great heat, the process is called calcining.

ROASTING FURNACE. An oven for the expulsion from ore of sulphur, arsenic and other volatile elements.

ROB. To remove pillars and other supports from a mine for their mineral values, regardless of the future of the property.

ROCK. Stone.

ROCK BREAKER. A rock crusher.

ROCK BURROW. A pile of refuse rock from a mine.

ROCK CAR. An ore car.

ROCK CRUSHER. A machine for reducing rock or ore to smaller sizes. Crushers are of two types, the jaw-crusher and the centrifugal. The jaw crusher works as a man cracks nuts with his teeth, the centrifugal operates on the plan of a coffee-grinder.

ROCK DRILL. A power drill.

ROCK DUMP. A rock burrow.

ROCK FILLING. Waste rock, placed in worked-out stopes to support the roof.

ROCK-HOUSE. A building where copper-bearing rock is received and put through crushers before shipment to the mill. Is really a preliminary mill, and usually is built in connection with the shafthouse.

ROLL. To make depth at irregular angles.

ROLLS. Heavy steel rollers, worked in pairs, like a clothes wringer, for crushing rock and ore.

ROOF. The rock above a mine opening.

ROOM. Similar to a stope; term usually applied to mines working mineral bodies lying nearly horizontally.

ROYALTY. A percentage paid to the fee-owner from mineral values obtained by the lessee of a mine.

RULE-OF-THUMB. The guesswork and rough measurement plan of mining, in contradistinction to systematic development from data obtained by careful surveys.

RUN. A bar or course of ground better or worse than the average value of the mine.

RUNNING GROUND. Superincumbent material that falls into the mine openings.

SADDLE. An anticline.

SAFETY CAGE. A cage furnished with automatic appliances to stop its descent in case the cable breaks.

SALT. A chemical union of an acid with a base.

SALTING. Placing foreign ore in a mine to deceive intending purchasers or other interested parties.

SAMPLE. A specimen of ore from a mineral deposit. A selected sample usually is misleading because containing far above average values, and fine samples frequently come from the poorest mines. An average sample is what its name purports—if it be an average sample.

SAMPLING. Securing sufficient ore from mine openings to allow a test to determine average values. Honest sampling requires great skill and prolonged practical experience.

SAND PUMP. A pump, usually centrifugal, designed to lift water carrying large quantities of coarse tailings or sand in solution.

SANDS. Tailings from the stampmills of Lake Superior copper mines.

SAND SHAFT. A shaft sunk through quicksand.

SAND WHEEL. A large wheel, having buckets on its inner perimeter, for elevating water carrying stamp-sand.

SCALE COPPER. Copper in very thin flakes.

SCHIST. A metamorphic laminated rock of foliated structure, made up of superimposed flattened particles.

SCHISTOSE. Of the nature of schist.

SCORIA. Slags from copper smelters; volcanic ash.

SCORIACEOUS. Of the nature of scoria.

SCRAM. A mine that is being gone through carefully, when apparently worked out, for mineral previously overlooked.

SCRAMMING. Searching a mine for mineral previously overlooked.

SCREEN. A grating of perforated metal or woven wire.

SEAM. A thin layer of rock or ore.

SECONDARY ENRICHMENT. Nature's process of evolving high-grade from low-grade ores. See chapter on geology.

SECTILE. That which may be cut easily.

SECTION. A field or district; also, in the United States of America, a square mile of land.

SECTION POST. A boundary mark set at section corners, by surveyors.

SEDIMENTARY. Rocks formed by deposition from water, as contradistinguished from rocks formed by igneous action.

SELVEGE. Fluccan.

SET. A framed form of timber, used for supporting ground in a mine.

SHAFT. A downward mine opening having its upper end at surface.

SHAFT-HOUSE. A building at the mouth of a shaft, where ore or rock is received from the mine.

SHALE. An argillaceous slate, of fissile structure.

SHEAVE. A grooved wheel, notched to carry rope; an open pulley.

SHIFT. A miner's turn, of eight to ten hours' work; a force of men employed on one turn.

SHIFT-BOSS. A mine boss, or under-captain, in charge of one gang or party of miners.

SHOE. A stamp shoe.

SHOOT. A chute.

SHORT TON. A weight of 2,000 pounds avoirdupois.

SHOT. A blast of some explosive.

SHOT COPPER. Small rounded nodules of native copper, somewhat resembling small shot in size and shape.

SHUTE. A chute.

SILICA. Dioxide of silicon.

SILICATE. An ore of any metal or metals chemically united with silica.

SILICIOUS. Containing much silica or quartz.

SILL. The floor-piece of a set of mine timbers.

SINKING. The process of deepening a shaft or winze.

SINKING-PUMP. A movable pump, usually vertical, secured to a platform, and lowered as required, as the shafts are deepened.

SKIP. An iron box, open at the top, running on four wheels, and hauled

by a cable, used in incline shafts for hoisting ore and rock, and for lowering timber.

SKIP-ROAD. A track of T-rails, spiked to wooden sleepers, on which a skip runs.

SKIP-WAY. A skip-road.

SLAG. The vitreous refuse matter from a smelting furnace.

SLICE. To remove mine pillars.

SLICKENSIDE. A polished rock surface, showing striations produced by movement of adjoining rocks under great pressure.

SLIDE. A dissociation of strata caused by the subsidence of the overlying rock formation.

SLIME. Exceedingly small particles of rock and mineral held in solution in water.

SLIME TABLE. A circular revolving table, whereon slimes are worked, and the minute particles of mineral saved.

SLIP. A fault where a superincumbent stratum has slid downward.

SLUDGE. Mixed rock and water, brought to surface where a diamond drill cuts through very soft rock: tailings from a concentrator or mill.

SLUICE. A wooden flume or launder.

SMELTER. Works where ores or crude metals are freed from gangue or chemically united elements by heat.

SMELTING. The reduction of ores and crude metals, in furnaces, by heat, fuel and fluxing material being added to the matter to be smelted.

SMELTS. A smelter.

SOAPSTONE. Steatite.

SOFT GROUND. Underground openings that do not stand well and require heavy timbering.

SOLLAR. A platform in a shaft.

SPATHIC. Having a form approximating that of feldspar.

SPECIMEN. A sample of mineral selected because typical, unusual or exceptionally rich.

SPEISS. Impure metallic arsenides produced in copper smelting; ore particles finely disseminated throughout a rock, usually occuring as impregnations.

SPHALERITE. Zinc blende; zinc sulphide, often found associated with galena and chalcopyrite.

SPILL. Lagging driven ahead of the regular timbering in treacherous ground.

SPITZKASTEN. Pyramidal boxes wherein ores are concentrated and sized by a jet of water fed from below.

SPOON. A long-handled spoon, used to scrape out drill holes.

SQUARE SETS. A form of mine timbering having forms with mortised and tenoned sill, top piece and uprights of equal length, joined at right angles.

SQUIB. A fuse.

SPRAG. A cross-timber set to secure the hanging wall in a stope.

SPUR. A short branch from a principal ore vein.

STACK. The chimney of a furnace; usually employed to designate a number of furnaces, when used in the plural.

STAMP-MILL. A mill for crushing and concentrating minerals.

STAMP-ROCK. Rock containing fine copper that can be secured by crushing and jigging.

STAMPS. Machines to crush rock or ore by heavy blows.

STAMP-SHOE. The heavy chilled iron casting attached to the lower end of a stamp piston, that does the actual crushing of rock in a stamp-mill.

STANNIFEROUS. Tin-bearing.

STATION. A chamber in a shaft, cut out for pumps, etc.

STATION-PUMP. A mine pump permanently placed, as distinguished from a movable sinking-pump.

STEAM-HAMMER. A heavy hammer, actuated by steam or compressed air.

STEAM-STAMP. A stamp actuated by steam.

STEATITE. Soapstone. A greasy mineral, having a talc base.

STEP FAULT. A series of faults, rising like steps.

STOCKWERK. Country rock penetrated by numerous small stringers of ore, the entire mass averaging sufficiently rich to permit its mining and treatment.

STOPE. Used interchangeably to designate the excavation above a drift, or the pay-rock remaining unmined above a drift.

STOPING. Breaking down the mass of pay-rock or ore above a drift. When stoping in an ore body of average width, miners can break rock much more quickly and cheaply than when driving the drifts, which are about 7x7 feet in size.

STOPING GROUND. Ground in reserve, opened by drifts, and ready for breaking down.

STRATA. The successive rock layers of the earth.

STRATIFIED. Having regular layers of varying rock forms.

STRATUM. A layer or bed of rock.

STREAK. The color given by a mineral when scratched or rubbed on porcelain.

STRIKE. The horizontal trend of a mineral body, measured by the points of the compass; a discovery of ore.

STRINGER. A thin seam of ore.

[illegible]. To remove the drift or alluvial soil overlying an ore body.

[illegible] drift or alluvial soil overlying an ore body.

[illegible] form of a mineral, whether granular, crystalline

STUDDLE. A prop in a mine.

STULL. The top-piece of a set of mine timber.

SULPHATE. An ore of any metal or metals with which sulphur and water are united chemically.

SULPHIDE. An ore of any metal or metals with which sulphur is united chemically. Sometimes called a sulphuret.

SULPHOANTIMONITE. An ore of any metal or metals with which sulphur and antimony are united chemically.

SULPHOARSENITE. An ore of any metal or metals with which sulphur and arsenic are united chemically.

SULPHURET. A sulphide. Term becoming obsolete.

SUMP. The pit at the bottom of a shaft, where water collects.

SURFACE CAPTAIN. A mine superintendent whose duties are wholly on surface.

SURFACE RIGHTS. The ownership of the surface of land only, where mineral rights are reserved.

SWABSTICK. A stick used to clean out drill-holes.

SYNCLINAL. A syncline; of the nature of a syncline.

SYNCLINE. A trough formed by rock strata that are low in the center and high on the sides. The reverse of an anticline.

TABLE. An ore concentrator taking finely crushed particles of ore and gangue for separation.

TABLE LAND. A plateau.

TAILINGS. Refuse matter from a mill.

TAMP. To closely pack clay or other sticky earth into a drill-hole above the cartridges, to give greater force to the blast.

TAP. To draw off molten metal or slag from the vent of a furnace.

TAPER OFF. Cornish for stopping work temporarily.

TELERA. Spanish for a roast-heap of sulphide ore.

TENOR. The average metallic content of an ore, matte or impure metal.

TENSILE STRENGTH. The resistance to breaking or elongation offered by metal when under strain from either end.

TERRERO. Spanish for burrows of partly leached ore.

TERTIARY. Rock forms of the third great geological period.

TEST-PIT. A shallow pit sunk to discover mineral.

THROW. The vertical displacement of a vein caused by faulting.

TIMBER. The wooden beams and sticks used for underground supports.

TIMBER-BOSS. The head timberman.

TIMBERMAN. One who works at timbering a mine.

TON. See metric, long and short tons.

TONELADA. Spanish for long ton.

TOSSING. Jigging finely comminuted ore.

TOWN. See Range for description.

TRACHYTE. A micaceous hornblende and feldspar rock.

TRAM. To load rock or ore in tram-cars and push same to the shaft; a tramway.

TRAM-CAR. A car running underground, on T-rails, used for carrying rock from the stopes and other workings to the shafts.

TRAMMERS. Men who load and tram the broken rock underground.

TRAP. A dense gray, blue or greenish rock of volcanic origin; of considerable variety in different beds, but usually of feldspathic-augitic nature.

TRAPPEAN. Of the nature of trap.

TREND. The general direction of a mineral body.

TRESTLE. A frame-work of timbers, connecting various mine and mill buildings on surface, usually carrying tram-tracks.

TRIBUTE. The royalty or percentage paid by workmen to owners for the privilege of working a mine. Apt to be a form of grand larceny, at the expense of the mine's future.

TRIBUTOR. One who works a mine on tribute.

TRIPOD. The three-legged iron fame on which the working parts of a power-drill rest; a three-legged wooden frame over the mouth of a pit or shaft.

TROLLEY-CABLE. A wire rope sometimes used in an incline shaft as a guide for the bucket.

TROUBLED. A vein is troubled when disturbed or faulted.

TRUE FISSURE VEIN. All mineralized fissures are true fissure veins. Term commonly used as meaning a fissure vein with promise of holding to great depth, in contradistinction to a gash vein.

TSUBO. A Japanese measure of six feet square, equalling 36 square feet.

TUFA. A porous limestone. Name frequently used in place of tuff for rock of volcanic origin.

TUFF. Scoriaceous material from volcanic vents, solidified by time and superincumbent pressure. Tuffs range in density from porous pumice-stone to dense and exceedingly refractory conglomerates.

TUNNEL. A practically horizontal opening entirely through a hill or mountain. Term is commonly used instead of adit, which is a horizontal gallery having only one opening to surface.

TURBINE. The most efficient form of a water-wheel; also a new form of steam-engine in which the entire movement of the power producing parts is rotary instead of reciprocating.

TUYERES. The vents by which air is supplied, under pressure, to blast furnaces and bessemer converters.

UNCONFORMABLE. Rock strata that do not correspond as to bedding, or geological horizons.

UNDERHAND STOPING. Removing ore in descending steps.

UNDERLAY. The mineral bodies lying under a given tract, though not outcropping on surface.

UNDERLIE. The underlay.

UNPATENTED. Mining claims held from the United States Government, subject to annual assessment work.

UNSTRATIFIED. Rock forms not bedded in layers.

UNWATER. To free from water; to pump out.

UPCAST. A shaft having an upward air current.

UPRAISE. A raise.

VAN. To dress ore.

VANNER. A jig for dressing ore by means of vibratory motion, aided by jets of water to carry away gangue-rock.

VARA. A Spanish-American measure of length of 33 inches.

VEIN. A mineral body having defined walls. See contact vein and fissure vein.

VEINSTUFF. Ore with its associated gangue.

VENTILATION. The system of natural or artificial air currents in a mine. See air-shaft.

VERTICAL. Perpendicular. Upright and downright.

VERTICAL SHAFT. One sunk at an angle of 90° with the horizon, or directly downwards toward the center of the earth.

VINNEY. Cornish for copper ore with a green coating caused by weathering.

VIRGIN. Native metal occurring elementally, as distinguished from ores, which are chemical compounds.

VITREOUS. Of a glassy nature.

VOLATILE. That which can be driven off as vapor, by heat.

VUG. A druse. A hollow, or cave, entirely surrounded by rock. Usually shows fine crystallizations.

WALL. Rock of a different formation adjoining a vein or other ore body.

WATER DRILL. A power drill in which a current of water runs through the bit of a drill, changing the rock-dust from the bit into sludge which is expelled from the bore-hole by the force of the current.

WATER-JACKET. An outer casing for a blast-furnace, in which water circulates, to keep the metallic furnace-walls from melting because of the intense heat of the charge.

WATER LEVEL. The ground water level is the point above which water does not rise when a mine is allowed to fill. The basic water level is the point below which altered and enriched ores are succeeded by base unaltered sulphides.

WEATHERED. Rock altered in structure by exposure to air and water.

WET PROCESS. Lixiviation.

WHEAL. Cornish for mine. Synonymous with bal.

WHIM. A windlass with a horizontal drum.

WHIP. A rope and fixed pulley or pulleys for hoisting.

WILFLEY. A Wilfley concentrating table.

WINCH. A windlass.

WINZE. A blind shaft, usually short, leading downward from a horizontal opening of a mine.

WINDLASS. A winding device for hoisting from a pit or shaft, by means of coiling a rope or cable around a drum.

WIRE BARS. Refined copper cast into bars for wire drawing.

WORKINGS. The underground openings of a mine.

ZINC BLENDE. Sphalerite. Sulphide of zinc.

ZINCIFEROUS. Carrying zinc.

ZINC SULPHIDE. Sphalerite.

CHAPTER XIV.

Copper Deposits of the United States.

Copper is found throughout the entire length of the Rocky Mountains, in Canada, the United States, Mexico and Central America, and in the cordilleras of the Andes in South America from the extreme north to Punta Arenas on the Straits of Magellan. The North American copper deposits apparently are richer west of the main range of the Rockies, and the principal deposits, as a rule, occur in various isolated mountain ranges in the high tablelands between the Rocky Mountains and the Pacific. In the eastern part of the United States the Appalachian Mountain system carries copper ores from Maine to Alabama, the principal deposits occurring in the Green Mountains, Blue Ridge Mountains and Piedmont Mountains. In the Lake Superior district native copper is carried in the roots of an ancient mountain range. The mines of the United States furnish 55 to 60 per cent. of the total copper supply of the world. Occurrences of copper are treated by states, in alphabetical order.

ALABAMA. In the northeastern portion of Alabama the extension of the Ducktown district of Tennessee carries pyritic ores of a similar nature. Copper occurrences are noted in the counties of Cleburne, Clay, Coosa, Dean, Haralson, Marion and Randolph.

In Cleburne county considerable copper mining was done in the eighth decade of the Nineteenth Century. The Woods or Stone Hill mine showed a prominent gossan, with chalcocite in the secondary zone, succeeded by chalcopyrite at comparatively shallow depth. The ore was but slightly argentiferous and carried occasional sphalerite. The Smith mine, near the Woods, had a similar ore body.

Mines of cupriferous pyrites have been opened recently in Clay county, and copper ore is found near Goodwater in Coosa county. Cupriferous pyrites are being developed in Dean county. In Haralson county the Tallapoosa pyrite mine, about 25 miles east of Tallapoosa, shows lenses of slightly cupriferous iron pyrites.

ALASKA. The territory of Alaska is greater in area than France, Germany, Belgium, Holland and Denmark combined, and its copper deposits are scattered over a vast territory, in most cases but slightly explored. Transportation facilities are excellent for the coast mines, but lacking for the interior properties, which must have rail connections in order to become producers. The first important copper production was secured in 1904, from coast mines. The geography of Alaska remains somewhat vague as to the interior, by reason of the country being so vast, so sparsely populated and so slightly developed. It is known that certain tribes of aborigines possessed copper before the coming of the white man, and it is altogether probable that this copper was secured from the native deposits of the metal found in the Copper River country and adjoining fields.

The principal copper districts of Alaska, so far as now known, are those of Prince of Wales Island, Prince William Sound and the Copper River coun-

try, the latter an immense district with numerous occurrences of ore and native copper. Alaska never has been organized as a territory, and has no counties, hence the difficulty in giving anything like exact limits to the districts of the interior.

The principal copper field of the present is the Prince William Sound district, which includes a long stretch of mainland and outlying islands. This district includes Latouche Island, Knights Island and the Ketchikan field. Nearly all of the mines are located within a mile or less of tide-water, and are enabled to ship their ores easily and cheaply to smelters along Puget Sound. The ore is mainly chalcopyrite, commonly associated with pyrrhotite and occasionally with pyrite, with a little chalcocite and malachite, occurring along shear zones and in sedimentary slates and altered lava flows called greenstones. As a rule, there are fairly strong gossans of slight depth. Latouche Island has several promising properties that are shippers, and the Bonanza mine has a large ore body outcropping on a mural escarpment near the sea. Knights Island shows promising sulphide ores in greenstone and associated rocks of the Orca series. Glacier Island also shows ore of promise. Ketchikan is the principal town of this district.

Several mines have been developed on Prince of Wales Island, mainly on contact deposits between limestone and intrusive diorite or greenstone. Below a shallow zone of oxidation the ore is mainly chalcopyrite, associated with magnetite, in lenses up to 40 feet width and 150 feet length, the chalcopyrite carrying one to two dollars gold per ton, with small silver values.

The Copper River country includes a number of sub-districts of large area, around the headwaters of the Copper, Tanana, Shusitna and White rivers, including portions of the Wrangell, Chugatch and Alaskan mountain ranges. The Copper River basin is a broad syncline, the central part of which is occupied by the Wrangell Mountains, of Tertiary age. The most prominent rock formation is the Nicholai greenstone, associated for about 300 miles with Permian limestone. The Nicholai formation consists mainly of amygdaloidal flows, resembling those in the Lake Superior district, and carries native copper and secondary sulphides. The flows are mainly altered basalts, containing considerable metallic copper in fissures, or in sedimentary rocks near the point of contact with the traps. Copper occurs native and as oxides in shear zones, or as chalcocite and bornite in veins in greenstone. Bornite, which is the principal ore, is slightly auriferous and argentiferous.

The basin of the Kotsina River, in the Copper River district, shows native copper with quartz gangue, near the basal flows of the greenstone series, filling amygdules in greenstone and associated with epidote, as in the Lake Superior district, there being a little bornite and chalcopyrite in connection with the native copper. This district is about 125 miles northeast of Valdez.

The Chitna district shows numerous occurrences of sulphide ores, with native stream copper along the valley of the river, and between the river and Mount Wrangell. On Nugget Creek, a tributary of the Kuskulana River, a mass of native copper reported as three by eight feet in size was found. Native copper is found on the headwaters of the Nizina River.

Numerous copper occurrences are noted on the headwaters of the White River, and small masses of native metal weighing up to ten pounds have

been found in greenstone dykes, said to traverse limestone and schists. The veins are small, and those noted seem of small importance. Along Kletsan Creek, near Scolai Pass, on the divide between the White and Chitna Rivers, native copper occurs as stream metal, evidently derived from ancient basaltic dykes intersecting diorite and Carboniferous limestone. Most of the valley is overlaid with a deposit of volcanic ash, up to one hundred feet in depth.

Native copper is reported from the Kenai Peninsula and the Turnagain Arm district, and copper sulphides occur in metamorphic rocks in the Kenai Peninsula. Copper ores are reported from Resurrection Bay and Lynx Creek, 50 miles north of Seward, and on the Knik River and Lake Iliama, west of Cook Inlet.

ARIZONA. Arizona is the second district of the United States and of the world in point of copper production, ranking second only to Montana. No other copper field has shown such heavy gains in production during the past decade, and there is none with brighter prospects for the future. About one-sixth of the copper mines of the United States are found in Arizona, and of this number many are of very doubtful value, while a few are of thoroughly demonstrated worth, and a considerable number are properties of much promise.

There are evidences of rude mining operations by prehistoric peoples at a number of points, but no traces of smelting, and, had the copper ores been reduced, the slags and possibly remnants of the furnaces scarcely could have escaped attention. It seems probable that azurite, malachite and ochrous iron were mined, in a crude way, for pigments, and prehistoric turquoise mines have been found at several points, notably in the Dragoon Mountains.

The first copper smelter of Arizona, built of adobe bricks, is said to have been located at the Ajo mines, in Yuma county, about 40 miles southeast of Gila Bend, and to have been operated by P. R. Brady and others, immediately after the Gadsen Purchase, in 1852. In 1873 copper production was begun from the Longfellow mine, near Clifton, Graham county, with an adobe furnace.

There are numerous copper districts in the various counties, these having, as a rule, a generally southeasterly and northwesterly trend, with copper deposits commonly on or near the contacts of igneous rock with Paleozoic limestones, mainly of the Carboniferous series. The greater portion of Arizona is included geologically in the Sonoran Plateau, with conditions much the same as in the adjoining Mexican state of Sonora.

Central and southern Arizona form a plateau of 1,000 to 5,000 feet elevation, grading to nearly sea-level along the western edge, with numerous isolated mountain ranges. Apparently this part of Arizona emerged from the seas late in the Tertiary age.

Arizona has copper mines, or attempts at mines, in the counties of Apache, Cochise, Coconino, Gila, Graham, Maricopa, Mohave, Pima, Pinal, Santa Cruz, Yavapai and Yuma, this list including every county in the territory. The principal districts, in order of importance, are the Warren district at Bisbee, Cochise county, the Greenlee district of Graham county, the Globe district of Gila county and the Jerome district of Yavapai county.

with a number of minor districts of some present importance and considerable future promise.

Apache county has copper deposits, apparently of promise, mainly undeveloped and but slightly prospected.

In Cochise county the Warren district, lying in the Mule Mountains, commonly called the Bisbee district, is the only important producer. Copper ores are shown, however, in the Chiricahua, Dragoon, Huachuca, Rincon, Swishelm and Whetstone Mountains. In the California mining district of the Chiricahua Mountains no important mines have been developed, though considerable good ore has been uncovered. In the Johnson camp of the Dragoon Mountains an intrusive granitic core is flanked by schist, quartzite, conglomerate and limestone, the latter carrying ores near a quartzite contact, the oxidized ores including chrysocolla, with sulphides at depth. Considerable development work has been done in the Huachuca Mountains, but no producing mines have been developed as yet.

The Bisbee or Warren district may be compared in form to half of a peach, retaining the pit, which corresponds to Sacramento Hill, a big gossan blowout half surrounded by a semi-circle of irregular ore bodies in limestone, with granite-porphyry to the northeast, the gulch between the mountains being roughly the dividing line between the porphyry and limestone. There is a conglomerate capping over the junction between the porphyritic and limestone rocks, with numerous quartzite dykes intruding the limestone. The rocks of the Bisbee district may be divided into five groups, these being pre-Cambrian crystalline schists, Paleozoic sedimentaries, Mesozoic sedimentaries, Quaternary sedimentaries and igneous intrusives. The underlying crystalline schists, of pre-Cambrian age, are unconformable with the superimposed stratum of Cambrian quartzite, about 450 feet in thickness, above which lie about 4,500 feet of limestones of Cambrian, Devonian and Carboniferous ages, with copper occurring in the Carboniferous series, the ore developed so far occurring in the beds known locally as the Naco and Escobrosa limes, which are considerably faulted. The ore bodies evidently were caused both by contact metamorphism and by percolating waters. The mineralization obviously came from the porphyritic intrusives, presumably of Carboniferous age, and in the Cretaceous period a subsidance caused an accumulation of about 4,500 feet of superimposed sandstones, conglomerate, shales and limestone, followed by emergence and much erosion, with considerable faulting. There is much displacement, accompanied by thrust-faulting, with overthrusts of nearly two miles. The limestone has numerous caves, often showing beautiful stalactitic formations, and crystalline copper carbonates. Along the contacts of the igneous and sedimentary rocks there are large masses of low-grade cupriferous pyrite, partly oxidized, and Sacramento Hill contains low-grade disseminated copper and iron pyrites. The ore occurs in very irregular bodies, but with a marked tendency to follow the bedding planes of the limestone, and the principal ore bodies found so far are adjacent to, and, as a rule, not more than 1,000 feet from, the porphyry contact. The copper ore outcropped at what is now known as the Cave shaft of the Copper Queen mine, and dips under the gulch at an even sharper angle than the drop of the gulch itself.

All of the more common oxidized and sulphide ores are noted, and there is considerable native copper, occurring as masses up to some hundredweights in size, and as finely comminuted native metal in the fluccan, which is heavy along the walls. The principal ores are disseminated chalcocite and chalcopyrite, the chalcocite usually being associated with manganese in a talc gangue, and being the source of more than half of the total copper production of the district. There are small but appreciable values in silver and gold, and to the northwestward of the cupriferous crescent are lead ores, and, in fact, Bisbee was a lead camp previous to the opening of the copper deposits of the Copper Queen mine, in 1880. The zone of oxidation is most erratic, and full oxidation is noted to the greatest depth yet reached, which is nearly a quarter-mile. The secondary sulphides are found with oxidized ores above and below, and even the unaltered sulphide, chalcopyrite, is sandwiched between oxidized ores and native copper, in a most confusing manner. Indications are not especially promising either north or south of the cupriferous crescent, though narrow fissure veins, containing high-grade ores, are noted in the granite-porphyry for nearly the entire length of the range.

In Coconino county there are promising copper outcrops on the southern plateau of the Grand Cañon of the Colorado River, and several small mines have produced limited quantities of ore, mainly rich carbonates, with occasional chrysocolla and a little chalcocite. There also are developing copper mines in the vicinity of Flagstaff, and at Ryan, in the northern part of the county, near the Utah line.

The first mines in the Globe camp of Gila county were opened for silver, in 1874, and were closed in 1877, copper mining beginning in the following year. The pioneers suffered severely from raids of the Apaches, and worked under great economical disadvantages, due to poor transportation facilities and expensive fuel. Oxidized ores only were smelted until 1902, when sulphide smelting was introduced. The geological base of the Globe district is the Final schist, of pre-Cambrian age, succeeded by the Apache group of pre-Cambrian rocks and the Globe limestone, including beds of age from Devonian to upper Carboniferous, faulted by the Gila conglomerate of Tertiary age. After the laying down of the Gila conglomerate there was much faulting and compression, with marked metamorphism, with a complex of eruptives enjoying a great variety of lithological cognomens, according to the fancy of the geologists. Roughly speaking it may be said that a limestone and diabase contact shows ore bodies occurring as irregular lenses, practically parallel with the horizontal bedding planes of the limestone series, up to nearly 600 feet in thickness, resting on quartzite. The Old Dominion fault is a very prominent geological landmark, ore occurring mainly on the southern side. There are fissure veins and fault-fissures, but many fissures are not all mineralized. The average strike of the veins is approximately northeast and southwest, with dips of 40 to 90 degrees. The ore bodies may be divided into three classes, these being irregular masses in limestone, fissure veins, and irregular mineralizations of the permeable rocks. Ores are mainly oxidized, but with occasional occurrences of sulphides, which may have oxidized ores below as well as above. The oxidized ores carry considerable hematite in their gangue, but are highly silicious and require heavy fluxing with iron as well as lime. The shortage of sulphide ores needed to furnish iron for fluxing the oxidized

ores is a drawback to the field. The Globe district is quite extensive in area, and the Gibson property shows veins of very high-grade massive secondary sulphides, in schist. Copper developments are under way in the San Carlos and Christmas districts, and elsewhere in Gila county.

The Greenlee district, in which are found the mining towns of Clifton, Morenci and Metcalf, is known commonly as the Clifton district, and is the oldest of the present important copper fields of Arizona, dating from 1872, and also is notable for the invention of the water-jacket blast-furnace. This district is second in Arizona as a producer, but is second to none in size of its ore bodies, though the ore, while occasionally found in high-grade fissures, is mainly of low copper tenor. The Arisona and Detroit mines are working low-grade ore bodies carrying 3 to 4 per cent. copper only, and the future of the district rests mainly on extensive development of ore bodies of even lower average tenor.

The geology of the Clifton district probably is more complex than that of any other important copper field of the world, and would require a monograph of a hundred pages or more for a complete exposition. A most critical and exhaustive study of this field has been made by Prof. Waldemar Lindgren, of the United States Geological Survey, and his report thereon is a monumental work. The Clifton district may be described as a geological island of pre-Tertiary granite-porphyry, quartzite and limestone, surrounded by lava flows and a sedimentary series of Paleozoic age, including quartzite and conglomerate, upon which is imposed about 800 feet of limestone beds of Silurian, Devonian and Carboniferous ages, intruded by porphyry and partially covered with flows of rhyolite and andesite. The porphyry is essentially a monzonite and much of it is workable as an ore of low grade. Contact metamorphism apparently is responsible for most of the extensive mineralization, though there are evidences at many points of secondary enrichment. The oxidized zone extends from surface to a depth of 50 to 200 feet, usually carrying oxidized ores of greatly varying tenors, though sometimes barren. The zone of secondary sulphides is 100 to 500 feet in depth, carrying chalcocite and bornite, succeeded by the pyritic zone carrying chalcopyrite and sphalerite, associated with pyrite. The ores of the pyritic zone are low in copper tenor, and difficult of reduction, because of the considerable quantities of zinc associated therewith, but this zone contains enormous quantities of ore, which, without question, will be extracted in the future. The ore bodies include oxidized ores occurring in irregular forms near contacts, also fissure veins of sulphide ores in the porphyritic zone, and contact deposits in prophyry. There also are stockwerks, carrying veinlets of disseminated chalcocite, these occuring mainly in porphyry, but occasionally in quartzite. The cupriferous monzonite may be considered the predominant ore deposit, this containing finely disseminated chalcocite in a highly altered monzonite-porphyry, with the gangue ranging from quartz to talc. Considerable brochantite is produced, this being one of the few districts where brochantite is found as a commercial ore. The rich oxide and carbonate ores of early days are practically exhausted, in the older and larger mines, but oxidized ores low in copper tenor are treated by leaching, this being one of the very few American copper fields in which leaching processes are employed successfully. The average of all ores treated in the district is about 3.5 per cent. copper and 18 cents gold per

short ton, while the oxidized ores treated by the Arizona Copper Co. average under 3 per cent. copper, and are the lowest in grade of any copper ores treated at a profit in Arizona.

In addition to the mines of the Greenlee district there are small copper properties elsewhere in Graham county, notably at Fort Thomas, Fort Grant, Pima, Safford, Solomonville and Willcox.

Maricopa county has a considerable number of developing mines, of various degrees of promise. The principal copper mining districts are found at Wickenburg, Cave Creek and Morristown.

Mining operations in Mohave county have been mainly for the precious metals, but there are a number of developing copper mines in the vicinity of Kingman and Chloride, and copper properties of considerable promise are noted along the Colorado River, and on the Bill Williams Fork River that forms the boundary line between Mohave and Yuma counties.

Navajo county has no copper producers, but there are ore bodies apparently worthy of serious investigation. On the Navajo Indian Reservation, shortly south of the Utah line, Triassic sandstones show a stratum carrying chrysocolla and occasional melaconite, as speiss and nodules, rich but very erratic in occurrence.

The principal producing copper field of Pima county is the Silver Bell district, though production has begun from the Pima district. The principal mining fields of the county are found in the Sierrita, Santa Rita and Santa Catalina mountains. In the latter district, near Tucson, more or less exploratory and development work has been done for about seven miles. The mountains show a granitic core, with quartzite and limestone sedimentary beds, cut by intrusive dykes of diabase, with ore occurrences along the dykes.

The Silver Bell district is in the Silver Bell Mountains, a small, isolated range of less than 3,000 feet elevation. The hills have granite bases, with quartzite and limestone strata superimposed, the latter being much eroded, with the usual intrusive rocks, the ore bodies occurring as irregular masses with prominent gossans, in porphyry shear-planes, and in limestone and granite-porphyry, near the contacts. The ores are mainly chalcopyrite and bornite.

The Pima district, on the slope of the Sierrita Mountains, was mined first in 1880, for silver-lead ores. This district shows large bodies of low-grade ore in limestone, and occasionally in porphyry, along the contact of these rocks, the ore usually having a limestone gangue, there being intrusive quartzites.

In the Santa Rita Mountains the Helvetia district shows Carboniferous limestone strata, with prophyritic intrusions, the ore bodies showing good gossan outcrops.

Pinal county, while having no large copper producers, has several districts of decided promise, and should become an important copper field, with further development. The Ray or Kelvin district shows a zone of approximately one mile width, with a length of at least three miles, in which occur banded acid igneous rocks, giving strong evidences of thermal alterations and silicification, carrying chalcopyrite coated with chalcocite, in small particles and thin veinlets, with gangue of country rock, and also

showing occasional bunches of ore of fair size. The surface showing of gossan throughout this zone is good, and apparently copper continues into the diorite to the westward of the zone. There are no sedimentary rocks in or near the principal copper zone. A little high-grade ore is noted at points, but, as a rule, the ore is low in copper tenor, though in tremendous quantity. The Mineral Creek district, near Ray, shows silicious and argillaceous shales and quartzite, with intrusive dykes of granite-porphyry, the quartzite being much faulted and brecciated along fault-planes. Carbonate ores of varying tenor are found throughout the district.

The Christmas district, on the Gila River, shows oxidized and sulphide ores, in altered limestone near porphyritic intrusives, ore being mainly chalcopyrite, associated with a profusion of magnetite.

The Pioneer district, sometimes called the Superior district, was worked originally for gold. The principal copper property in this district has two contact veins, between quartzite and limestone, carrying silicious oxide and carbonate ores, more or less auriferous and argentiferous, with occasional free gold, and associated with iron and manganese.

The Casa Grande district shows ore of good average tenor, and copper ores of more or less promise are noted at various other points in the county.

Santa Cruz is the smallest county in Arizona, lying near the Mexican border. Principal developments are in the Patagonia Mountains, where there are several mining districts. This mountain range shows the characteristics common to practically all of the isolated ranges of the Sonoran Plateau, and ore bodies occur mainly as contacts between limestone and porphyritic rocks, or in the limestone near the point of contact. The copper ores usually are auriferous and argentiferous, and in most cases are associated with galena and sphalerite, the latter causing considerable trouble in reduction.

The county of Yavapai in area would put to blush several of the smaller kingdoms of Europe, and is mineralized in all of its mountain ranges. This county is the principal gold district of Arizona, and shows copper ores, of more or less promise, in practically every one of its numerous mining districts. There are copper mines, or attempts at mines, near Big Bug, Briggs, Carrollton, Cherry, Crown King, Dewey, Gilbert, Granite, Groom Creek, Humboldt, Huron, Jerome, Kirtland, Maxton, Mayer, McCabe, Middleton, Minnehaha, Poland, Providence, Prescott, Stoddard and Turkey. The only important copper producer is in the United Verde mine, at Jerome, though the Bradshaw Mountains have small producers of promise, and there are other fields in which development work is under way.

The Verde district, which includes Jerome, is very rugged. The district was fissured and faulted, then cut transversely, at nearly right angles, by dykes, followed by extensive mineralization, apparently by metasomatic action. The country rock is a schistose slate, extensively intruded by igneous dioritic rocks, with an unconformable capping of limestones and sandstones of later age devoid of copper. The veins at Jerome and to the southward show strong gossans and promising surface indications, but many attempts at developing mines have resulted in the making of no important producers except the United Verde. This property shows two ore bodies separated by low-grade ore and a quartzite dyke very rich in gold

and silver. There is a limited zone of oxidized ores, largely worked out, but the principal values are in disseminated sulphides.

Yuma county was accessible with such difficulty, until the building of the Arizona & California railroad, in 1906, that copper mining developments have lagged, though there are notable deposits of copper ore along the Colorado and Bill Williams Fork rivers. The Empire Flat district shows schist and limestone beds with intrusive granite, carrying fissure veins with strong gossans. The ores are of great variety, and exceptional richness, including considerable chrysocolla in the oxidized zone, and secondary sulphides of high average tenor. The district around Empire Landing, about 75 miles above Empire Flat, is partly in Yuma county, Arizona and partly in San Bernardino county, California. Although explored slightly during the preceding twenty years, development may be said to date from the advent of a railroad, in 1906, though some copper ore was mined and shipped by way of the Colorado River to Swansea, in early days. There are ore occurrences of considerable promise in this district.

ARKANSAS. Copper ores are noted sparingly throughout the Ozark uplift, and copper deposits are found in the counties of Baxter, Garland, Montgomery, Marion, Pulaski, Searcey and Sevier. The ore as a rule is chalcopyrite, and quite commonly is associated with galena and sphalerite. The lead and zinc deposits of the Ozark region apparently are of greater promise than the copper ores. Tetrahedrite and tennantite are noted ten miles north of Little Rock, in Pulaski county.

CALIFORNIA. Few states in the Union are more richly endowed with copper. The first discovery, made in 1840, when California was a portion of Mexico, was near El Paso Soledad, in what is now Los Angeles county, and in 1854 a little copper was produced therefrom. In 1855 copper was discovered in Alpine county, but the Napoleon mine, in Calaveras county, discovered and opened in 1860, was the first Californian copper producer of importance. There was a copper boom in 1862 and 1863, with hundreds of stock companies organized, and between 1863 and 1866, nine small copper smelters were built in the state, the local production being about two million pounds in 1864, in addition to considerable shipments of ore to Swansea, Baltimore and New York. After 1868 the industry was practically non-existent, until 1896, when the Iron Mountain mine, under English management, became an important producer. The high-water mark of production was reached in 1901, with an output of 34,931,985 pounds fine copper, in which year Shasta county produced 30,990,781 pounds, with between one and two million pounds each from Calaveras and Fresno counties, the balance of the output being composed of the small contributions of fifteen other counties. In 1900 California stood fourth among the copper producing fields of the United States.

There are occurrences of copper ore in about fifty of the fifty-seven counties of California, and there are copper mines of more or less importance in the counties of: Alameda, Alpine, Amador, Calaveras, Colusa, Contra Costa, Del Norte, El Dorado, Fresno, Humboldt, Inyo, Kern, Lake, Lassen, Los Angeles, Madera, Marin, Mariposa, Mendocino, Merced, Mono, Nevada, Placer, Plumas, Riverside, San Bernardino, San Diego, San Luis Obispo, Santa Clara, Shasta, Siskiyou, Sonoma, Tehama, Trinity, Tulare and Tuolumne.

The copper fields of the state may be divided into four groups, of which the first in productive importance is in Shasta county, the second in the Sierra Nevadas, the third along the Coast Range Mountains, and the fourth in the desert region of Southern California, near the Nevada and Arizona lines. The Sierra Nevada copper belt stretches along the western flanks and foothills of the mountains, showing practically continuous occurrences of copper for nearly 400 miles, reaching from Oregon on the north to nearly the Lower California line. This field contains many old mines, and is a district of much promise. The Coast Range field shows copper deposits for about 150 miles southward from the Oregon line, but the principal occurrences and developments are in Siskiyou and Del Norte counties, on the Oregon boundary. The southern extension of the Coast Range belt also shows copper ores in San Diego and adjoining southern counties. In Kern county there is an apparent branching of the Sierran copper range, with an offshoot that traverses Inyo and San Bernardino counties, reaching over into the neighboring territory of Arizona, thus establishing a close geographical and geological connection between the copper measures of southeastern California and central western Arizona. The mines of Shasta county are of preponderant importance, Calaveras county in the Sierra Nevadas coming second, with Fresno third, and with important developments under way in Siskiyou and Del Norte counties.

As a rule the alteration zone of Californian copper deposits is comparatively shallow, showing oxidized ores of high grade in profusion at surface, usually succeeded by unaltered chalcopyrite at an average depth of about one hundred feet only.

The copper district of Shasta county, as developed, is a crescent of two to three miles average width by about thirty miles extreme length. The principal developments are in the western third of the crescent, though there are properties of promise to the eastward. This district shows an extensive series of sedimentary rocks ranging in age from Miocene to Devonian, associated with igneous rocks of various ages, intercalated with the sedimentaries, or more commonly occurring as intrusives. The western end of the crescent shows slate to the west with granite-porphyry and quartzite to the east. Copper ores occur as sulphide deposits in contact zones and shear zones and a wide and irregular belt of igneous rocks runs from Iron Mountain past Bully Hill, traversing a series of sedimentaries ranging from Devonian up to nearly the top of the Triassic series. A large portion of this rock is volcanic, embracing acid and basic lavas, with fossiliferous tuffs. The entire district is much faulted and sheared, with sulphide ore bodies occurring in shear zones ranging up to hundreds of feet in width. These lenses are usually flat-lying, with chalcopyrite disseminated in pyrite, almost invariably auriferous, but low in copper tenor. The gossan cappings are massive, and large bodies of silicious ore are lacking. The Iron Mountain mine was worked originally for gold and silver values in the gossan.

In Calaveras county the principal developments are in the vicinity of Copperopolis, where mining has been done, more or less regularly, for many years. The ore bodies occur in black pyritous slate, in a bed of amphibole schist, the geological horizon being the same as at the gold mines of the Mother Lode, twelve miles eastward.

been worked for years in the western part of the Cœur d'Alene belt, no serious attempts at copper mining were begun until 1898. This district now has one considerable producer, and a number of developing mines of promise. The Snow Storm mine, on Stevens Peak, near the Montana boundary, shows an impregnated cupriferous zone conforming to the bedding planes in Algonkian quartzite. The ore body, as developed, is 10 to 35 feet in width and upwards of 400 feet in length. The usual oxidized ores above are succeeded by chalcocite and bornite, disseminated in quartzite, with occasional bodies of chalcopyrite. The ore body as a whole averages about 4 per cent. copper, 6 ounces silver and $2 gold per short ton, the ore being highly silicious and devoid of iron and alumina.

The Seven Devils and Snake River copper districts lie mainly in Washington county, Idaho, though with extensions on the west into Baker county, Oregon. These districts have been worked spasmodically since about 1888, the lack of adequate transportation facilities precluding regular operation. The Seven Devils district shows numerous copper deposits, over a considerable area. There is an extensive series of Triassic basic lavas, with intercalary slate and limestone, intruded by diorite, all of the igneous rocks being cupriferous, ores occurring mainly as primary and secondary sulphides, largely the latter, in fissure veins, contact veins and impregnation zones, most of the ore bodies carrying considerable garnet, epidote and calcite. In the Snake River district the ores are mainly malachite, bornite and chalcopyrite, occuring usually as contact deposits between limestone and dioritic rocks, garnet and epidote being characteristic associated minerals.

In the vicinity of Mackay, in Custer county, there are several mines, of which one is of some importance. Much work has been done at this point, but the best results were not secured, owing to the vacillating policy of the principal company. The ore is of low average grade, but exists in large quantities.

Bannock county, in the extreme southeastern part of the state, shows copper ores, occurring in veins and lenses in greenstone, schist and conglomerate near limestone, the ores being both auriferous and argentiferous.

Copper ores are noted at various points in Lemhi county, notably in the Black Bird district, about 30 miles west of Salmon City, where there are well defined fissure veins, and an impregnation zone in mica-schist intruded by granite.

ILLINOIS. Float copper, in alluvium brought from the Lake Superior district by glacial action, is of rather common occurrence in Illinois, and deposits of copper ore in place have been found in the counties of Chittenden, Hancock and Hardin.

INDIANA. Occasional small pieces of native copper, brought in drift from the Lake Superior district, are found in alluvium in this state. The occurrence of copper ore in an oil-well drilled six miles northwest of Marion, Grant county, was reported, but not verified, in 1904.

IOWA. The only reported occurrences of copper in Iowa are occasional small pieces of native metal found in drift, evidently brought by glacial action from the native copper deposits of Lake Superior. It is probable

that occasional chalcopyrite would be found in lead mines near Dubuque if a close watch were kept for such ore.

KANSAS. Occasional chalcopyrite is found in the lead and zinc mines of Galena, Cherokee county, in southeastern Kansas. The rock strata of Kansas range from Carboniferous to Tertiary, but igneous rocks being lacking, there seems slight likelihood of the existence of copper deposits of commercial importance.

KENTUCKY. Chalcopyrite occurs in Livingston and Union counties, and copper ore was reported, in 1902, from the vicinity of Richmond, Madison county, but none of these occurrences seem of commercial importance.

LOUISIANA. The only known occurrence of copper ore in this state is in a peak deposit of galena, sphalerite and barite, in halite, on Belle Isle, near the mouth of the Atchafalaya river, in Iberia parish.

MAINE. There are occurrences of copper ore in the counties of Hancock, Penobscot, Sagadhoc and Washington, there being old copper mines near Calais, Washington county, on the New Brunswick border.

Occurrences of copper are noted in Brookville, Sullivan, Blue Hill and Franklin, in Hancock county, the more important being in the vicinity of Blue Hill, where there have been about a dozen attempts at actual mining, mostly unimportant, though several small mines were opened. This county had a copper mining boom, circa 1877, at both Blue Hill and Sullivan, mining being suspended about 1884, on account of the low price of the metal. The copper slump of 1907 came just in time to nip in the bud an attempt at reopening some of these old mines. At one time there were two mining exchanges in Bangor, but at last accounts these buildings were occupied as a saloon and barber shop, respectively. The Blue Hill ores were claimed to run 5 to 30 per cent copper, with an average of 10 to 12 per cent, which obviously is a great exaggeration, and the ores were claimed to average $12 to $15 gold per ton, also an obvious exaggeration. The old waste-dumps are said to average 3 to 4 per cent. copper.

MARYLAND. Small copper mines were operated in Maryland in colonial days and during the first half of the Nineteenth Century, the copper industry of Maryland being of some importance until the suspension of mining was brought about by the discovery and exploitation of the Lake Superior mines. The copper ores of Maryland are mainly chalcopyrite, with occasional chalcocite and bornite, and a small amount of malachite. There are three copper belts, in the three counties of Baltimore, Carroll and Frederick.

The most important copper district of the state is in Frederick county, where there is a cupriferous belt running along the Linganore hills, from New London northward to a point beyond Libertytown. This district shows chalcopyrite with occasional chalcocite and bornite, in dolomitic limestones and micaceous schists.

The second district, in Carroll county, is a fault-zone, traceable by occasional outcrops for a distance of about 25 miles, the principal operations of the past having been between Sykesville and Finksburg. The predominant rock form is slate, and the ore is mainly chalcopyrite, with some chalcocite and bornite.

The third district, in Baltimore county, shows copper ore within the city limits of Baltimore, but the principal mines are found at Mount Washington, in the Bare Hill district, a few miles northwest of Baltimore, where there is a vein of 2 to 5 feet width, in hornblende gneiss, near intrusive peridotite.

MASSACHUSETTS. In this state copper ore is noted in the counties of Berkshire, Essex, Franklin, Hampden, Hampshire, Norfolk and Worcester. A little native copper is found in some of the Triassic sandstone strata, and a little chalcopyrite is found in the lead mines of Southampton, in Hampshire county. In Franklin county, the Davis pyrite mine has been worked for sulphur values since circa 1880. Two miles west of the Davis mine is a Savoy schist, carrying a fahlband of 15 to 20 feet width and 750 feet apparent length, with a paystreak on the north wall carrying chalcopyrite. Chalcopyrite also is noted about 10 miles west of the Davis mine, in Hampshire county. At Sheldonville, Norfolk county, a 94-foot shaft was sunk, circa 1901, on a quartz vein in granite, carrying values in gold, silver and copper.

MICHIGAN. The Lake Superior copper district of Michigan was the first American copper field of importance and now is one of the oldest of the leading copper producing districts of the world, as well as the third in size of output. It is the lowest in average grade of any successful copper mining district, and probably contains the most copper of any single field. While the cupriferous Keweenawan formation of Lake Superior outcrops to the eastward in the district of Algoma, Ontario, and to the westward traverses northern Wisconsin and is found in several of the eastern counties of Minnesota, the developed and productive mines lie wholly within the limits of Michigan.

Apparently the aboriginal inhabitants of what is now the United States were entirely unacquainted with bronze or brass, and made but slight use of copper at the time of the discovery of the new world by Columbus, though both copper and bronze were used extensively at that time in Mexico, where the superior Aztec civilization flourished. There are extensive remains, however, of mining done in the Lake Superior district by some race preceding the North American Indians. This people, whose civilization was of a higher order than that of the races succeeding, is known vaguely as the mound-builders. By this long-gone race, many of the Lake Superior copper beds were mined to shallow depth, for mass copper, and at perhaps a majority of the early-day mines, opened around the middle of the Nineteenth Century, there were pits and other evidences of prehistoric mining, to a greater or less extent. That they were good judges of mineral values has been proven by the making of good modern mines under many of these ancient pits. The Ojibways, who were found in possession of the southern shore of Lake Superior by the first white man penetrating to this inland sea, were but slightly acquainted with the practical use of copper, and had no legends regarding the mining done by their predecessors.

The existence of native copper on the southern shore of Lake Superior was first published to the world in a book by M. Lagarde, issued in Paris, in 1636, though it is probable that the existence of the metal was known only from the statements of the Indians to early French explorers on the

lower lakes. Truchement Bruslé is quoted in this book as having in his possession an ingot of copper secured from the Huron Indians. It is probable that Bruslé's ingot was merely a small mass of native copper.

The next notation of Lake Superior copper deposits is found in the Jesuit Relacions for 1659 and 1660. At that time the Ojibways had a few crude utensils made from copper, but the metals in their possession were mainly rough lumps, which the Jesuits said were worshipped, but which, in all likelihood, were merely venerated as unusual works of the Gitchee Manitou.

In the Jesuit Relacion for 1666-1667 is a chapter giving the journal of the exploration of Lake Superior by Father Claude Allouez, who seems to have been the first white man who, of a certainty, saw copper along the southern shore of the lake. In quick succession Lake Superior was visited by Fathers Marquette and Mesnard, and, as a result of their efforts, missions were established for the conversion of the natives. It was nearly another hundred years, however, before white men other than the Jesuit missionaries and French voyageurs and couriers du bois saw the shores of this remote and mysterious body of water.

In 1770 Capt. Jonathan Carver printed a book, in London, telling, among other things, of the native copper of Lake Superior, which, according to his account, could be had merely for the trouble of picking it up. This publication led to the formation of a mining company in London, and Alexander Henry, an adventurous Englishman, who was in turn hunter, trapper, explorer and miner, directed the operations of a party of English miners, who drove a long adit into a claybank beside the Ontonagon River, on property now owned by the Victoria mine, during the winter of 1771-1772. The spring rains caused the caving of the adit, and no further attempts at copper mining were made for seventy years.

When the treaty of Paris brought peace between the United States and Great Britain, Benjamin Franklin, who had heard of the mineral wealth of Lake Superior, deflected his pencil a trifle to the north, upon the crude map that was made the basis of delimitation, and thereby secured to the possession of the United States bodies of copper and iron that since have yielded those metals to the value of more than one thousand million dollars. Some effort was made by the American government, in 1798, to secure definite information regarding the Lake Superior copper deposits, and, in 1826, the Ojibways ceded their mineral rights to the United States government.

In 1830 the lake was first visited by Dr. Douglass Houghton, a young scientist combining rare technical skill with high courage and indomitable energy. Through his efforts was made the first survey of the Upper Peninsula of Michigan, comprising more than two-thirds of the southern shore of Lake Superior.

The first miners to reach the Lake Superior copper field were Jim Paull and Nick Miniclear, two backwoodsmen who came overland from southern Wisconsin in midwinter, suffering great hardships, and arriving on the shore of the great lake in March, 1843. Later in the same year a land office was opened by the Federal government at Copper Harbor, and a number of prospectors reached the field. The early mining locations were of immense area, and overlapped in a most haphazard and ridiculous

manner. Confusion grew until the government adopted the expedient of selling the mineral lands outright.

In 1844 other mineral seekers, mainly devoid of practical knowledge, arrived in the district, and the news of important discoveries became bruited about. In this year arrived the first Cornishmen, who were the first real miners to reach the district. The first actual mining of copper was done in 1844, the original product being a few tons of ore, called black oxide, but possibly chalcocite, taken from a fissure vein near Copper Harbor. This vein was abandoned quickly, but the same company opened a fissure vein carrying native copper, and begun the payment of dividends in 1849, since which year dividends have been paid annually by Lake Superior properties. Shortly after the opening of the Cliff mine, in Keweenaw county, the Minnesota mine was opened in Ontonagon county, at the other end of the district Cross-fissures only were worked at first, but these, while producing several highly profitable mines, have pinched out or lost their workable values at 2,500 feet or less in depth. The stratified beds, on which all the productive mines of the present day are developed, were neglected in the early years, and the Portage Lake district of Houghton county, now much the most important portion of the field, was neglected because of the few fissure veins found crossing the stratified beds. The first successful mining on cupriferous beds was done by the Quincy, which made a success of an amygdaloid lode, and gradually other amygdaloid beds were developed. The first successful mine to be opened on a conglomerate bed was the Calumet & Hecla, in 1866, which remains the largest and most profitable mine of the Lake Superior district, and has paid greater dividends than ever declared by any other mining company in the history of the world, these exceeding one hundred millions of dollars.

The first efforts at smelting were made in 1846, when a small furnace was built, by Prof. Jas. T. Hodge, on the Gratiot river, in Keweenaw county This ran for two short campaigns only, as selected copper rock, assaying about 20 per cent. metal, gave smelter returns of only 3.5 per cent. copper showing that nearly five-sixths of the metal was lost in the slags. A second furnace was built about 1847, by the Suffolk Mining company, seven miles southeast of Eagle River, but this was not a success. In 1849, a third furnace was built, on Isle Royale, but never put in commission. Until about 1850 all lake copper was smelted in Baltimore, but in that year J. L. Hussey & Co. built a copper smelter at Cleveland, and a smelter was built in Detroit in the same year, and shortly thereafter a successful local smelter was built at Hancock, in Houghton county. About 1863 a smelter was built at Ontonagon, and previous to 1867 a small and unsuccessful smelter was built at Lac La Belle, in Keweenaw county. The Calumet & Hecla smelter, at Hubbell, was built in 1886, the Dollar Bay works in 1888, the Quincy smelter in 1898 and the Michigan smelter in 1904.

The Keweenawan formation in Michigan may be divided into four parts, the first including Keweenaw Point at the eastward, the second comprising the Portage Lake or central district, which includes the Calumet and South Range fields, and practically Houghton county, while the mines of Ontonagon county, and the trans-Ontonagon extension in Ontonagon and Gogebic counties comprise the third field. The fourth district is Isle Royale, nearly all of the island showing cupriferous beds, with many old and rich mines, mainly small.

The richest cross-veins of Keweenaw county were at the western end, the most notable being developed by the Cliff, Central and Phœnix mines, The fissure veins of Keweenaw county usually cross the stratified beds at approximately right angles. The most promising copper ore body of the Lake district was opened, circa 1845, on the northeastern side of Bohemian Mountain, and some ore therefrom was shipped to Swansea. The ore was mainly bornite, with some massive chalcopyrite, occurring in an 18-inch vein. There are narrow fissure veins of ore, mainly arsenical, in the Mohawk mine of Keweenaw county, and also in the South Range mines of Houghton county. Chalcopyrite has been found in the Huron shafts of the Isle Royale mine, at Houghton, and at Copper Harbor, in Keweenaw county, two shafts were sunk, to a depth of about 20 feet each, on what was believed to be melaconite, and about forty tons of ore were extracted therefrom, the deposit apparently being merely a pocket. The green stains of malachite are found in many cupriferous beds, in the partly decomposed portions at or near surface, but it is altogether probable that the carbonates were evolved from native copper by weathering

The Lake Superior copper formation, at least four hundred miles in extreme length, with one hundred and fifty miles in Michigan, on which more or less mining has been attempted, and about one hundred miles on which actual mining and development work is in progress, consists of a series of stratified beds, resulting from old lava flows. The Keweenawan series is a succession of extrusive lavas, more than two hundred in number, with intercalations of conglomerate, about thirty in number, and occasional intercalary sandstones. This formation has an average thickness of 25,000 to 30,000 feet in the main series, with a secondary series of conglomerates and sandstones outcropping in the Porcupine Mountains of Keweenaw county. Overlying the Keweenaw series, to the north and west, is a conformable sandstone, while to the east and south is an unconformable sandstone, equivalent in horizon to the Potsdam sandstones at the top of the Cambrian series. The Keweenawan series is of Algonkian age, and at the base of the Azoic or Archæan system, lying above the Huronian ferruginous series, with a fault against which the copper strata are tilted. The entire series of beds, including both traps and conglomerates, has been tilted to angles varying from 20° to 72° with the horizon. The overlying sandstone shows small specks of copper, not in workable quantities, while the underlying unconformable sandstone shows occasional impregnations of native copper, and apparent evidence of igneous metamorphism, near the point of contact.

The Keweenaw Peninsula rises to an extreme height of nearly 800 feet above the waters of Lake Superior, and it is supposed that it once formed the shore of a sea, over which poured vast floods of lava, gradual subsidence bringing the lava beds beneath the sea. The conglomerates were supposed to be of sedimentary origin, but this supposition calls for no less than thirty subsidences and emergences of the Keweenawan series, which seems a strain upon the imagination, especially as there are only occasional patches of sandstone in place of the considerable beds that might be looked for in connection with the conglomerates, though some of the conglomerates shade into sandstone in spots, and the upper series of the Keweenawan formation, not mined at present, shows thick beds of sand-

stone, some of which are cupriferous. It is probable that the conglomerates are partly tuffs of volcanic origin, though some undoubtedly are ancient sea-beds, formed by material laid down from rocks broken from adjacent shores. The Keweenawan series forms a syncline, of which the southern edge outcrops on the Keweenaw Peninsula, with dip to the north and northwest. The northern fold of the series outcrops on Isle Royale, with dip to the southeast. The axial line of the syncline runs somewhat north of east, but there is a marked divergence in the trend of the southern outcrops along the district where the principal mines are opened, the strike of the formation being approximately North thirty degrees East, in the Houghton county field, which produces nearly nine-tents of the total copper output of the Lake Superior district.

Toward the middle of the Keweenaw Peninsula the western sandstone is lost under the lake, and at Bete Gris Bay the eastern sandstone also plunges beneath the waters, leaving the Keweenawan series in sole possession of the eastern tip of the peninsula. The eroded edges of the solid rock formations of the Keweenaw Peninsula usually slope, under glacial drift, to the shore lines. The district was glaciated from northeast to southwest, at a comparatively recent age, when considerable drift was deposited in the lower portions of the surface, much of the district being covered with sand, gravel and boulders ranging from a few feet to three hundred feet in depth. As a result of glaciation and erosion the harder strata, notably the greenstone of Keweenaw county, outcrop prominently, and there are moraines at various points on the southern and eastern side of the peninsula, with quicksands that are difficult to sink through. In many places, especially at the crests and escarpments of crystalline igneous strata, the naked rock stands out strongly, but the lower portions are covered with drift. From Keweenaw Point toward the south and west there is a considerable thinning of the flows, with a corresponding thickening of the conglomerates. In addition to the main series of the Keweenawan belt, consisting principally of eruptive rocks, where is a second series, mainly of sedimentary rocks laid down at a later period, this second series being found in the Porcupine Mountains of Keweenaw county, and apparently resulting mainly from the breaking down of the eruptive rocks of the preceding formation, with redeposition of detrital material so secured, in the form of conglomerates and sandstones, mainly the latter. Rich cupriferous conglomerate float has been found from time to time in the Porcupine Mountains, but the bed has not been found in place. The Nonesuch shales and sandstones of the Porcupine belt contain very finely comminuted copper, with occasional silver.

The Keweenawan formation shows extensive fissuring, more notably in the middle and eastern portions of Keweenaw county, and there is considerable faulting. The longest throw that has been noted is 284 feet, on the east vein of the Central mine, in Keweenaw county, along the Kearsarge conglomerate, estimated as equivalent to a movement horizontally northward of more than two and one-half miles.

The dip of the strata of the Keweenawan series varies greatly from point to point along the strike, and in any given cross-section is sharpest along the eastern sandstone, and flattest along the western sandstone, an evidence of thrusting exerted from the direction of the eastern or Potsdam sandstone. The contact between the Keweenawan rocks and the eastern

sandstone shows the latter much tilted from the horizontal position occupied a short distance further east, the sandstone standing almost vertically at some points adjoining the eruptive rocks. At the Delaware mine, in Keweenaw county, the average dip of the Keweenawan beds is about 20°; at the Arnold mine, about 25°; at the conglomerate mine of the Calumet & Hecla, in northern Houghton county 37° 30′; at the Osceola mine, 41°; at the Franklin Junior mine, 47°; at the Quincy mine, 51°; at the Arcadian mine, 53°; at the old Atlantic mine, 54°; at the Isle Royale mine, 59° and at the Baltic mine, 72°.

The Keweenawan series, in Houghton and Keweenaw counties, may be divided lengthwise into three approximately equal parts. The flows of the upper third, lying to the north and west, have developed no paying mines. In the second series, including the beds approximately from the Atlantic to the Osceola amygdaloids, there are a number of successful mines, including the conglomerate mine of the Calumet & Hecla, while the lower third includes the Kearsarge and Baltic amygdaloids, which have shown the greatest persistence in retention of payable mineral values along their strikes, of any of the cupriferous beds yet opened in the Lake Superior district.

In the matter of arsenic, which is a deleterious element that is giving considerable trouble to many of the Lake mines, there are certain rules that seem to hold good in most cases, though with possible exceptions. The first of these rules is that arsenic increases with depth. In the cases where no arsenical cross-veins have been noted in the mines affected, it is possible that the increase of arsenic comes from the gangue. The second rule is that there seems, in the district from Portage Lake to the southern end of Keweenaw county, an increase in arsenic from south to north. The third rule, which is based on indubitable evidence, is that in any given cross-section the percentage of arsenic in the copper secured increases from the upper to the underlying flows, in a fairly steady ratio, the copper produced from the felsitic beds at the base of the series being notably arsenical.

A cross section of the Keweenawan series at any given point would show a large number of trap and conglomerate strata, varying greatly in thickness and of unusual persistence both as to length and depth. There necessarily must be an end to even the most extensive lava flow, and owing to inequalities existing on the land-surface and sea-bed over which these old flows were spread, any given stratum may be cut out temporarily, to reappear, at greater depth, or to either or both sides of the point of disappearance. The conglomerates afford the geological bases of measurement for the series, these being much more readily distinguishable than the trap beds, owing to cleaner walls and divergence in appearance from the surrounding and more numerous trap strata, and the correlation of cupriferous beds by means of measurements of the conglomerates has made great progress during the past decade. The conglomerates are composed of rounded pebbles of igneous rock, cemented mainly by reddish and yellowish particles of quartz-porphyry. The Calumet & Hecla conglomerate is felsitic. Of the conglomerate beds many carry copper in minute quantities, but only two have been mined seriously, these being the Calumet and Allouez conglom-[redacted], of which the former has made the greatest mining success of the [redacted], while the latter has been, on the whole, a failure.

The lava flows of the Keweenawan series have experienced long continued metamorphic action, producing amygdaloidal structures in the upper portions of the various beds, and these amygdaloidal portions of the trap flows, mainly melaphyrs, carry native copper as replacements of amygdules leached out, as irregular masses in beds or along contacts between different strata, and in fissure veins. Nearly all of the amygdaloids carry some copper, but the majority are too low in tenor to be workable.

The lava flows, as a rule, are composed of dark basaltic rock with the texture of diabase. Felsite rock are of rare occurrence, except in the lower part of the belt, the basal series being felsitic. The chief original minerals are felsite, augite, magnetite and olivine, the typical rock containing about 55 per cent. felsite and 30 per cent. augite, the balance being composed of magnetite, olivine and allied secondary minerals, the base of each flow being more augitic than the amygdaloidal upper portion. Of the basaltic rocks an average type would contain about 45 per cent. silica, 15 per cent. alumina, 13 per cent. iron oxide, up to 10 per cent. calcium, about 10 per cent. of combined sodium and magnesium, and one to two per cent. each of carbon dioxide, titanic oxide and water. According to Lane the formula of the average amygdaloidal rock, deprived of its copper, might be written $CaO.MgO.Na_2O.FeO.(Fe,Al)_2O_3.4SiO_2$. Both amygdaloids and conglomerates carry much epidote, and other minerals, notably calcite, occur in connection with copper, calcite crystals that carry occluded crystallized native copper being fairly common, while some occurrences are among the largest and most perfect specimens of crystallization afforded by the mineral world. In the typical amygdaloids there are considerable quantities of prehnite, laumonite and other related silicates.

The genesis of the native copper deposits of Lake Superior remains obscure, and none of the theories provided by scientists is absolutely satisfactory, though synthetic laboratory experiments lend corroborative evidence to the theory more commonly accepted that the metal was deposited in native form from sea-water, where it had been held in solution. Dr. Koenig has found mine-waters depositing copper at the bottom of the Quincy mine, where the waters are strong brines, carrying considerable bromine. In the upper workings of the Lake Superior mines, to a depth of about 1,000 feet, the mine-waters are soft, or slightly hardened by sodium silicate. Below this depth the waters become briny with sodium chloride and calcium chloride, the latter increasing rapidly with depth, while below a half-mile the mine-waters contain a few grams of copper chloride per ton, and deposit copper therefrom as opportunity offers. Carbon dioxide is lacking almost entirely from the deep mine waters of the district. It seems probable that the native copper was deposited by sea-waters from sulphide solutions through chloride reactions. Such a reaction has been found in nature in New Zealand, where the sulphide ores of a mine abandoned for forty years were found partly transformed to native copper, by the action of the sea, which had broken into the workings. Another theory quite commonly held, is that the metal was included originally in the magma of the basic lavas and was deposited in its present form by local concentration and metasomatism. Lava flows somewhat similar to those of the Keweenawan series carry native copper in Alaska, Newfoundland and elsewhere.

Metallic copper is found in all rocks of the Keweenawan series, including the superimposed western sandstone, and along the contact of the unconformable eastern sandstone as well, but excepting the sedimentary secondary series of the Keweenawan belt, in the Porcupine Mountains, none of the sandstones contain copper in workable quantities. The metal is found in both traps and conglomerates of the main series, the metal of the conglomerates occurring largely as cementing material. Copper occurs occasionally in the very dense trap rocks, but is found more commonly in the more open upper portions of the trap flows, where the amygdules have been leached out and replaced to greater or less extent by the native metal. It is obvious that the amygdaloidal portions of the flows were much more suitable for the physical reception of the metal than the extremely dense traps at the base of each flow.

In the amygdaloidal cupriferous beds the copper usually favors either the foot or hanging wall, but occasionally, in wide beds, occurs in streaks toward the centre, and usually is disseminated more or less irregularly through the entire width of the amygdaloid, but, with a tendency, perfectly natural in view of the physical structure of the amygdaloidal traps, to favor the hanging wall. Occasionally the mineralisation is so strong that the dense basal portion of the superincumbent trap flow forming the hanging wall has been impregnated with fine copper for a few inches, or even for a number of feet, and is found workable for its metallic values.

The percentage of copper contained in the rock decreases in all mines opened to more than 4,000 feet in depth. As a rule, the amygdaloid mines usually show decreased values below a depth of about one-half mile. The payable cupriferous beds show copper courses in practically all instances, these being diagonal chutes of richly mineralized ground descending on the plane of the bed with a rake about midway between the strike and dip. Apparently the beds themselves will continue, in practically all cases, to much greater depth than mining is possible. The ultimate depth of mining cannot be foretold with any certainty, in view of the steady progress that is being made in knowledge, methods and equipments. The deepest mines of the world are in this district, the Tamarack having a vertical shaft of nearly one mile depth, while the Calumet & Hecla has a shaft sunk at an angle of 37° 30′ that is 8,100 feet in depth, with a winze of 190 feet sunk from the drift on the bottom level of this shaft. The great heat and briny waters found at the bottoms of the deep mines render work somewhat difficult, and these factors, combined with increased hoisting and mining costs, coincident with decreased copper contents, must, of necessity, eventually furnish a bottom for even the most ambitious of mines.

Considerable silver is carried in connection with copper in many of the Lake Superior mines. The mines of the Evergreen belt, in Ontonagon county, are the richest in silver, followed by the mines in the immediate vicinity of Portage Lake in Houghton county. The silver is mechanically admixed with the copper, but the two metals are not alloyed.

Various theories of cross-sectional mineralization in zones are held by students of this field, but none of them have been fully elaborated, and, while there seems some basis for such theories, there are conflicting features precluding their full acceptance at present.

Throughout the native copper district of Lake Superior there are puzzling magnetic earth currents, these being most marked on Isle Royale

and near Duluth, and the aberrations of the mariner's compass are such that navigation is rendered somewhat difficult, and even dangerous, at times. In this connection it may be stated that the first wireless telegraphy was done in Ontonagon county, Michigan, by Ayers Stockley, shortly after the laying of the first successful Atlantic cable in 1866. Mr. Stockley used crude home-made apparatus, but succeeded in transmitting telegraphic messages correctly, for a distance of nine miles, by utilizing the magnetic earth currents traversing the cupriferous strata.

While practically the entire copper production of Michigan is from the native metal, nearly all of the principal commercial copper ores are found in the native copper district, and copper ores are found in many other counties of the Upper Peninsula of Michigan. The list of Michigan copper ores includes cuprite, melaconite, azurite, malachite, chalcocite, bornite, chalcopyrite, chrysocolla, algodonite, domeykite, whitneyite, mohawkite and keweenawite.

The active copper mines of Michigan are in the three counties of Keweenaw, Houghton and Ontonagon, with a considerable number of old and idle mines in Isle Royale county. The Keweenawan copper belt extends to the Wisconsin boundary through Gogebic county, and small quantities of chalcopyrite are noted in several of the iron mines of this county.

In Baraga county there is an isolated outlier of the Keweenawan formation, known as Silver Mountain, and the same formation, carrying native copper, is noted on the Huron Islands.

Native copper is said to have been found near Perkins, Delta county, but the discovery does not seem of commercial importance.

Native copper, evidently brought by glacial action from the Keweenawan measures to the north, has been found in drift above the iron ore body of the Cyclops mine, at Norway, Dickinson county, and chalcopyrite is noted in small quantities in connection with hematite in the Emmett mine, and also in the Chapin mine at Iron Mountain, in this county.

Copper ore has been reported from the vicinity of St. Ignace, Mackinac county, but the occurrence has not been fully verified.

In Marquette county chalcopyrite and native copper occur on Presque Isle, in the city of Marquette and chalcocite is noted on Mount Mesnard and on the Chocolay river, near the same town, while a variety of copper ores occur near Sands Head. Small quantities of copper sulphides are found in the gold mines north of Ishpeming, and the granite rocks extending from the serpentine belt north of Ishpeming to the shore of Lake Superior show numerous small veins containing copper ores and other minerals.

In Menominee county copper ores have been found near Carney, and some attempts at mining have been made thereon.

MINNESOTA. The western continuation of the Keweenawan cupriferous series extends from the Upper Peninsula of Michigan across northern Wisconsin into Minnesota. The northern fold of the Keweenawan syncline is found in Cook and St. Louis counties, north of Duluth, where attempts at mining have been made. There also are remaining bodies of sulphide copper ore near Lake Superior in this county. In St. Louis county, in 1906, a mass of native copper is said to have been found, weighing about 100 pounds, which was found embedded in iron ore at a depth of 200 feet below the surface, in the Mountain shaft of the Minnesota Iron Co.

The southern fold of the Keweenawan syncline extends into Pine and Chisago counties, shortly north of St. Paul and Minneapolis, and several tentative efforts at mining have been made in these counties, native copper being found near Hinckley, Pine county, and native copper and malachite occurring in Chisago county.

MISSOURI. This state has a producing copper mine in Madison county, and has old mines or attempts at mines in the counties of Benton, Clare, Cole, Cooper, Crawford, Dade, Dallas, Dent, Franklin, Greene, Iron, Lawrence, Maries, Ste. Genevieve, St. Francois, Shannon and Washington, and also shows copper ores in the counties of Jasper, Jefferson and Wright. Copper ores are noted mainly along the Ozark uplift, in the southern part of the state, and in the lead district of southeastern Missouri.

The first copper production of Missouri was made in 1837, from carbonate ores, and at various times smelters have been erected in Crawford, Madison, Ste. Genevieve and Shannon counties. Franklin county once had a small copper producer, near Sullivan, but the output was very small. Native copper and various ores are found in the Stanton mine in this county.

In the Circle Diggings of Cole county, malachite, azurite and chalcopyrite are found, and a limited production has been made from this district.

The Collins mine, in Cooper county, shows chalcopyrite and carbonate ores.

The Cherry Valley mines of Crawford county have produced a small quantity of malachite.

In the zinc and lead mines of Jasper county a little chalcopyrite and occasional native copper occur in connection with sphalerite.

In Ste. Genevieve county, near the Mississippi river, attempts at mining were made previous to the American Civil War.

Shannon county has sulphide copper ores and in 1901 was the scene of a short-lived copper boom.

The principal copper mining operations of both past and present are noted in Madison county, in southeastern Missouri, which long has been an important lead field, being the site of the Mine La Motte, the oldest American lead mine west of the Alleghany Mountains. In 1863 copper mines were opened at Cornwall on parallel blanket veins of disseminated chalcopyrite with cherty gangue, having a country rock of Silurian limestone, and some little production was secured from this property. Chalcopyrite is noted occasionally in connection with sphalerite, pyrite and small quantities of nickel and cobalt sulphides, in the Mine La Motte. To the southward of the Mine La Motte, and about two miles east of Fredericktown, is the Buckeye mine of the North American Lead Co. On this tract the Buckeye copper mine was opened in early days, and produced a little ore. The present company opened a new mine, for lead, but at depth this has yielded an increasing quantity of chalcopyrite, and this ore became so common that a smelter has been erected for its treatment. The chalcopyrite averages about 6 per cent. copper after selection, and carries combined nickel and cobalt values, mainly the latter, to the extent of about 3 per cent. The country rock in the vicinity of Fredericktown is limestone, of various ages from Carboniferous to Cretaceous, with bosses of intrusive granite-porphyry, the ore occurring as irregular contact deposits, in limestone, near the contact with igneous intrusives. I have found copper ore in

all directions from Fredericktown, and believe this district to be one of the most promising copper fields between the Mississippi river and the Rocky Mountains.

MONTANA. This state has copper mines or attempts at mines in the counties of Beaverhead, Broadwater, Cascade, Deer Lodge, Flathead, Gallatin, Granite, Jefferson, Lewis & Clarke, Madison, Meagher, Missoula, Park, Powell, Ravalli, Silver Bow, Sweetgrass and Teton. The Butte camp in Silver Bow county is overwhelmingly preponderant in importance, being the largest and most important copper district of the world.

The mines of Jefferson county, which are found principally in the vicinity of Corbin, Clancy and Basin, seem next in promise to those of Silver Bow county, though production is not large as yet.

Missoula county, in the extreme western part of the state, carries the eastern extension of the Cœur d'Alene copper belt of Shoshone county, Idaho, with similar geological conditions, and at present, is a district of small development but considerable promise.

Meagher county has a number of small attempts at copper mines, including copper deposits in shale near White Sulphur Springs.

The Butte camp of Silver Bow county dates from 1863, when placer gold mining was begun. This was followed by silver mining in the following year, and copper was first discovered by crosscutting at depth from the shafts of the silver mines. The increasing percentage of copper in several of the silver mines in the western part of the camp led, in 1879, to the building of the first copper smelter by Senator W. A. Clark, the product being a highly argentiferous copper matte, in which the principal value was silver, the copper being used mainly for a carrier. In 1880 the Parrot and Boston & Colorado mines were making argentiferous copper matte, and in 1881 the great Anaconda mine was opened, treating ore at first that averaged about 30 oz. silver per short ton, the silver bullion being very base and containing about half copper. In 1882, at a depth of about 300 feet, the Anaconda found massive chalcocite in a crosscut, and from this find a considerable shipment of 50 per cent. copper ore was made to Swansea. From that date copper production increased rapidly, while the output of the silver mines has declined, though Butte became a much larger silver producer than ever before, owing to the metal secured as a by-product from the copper mines.

The Butte camp is known officially as the Summit Valley district, but this name is used rarely. The town is in the heart of the Rocky Mountains, and, in addition to being the largest copper camp, is the second largest mining camp of the world, ranking immediately after Johannesburg, while if white population only were counted, Butte probably would lead its South African competitor. In addition to the city of Butte, with nearly 75,000 people, that has grown up around the shafts, the copper industry of this camp supports the smelting towns of Great Falls and Anaconda, with nearly 20,000 people each.

The Butte camp is approximately a rectangle of four by seven miles, but the district as now proven is approximately two miles wide and three miles in length from east to west, the principal production coming from an area that is approximately one and one-half miles north and south by two miles east and west. The deepest shaft of the district is 2,800 feet

showing good ore on the bottom level. Developments since the beginning of the century have increased considerably the area in which rich mines are opened, and, in addition, work of an exploratory nature has shown promising bodies of copper ore outside of the area formerly considered as including all of the possibly productive ground. The new developments have been mainly to the eastward.

The development of mines in this camp was seriously hampered for many years by the most extensive, bitter and protracted litigation to be found in any mining district, but, happily, this was settled in 1906, by a compromise in which both principals saved face, while benefiting by the cessation of litigation that was costing an average of nearly $2,000,000 yearly.

The Butte district shows an extensive area of igneous rocks of Tertiary age, with later intrusives. The oldest rock is a dark basic granite, or quartz-monzonite, known as the Butte granite, surrounded by altered limestone and other sedimentaries, and partly covered by andesite, the copper veins, so far as known, occurring exclusively in this rock. The Butte granite is cut by dykes of an intrusive, probably of the Eocene period, known as the Blue Bird granite, and aplite of later age. There is a still later intrusive of rhyolite-porphyry or quartz-porphyry, known locally as the Modoc porphyry. The older rocks are faulted by intrusive fracturing, producing fissures with a generally east and west trend. Those were faulted by prolonged volcanic activity, and are cut by intrusive rhyolite, conforming in trend with the dykes. The big butte north of the town, from which the city takes its name, is an eroded remnant of a small rhyolite volcano.

The mineralized veins in the northwestern portion of the camp, which were first to be mined, carry mainly silver and zinc values to the depths yet worked, but there are strong indications of increasing copper values in the bottoms of the deeper shafts. The most productive copper veins, which have a generally east and west trend, give poor surface showings, and, as a rule, are almost entirely barren to depths of 300 to 500 feet, and occasionally to a depth of 1,000 feet. The outcrops of these veins are decidedly unpromising in appearance, and gossans are almost entirely lacking. There are lower fissures, causing displacements of both the cuprifous and argentiferous veins, but these are poorly mineralized, as a rule. The silver veins show rather prominent gossans.

At depth there is a tendency of the wider copper veins to split to smaller parallel veins, separated by country rock that is considerably altered and somewhat mineralized. There also is an increase at depth in the number of smaller mineralized fissures, while some of the fault veins that mineralized in the upper workings carry good values at depth. The veins are very erratic in size, with many pinchings and bulgings from point to point, and with a general tendency toward increasing width at depth, which is being followed by forking of the veins. The walls are poorly defined in many cases, and frequently are more or less mineralized. The whole part of the Butte district forms almost a gigantic stockwerk.

No important copper district now worked shows such extensive enrichment as is noted in the Butte camp. The process of secondary enrichment has been carried on so long, and so actively, that the gossans of the copper veins, undoubtedly large and prominent at one time, have

been lost almost entirely, through the combined effects of leaching and erosion. The leaching process has been so thorough that the principal copper veins show but slight traces of values for hundreds of feet from surface, but, in compensation, the zone of secondary enrichment is the deepest found in any important copper camp, and massive chalcocite, in large bodies, has been found at a depth of 2,400 feet below surface, while the deepest shaft in the district shows secondary sulphides of good average tenor on its bottom level. There is, however, a general tendency toward decreased values with depth, as in all other mining fields, but the greatly decreased average tenor of the copper ores of Butte, as now smelted, is due partly to other factors than actual impoverishment of ore at depth, the most important of these causes being the greater thoroughness with which mineral values are extracted, the scramming of ore left standing from early mining operations, and the vast improvement and cheapening of metallurgical processes, by reason of which it is now possible to work at a profit ores that were absolutely unpayable only a few years ago. The tenor of ore produced by the leading mines, except North Butte, shows a marked decline from the figures noted at the end of the Nineteenth Century, present extraction averaging as low as 2.5 to 3 per cent. copper from several of the more important mines.

The principal copper values of the Butte district are found in chalcocite and enargite, which furnish about 90 per cent. of the total production of the camp. Chalcocite occurs massive, in immense veins, also disseminated in granules. There is considerable bornite, which occurs extensively in the western mines, but is found sparingly in the eastern properties. The mines also produce considerable quantities of chalcopyrite and cupriferous pyrite, with more or less tetrahedrite and tennantite. The large amount of enargite smelted is responsible for the heavy arsenical fumes from the Washoe smelter, it being estimated that upwards of 30,000 tons of arsenic pass off yearly in the smelter fumes from the Washoe works.

The gangue of most of the ore bodies is granitic or silicious, consisting largely of altered country rock. The veins frequently show considerable fluccan, but, as a rule, partings are poorly defined, the ore fading into the country rock, which is impregnated to some distance on either side of the vein. The ores are highly silicious, averaging about 55 per cent. silica, 15 per cent. iron oxide and 10 to 15 per cent. sulphur, the high grade ores ranging 5 to 15 per cent. copper, with an average tenor of about 6 per cent., while 90 per cent. of the production of the district, excepting North Butte, is concentrating ore averaging 2 to 4 per cent. in copper tenor.

In addition to the ore bodies now worked there are immense deposits of ore of a grade still lower, and of a tenor too low to permit profitable working at present, though it is probable that eventually these ores will be extracted and treated at a profit.

While the Butte district has shown a marked tendency toward decreased values within the past decade, a similar tendency is noted in most other districts, and Butte, far from being a decadent camp, bids fair to hold its position at the head of the copper districts of the world for years to come.

NEVADA. This state has copper resources of prime importance

under development, and the Ely field promises to make a copper camp of the first magnitude, while developments elsewhere, notably in the Yerington district, are of promise. The state has copper mines, or attempts at mines, in the counties of Elko, Esmeralda, Eureka, Humboldt, Lander, Lincoln, Lyon, Nye, Storey, Washoe and White Pine. With the improvement in general mining conditions, brought about by the discovery of the gold bonanzas of Tonopah and Goldfield, and the improved facilities given by construction of new railroad lines, copper mining is making substantial progress.

In Esmeralda county the Sodaville and Mina copper districts are at the northern end of the Pilot Mountains, showing a contact zone of about twelve miles length, on the borders of a granite intrusive.

In Humboldt county there are promising copper deposits in the vicinity of Winnemucca, and in the Jackson Mountains, circa 60 miles north of Humboldt.

The Bunker Hill district, in the northwestern part of Lincoln county, shows nickel-copper ores, somewhat similar to those of Sudbury, with an average of about one-third ounce of platinum per ton of ore, in some cases.

The Yerington district, in Lyon county, circa 20 miles southeast of the Comstock lode, is in the Mason Valley Mountains, a small range of about 25 miles length and 5 miles width, with an extreme elevation of 6,500 feet. The core of this district is an intrusive granite, exposed by erosion in the higher peaks and deeper cañons, and covered by metamorphosed sedimentary strata on both slopes, with rhyolite flows along the eastern base. Copper ores occur in fractures and shear zones, and as bedded veins in dolomitic limestone, also as impregnations in limestone of Carboniferous age. The ores found in the dolomitic limestone are mainly oxidized, with quartz and calcite gangue, while the Carboniferous limestone shows mainly chalcopyrite, with a little chrysocolla and covellite in the oxidized zone, but the secondary sulphides, chalcocite and bornite, are found rarely. Owing to the heavy limestone gangue, carrying garnet and epidote, concentration is not effected readily, and the ores must be considered upon a smelting basis. Fortunately ore charges of about two-thirds sulphides and one-third oxides and carbonates are self-fluxing. Water supplies are available from the Walker river and from artesian wells.

In Nye county the Lone Mountain district is roughly eight miles wide by about twenty miles in length, showing at the northern end a monadnock lying about fourteen miles west of Tonopah. This district carries gold, silver, copper and lead ores.

In White Pine county the Robinson district, as it is called officially, but more commonly known as the Ely camp, is a low grade district of very unusual promise. This field, as now proven, is a belt of about one mile width by six miles length, having a generally easterly and westerly trend, transverse to the Egan Mountain range. There is an intrusive monzonite-porphyry of post-Carboniferous age cutting Carboniferous sedimentary strata, with intrusive monzonite dykes, copper deposits occurring in both the monzonite and the sedimentary strata adjoining. The principal ore body is that portion of the monzonite-porphyry lying under the zone of oxidation, and apparently is about 400 feet in thickness. According to

Prof. Lawson the workable ores are tertiary and not secondary, having resulted from the leaching of the former secondary ores of the oxidized zone. The porphyry mass shows large quartz blowouts that cover nearly one-third of the porphyritic area, these occurring mainly along the contact between the monzonite and limestone. The limestone on the northern flank of the porphyry shows small bodies of slightly argentiferous lead ore, and on the southern flank of the intrusive monzonite gold ores are found, in the sedimentary beds. The monzonite ores of the principal Ely mines sample 2.32 to 2.6 per cent. copper, 0.03 to 0.05 oz. silver and about 40 cents gold per short ton.

NEW HAMPSHIRE. Copper ores are found at a number of points in this state, especially in Grafton county, where more or less mining has been attempted. Occurrences of copper are noted at Bath, Franconia, Haverhill, Littleton, Lyme, Oxford, Warren and Woodsville in Grafton county, near Jackson and Madison in Carroll county, at Westmoreland, Cheshire county and at Croydon and Unity in Sullivan county.

NEW JERSEY. This state has copper deposits in the counties of Bergen, Hudson, Mercer, Middlesex, Passaic, Somerset, Sussex, Union and Warren, and more or less mining has been done in several of these counties, the principal operations having been near Arlington, Griggstown and Somerville. The Schuyler mine near Arlington, Hudson county, was the first New Jersey copper mine, and apparently was the second in the British colonies that later became the United States. This mine, only eight miles from New York city, was found in 1719 by a negro slave of the Schuyler family, which was made wealthy therefrom. The first steam engine in the United States was a pump of the Newcomen type, installed at this mine, and the first machine shop in the country was built in 1794 near Belleville, New Jersey, by the owners of this mine, and the first American copper smelter was built in connection with this mine. The property was a fairly steady producer until the American Revolutionary War, and thereafter was worked intermittently, being in the hands of an English company for some time after peace was restored between England and the United States. In the Arlington district there are cupriferous sandstones overlying trap beds, with impregnations of copper in shale adjoining the trap. Except in Warren county the New Jersey copper deposits occur in amygdaloidal traps, and in Triassic sandstone and shale adjoining traps.

In Somerset county, in eastern New Jersey, copper occurs in red beds of Triassic age, associated with intrusive diabase, showing oxidized ores above, with sulphides occurring at a depth of about 600 feet, while below a depth of 600 feet native copper and occasionally chalcocite in bunches are found, giving strength to the theory that the oxidized ores above are alteration products from native copper. The main ore bed varies from 3 to 15 feet in thickness, and has been traced five miles and worked more or less for that distance. At one mine there is an incline shaft of 2,360 feet in depth. Enough copper was secured from a mine near Bound Brook to cast a brass cannon for the American army, during the Revolutionary War.

In Pahaquarry township, on the Delaware Water Gap, in Warren county, the northeastern slope of the mountain shows red shales and Medina sandstones, some of the gray sandstones interbedded with red

shale carrying impregnations of chalcopyrite, cementing the grains to the extent of one to two per cent. copper. These beds aggregate fully 200 feet in thickness, and may become highly valuable at some future time, when ores of lower tenor than now worked will be available commercially.

NEW MEXICO. The first New Mexican copper mining in historic times apparently was done in the Santa Rita district, Grant county, about the beginning of the Nineteenth Century. Mining development, after the territory passed under American control, was hampered somewhat for many years by the old Spanish system of land titles, but this trouble has been remedied, in the main. New Mexico shows extensive areas of Permian red beds carrying finely disseminated copper ores in sandstones and shales and has copper ores in nearly all parts, copper occurrences being noted in the counties of Chaves, Colfax, Donna Ana, Grant, Lincoln, Mora, Otero, Rio Arriba, Sandoval, San Miguel, Santa Fé, Sierra, Socorro, Taos, Union and Valencia.

Donna Anna county has promising copper deposits in the Oro Grande Mountains, about 15 miles northeast of Las Cruces, and in the Organ district has copper mines on contact deposits between metamorphosed limestone and igneous intrusives.

In Otero county there are mines of copper in the Jarilla Mountains, with considerable development under way in the vicinity of Orogrande.

Rio Arriba county has extensive copper deposits in the Bromide district. These apparently are of low average tenor, though of considerable size, but have been developed only slightly.

In Sandoval county chalcocite is noted, in Triassic sandstones, in the Nacamiento district.

Socorro county is large and has a number of copper districts of various degrees of promise, including the Cooney, Kelly, Magdalena and other districts in the Mogollon Mountains, also copper fields in the Socorro and Oscura Mountains. The Cooney district, on the western side of the Mogollon Mountains, in the southwestern corner of the county, shows dacite flows, cut by rhyolite dykes, copper ores occurring in brecciated fissures near contacts, and as true fissures that carry argentiferous secondary sulphides and gold in the oxidized zone.

Taos county has pre-Cambrian deposits of sulphide copper ores associated with sphalerite.

Grant county is the source of the principal copper production of New Mexico, and has two important fields, and several others of promise. Among the new fields the Hachita district shows promising properties.

The Lordsburg district of Grant county is about eight by eighteen miles in extreme area, and is located in the Pyramid Mountains. The development of this field dates from 1870, and its history is filled with ups and downs. The Pyramid range apparently dates from about the close of the Tertiary age, showing fissure veins and shear zones carrying all of the common oxides and carbonates, secondary sulphides and chalcopyrite, with considerable galena, occasional sphalerite and cerussite, and a variety of silver ores.

The Santa Rita district of Grant county was the scene of the first copper mining in this territory. This district shows an underlying core of igneous rock, with an overlying bed of quartzite impregnated with oxidized ores and occasional native copper, some sulphide ores occurring

in the underlying porphyry. Although mining has been done in this district for about a century, the workings were merely superficial until a deep shaft was begun in 1906.

The Burro Mountain district of Grant county is the most important in the territory. This field lies about fifteen miles south of Silver City, at the base of the Burro Mountains, and mining dates from 1879. Several small copper smelters were erected in the ninth decade of the Nineteenth Century, but the most important development dates from about 1903. The Burro Mountains are a short isolated range of only about five miles extreme width by ten miles length, showing narrow veins of cupriferous pyrite in porphyry, and associated deposits of disseminated chalcocite, with some ore bodies of unusually large size carrying sulphide ores of low average tenor, frequently zinciferous and refractory. The mineral values occur principally in chalcocite and cupriferous pyrite, with small quantities of gold and silver. The sulphides average 3.5 to 4 per cent. in copper tenor, and there are some oxidized ores, but the zone of oxidation is quite shallow.

NEW YORK. The only copper mine ever opened in the state of New York was at Canton, St. Lawrence county, but this never became an important producer. There are occurrences of ore, however, at numerous other points in the state. Chalcopyrite is found in the Ancram and Beckee lead mines in Columbia county; at Crown Point in Essex county; at Alexandria and Antwerp in Jefferson county; at Salisbury in Herkimer county; at Ladentown, Rockland county, where malachite and cuprite occur in the seams in the trap; at Ellenville and the Red Bridge lead mines in Ulster county; cuprite, azurite, malachite and chalcopyrite occur in the vicinity of Conklingville, Saratoga County; at Chester, Warren county, and at East Chester and Ossining in Westchester county.

NORTH CAROLINA. This state has copper in the counties of Alexander, Alleghany, Ashe, Buncombe, Cabarrus, Caldwell, Catawba, Chatham, Clay, Davidson, Gaston, Granville, Guilford, Jackson, Lexington, Lincoln, Madison, Mecklenburg, Mitchell, Montgomery, Moore, Person, Randolph, Rockingham, Rowan, Stanley, Swain, Transylvania, Wautauga, Wilkes and Yadkin. As a rule the ores occur in mountainous districts near the contacts of basic rocks altered to hornblende-schists, which apparently were the source of the metal, and which still contain small quantities of chalcopyrite and pyrite. The ores of North Carolina are mainly sulphides, but native copper and practically all of the commercial ores of copper, as well as many rare minerals, have been found. Copper mining was followed to a small extent previous to the American Civil War, mainly in Ashe and adjoining counties. The state is notably rich in available water powers, which should prove valuable in the development of its mineral resources.

The Virgilina district lies along the border of Virginia and North Carolina, including the counties of Person and Granville in the latter state. The length of this belt is about twenty five miles, with a width of about three miles. The Virgilina district is in the sub-Piedmont division of the Appalachian belt, and contains a number of small mines of some promise.

In the same division of the Appalachian belt, but some distance to

the south, is found the Gold Hill district of Rowan county. This field was worked originally for gold, yielding about $3,500,000 from 1842 to 1893, inclusive, but the mines eventually were closed down, because of change of values at depth from gold to copper. The district is about one mile wide and twenty miles long, lying on a plateau of the Piedmont Mountains. The predominant copper ore is chalcopyrite, with gangue of quarts and decomposed schist. The outcrops of prominent ore bodies carry one to twenty per cent. copper, and some ores can be concentrated ten into one. The average sulphide ore of this district carries 2 to 4 oz. silver and 50 cents to $2 gold per short ton. The ore occurs in fissure veins, the secondary zone carrying considerable native copper and rich oxides and carbonates. The deepest workings are nearly 1,000 feet.

In Webster county, in the Cullowhee district, there is one producer and several developing properties of promise. This field shows lenticular bodies of chalcopyrite with quartz and corundum gangue, and prominent gossan cappings in a fracture plane following a basic band in schist.

NORTH DAKOTA. Copper was reported December, 1906, as occurring in this state, but a satisfactory verification of the statement has not been secured.

OHIO. Small masses of native copper, brought from Lake Superior by glacial action, are found occasionally in drift in this state, and native copper ingots and ornaments are taken from mounds built by a prehistoric race, but, so far as known, no copper has been found in place.

OKLAHOMA. Copper ore has been found in small quantities at several points in the state of Oklahoma, notably in the mountains of Woods and Woodward counties, where auriferous copper ores have been found, but no mines have been developed.

OREGON. Copper ores are found in this state in the counties of Baker, Douglas, Grant, Jackson, Josephine, Lynn, Marion, Umatilla, Union and Wallowa. Oregon enjoyed a small share of the California copper boom of 1860-1868, when there was considerable activity in southwestern Oregon, notably in Josephine county, where a smelter, one of the earliest on the Pacific coast, was built for treating oxidized copper ores. Josephine county carries the northern extension of the Coast Range copper belt found in Siskiyou and Del Norte counties of California. This belt, about 25 miles wide and approximately 50 miles long, shows large copper veins, usually carrying fair gold values near surface. The ore is mainly chalcopyrite, with occasional bornite, disseminated in pyrite and pyrrhotite. The district has one small but modern smelter, which can work only four to five months yearly, because of the heavy snows and rains that render the mountain roads impassable except in the summer.

Baker county, in eastern Oregon, has a number of developing copper properties of considerable promise. This county carries the western extension of the Seven Devils district of Idaho, along the Snake River. The copper deposits occur mainly in basaltic flows, interbedded with sedimentary rocks of Triassic age, showing fine grains of chalcocite and bornite, with occasional chalcopyrite, in lavas and tuffs, the mineralization apparently following the jointing planes.

The copper production of Oregon is small, but promises to increase.

PENNSYLVANIA. This state has copper ores, and in several cases old copper mines, in the counties of Adams, Berks, Bucks, Chester, Co-

lumbia, Lancaster, Lebanon, Montgomery and Philadelphia. The first copper producer of Pennsylvania was the Gap mine in Lancaster county, which was opened as a copper mine, late in the Eighteenth Century, and as such was a failure, but was reopened as a nickel mine, circa 1850, and was a successful producer of that metal, with a small incidental output of copper, until 1893, when it was closed by the competition of the richer nickel-copper mines of the Sudbury district of Ontario. The old mines at Cornwall, in Lebanon county, show native copper, cuprite, azurite, malachite, chalcopyrite, chrysocolla and brochantite. In Montgomery county the Perkiomen mine shows fully as long a list of copper minerals. Near Gettysburg, in Adams county, native copper and cuprite are noted, and native copper, cuprite, melaconite, malachite, chalcopyrite, aurichalcite and chryscolla occur in Jones's mine, near Morgantown, and elsewhere in Bucks county. Oxide, carbonate, sulphide and silicate ores of copper have been found in the Frankford stone quarries, in the city of Philadelphia.

RHODE ISLAND. There are no mines of copper in this state, but chalcopyrite occurs near Portsmouth, Newport county, and occurrences of azurite, malachite, bornite and chalcopyrite are reported from other points, though apparently found nowhere in commercial quantities.

SOUTH CAROLINA. Chalcopyrite is noted sparingly at the Fair Forest gold mines of Union county, but no copper deposits of promise have been found in the state.

SOUTH DAKOTA. Copper ores are noted in the counties of Custer Lawrence and Pennington, all in the Black Hills, and a little copper mining has been done in these counties. Copper ores are used to a limited extent for fluxing refractory gold ores at some of the local smelters. Geologically, the copper measures of the Black Hills are comparable with those of the Ducktown district of Tennessee.

TENNESSEE. This state has important active copper mines in Polk county, small and idle mines in Sullivan county, and occurrences of copper ore are reported from Lawrence county and from Jellico Plains, Monroe county.

The discovery of copper in the Ducktown district of Polk county was made in 1843, by a gold hunter, who mistook crystals of cuprite for gold. As early as 1854 there were two small matting furnaces in commission, and 14 mines were worked, most of the ore being hauled by wagon 40 miles to a railroad, and shipped to Swansea for reduction. The district prospered until 1863, when work was suspended, owing to the American Civil War, and the mine remained idle until 1866, when work was resumed and continued until 1878, after which the entire district remained idle until 1891, when a British company begun work on a modern scale, and has scored a marked success. The Ducktown district lies in the extreme southeastern corner of Tennessee and extends into the adjoining states of Georgia and Alabama. The Ducktown basin is an eroded plateau, enclosed on three sides by mountains rising 500 to 2,500 feet above the general level of the country, the basin having an average elevation of about 1,500 feet above sea-level. The country rock of the Ducktown plateau consists of foliated mica-schist, with intercalary gneiss, and the ore occurs in a fault-zone in rocks of lower Cambrian age. The mines

show a heavy gossan of fair grade hematite, which is shipped extensively to iron furnaces. The oxidized zone is comparatively shallow, and has been worked out in the active mines, leaving only chalcopyrite, associated with pyrrhotite in a gangue of quartz, epidote and other metamorphic minerals. The sulphide ores average about 2 per cent. in copper tenor, and are neither auriferous nor argentiferous, occurring as great lenses in metamorphic schist, sometimes with sharply defined walls and again grading into the country rock.

TEXAS. Copper ores in this state are noted in the counties of Anderson, Archer, Baylor, Burnet, Clay, El Paso, Hardeman, Haskell, Knox, Lincoln, Llano, Mason, Montague, Presidio, Stonewall, Taylor, Wichita, Wilbarger and Wise. A little native copper is found in Burnet and Llano counties, with chalcopyrite in both counties and argentiferous tetrahedrite in the latter. Along the Brazos river there are Permian red beds showing carbonate and silicate ores in sandstone. There have been occasional sporadic attempts at development of copper mines, but as yet nothing serious has been accomplished, the ores as a rule being low grade carbonates, sulphides and silicates, distributed in beds of Permian age.

UTAH. This state, while now ranking fourth in point of production among American commonwealths, is scarcely second to any in promise, and possesses in one of its camps the largest bodies of ore of any metal known anywhere upon the globe. The copper production is increasing rapidly, and, in 1906, the copper output of Utah was about as great as the production of either Michigan or Montana in 1887, and about as large as the output of Arizona in 1897. The state has copper mines, or attempts at mines, in the counties of Beaver, Box Elder, Davis, Emery, Grand, Iron, Juab, Morgan, Piute, San Juan, Salt Lake, Summit, Tooele, Uintah, Utah, Wasatch, Washington and Weber.

In Box Elder county, near the Nevada line, there are promising copper deposits in limestone, showing good gossans above, and, as a rule, having heavy fluccans along either or both walls.

The first mining in Utah was done in Beaver county, just before 1860. The principal copper developments in this county are in the Cactus district, and at Milford. The richness of the Beaver county ores has been exaggerated, for stock-selling purposes, but one of the mines, under careful management, has reached the point of paying dividends, and it is probable that Beaver county will be given more serious attempts at mining in the future.

Juab county, in the centeral western portion of the state, has a number of old and large producers of silver and lead, and with increasing depth there is an increase in copper values, with considerable gold. The Tintic district, of which Eureka is the principal town, shows Carboniferous limestones, with intrusive quartzite on the west and rhyolite on the east, with ore occurring as contact deposits in both the sedimentary and igneous rocks, the ores being almost exclusively sulphide and carrying good values in lead, zinc, copper, silver and gold.

Piute county has been almost exclusively a gold and silver mining field, but shows considerable copper.

In San Juan county there is a copper field showing sedimentary rocks of Carboniferous age, these including limestone, shale and quartzite,

which have been intruded and fissured, with extensive metamorphism. Quartzite is the predominate rock form, with intercalary limestone below and Carboniferous shales, sandstones and limestones in the upper part. The lower limestones, of dolomitic nature, carry copper ores, as do the Carboniferous shales of the upper portions. There are many intrusive dykes and sills of monzonite-porphyry. Ore occurs in the intrusive zone in limestone, or at the point of contact in deposits roughly parallel with the bedding planes of the country rocks, which are mineralized in lenticular chutes dipping with the bedding planes, and with moderate pitch.

Tooele county is primarily a gold district, with considerable silver production, and small outputs of both lead and copper, but has copper deposits of promise.

Summit county was originally a silver-lead district, and these metals still predominate in output, but considerable sulphide copper ore is found in the lower workings of the argentiferous lead mines.

Salt Lake county contains three important mining fields, of which one is a copper camp of the first magnitude. The Little Cottonwood district, with Alta as its center, shows good values in lead, copper and silver, and has several good mines. The Big Cottonwood district, with Brighton as its center, shows mainly silver and lead values, but copper indications are promising.

The Bingham camp, known officially as the West Mountain district in Salt Lake county, already an important camp, is certain to become one of the greatest copper mining fields of the globe. It lies about 20 miles southwest of Salt Lake City, on the eastern slope of the Oquirrh Mountains, with an area of about fifteen square miles. Water is scarce, being supplied chiefly from the mine workings. This is an old camp, worked originally for silver-lead values, and dates from the opening of the Old Jordan mine in 1863. The extraction of gold from the heavy gossan was begun in 1880, but did not prove profitable. The first copper mining, begun in 1896, was done on fissure veins carrying disseminated copper sulphides averaging 3.5 per cent. copper, 2.5 oz. silver and 10 cents to $1 gold per short ton, with irregular but sometimes important lead values, and with occasional sphalerite. Several large and profitable mines have been opened on the sulphide veins which occur in dolomitic limestones near igneous intrusives, the lenticular ore bodes lying roughly parallel with the beds and the country rock, some of these lenses being of great size ranging up to 200 feet in thickness and several hundred feet in length and depth, and carrying excellent average values.

While the mines opened on the contact deposits of sulphide ore have rendered Bingham an important producer of copper, recent developments on the monzonite ore bodies are of far greater importance. While a limited amount of mining of monzonite ores has been done in Graham county, Arizona, it may be said that Bingham is the first camp in the world to turn country rock into ore upon any large scale. The monzonite ore bodies of Bingham are of the very greatest commercial importance and contain hundreds of millions of tons of ore. The ore concentrates excellently, though there is a loss of nearly 25 per cent. at present, mainly due to slimes, but this probably can be reduced to 20 per cent., and possibly to 15 per cent, eventually, by various minor improvements in milling. The ore of

the monzonite-porphyry is chalcopyrite, quite evenly disseminated in small grains throughout the porphyritic mass, with occasional veinlets carrying high-grade chalcocite and bornite. The porphyritic ores range from 0.72 per cent. to 1.75 per cent. in copper tenor, and, at the principal property, the average of six thousand assays gave 1.98 per cent. copper, 0.15 oz. silver and 0.016 oz. gold per ton. Owing to the system of mining, by which the monzonite mountains are quarried off by steam shovels, this copper field should give the lowest average mining cost of any in the world, with milling costs nearly as cheap as in the Lake Superior district, and eventually the present smelting costs should be reduced materially.

VERMONT. In this state there are copper mines in the counties of Lamoille and Orange, the latter being the more important, and copper ores are noted also in the counties of Franklin, Madison and Rutland. Copper mining was an industry of some importance in Vermont previous to the opening of the Lake Superior district, and the largest mine of the state was a famous producer for many years. The Vermont ore is chiefly chalcopyrite, and is noted at Brandon and Cuttingville in Rutland county, at Bridgewater in Madison county, at various points in Franklin and Lamoille counties, and at South Strafford, Copperfield, Vershire, Corinth and elsewhere in Orange county.

There are three principal copper districts in Orange county, the northern being at Corinth, where the Union mine is the most important property. The middle district is at Copperfield, where the Ely mines, opened in 1821, were the largest in the state, and the southern district is at South Strafford, where the Elizabeth mine has been a considerable producer. The ore is mainly chalcopyrite disseminated in pyrite and pyrrhotite, with a small amount of other gangue. The Elizabeth mine is the oldest in the state, having been opened in 1793 and long worked for cupriferous pyrrhotite. The Orange county deposits considerably resemble those of the Capelton district in Quebec, to the north, and are somewhat similar to those of the Ducktown district of Tennessee. The country rock is mainly contorted metamorphic sericite schist, surrounded by sedimentary beds of Paleozoic age, with pegmatite dykes. The Ely ore body is 20 to 30 feet in thickness, up to 150 feet in width, and has been mined to a depth of 3,600 feet. According to Weed the mineralization was pneumatolytic, due to emanations from granitic magma.

VIRGINIA. The existence of copper in this state has been known from early colonial days, and copper ores are noted in the counties of Albemarle, Buckingham, Carroll, Charlotte, Culpepper, Fauquier, Floyd, Fluvanna, Franklin, Grayson, Greene, Halifax, Loudoun, Louisa, Madison, Montgomery, Nelson, Orange, Page, Rappahannock, Rockingham and Stafford. In Louisa county the copper ore bodies have strong hematite gossans, which were mined for iron ore at one time. In this county cupriferous pyrite mines are worked, but no attempt is made to save the copper values, except by the leaching of mine waters, from which a little cement copper is secured.

The copper fields of Virginia may be divided into four principal groups, known as the Virgilina, Blue Ridge, Gossan Lead and Loudoun-Culpepper districts. In the Piedmont region there also are copper deposits in Albemarle, Buckingham and Charlotte counties.

The Virgilina district lies in Halifax county, Virginia and in Gra ville and Person counties, North Carolina. The field is about three mil in width by twenty-five miles in length, and in Virginia runs from th state line to the Hyco River, about 8 miles north. The ore is mainly cha cocite, with occasional bornite, having a gangue of quartz and talcos altered country rock, the ore averaging about 3 per cent. copper, but wit chutes of high grade ore running 5 to 25 per cent. in tenor. Selecte ores, as shipped average 6 to 10 oz. silver and 75 cents gold per ton. Th ores which are highly silicious and require concentration, occur in lentic ular chutes of varying sizes, from 6 inches to 20 feet in width, and wit an extreme length of several hundred feet, lying in fissure veins cuttin schistose rocks altered from andesite and similar volcanic rocks. Th average copper tenor of the ores of the district is said to be about per cent.

The Blue Ridge district runs along the mountains in the counties o Warren, Fauquier, Rappahannock, Madison, Page and Greene. This di trict shows pre-Cambrian basaltic flows, capped by sedimentary bed and intruded by granitic rocks, later faulted and subjected to regiona metamorphism. The gossans are not prominent and the copper occur mainly native and as cuprite, with small quantities of carbonates an occasional bornite and chalcopyrite. This district shows mainly gan veins, with promising surface ores which do not hold to depth.

The Gossan Lead of Grayson, Floyd and Carroll counties, in sout western Virginia, shortly above the North Carolina line, is traceable f upwards of ten miles in a fault fracture between schists and slates o Cambrian age and metamorphosed schistose diorite. This district ha been worked extensively for iron ore, from its limonite gossans, and pr duced a little copper in the decade previous to the American Civil Wa from chalcocite disseminated in pyrrhotite, but the average copper co tents are estimated as slightly under one per cent.

The fourth district includes Loudoun and Culpepper counties, wher copper ores are noted at various points, and where there have been so desultory attempts at mining at various times.

WASHINGTON. This state has a number of copper deposits of co siderable promise, and bids fair to become an important producer ev ually. Copper ores are noted, and there are mines, or attempts at mi in the counties of Chelan, Clarke, Cowlitz, Ferry, King, Kittitas, Le Lincoln, Okanogan, Pierce, Skagit, Skamania, Snohomish, Stevens a Whatcom.

In Chelan county there are large bodies of ore of low average gr and the district is regarded as promising.

In Ferry county there are copper ores in the vicinity of Republic. most of the mines in that camp carry cupriferous values to a greate less extent.

In King county the Skykomish or Foss River district shows pro ing occurrences of ore, mainly chalcopyrite, with good outcrops.

In Kittitas county the Cle Elum district shows a cupriferous b nearly a mile in width by several miles in length, carrying copper of good average tenor that show strong outcrops.

Okanogan county, near the British Columbia boundary line, sh

numerous bodies of copper ore, mainly of low grade, but of considerable size, and the field is one that may develop important low grade mines in time.

In Pierce county native copper occurs near Eatonville, and various copper ores are found elsewhere in the county.

The Mount St. Helens district lies mainly in Skamania county, with portions in Cowlitz and Lewis counties. There are several promising mines under development in this field.

In Snohomish county the Darrington district, in the Cascade Mountains, has a number of developing mines, opened on a wide ore zone carrying paystreaks of massive bornite and chalcopyrite The Index district of Snohomish county shows a number of properties, on which more or less work has been done, but has suffered severely from wildcat promotions. The veins generally are narrow, and values irregular, occurring in concretions and kidneys of bornite, with small granules of bornite disseminated in a granitic gangue. For concentration the ore must be crushed to about sixty mesh, and slimes so badly that on an average less than half the copper values have been recovered.

In Stevens county the Chewelah district shows chalcopyrite, both massive and disseminated in pyrrhotite, in schist, near a granite contact. This district has been a small producer of copper for many years.

WISCONSIN. Copper ores are noted in this state in the counties of Ashland, Burnett, Chippewa, Crawford, Douglas, Grant, Iowa, Lafayette, Polk and Sauk.

The northern fold of the Keweenawan trap formation extends across the Lake Superior shore of northern Wisconsin, from Hurley to the Minnesota line, carrying more or less native copper in the amygdaloidal portions of various trap beds. The Keweenawan series is fully described in the article on Michigan. Some remains of prehistoric mining have been discovered east of the Fond du Lac mine, near the Brule river, and in the vicinity of the Percival mine, in Douglas county. The first attempt at copper mining, in historical times, was made in Douglas county, in 1845, by the North American Fur Company, which opened a shaft on a leah vein of tetrahedrite. Further mining attempts in this district were made in 1855, 1862, 1873 and 1898. Work was resumed in 1907 on a property on the Minong range, which is on the southern fold of the Keweenawan syncline, in the southern part of Douglas county.

In Crawford county an attempt was made at copper mining just previous to 1860, in the vicinity of Prairie du Chien. Copper ores are noted in the lead and zinc districts of southwestern Wisconsin at Shullsburg, Lafayette county, and at Mineral Point, Iowa county, where some rude attempts at copper mining have been made. Chalcopyrite and malachite have been found in Sauk county, and auriferous and argentiferous copper ore was found in 1902 in a diamond drill hole bored north of Osceola, Polk county. Copper ores are found south of Boscobel, Grant county, and chalcopyrite of good grade occurs near Mellen, Ashland county, where some attempts have been made at mining.

WYOMING. This state has copper mines or attempts at mines in the counties of Albany, Big Horn, Carbon, Converse, Frémont, Laramie, Natrona, Sheridan and Weston. The state has copper fields of consider-

able promise, but production has been small, owing to lack of transportation facilities in the principal districts.

The Grand Encampment copper district is of immense size, having an estimated area of 2,500 miles, lying in the southern half of Carbon county and the southwestern quarter of Albany county, and being divided into nearly equal parts by the North Platte river. The Sierra Madre Mountains lie to the west and the Medicine Bow range to the east. Gold prospecting was begun in 1898, but was not especially successful, and was followed a year or so later by copper prospecting. The district has been a producer since 1900, hand-selected ores shipped for treatment ranging 30 to 49 per cent. in copper tenor in carload lots, the higher grade ores carrying $8 to $10 gold and silver per ton. The general formation of the Sierra Madre Mountains is an irregular core of red granite, with superimposed Algonkian mica-hornblende schists. Associated with the schist, and conformable in strike and dip, are huge ledges of limestone and altered schist, known locally as lime dykes, being composed mainly of limestone and silica. There are extensive evidences of alteration and replacement in the granite, diorite and schists. The principal ore bodies occur on the contacts between the schists and adjacent rocks, notably quartzite. The gossans usually are of soft spongy limonite, with some hematite and a little quartz. The veins range from mere stringers to 20 feet in width, and the zone of oxidation, as determined, is from 35 to 100 feet in depth, being succeeded by bornite and massive chalcopyrite, the oxidized zone showing mainly azurite and malachite, with a little native copper. The Medicine Bow range shows a core of gray and red granite, flanked irregularly by schist and gneiss, with dykes similar to those of the Sierra Madres. The Rambler mine, in the Medicine Bows, was opened in 1900, for gold, abandoned as worthless, and relocated for copper. This mine is notable for its large quantities of covellite, and for carrying platinum, palladium, osmium and iridium, this being the first known occurrence of platinum in connection with copper.

In Albany county, in addition to a portion of the Grand Encampment district, there are copper mines in the Spring Hill and War Bonnet divisions of the North Laramie Peak district.

The Laramie Hills district runs along the southern boundary of the state, from Laramie through Albany and Converse counties, to Casper, Natrona county. This range shows a granite core, with generally north and south trend, flanked by schists and various sedimentary beds. Copper occurs native, in red altered granite, at Sherman Hill, and as sulphide ores at Hecla, Slate Creek, Cooney Hill and to the northward of Laramie Peak. Laramie county includes the Hartville uplift, in east central Wyoming, showing a considerable geological resemblance to the Black Hills of South Dakota. Copper ores are found throughout the entire uplift in fissure veins and lenses, usually pinching out at slight depth, and also as blanket veins. Some copper mining was done in this vicinity as early as 1881, when 75 men were employed at the Sunrise mine, but the industry was not successful, owing to lack of rail transportation.

CHAPTER XV.

Copper Deposits of Canada and Newfoundland.

In this chapter the copper deposits of Canada are treated in detail by provinces and territories, and, for geological convenience, Newfoundland is added, although Newfoundland is not a part of the Dominion of Canada, being the oldest colony of the British crown. Because there seems no other place for it, the few lines referring to the discovery of copper in Greenland are added to this chapter, though Greenland is an appanage of the Danish crown.

Although copper has been mined for many years in the eastern provinces of the Dominion of Canada, and the mines of Georgian Bay, in Western Ontario, are of practically the same age as the oldest of the Lake Superior properties in Michigan, the Canadian copper industry did not come to importance until the exploitation of the great nickel-copper deposits of the Sudbury district, beginning with about 1886. Ten years later the production of the Trail district in British Columbia became important, and was followed by far greater developments in the Boundary district of the same province, this field now ranking among the really important copper districts of the world. Despite its considerable present development, the copper industry of Canada must be rated as merely in its infancy, and the dominion must be included in any list of the principal copper producing countries of the present or future.

British Columbia produces more than three-fourths of the Canadian copper output, and Ontario furnishes nearly all the balance of the production, but there are small mines in most of the other provinces, and the territory of Yukon is a potential producer of importance.

BRITISH COLUMBIA. This Canadian province is a kingdom in both area and resources and its developed wealth in timber, minerals, arable lands and fisheries is trivial, compared with its possibilities. The first mining was for gold, in placer washings, shortly after the middle of the Nineteenth Century, after which the mining industry languished, until the completion of the Canadian Pacific railroad, when quartz mining was begun, in a small way, first for gold and silver, and later for lead. It was found, about 1896, that the mines of the Trail district carried considerable copper values, and the copper industry of the province dates from that discovery. In the last years of the century the first copper mines were opened in the Boundary district, and these have become of great importance. Most of the gold and silver mines of British Columbia carry more or less lead and copper, highly useful as fluxing agents, while the copper ores almost invariably have appreciable values in gold and silver, this comity of the metals aiding greatly in the development of the various mining fields of the province, most of which are low in grade, though with large ore bodies.

In 1906 the Boundary district made 75 per cent. of the total copper production of British Columbia, followed with 12.5 per cent. from the

mines of the Pacific coast, and 11.5 per cent. from the Rossland mines of the Trail district. Nearly all of the other mining districts of British Columbia have copper ores, with small mines, or attempts at mines, but, in 1906, the production of all the other districts combined was 1.5 per cent. of the total output of the province. With better transportation facilities, some of the other districts, now negligible as producers of copper, should become of importance.

The copper smelting industry of the province is well developed, and British Columbia has some of the largest, most modern and best managed copper smelters now in existence, and the Granby mine, of the Boundary district, holds the world's record for low smelting costs.

The Boundary district, lying along the northern border of the state of Washington, includes the Kettle River, Grand Forks and Osoyoos mining divisions, which are contiguous. The mountains are not especially rugged, and as a rule the western and southern slopes are open. The formation includes somewhat altered sedimentary rocks, mainly limestones, with granite, greenstone and other eruptives, the ores of the district occurring mainly in altered limestone near the contacts with igneous intrusives. The ore bodies are almost exclusively disseminated sulphides, very low in grade, but of immense size, slightly auriferous and argentiferous, and self-fluxing, requiring only small charges of coke for reduction. The Boundary district is an important copper field, and must continue to increase in production for many years to come. This district is comparable with the Lake Superior copper field, not only in the low grade of its average ores, but also in the enormous size and certainty of its ore deposits, and the magnitude of the investments and equipments required for profitable copper production. These heavy investments afford assurance of permanent operation, and heavy production, regardless of fluctuations in the price of the metal.

The copper deposits of the Pacific coast include numerous mines on the various islands scattered from Puget Sound to the Alaskan boundary, and also on the mainland. Most of these mines are on Vancouver Island, where copper ores are found along the western side. Ore occurs mainly as replacements in marble and greenstone, along and near the contacts with dykes of igneous rock. The ore bodies are very irregular, and carry magnetite and garnet gangue, with segregations of chalcopyrite and local enrichments of bornite. On Texada Island the nature and occurrence of ore bodies are practically similar to those on Vancouver Island, and, in the main, the coast deposits are of this same class.

The Trail district, of which Rossland is the center, shows an area of eruptive rocks, mainly diorite, cut by many porphyritic dykes of one to eighty feet width, having a mainly north and south strike. Veins are shear-zone fissures, ores consisting of country rock more or less replaced by or impregnated with cupriferous pyrrhotite, the metallic values being mainly in gold but including considerable copper, and a small amount of silver.

The Yale district includes the Similkameen division, with exposures of copper ore, mainly refractory, at many points. Development is slight but the district is of considerable promise. The Aspen Grove field of the Similkameen division shows eruptive rocks in parallel flows, ore occurring

mainly in a red breccia that carries native copper and chalcocite, intermixed. There also are promising showings of ore at various points in the Keremos section of the Similkameen, the best of these being in the vicinity of Olalla and Princeton.

FRANKLIN. Indications of copper are reported from several points along the eastern side of Baffins Land.

KEEWATIN. In the southern portion of this district, north of the Albany River, native copper is shown in conglomerate, and there are indications of copper on the western side of Hudson Bay. The Copper Mine River, flowing into a bay of the Arctic Ocean, must have been named for some real or fancied exposure of the metal. The district of Keewatin is wild, and but little known, though it gives indications of mineral wealth at various points.

LABRADOR. There are fairly good indications of copper in the Chibougamou district, and also on the East Main River. Labrador is in the peculiar situation of being a district wthout a regular local government, the management of its affairs being divided between the Canadian province of Quebec, which looks after the bulk of the peninsula, and the crown colony of Newfoundland which administers the narrow strip along the eastern shore that is known as Ungava.

MACKENZIE. An immense outcrop of high grade sulphide ore is reported to exist near the mouth of the Mackenzie River on the Arctic Ocean, some distance north of the Arctic Circle, but it is possible that the value and size of this deposit have been exaggerated, as the information comes from whalers, devoid of geological knowledge or practical mining experience.

MANITOBA. Along the eastern boundary of this province, near Lake of the Woods, is a small area of mineral land, and a vein of 18 to 20 inches width, reported to occur between granite and trap and to be traceable for a half mile, showing a cupriferous, nickeliferous and slightly auriferous pyrrhotite, has been prospected slightly at Ingolf station, near the Ontario border.

NEW BRUNSWICK. Copper ores are found in the counties of Carleton, Charlotte, Gloucester, St. John and Westmoreland, and native copper is found in red sandstones of Carboniferous age. These sandstones range nearly to conglomerates, and apparently carbonaceous material has been replaced, to a large extent, by copper sulphides. Attempts have been made at mining both ores and native copper.

NOVA SCOTIA. This province has copper mines in the counties of Cape Breton, Cumberland, Inverness and Pictou. Native copper occurs in the counties of Annapolis, Cumberland, Digby and Kings, and, in addition to these counties, copper ores are found in the counties of Antigonish, Colchester and Sydney. The ores are mainly sulphide, and nickeliferous copper ore is reported from Cape Breton county. At Brier Island, Digby county, native copper occurs as nodules in an amygdaloidal trap, similar to occurrences in the Keweenawan formation of Lake Superior. The deposits of Inverness county are of auriferous and argentiferous chalcopyrite, and those of Cape Breton county are of a similar ore, having a silicious

gangue, and occurring in veins traversing diorite and felsite. The mo
important mining developments are in Cumberland, Inverness and Ca
Breton counties, the Coxheath mines of the latter county having been t
principal producers in the past.

ONTARIO. Copper was discovered on the northern shore of La
Huron as early as 1770, but the first real mining was begun at the Bru
Mines, on the northern shore of Georgian Bay, in 1846, immediately aft
the opening of the first Lake Superior native copper mines in Michig
Copper is found native at numerous points, and in the Sudbury distr
occurs as nickel-copper sulphides, but the deposits mainly are iron-copp
sulphides. As a rule, the oxide and carbonate ores of the alteration zo
are missing in Ontario, the iron sulphides, mainly chalcopyrite, reaching
surface with slight traces of change, though small quantities of bornite
noted at times.

Ontario is a large province, and shows a great diversity of geologic
and topographical conditions, its frontier marching with New York
the east and Minnesota on the west. The province has copper mines
the counties of Frontenac and Hastings and in the districts of Musko
or Parry Sound, Nipissing, Algoma, Thunder Bay and Rainy River, a
in addition, has copper ore in Lancaster and Lanark counties, and el
where.

The Muskoka district lies along Parry Sound, on the eastern sh
of Georgian Bay. The surface of the country is glaciated, showing mai
rock exposures. The prevailing rock-forms of the district are gneis
and schists, the formation showing much flexure and faulting, with num
ous small quartz veins and frequent pegmatite dykes of large size a
great persistence. The topography is rough, and much of the rock
utterly devoid of vegetation or covering of any sort, the bald knobs alt
nating with marshes and swales in the lower ground. The mineraliz
zone is apparently about a quarter of a mile in width, with a genera
northeast and southwest strike, and has been prospected for about twe
miles in length. Ores occur as extended and approximately parallel ser
of lenses, with a general trend in line with the mineral belt, practica
along the fault zone, lenses varying from 5 to 40 feet in width, as a ru
though occasionally showing much greater width, and usually carryi
a limonite gossan. The ore is mainly chalcopyrite disseminated in pyri
showing occasional chalcocite and bornite, and carrying $3 to $10 gold
ton. Sphalerite is associated with copper, as a rule, and some of
beds are nickeliferous, ranging as high as 2.5 per cent in nickel tenor.

The Sudbury district, discovered 1882, where mining was begun
1886, is an oval of about 40 miles length by 20 miles width and is co
sidered locally as two ranges, each crescents with ends joined. The pr
cipal developments are on the south or old range, running from Sudbury
Carson. The interior of this oval shows a trough of rocks of Cambri
and Silurian ages, consisting of slates, sandstones and volcanic tu
flanked on the outside by granite. The ores occur as irregular chutes,
mammoth lenses varying greatly in metallic values, but with an aver
of 2.5 per cent. to 5 per cent. nickel, and carrying, as a rule, about o
half as much copper as nickel.

Copper developments in the Nipissing district have been overshadow

by the sensational discoveries of native silver in the Cobalt field, but there are bodies of copper ore in this district that seem worthy of exploitation.

The district of Algoma is very extensive, and shows copper at many points. Principal development in the past has been in the Bruce Mines district, on the northern shore of Georgian Bay, where the ore is chalcopyrite, with quartz gangue, in strong fissure veins. Between Sault Ste. Marie and Sudbury there are several developing mines of considerable promise, in the Massey Station district, and good sulphide ores have been found in the Goulas Bay region, circa 30 miles north of Sault Ste. Marie. The Keweenawan formation of Michigan is found on Michipicoten Island, and also on the mainland east of the island, at Mamainse Point, about 50 miles north of the Soo, but exploratory work has not as yet shown workable values in the native copper deposits. Michipicoten Island also carries various sulphide and arsenide ores of copper.

In the Thunder Bay district, on the northern shore of Lake Superior, native copper has been found on Battle Island, east of Thunder Bay, on St. Ignace Island, in Nepigon Bay, at Black Bay, on Shebandowan Lake, at Pointe-aux-Mines, and elsewhere. Chalcocite is noted on Spar Island, and chalcocite and malachite are found on Silver Islet, this tiny island having been the location of the first great native silver mine of the world, which was fully as rich as any of the present-day bonanzas of Cobalt. Chalcopyrite also occurs at Neebing and elsewhere.

In the Rainy River district sulphide ores of copper have been found at various points, but the mining in that district has been mainly for gold, in the numerous fissure veins with quartz gangue that traverse granite, and which have an unfortunate habit of going wrong at a depth of 400 to 500 feet.

There are strong evidences of copper in the wild and little known district between Sault Ste. Marie and James Bay, and with the completion of a projected railroad, certain to come sooner or later, this district may prove an important producer of both copper and iron, and very likely of silver as well.

QUEBEC. Copper ores have been found in the counties of Arthabaska, Bagot, Beauce, Browne, Dorchester, Drummond, Levis, Lotbiniere, Megantic, Missisquoi, Richmond, Shefford, Sherbrooke and Wolfe, also on the northern shore of the Gulf of St. Lawrence in the district of Saguenay, and promising specimens of ore have been secured from the Lake St. John district, near Labrador.

The principal copper deposits of Quebec, judged from development in the past, lie in three zones, shortly north of the Vermont border, in Sherbrooke and adjoining counties. These belts average about two miles width, and are about 25 miles apart. The eastern belt has been the principal producer, from mines in the vicinity of Capelton. The western belt is about 60 miles east of Montreal, showing ore bodies in limestone, near igneous intrusives. The ores of the Capelton district are mainly chalcopyrite, or cupriferous pyrite and pyrrhotite. The pyrite of this district occurs in lenses, following cleavage planes, varying from 12 inches to 30 feet in thickness, and up to 100 feet in length. The principal mines have been opened in limestone associated with slate, in contacts with

diorite and serpentine. The cupriferous pyrites are of good sulphur ten and while the Capelton mines carry only 2 to 4 per cent. copper, and to 4 ounces silver per ton, the sulphur values render these low-grade o profitable, when worked with skill and prudence.

YUKON. The principal copper deposit, and the only developed cop mines of Yukon, are found in the vicinity of White Horse, near t Alaskan border. The White Horse district, at the head of navigation the Lewes River, is connected with Skagway, Alaska, by the White P & Yukon railroad, 110 miles in length, which has such tremendous gra that five 110-ton locomotives are required to take a train over the summ Copper was discovered in this district in 1898, and a number of small rich mines have been developed, these being much hampered in producti by exceedingly high freight rates, and lack of local smelters or local f available for smelting purposes.

The White Horse copper belt is 15 to 20 miles in length, with generally north and south trend, west of and nearly parallel with Lewes River, with a width, as developed, of one-half mile to nearly miles. The belt shows copper deposits along the contact of limestone granite, the contact deposits connecting with fissure veins traversing gr ite. The developed mines are 4 to 10 miles southwest of White Horse, the district has been prospected for about 20 miles, with assessment wo done on about 200 claims. The zone of secondary enrichment shows oc sional carbonates, but principal ores are sulphide, formerly reported mainly chalcopyrite with occasional chalcocite and bornite, but the o now developed are mainly bornite. It is probable, however, that pyri ores will succeed at slightly greater depth. The enriched sulphides ca fair values in both gold and silver, and the ores shipped have been of v high tenor. Exploratory work is hampered by a glacial moraine, wh leaves only occasional exposures of ledge-rock. This district is of so present importance, and of much greater promise for the future.

NEWFOUNDLAND. The first copper mines of importance w opened in the Tilt Cove district in 1862, and remain considerable p ducers. There are deposits of chalcopyrite and cupriferous pyrite many different points on the island, with occurrences of native copper Placentia Bay, and elsewhere. The developed mines carry cupriferous i pyrites, in which the sulphur values are an important factor. The isl produced about 1,500,000 tons of cupriferous pyrites to the end of Nineteenth Century, and apparently has far greater available resour for the future.

The Newfoundland deposits occur mainly in serpentine rocks chloritic slates lying parallel to the serpentine in rocks of lower Silur age. The principal cupriferous districts are on Notre Dame Bay, in northeastern portion of the island, this including the Tilt Cove and Be Cove fields, at Bay of Islands, in the western portion, and at Lady P and Birchy Cove. On Oderin Island, in Placentia Bay, in the southeast portion of the island, native copper occurs in stratified archaic rocks, one mass of copper weighing 55 pounds has been taken from a melep in strata of a geological horizon corresponding to that of the Keweenaw formation of Lake Superior.

The Tilt Cove district, on Notre Dame Bay, in the northeastern portion of the island, has been traced for about 40 miles, and the Tilt Cove mines are the only steady copper producers on the island. The district shows 4 main series of lenses, carrying pyrite in which is disseminated chalcopyrite having an average tenor of about 4 per cent. copper, 50 per cent. sulphur and $1.50 gold per long ton. The ore is bunchy in occurrence, the ore beds ranging from 4 to 10 feet in average thickness, but being much broken and disturbed, while the veins frequently become barren, and sphalerite is found in frequent connection with chalcopyrite.

GREENLAND. An exploratory expedition, sent to Greenland in 1906, by N. Bernberg, a public-spirited merchant of Copenhagen, reports the discovery of large deposits of copper ore at Alanjarssnak, on the western coast of the island.

CHAPTER XVI.

Copper Deposits of Mexico.

The Republic of Mexico has made relatively greater progress in co production, since the beginning of the Twentieth Century, than any o country, and in actual increase of output stands second only to the Un States. There is every reason to predict a large and fairly steady gro in Mexican copper ouput, as all of the essentials of a large and profit production are found in more than one state of the Republic, such es tials being enormous deposits of ore of medium to high grade, transpo tion facilities, that in many cases are excellent, and which are being proved by extensive railroad construction, and settled political conditi Occasionally complaints are made by foreigners, operating mines in Me of unjust treatment by the authorities, but, as a rule, these complaints into two classes, the first being due to neglect to comply with the but stringent Mexican laws regarding titles and methods of keeping counts, while the second, having a foundation of fact, relates to the p exactions of petty officials. In cases where the operators of mines have perienced arbitrary or unjust treatment from local officials, compl to the governors of the states, or to the president of the Republic, resulted, almost invariably, in the speedy correction of any injustice.

Previous to the Spanish conquest the Anahuac races had acquired siderable mining experience and metallurgical skill. The work of extr ing metallic values done by the aborigines of Mexico deserves to called real mining, as the antiguas of date previous to the conquest shafts and tunnels of considerable extent. The metals found by Corte more or less general use, and for sale in the great market place of Te titlán, included gold, silver, copper, tin and lead. Copper was empl freely in the mechanical arts, the metal being used mainly in the of bronze, through alloying copper with tin, and was hardened by ham ing. The best tools of the natives, made previous to the Spanish conq assay about 94 per cent. copper and 6 per cent. tin. Not only did Aztecs utilize the metals for industrial purposes, but they had, appar independent of old-world influences, developed a system of metallic rency, with gold in quills and copper coins in the shape of the G letter T.

In 1895 the Mexican copper output was only 11,620 long tons, ten years later exceeded 55,000 long tons, a growth of practically hundred per centum in a single decade, being much the largest pr tional increase made by any country, and the largest actual increase by any nation except the United States. At the end of July, 1906, were mines as follows in Mexico: copper, 956; iron and copper, 209; co and lead, 25; silver and copper, 773; silver, copper and lead, 310; silver and copper, 1,314, a total of 3,587 copper mines and mines with cu erous values, as compared with 2,931 different cupriferous mines in the ceding year. In July, 1907, there were upwards of 1,000 copper mines a

and nearly or quite 4,000 mines in which copper values were of appreciable importance. These figures are not for single pertenencias, as is the case in Chile, but are for individual properties, ranging in size from a single hectare to thousands of hectares in the case of the Greene-Cananea and other large mines.

The smelting industry of Mexico is highly developed and is increasing rapidly in importance. The production of copper in a given field depends not only upon the richness and extent of its ores, and the experience and energy of its miners, but also is dependent to a very large extent upon the items of transportation and smelting. The transportation facilities of Mexico are excellent, for so rugged a country, and are being improved steadily, by the construction of new railroads of prime importance. The republic now possesses some of the largest and most modern smelters of copper and lead to be found anywhere upon the globe, and further enterprises of great importance are projected. It is doubtful if any country of equal extent anywhere upon the earth's surface possesses mineral values equal to those of Mexico.

Mexico has copper mines in the states of Aguascalientes, Chihuahua, Coahuila, Durango, Guanajuato, Guerrero, Hidalgo, Jalisco, Mexico, Michoacán, Neuvo León, Oaxaca, Puebla, Queretaro, San Luis Potosí, Sinaloa, Sonora, Tabasco, Tamaulipas, Zacatecas, and in the territories of Baja California and Tepic. In point of production of copper, Sonora easily leads, with Lower California second, but there are copper developments of prime importance in a number of other states, notably in Chihuahua, Coahuila, Guerrero, Jalisco, Michoacán and Puebla.

Copper in almost every known form is found in some part of the republic, the cupriferous measures being very extensive and including a great variety of types. Argentiferous copper ores are found frequently near the crystalline slates of the Azoic group, a typical example occurring in the district south of Puebla. Copper accompanied by hematite is noted in cretaceous beds of Mesozoic age, while in the Cenozoic group copper is found in regular veins in hornblendic andesite of the Pliocene system, also in the stratified sedimentary beds of the upper Miocene and lower Pliocene, as at the Boleo mine in Baja California. Copper deposits occur frequently in acid Tertiary rocks. The Sierra Madres are highly mineralized, not only as to the main range, but also, as a rule, in their foothills and outlying spurs. In northern Mexico there seems a preponderance of silver-lead deposits on the eastern slope, and of copper and gold values on the western slope of the cordillera. The principal mining portion of Mexico extends, unbroken, for a distance of fully 1,500 miles, with an average width of 250 miles, from the American border on the north into the state of Oaxaca in the south and the possibilities of Mexican mining developments in the future are past human computation.

AGUASCALIENTES. In July, 1907, this state had 49 registered copper mines, in addition to numerous other properties carrying copper as other than the principal metal. The principal copper developments are in the dioritic rocks of the Tepezalá district, where the ore is mainly chalcopyrite, with silicious gangue. The copper ores of the Pánuco district occur mainly in pegmatite dykes, as chalcopyrite.

HIDALGO. There were five registered copper mines in the state of Hildago in July, 1907, the principal copper district being at Zimapán where considerable work is under way.

JALISCO. The state of Jalisco leads all the others of Mexico in th number of copper mines, official figures showing no less than 302 copp properties in the state in July, 1907. Most of these mines, however, a small, though there are many of considerable promise, and a good sta has been made at mining and smelting under modern conditions. Jalis was the seat of a primitive copper mining, smelting and manufacturi industry of considerable importance, under the Aztec races, previous to Spanish conquest. The principal cupriferous fields of the state include districts of Ameca, Autlán, Ayutla and Cacoma, in all of which act copper developments are under way. Auriferous copper veins occur Tertiary diorite in both the Ameca and Cacoma districts. The ores mainly oxides and carbonates, with a little chalcopyrite, all strongly arg iferous, and at Autlán in addition to large quantities of malachite, phide ores are much in evidence.

MEXICO. The state of México had three copper mines in July, and shows native copper and tetrahedrite in beds on the border, near pilco, Jalisco.

MICHOACÁN. According to official records there were 95 copper in the state of Michoacán in July, 1907. This state is mountainou with rather indifferent transportation facilities, these drawbacks ret development. One present-day property, the Inguarán, was work tensively in the days of the aborigines, and other copper mines were w by the Aztecs.

There are deposits of copper ore of more or less importance districts of Angangueo, Ario, Churumuco, Huacana, Huetamo, Oroal cuaro and Tacambaro, the principal copper mines as now exploit in the district of Augangueo and in the Inguarán division of the Ta district.

In the Inguarán field ore deposits are found in micaceous diorite country rock and granite in several stages of alteratio capping of silicious limestone of 200 to 300 feet in thickness. T its show oxidized ores above, but the principal values are in di chalcopyrite, with a little bornite, both carrying fair silver val little gold, with a gangue of granite-porphyry, the ores being di through the country rock.

The Churumuco district shows high grade ores in fissures porphyry. In the Oroalo district veins occur in feldspar-porph to those of Real del Monte in the state of Hildago.

NUEVO LEÓN. According to the government records three copper mines in Nuevo León in July, 1907, but none development or of unusual promise. There are copper ores of points in the state.

OAXACA. According to government records, there we copper mines in the state of Oaxaca in July, 1907, but ther mines in which there were considerable copper values. Ther mines in the Ocotlán and Ejutla districts, south of the cit

and there are copper ores also in the districts of Miahuatlán, Villa Juárez and elsewhere.

PUEBLA. There were five registered copper mines in this state in July, 1907, including the Teziutlán mines, which are much the most important copper producers in southern Mexico. The ores occur in irregular deposits as an intimate mixture of chalcopyrite, galena and sphalerite, in highly metamorphosed calcareous Cambrian slates. Impregnations of copper in andesite are noted near Colucán, and copper ore exists at various other points.

SAN LUIS POTOSÍ. There were fourteen registered copper mines in this state in July, 1907. In the Matehuala district, which is the most important producer of metal, the copper ores are mainly sulphides, with garnetiferous gangue, occurring as contact deposits between limestone and porphyritic rocks. There are cupriferous deposits of promise in the districts of Catorce and Salinas, and copper ores exist at a considerable number at other points.

SINALOA. There are copper ores in nearly every district in the state of Sinoloa and the number of registered copper mines in July, 1907, was 25. The northern part of this state is a continuation of the Sonoran plateau, but owing to indifferent transportation facilities, no important mines of copper have been developed, though there are several properties [illegible] considerable promise. With the completion of two new railroad lines [illegible] under way, traversing this state, copper mining should become an imp[illegible]ant and profitable industry. In olden times considerable high-grade c[illegible] ore, mainly argentiferous, was smelted in crude adobe furnaces, n[illegible] mines.

SONORA. The state of Sonora, one of the richest in the Re[illegible] Mexico, is of immense size, being nearly twice the area of the stat[illegible] York, or as large as Michigan and Indiana combined, and is [illegible] richest mineral fields in the world. It is much the most impor[illegible] producing state of Mexico, and one of the leading copper [illegible] globe, with unusually brilliant prospects for the future. Ac[illegible] government records there were no less than 234 copper min[illegible] in July, 1907, in addition to mines carrying mixed metall[illegible] siderable copper was produced in adobe smelters, durin[illegible] Spanish domination, and under the republic, previous [illegible] tion of the copper industry begun in the closing years [illegible] Century. Humboldt predicted, nearly one hundred [illegible] mineral wealth of the world would be developed in [illegible] consisted of the present states of Sonora and Sinalo[illegible] Mexico, and the territory of Arizona in the United St[illegible] is be[illegible] the letter, as there is no richer [illegible] are [illegible] [illegible]tern slope of the Si[illegible] in co[illegible] [illegible]hiahua on the [illegible] values a[illegible] [illegible]d. The [illegible] its are of t[illegible] [illegible] opment, which [illegible] hampered by lac[illegible]

ing is now under way. The frequent outbreaks of the Yaqui Indians also have caused much trouble in several of the mining fields. There are copper mines in the districts of Alamos, Altar, Arizpe, Hermosillo, Magdalena, Moctezuma, Sahuaripa and Ures.

The Alamos district is essentially a silver field, but contains much copper, this metal being an important by-product from the Quintera silver mines. The Piedras Verdes copper deposit is one of considerable promise, and there is little doubt that copper mines of importance will be opened, in time, in this district.

The Altar district has mines of gold, silver and copper, but developments in the copper line have been on a rather limited scale in the past, though the district has properties of promise.

The Arizpe district is the scene of the most extensive copper mining development in Mexico, and is the site of one of the greatest copper industries of the globe, in the municipality of Ronquillo, generally known as the Cananea field. The Cananea mines were worked as early as the Eighteenth Century, by the Casa Gua, of Chihuahua, later by Don José Perez, and eventually, in the latter half of the Nineteenth Century, by Governor Pesqueira, passing, in 1899, to the predecessors of the the present owners. The Cananea Mountains are an isolated range of about 25 miles length, lying in the free zone of northern Mexico, only a few miles south of the Arizona border, the range being of the short, isolated, variety typical of the Sonoran plateau in both Sonora and Arizona, and to the southeast is the Sierra Manzanal, almost a continuation of the Sierre de Cananea. The Cananea range of mountains consists of shattered and altered Paleozoic limestones, with intrusive masses of diorite and rhyolite, flanked by bedded tuffs. The mountain range has a northwesterly and southeasterly strike, the highest point being Elenita Peak, 7,600 feet above sea-level, and there is a zone of fissuring along the axis of the belt, ore bodies occurring as concentrations and replacements in either limestone or porphyry, the former being of Paleozoic age and the porphyries being largely rhyolitic. The district gives every indication of great volcanic activity at some remote date, followed by heavy erosion. As a rule the gossans are not heavy, much of what appears to be gossan at a short distance proving, on closer inspection, merely stained and weathered conglomerate. There are numerous ore bodies occurring as contacts between limestone and the igneous eruptives, largely as patches surrounded by crystallized rocks. The ores are of a great variety, ranging from native copper, in masses up to a hundredweight or even greater, through the rich oxidized ores and secondary sulphides, down to disseminated chalcopyrite. The ore of the Capote zone is almost exclusively pyrite coated with very thin films of chalcocite, usually with a porphyritic silicious gangue. The Capote ore body occurs in shattered quartzite, the ore being soft and containing sericite, causing trouble in concentration. The mines show a considerable variety of forms of occurrence, including contact metamorphic deposits, impregnated sedimentary rocks and fissure veins.

The principal developments in the Cananea field are in the southeastern half of the range, which is separated into two nearly equal portions by Puertecitos Pass. There is reason to believe, however, that ore deposits of value exist in the northern half of the range, this opinion being based upon personal inspection.

In addition to the great copper mines developed and developing in the Cananea Mountains, there are other highly promising deposits of copper ore in various other fields of the Arizpe district, including prospects in the Sierra Manzanal, and remarkably rich surface ores in the Sierra Azul, or Ajo Mountains, to the eastward of La Cananea. In fact, nearly every municipality of the district of Arizpe shows more or less copper ore.

The Magdalena district is a gold field, primarily, but each of its six municipalities shows more or less copper, and many of these are not devoid of promise.

The district of Moctezuma ranks in importance second only to that of Arizpe, in the state of Sonora. There are large developed mines in the neighborhood of Nacozari, the hill on which the Moctezuma mine is opened being a body of cupriferous monzonite, too low in grade to work at present, but possibly available at some future time. Good mines of copper, carrying considerable values in silver and lead, are being developed in the vicinity of Cumpas, in the Moctezuma district and exploratory and development work on copper properties is noted at several other points.

The district of Sahuaripa, in the central eastern part of Sonora, has its eastern boundry on the line of the state of Chihuahua. The topography is exceedingly rugged, as a rule, but the district is better watered than some other portions of the state. Rail transportation is lacking, and the Yaqui Indians are very troublesome, at times, but the district is one of great promise for some future period when the Indian uprisings shall have been quieted finally, and cheap transportation is afforded by rail.

The Ures district contains a number of developing copper mines, in addition to mines of other metals, and while its production is small, at present, the time should come when rich and profitable copper mines will be steady producers of the metal.

TABASCO. The state of Tabasco has no copper mines, but is supposed to have copper ores near the Chiapas line, as the Santa Fé mine of Chiapas is but a very short distance from the state of Tabasco.

TAMAULIPAS. In July, 1907, the state of Tamaulipas was credited with the possession of eleven copper mines, of which only one or two are of present importance. There are copper deposits at a number of points in this state.

TEPIC. In July, 1907, the government statistics of Mexico credited the territory of Tepic with the possession of two copper mines, and there are mines of other metals carrying material copper values. Copper ores exist at a number of points in this territory, though the principal mining industry is based upon gold.

TLAXCALA. There are no recorded copper mines in the little state of Tlaxcala, but beds of copper ore outcrop near Monte Tlatlay.

VERA CRUZ. There are no copper mines in the state of Vera Cruz, but copper ores have been found in the district of Zomelahuacán, and probably exist at other points as well.

YUCATÁN. It is reported, though the statement does not seem fully verified, that for some centuries the Maya Indians have worked cop-

per mines, in a crude way, in the interior of Yucatán. The greater portion of this state was held, practically undisputed, by the war-like Mayas, from the time of the Moctezumas until a recent period, the Spaniards finding it easier to leave the aborigines in undisputed possession of their territory than to attempt a conquest. Under the wise and pacific government of Don Porfirio Diaz the extension of the power of the Federal government over the entire state of Yucatán has been accomplished with very little bloodshed, through the exercise of great tact, patience and firmness. The interior of Yucatán is wild and little explored, but it is probable that considerable mineral values exist.

ZACATECAS. According to government records there were fourteen copper mines in the state of Zacatecas in July, 1907, the principal copper producing districts being those of Mazapil and Conception del Oro, south of Saltillo. The mines of Mazapil show a considerable variety of copper ores, existing in large quantities, and this is a field of promise. The Bolaños and Ramos districts also are of slight present importance, and of considerable future promise.

CHAPTER XVII.

Copper Deposits of Central America and the Antilles.

In this chapter detailed references are made to the copper mines and copper producing districts of Central America and the West Indies. While the production from this field is small, these countries are not devoid of ore bodies of considerable promise.

COSTA RICA. Las Concavas mine, opened in the Eighteenth Century, or possibly earlier, was a small copper producer, at intervals, for many years, but has been idle for some time. There are outcrops of copper ores at several points in the republic, but no serious attempt at mining has been made except at Las Concavas. With the present large investment of foreign capital in Costa Rica, and the rapid extension of transportation facilities, further attempts at the exploitation of copper deposits would seem only a matter of time.

CUBA. The first American copper mines worked by Europeans are said to have been in Cuba, in the province of Santiago. There are copper mines, now idle, in the provinces of Matanzas, Pinar del Rio, Puerto Principe, Santa Clara and Santiago.

In the province of Matanzas copper ores are noted at El Recreo, a vein of one to twenty inches width having been traced for a distance of about a quarter of a mile.

In the province of Pinar del Rio copper is noted near Arroyo de Mantua, in the form of chalcopyrite associated with pyrrhotite, and with occasional chalcocite, occurring as lenticular chutes in metamorphic schist, and carrying strong limonite gossans.

In the province of Puerto Principe there are small mines that were worked many years ago, on fissure veins carrying chalcopyrite with quartz gangue, but none of these seem of especial promise.

The province of Santa Clara has copper ores at various points, including several localities northeast of Cienfuegos, and old copper mines are found at San Juan de Malaja, 6 miles northeast of the city of Santa Clara, and at the Finca San Joaquin, 12 miles west of Manicaragua, and also a short distance from Cumanayagua.

The mines of El Cobre, 8 miles west of Santiago Bay and about 30 miles north of Santiago de Cuba, were opened by the Spanish, A. D. 1532, the first production having been used for the casting of bronze cannon. The various mines were consolidated, in 1832, in the hands of an Anglo-Spanish company, and were worked until the plant was burned by insurgents, in the Cuban rebellion of 1868, producing, according to the custom-house records of Santiago, 610,200 tons of ore, exported to Swansea, averaging about 10 per cent. in copper tenor, and valued at $50,186,225, probably in depreciated Spanish currency. The ores of the Minas de Cobre [illegible] about 200 feet width, and of at least a mile

in known length, the belt showing several parallel veins, with rocks between much altered, the ore occuring as chutes with extreme widths of about 20 feet, and lengths of 20 to 200 feet, along fracture veins in serpentine. The ore is primarily chalcopyrite, associated with pyrrhotite, with quartz gangue, the grains of chalcopyrite frequently being coated with covellite.

GUATEMALA. The republic of Guatemala possesses considerable mineral wealth, but owing to lack of transport and rugged topography, mining development is limited, being confined mainly to placer gold mining. With the completion of the Ferrocarril Guatemala del Norte, various cupriferous districts will be rendered accessible, and doubtless copper mining developments will follow. There were small copper mines in Guatemala under Spanish domination, as early as the Seventeenth Century, but metallic production was mainly silver.

Small veins carrying massive malachite occur near Ravinal, in the department of Baja Verapaz, also near Cabulco.

In the department of Chuquimula, in eastern Guatemala, there are copper deposits, claimed to average 5 to 20 per cent. copper tenor, but these are idle, though they will be available for exploitation on the completion of the new northern railway. This department is mountainous and isolated, but apparently rich in minerals.

In the department of Huehuetanango, on the southern slope of the Cuchumatanes Mountains, there are contact veins between limestone and granite, showing high grade carbonates. Near Chiantla there is an occurrence of copper ore said to resemble that of the Santa Fé mines of Chiapas, in Mexico. There are developed silver-lead mines in this department.

Copper carbonates are found in sedimentary beds not far from the city of Guatemala, in the department of that name.

HAYTI. There are deposits of copper ore at various points in the republic of Hayti, notably in the Hotte Mountain range, in the southern part of the island, and extensive deposits of copper ore, in and near igneous rocks of andesitic nature, associated with Tertiary limestones, are said to occur at Terre Nueve, about 10 miles from the seaport of Gonaives. There also are exposures of copper ore at Grande Riviere, south of Le Cap, 6 to 10 miles south of the sea, and at Limonade, copper ores carrying platinum, iridium and osmium are noted. Previous mining developments have been of the crudest, but efforts are now being made to develop a copper property along modern lines, with American capital.

HONDURAS. Copper ores occur in nearly every department of this republic, but development is limited, and the mines are of small size. There are copper mines in the departments of Tegucigalpa and Comayagua. In the department of Yoro, in the northwestern part of the republic, promising deposits of copper ore are reported from a district about 40 miles from the Ulloa river. This district is said to show a vein up to 14 feet in width, claimed to be traceable for miles, giving ores assaying 15 to 16 per cent. copper, which seems a statement liable to reduction.

JAMAICA. There is a cupriferous district near the middle of the island, showing several veins of 3 to 4 feet width, on which a little ex-

ploratory work was done, and from which one small shipment of ore was made, circa 1854. Since that date there have been repeated efforts to organize mining companies, and develop mines, but no permanent results have been secured. Apparently the deposits first opened were of small extent and of low value. There are indications of copper and other metals at various other points in the island.

LEEWARD ISLANDS. Copper ore has been noted on the island of Virgin Gorda, one of the Virgin Island group.

NICARAGUA. A very small amount of copper is produced in Nicaragua, as a by-product from the smelting of silver ores, the copper acting as a carrier in the matting of argentiferous sulphides. Occurrences of copper ore are noted along the Atlantic coast, and there are cupriferous belts on the Escondido and Mico rivers. The most promising ores are noted in the department of Segovia, but development is rendered difficult by a mountainous country and poor roads. Copper ores are noted also in the vicinity of Jinotega in the department of Matagalpa, in the department of León, and near Prinzapulca, on the gulf coast, in the department of Zelaya.

PANAMÁ. This newest of American republics has deposits of copper and other minerals, but lacks developed copper mines.

PORTO RICO. Copper mining in Porto Rico begun in 1869, when La Abundancia mine was opened, in the barrio of Rio Blanco, and this was followed by the exploitation, on a small scale, of several adjacent properties. The Rio Blanco deposits carry a vein of pyrrhotite of 6 to 10 feet width, with a paystreak of 8 to 15 inches, mineralized with bornite and chalcopyrite, the paystreak averaging 10 to 12 per cent. copper. Work was abandoned because of the heavy cost of transportation, after several hundred tons of rich ore had been produced. Copper outcrops are noted at various points along the mountain range that crosses the island from east to west, the richest being in the barrio of Rio Blanco.

Since the American occupation, numerous mining claims have been filed, but no actual mining has been done, except a little placer work for gold. At the end of 1906 eleven claims had been filed for copper, and one for iron and copper, these being mainly in the western end of the island, in the departments of Mayaguez, Arecibo and Ponce.

SALVADOR. Copper ores are noted in the department of Chalatenango, near the Honduranian frontier, and some attempts at mining in a crude way have been made. There also are copper ores near Melapán, in the department of Santa Ana.

SANTO DOMINGO. A little mining for copper is said to have been done by the Spanish, during the Eighteenth Century, but such operations must have been conducted on a small scale. The Sierra de Differencia, constituting the backbone of the island, shows copper ores at various points, the most important occurrences noted being near the Jaina and Nigua rivers, in the province of San Cristobal, on the northern side of the island, and on the southeastern flanks of the mountains, in the same province, about 25 miles northeast of the city of Santo Domingo. At the latter point ores are said to occur in tuffs, near the point of contact with Cretaceous limestone, the ores being chiefly chalcopyrite, associated with limonite, with some malachite and brochantite.

CHAPTER XVIII.

Copper Deposits of South America.

The cordillera of the Andes carries copper from its northern end i Columbia to Punta Arenas, at the southern tip of the continents mainland. Apparently the copper ores favor the western slopes of the co dilleran belt, as the principal mining fields lie mainly along the coast rang or between the coastal and central mountain ranges, largely in the table lands between these two Andean ranges. There are occurrences of coppe ore in Argentina and elsewhere, on the eastern slopes of the Andes, bu these apparently are of less importance than the copper measures to th west. The principal cupriferous developments in South America are i the Republic of Chile, with Perú a good second, and there is every reaso to believe that not only these, but other countries, will become increas ingly important producers of copper.

ARGENTINA. The republic of Argentina has copper mines in th province of Buenos Aires, near the capital, which apparently are of smal extent and little promise, and in the Andean provinces of Catamarca Córdoba, Jujuy, Rioja, Salta, San Juan and Tucumán, of which the mor important are in the province of Rioja. All of the latter named province are in the northwestern part of the republic, lying on the eastern slope o the Andes, in a rugged district offering serious obstacles to economica transport.

The production of copper by Argentina has been small for many years but eventually should become important. The ores are mainly sulphide but, like those of the eastern slope of the Andes, run largely to arsenica and antimonial forms, enargite being an ore of frequent occurrence.

In the province of Rioja is found the Famatina district, in a field o only about ten by fifteen miles area, which includes the Mexicana, Tigre Caldera and Cerro Negro sub-districts. The Sierra de Famatina is a grea mass of metamorphic rocks, 60 to 100 miles in width, with peaks of nearl 20,000 feet in height. Near Chilecito is a vast upheaval of geologically recent eruptives, showing copper ores in fissures. The district is ver rugged, and difficult of access and transport. The mines of the Mexican district occur at elevations of 13,100 to 14,800 feet, the veins being numer ous, narrow and rich.

The Capillitas district, in the province of Tucumán, is very small having an area of about 4 square miles only. The topography is exceed ingly rugged, and there is no wood, and no water, except in the mines which can feed the boilers, but are unable to supply water for mills The Cerro de Capillitas shows a mass of fissure veins, forming almost gigantic stockwerk, in granite, gneiss and porphyry, with a capping o trachyte. The ores developed are cuprite, melaconite, azurite and mala chite, with a limited amount of bornite and occasional highly argentifer ous tetrahedrite. It is probable that chalcopyrite will come in at greate

depth, but the richer ores in the alteration zone evidently are of considerable depth, and are both auriferous and argentiferous, as a rule..

BOLIVIA. Mines of both silver and copper were worked in Bolivia by the Incas. Geological conditions are somewhat similar to those found in the adjoining countries of Perú and Chile, but the exploitation of Bolivian copper mines has been hampered by a variety of disadvantages. The mines lie in the high cordilleran plateau and lack of rail transportation has been a serious drawback, but arrangements were made, in 1906, between the governments of Bolivia and Chile, for the construction of a rail line from Arica to La Paz, with a branch to Coro Coro, and the completion of this line cannot operate otherwise than as a great stimulus to production from the rich mines of the Coro Coro district. Most of the copper produced in Bolivia is shipped through the Peruvian port of Mollendo, though occasional shipments are made by way of Tacna, a Chilean port. The mining districts of Bolivia are arid, as a rule, and but slightly developed outside of Coro Coro.

There are copper mines in the departments of Aurora, La Paz, Litoral, Lipez Norte, Lipez Sur, Oruro, Pacajos and Potosí.

There are copper ores and mines at several points in the department of La Paz, but the most important mines of the department, and of the republic, are at Coro Coro. These mines are believed to have been worked by the Incas. The district is arid, and the only available local fuel is coñiga and cagajon. The nearest water supply is the Desaguadero river, 14 miles distant, which is a navigable stream, and copper is shipped by way of the port of Desaguadero. The Coro Coro district lies in the basin of Lake Titicaca, in the cordillera of Chacarilla, between the Andes to the eastward and the Cordillera Real, or coastal mountain range, to the west. This district shows two dissimilar sedimentary strata, apparently of different geological horizons, similar only in their origin and cuperiferous nature. The older and underlying formation, Las Vetas, is an arenaceous conglomerate of argillaceous tendencies, having a generally northeasterly trend. Superimposed upon this stratum is another conglomerate, Los Ramos, having a generally southwesterly trend. The upper conglomerate is much like the lower, but is darker in color and mottled with red and white particles of gypsum and other minerals in the older stratum. The country rocks are eruptive, mainly dioritic, and the copper occurs native as a rule, and but rarely as ores in quantities of commercial importance. The conglomerates range from 2 to 6 feet in thickness, with an extreme thickness of 50 feet in the Veta El Dorado, which has a minimum width of about 3 feet. These conglomerates carry native copper averaging about 2.5 per cent. with copper ores in small quantities, mainly chalcocite and domykite, scattered irregularly through the beds, and native silver occurs sparingly. The mineralized district has been proven for about one-half mile in width and for about 5 miles in length, but traces of copper are noted for a considerably greater distance, and about 25 miles to the southeast what apparently is a continuation of these beds has been found, and mined slightly, while the same formation also outcrops still further south, in a region west of Poopo. The southerly continuations of the Coro Coro belt are difficult of access, though of considerable promise. The native copper occurs usually in small nodules, though masses, commonly of small size,

These lack regularity, and even continuity, having an average width o about 4 feet and giving average assays of about 6.5 per cent. copper and 3 grams of gold, per metric ton. Elsewhere in this state copper ores ar noted at Cacapava, where two small mines have been opened, and a Guarahina, Sao Gabriel, Cerro Martino and Cerro do Geraldo.

In the state of Sao Paulo chalcopyrite associated with sphalerite an galena has been found, in limestone, near Paranahaiba, but attempts a mining were abandoned, as the ore was found in small pockets only. Cop per occurs also in the Sporanga Mountains.

CHILE. This country was, about the beginning of the last quarte of the Nineteenth Century, the largest copper producer of the world, bu now holds only sixth place, having been passed by the United States, Mexic Spain, Japan and Australia. The copper output of Chile has decreased, no only relatively, but actually, owing mainly to the exhaustion of the prin cipal bodies of oxidized ores in the older mines. From this decline i output it must not be inferred that Chile is exhausted as a copper producer on the contrary, the possibilities of copper production are greater than i almost any other country except the United States, Mexico, Canada an Australia. It will be necessary in the future, however, to obtain a muc larger proportion of the product from sulphide ores than has been gaine in the past. The production from sulphides of low and medium coppe tenor is increasing, and with the increase of railroad facilities, and th better equipment of mines and smelters along modern lines, Chile mus become an increasingly large producer of copper. The largest annual pro duction ever made was about 43,000 long tons of fine copper in 1882, an total production from 1844 to 1900, inclusive, is estimated at 1,830,00 long tons of fine copper.

Copper deposits were worked in a limited way before the first whit man set foot on the soil of Chile, and a little metal was produced unde Spanish domination, but the industry did not gain real importance unti during the fourth decade of the Nineteenth Century, after the gaining o independence. Until 1842 the high grade oxide and carbonate ores wer smelted in charcoal furnaces, but in that year the first reverberatory furnace was built by Charles Lambert at Coquimbo, and in 1857 the firs blast-furnace was built by the same pioneer. The period of greatest pros perity of the Chilean copper industry includes the three decades from 185 to 1880, followed by twenty years of slow but fairly steady decline, with turn of the tide, followed by improvement, setting in with the beginnin of the Twentieth Century.

In 1903, according to the official records of the republic, there wer in Chile patented mines as follows: copper, 7,106; gold and copper, 13 silver and copper, 427; copper and iron, 16; copper and lead, 4; gold, silv and copper, 38; silver, copper and lead, 14; silver, copper and cobalt, a total of 7,730 cupriferous mines. The number of working properties wa 748, not quite 10 per cent. of the total. In this connection it should b explained that a mine in Chile consists of one hectare [illegible] of the properties including a considerable number [illegible] mining laws are very liberal, and the government [illegible] retarding the mining industry. Each holder of [illegible] tically two and one-half acres, is taxed $10 yearly

surveyed, the property is freehold as long as taxes are paid regularly. Transportation facilities are poor, and there is considerable complaint of dishonesty and favoritism in the management of the state railroads.

Chile has two parallel copper belts, running nearly due north and south, along the axis of the Andes, these belts being approximately one hundred miles apart. The principal developments have been secured in the western or coastal belt, because of better transportation facilities. The cupriferous fields of Chile show mainly strata of the Permian system, with sandstones predominating. These have been much faulted, twisted, broken and upheaved by eruptive rocks, largely diorite. The auriferous copper veins of Atacama and Coquimbo usually are associated with highly silicious eruptives, while the argentiferous copper veins are associated commonly with diabase. General geological conditions are somewhat similar to those of the Mansfeld district of Germany, and in the Ural Mountain range of Russia, though the topography of Chile is much more rugged. The cordilleran belt, on the main chain of the Andes, lies back from the coast some distance, and the country is so mountainous, and the altitude is so great, and transportation facilties so poor, as a rule, that mining developments are on a scale that is trival, compared with the possibilities of great production from this belt. The two parallel cupriferous belts stretch from Perú on the north to nearly the southern end of Chile, in what formerly was called Patagonia, a wild country that has been divided between Chile and Argentina, the Andes forming the line of division. In the desert regions comprising the greater part of Chile, the oxidized zone usually is of great depth.

There are copper mines in the provinces of Aconcagua, Antofagasta, Atacama, Colchagua, Coquimbo, O'Higgins, Santiago, Tacna, Tarapacá and Valparaiso, with copper ores known to exist in practically all of the other provinces. Antofagasta, Coquimbo and Atacama lead in production and in the number of important mines.

The principal copper mines of the province of Aconcagua are in the department of La Ligua, where there are a number of important mines, and in the departments of Petorca and Putaendo.

In the province of Antofagasta there are mines of importance in several districts, including Calama, San Pedro de Atacama and Tocopilla, the latter being an old field. Important mines are being opened in the department of Gatico, under modern methods. In the Chuquicamata district the copper mines were worked originally for atacamite, this assaying 2 to 3 per cent. only in copper, but being reduced easily. Developments at depth, however, have shown much richer ores, ranging from 5 to 20 per cent. in copper tenor, and important developments are under way. The center of this field, 163 miles by rail from Antofagasta, has an average elevation of about 9,000 feet above sea-level. The richer ores, principally atacamite, occur in small veins, with gangue of quartz and feldspar, and ore as now mined averages 10 to 12 per cent. co[illegible] In the Taltal district the rich gold mines of Guanaco have become [illegible] at depth, a phenomenon noted at numerous other points in [illegible]

The province of At[illegible] number of departments and includes [illegible] per districts of Chile. The ores mined [illegible] per cent.

was 440 metric tons, the district of Pallasca leading with 229 metric tons, followed by Recuay with 154 metric tons, balance of production being from the districts of Bolognesi, Cajatambo, Huallas and Huari.

The department of Arequipa produced 102 metric tons of fine copper in 1906, from the districts of Arequipa, Acarí, Camaná and Islay, the formerly important district of Acarí furnishing less than 9 tons of this small output.

The production of the department of Cajamarca, in 1906, was 163 metric tons, the Cajabamba district leading with 137 tons, with small products from the Contumazá and Hualguayoc districts.

In 1906 the production of fine copper from the mines of the department of Huancavelica was 254 metric tons, the district of Castrovirreina leading with 234 metric tons, followed by small products from the districts of Angaraes and San Juan. This department, which lies a long distance nearly due south of Cerro de Pasco, shows copper ores in promising quantities, mainly in eruptive rocks. The ores smelted in 1905 averaged about 25 per cent. copper, and 0.1 to 0.135 per cent. silver.

The department of Huánuco produced, in 1906, fine copper to the extent of 235 metric tons, of which the district of Huánuco made 141 metric tons, and the district of Huallanco 94 metric tons.

The 1906 production of the department of Ica was only 28 metric tons fine copper, all coming from the district of Ica, which was worked extensively at one time, but was practically abandoned in 1892. The largest mine was the Canza, with selected ores averaging about 30 per cent. copper, lower grades being rejected. Disadvantages in this district are lack of water and of decent roads for transportation.

The department of Junín is much the most important copper field of Perú, and is of great promise. The output of fine copper, in 1906, from the various districts of this department, was 9,440 metric tons, of which 6,741 metric tons came from the Cerro de Pasco district, with 2,697 metric tons from the Yauli district. The district of Huancayo produced only 2,156 kilos fine copper.

The Cerro de Pasco district, worked for nearly 300 years for silver and an enormous producer of that metal, has become a very important copper field, since 1890, and is now mainly in the hands of a single American corporation. Unlike most of the other Peruvian mining fields, which are arid, there is an excess of water at Cerro de Pasco, and there are numerous streams that could be made to furnish power. Timber is scarce, except in a few districts difficult of access, but coal of fair quality is found in abundance, within 20 miles, and a branch railroad has been built to the coal fields. An extension of the Meiggs railroad has been built from Oroya to Cerro de Pasco, cutting to a comparatively trivial sum the former freight rate of $40 per ton for this distance, all transportation having been on the backs of mules and llamas. The Cerro de Pasco district is a basin of approximately one mile width and two miles length, entirely mineralized and bounded on the west by andesite, with limestone on the three other sides. The formation is in some doubt as to age, but apparently is lower Cretaceous, with strata of slate, sandstone and limestone upon which is superimposed a mass of limestone conglomerate, of marshy rather than marine origin, fractured by eruptive acid andesite rocks, the

in many cases engulf the sedimentary strata, the limestone being highly metamorphosed. Apparently the entire basin in a mammoth stockwerk, with impregnations of silver and copper ores, the ore occurring in immense pockets, up to hundreds of thousands of tons in weight, and largely, though less frequently, in veins. The deposits are said to be metasomatic at the western end, east of the andesite, occurring mainly as veins in or near the andesite, while to the eastward, west of the limestone, the ore occurs in large pockets, in and near the limestone. The alteration zone is 200 to 300 feet in depth, succeeded by a zone of lean cupriferous pyrites, followed in turn by highly argentiferous sulphides and arsenides. Below the water-level the ores include bornite as well as chalcopyrite, with considerable tetrahedrite, associated with sphalerite, galena, arsenopyrite and pyrite.

The Huayllay division is about 25 miles southwest of Cerro de Pasco, at an elevation of about 15,000 feet. Copper occurs at various points, mainly as enargite, with considerable tetrahedrite and some chalcopyrite. Bismuthinite is shipped in considerable quantities from one property, and there are a number of old copper mines, mostly small, in this field.

The Yauli division of the Cerro de Pasco district is a short distance east of Oroya, the principal copper deposits occurring between wollastonite strata and andesitic rocks, such as dacite and prophyllite. The Morococha sub-district of the Yauli division has a number of important producing mines, and is located on a 10-mile spur of the main line of the Oroya railroad that runs from the western end of the Galera tunnel, which passes under Mount Meiggs. The Yauli mines, including the Morococha sub-division, are located at an average elevation of more than 13,000 feet above sea-level.

The department of Libertad produced, in 1906, only 74 metric tons fine copper, of which 73,654 kilograms came from the district of Santiago de Chuco, and only 690 kilos from the district of Salpo.

The department of Lima is the second largest producer of Perú, having made 2,547 metric tons fine copper, all from the district of Huarochirí, in 1906.

The American consul at Iquitos writes that prospectors on the upper Maranón river, an affluent of the Amazon, found copper in the dumps of a half dozen abandoned mines, worked by Spaniards previous to the Peruvian War of Independence, at a distance of three weeks journey from Iquitos.

The production, in 1906, of the mines of the department of Puno, was 187 metric tons fine copper, all from the district of Lampa.

URUGUAY. Mining is but little developed in this republic, and while copper ores have been found at various points, no serious attempts have been made at developing copper mines.

VENEZUELA. Venezuela has produced no copper since 1894, but was a producer of importance at one time. Copper ores are known to occur in the departments of Baraquisimetó, Carabobo, Lara and Mérida, but the only mines of importance have been developed in the department of Lara.

There are traditions that the Quebrada mines, in the Aroa district of Lara, were worked by aborigines, before the coming of the Spanish. In the first half of the Nineteenth Century a Baltimore company operated

western part of the principality, chalcocite is found at Gornya-Danya an at various other points. Native copper and rich oxidized ores have bee noted in the districts of Sleven and Samakof, and elsewhere.

CORSICA. The island of Corsica has a cupriferous district about 2 miles wide by 50 miles in length, showing copper ores, mainly sulphid in contact deposits between limestone and igneous intrusives. In this di trict there are a number of small and unimportant mines, mostly of co siderable age, of which the Lancone mine was once a considerable produce The present copper production of Corsica is trivial, coming mainly fro a single small mine that ships about 200 tons of ore yearly to Great Britai

CYPRUS. The Latin word cuprum, from which comes the Englis word copper, and its equivalents in most of the other European language is derived from aes cyprium, the earliest Latin name of copper, derive from the name of this island, where the Romans first secured their supplie of the metal, and it is probable that copper mines were worked by th Greeks before the Romans. The latest attempt at modern mining, earl in the Twentieth Century, was in the vicinity of Limassol, but the islan now has no active copper mines.

ENGLAND. English tin was known to the Phoenicians nearly o quite three thousand years ago, and copper has been produced, in all like lihood, for as many years as tin, the same veins carrying both metals, i Cornwall and Devon. At the close of the Eighteenth Century Englan occupied relatively the same position in the copper industry as held by th United States one hundred years later, producing 55 to 60 per cent. of th copper supply of the world, and, including the Welsh mines, then larg producers, Great Britain was as important a factor in the copper trad at the beginning of the Nineteenth Century, as North America is in th same trade at the present time. In 1799 the output of copper by Englis mines was 4,923 long tons, but had shrunk, in 1899, to 367 tons.

The mines of Cornwall and Devon, adjoining counties in the south western corner of the island, have been important producers of tin for hundred generations, and it is no wonder that the Cornishmen are counte the world's best practical miners. A small, though relatively importan production of copper, was secured from these counties during the middl ages, but systematic copper mining may be said to date from about A. D 1700. The quantity of copper ore produced by the mines of Cornwall an Devon, during 126 years ending with 1865, was 7,844,305 long tons, value at £50,964,388. The average yield for the last 70 years of this period wa about 8 per cent. fine copper. The metalliferous belts of Cornwall an Devon may be considered as one geographically, occurring in a distric showing metamorphosed sedimentary rocks, mainly clay-slates of th Devonian system, with frequent bosses of granite, both slate and granit being intruded by a quartz-porphyry of later age. There are numerous fissure veins cutting all of these rocks, these averaging 2 to 3 feet only i width, and frequently showing prominent gossans, the cappings being mor numerous and stronger above copper ores than above the tin ores. The same veins carry ores of tin and copper, but there is a marked segregation of these minerals, governed by the nature of the wall-rocks, tin occurring mainly in portions of the fissures traversing granite, while copper favors

the slates. There are exceptions to this rule, and in places tin and copper alternate in occurrence, but, in the main, the metals favor the different rocks as noted. As a rule the veins are best mineralized where having the sharpest dip. The copper ore is mainly chalcopyrite, with quartz gangue, but the upper workings show the usual oxidized ores and native copper. One mass of virgin metal, weighing three tons, was secured from a mine near Mullion, Cornwall. The secondary sulphides are found to some extent, and copper silicates occur in small quantities, while there are occurrences of many of the rarer copper minerals, of scientific interest rather than of commercial importance.

The county of Cumberland was a producer of copper from a number of mines at one time, but these have been idle for a century or more. The Goldscope, in this county, was the most famous English copper mine during the Tudor era, working a fabulously large force of men to obtain the very moderate amount of copper secured.

The county of Cheshire contains numerous deposits of oxidized ores, averaging about 1.5 per cent. in copper tenor, disseminated in sandstone, which are not of present commercial importance, though possibly of future value.

There are deposits of copper in western Shropshire, along the Welsh border.

In Staffordshire the Ecton mine, owned by the Duke of Devonshire, was opened in Roman times, and was operated as recently as 1840. This was the first English mine to use gunpowder for blasting, in 1677.

The Laxey mines, in the Isle of Man, produce lead, zinc, copper and silver, the principal values being in the two metals first named.

FAROE ISLANDS. On the western side of the island of Luderö there are a number of superimposed cupriferous amygdaloidal traps. The copper occurs in thin vertical sheets, as virgin metal, of about one thirty-second inch in average thickness, and some of the gangue rock, from which metallic copper of appreciable size had been removed, assayed 1.88 per cent. copper.

FINLAND. The grand duchy of Finland, which, though closely bound to the Russian Empire, is not a portion thereof, as quite generally considered, has copper mines in the provinces of Viborg and Kupio. The most important is the Pitkaranta, on the northern shore of Lake Ladoga, in the province of Viborg, where mining dates from about the middle of the Nineteenth Century. The ore is mainly chalcopyrite, occurring in veinlets and disseminated in beds of "skarn," or sahlite, which is a granular mixture of augite, granite and ferromagnesian silicates, traversing granite. The ore body averages about 15 feet width, and is low in grade, but has been developed more or less extensively for about one and one-half miles in length.

FRANCE. There are no copper mines of present-day importance in France, the old mines of Chessy, which were famous properties and considerable producers in the middle ages, having been exhausted and idle for many years. In 1903 French copper production was 10,900 metric tons of cupriferous pyrites, of an average value of $13.25 per ton, a considerable portion of the value being in the sulphur contents, coming mainly from the department of Ariege, with a small output from the department of

Gard. The production is principally from mines of cupriferous pyrites a St. Bel, northwest of Lyons, where the ore occurs in series of lenses havin a known length of about 1,300 meters. One of the lenticular masses is o mammoth size, having an ascertained thickness of 140 feet, at the dept of 544 feet, with a known length of 1,968 feet, consisting of massive pyrit with a little intruded quartz, slightly cupriferous. There also are sma mines of argentiferous tetrahedrite in the department of Ariege, and i 1900 the production of such ore was 1,184 metric tons, valued at 612,39 francs, mainly in silver, sent to Great Britain for smelting.

There also are small copper mines in the department of Var, and i Savoy. There are very small copper mines in the department of Isere, an in the Basses-Pyrenees some exploratory and development work was don in the early years of the century. At Cap Garonne, near Toulon, there ar Permian quartz-conglomerates carrying a cupriferous bed of 2 to 4 fee thickness, the lower portion mineralized with chalcocite and melaconite.

GERMANY. In production and importance, the copper mines of Ger many rank second in Europe only to those of Spain, and the Germanic cop per industry is of considerable antiquity, the Mansfeld mines having bee important producers in the middle ages. In 1799 Germany produced onl 372 long tons of fine copper, nearly all from the Mansfeld mines, and on hundred years later made 20,875 long tons, of which about 90 per cent. wa from the Mansfeld mines.

There are copper mines of greater or less importance, and other mine carrying cupriferous values, in Bavaria, Brunswick, Elsass, Hanover, Hessen Nassau, Prussian Saxony, Rheinprovinz, Saxe-Coburg-Gotha, Saxe-Mein ingen, Saxony, Silesia, Weimar and Westphalia.

The copper mining industry of Saxony is of overwhelming import ance, values being secured mainly from a single property in a singl district, though there are cupriferous quartz veins in Schneeberg. The pro duction of Saxony, in 1904, was 710,911 tons of ore, from three mines, o which one, the Mansfeld, is one of the world's greatest copper producers while a second, the Rammelsberg, is of considerable importance.

The Mansfeld mines are at Eisleben, in the southern Harz Mountains In this portion of the Ober Harz the copper occurs in rocks of the Permian system, resting unconformably upon crystallised strata of Paleozoic rocks the metalliferous bed lying in the Zechstein, a member of the Permian for mation. These horizons of the series consist mainly of unstratified gyp sum, associated with bituminous dolomitic limestones, beneath which is a stratified fetid limestone, below which lies the true Zechstein, giving name to the formation. At depth this passes into a bituminous marly shale, the lowest part of which, ranging from 18 inches to 3 feet in thickness, forms the cupriferous strata, carrying disseminated copper sulphides to the extent of 2 to 5 per cent. copper, with an average tenor, as mined, of about 2.8 per cent., and carrying an average of about 0.15 kilos silver per metric ton. Under the cupriferous shale is a calcareous sandstone-conglomerate, sometimes carrying disseminated copper carbonates, and containing also small values in cobalt and nickel, all of the ore being more or less argentif erous. The copper-bearing shales of the Mansfeld district are about 200 square miles in area.

The Rammelsberg deposits, in the northern Harz Mountains, two miles south of Goslar, Prussian Saxony, occur in lenticular bodies of banded ore, with layers conformable to the bedding of the Goslar slate, in folded beds of Devonian age. The Rammelsberg is the second largest copper producer of the German Empire.

In 1904 the production of Westphalian mines was 47,718 metric tons of ore, secured from three copper mines and as a by-product from eighteen mines of other metals, and in the same year two copper mines in Silesia produced 1,760 metric tons of copper ore.

GREECE. The first Grecian copper mining was done at Chalkos, in the island of Eubœa, in semi-historic times, and the Greek name of the metal, chalkos, came from this source. The eastern coast of Attica shows argentiferous sulphide ores of lead and zinc, including the important silver-lead mines of Laurium, the argentiferous galena and sphalerite carrying occasional chalcopyrite. Copper ores occur in small veins only, as a rule, in eastern Attica, but in 1907 one copper mine was being worked, in a small way.

There are deposits of copper ore in Thessaly, but apparently these are not of large size or especial promise.

HERZEGOVINA. This country, nominally under Turkish suzerainty, but actually administered by the crown of Austria-Hungary, has a few small and exceedingly primitive copper mines, but none worthy of serious consideration, as now developed.

HUNGARY. Copper mining is an industry of great antiquity in the kingdom of Hungary, and there is a considerable number of old mines, mostly worked out or idle, and nearly a dozen copper smelters, all small and antiquated in design. Sulphide ores predominate as a rule. In 1901 the production of copper ore in Hungary was 161,547 metric tons, from 16 working mines, of which five produced the bulk of the ore won, and, of the larger producers, three mines were owned by the government and two were under private ownership.

There are copper mines in Transylvania, in the eastern portion of Hungary. The copper measures of the Banat, formerly worked for copper values, are now producers of iron ore only, though auriferous copper ores are found as contact deposits at the junction of garnetized Tertiary limestone and intrusive monzonite. At Herrengrund, north of Neusohl, near the Galician boundary, there are small copper mines, and at Dognacska there are very old and very small mines, that are limited producers of copper sulphides.

IRELAND. In 1906 the copper production of Ireland was about 3,000 tons of low grade cupriferous pyrites, valued at about £4,000 only, a considerable proportion of the values being in sulphur. At one time the Irish copper mining industry was of much importance, the production of the Connecree mines being 677 tons of fine copper in 1799, equivalent to nearly 8 per cent. of the world's production in that year, while in 1899 the Irish output was only 17 tons of fine copper, all obtained by leaching and cementation. The Irish copper ore sold in Swansea and Liverpool, from 1875 to 1882, amounted to 620,681 tons, of 21 cwts. each, valued at upwards of £1,000,000, but after 1882 the copper mining industry was practically extinct for

twenty years, though efforts are now under way to revive the industry. The Irish copper mines, however, have been material contributors to the progress of the industry, the wire rope tramways now in general use having been invented by Chas. Hodgson, of Wicklow, for use in the local mines, and the single rail was first utilized by Capt. Geo. Oates at the Cronnebane mine.

The Irish copper ores are mainly chalcopyrite and cupriferous pyrite, and there are copper mines in the counties of Cork, Kerry, Waterford and Wicklow, and in addition there are copper deposits in County Tipperary.

In County Cork the principal cupriferous districts are in the western part, including the Berehaven district, where mines were worked early in the Nineteenth Century, the Schull district and the Crookhaven and Kilcrohane districts.

The copper measures of County Cork extend into the adjoining county of Kerry, where mines have been opened at various points, including Ross Island in Lake Killarney. The Mountain and Keallonge mines, operated during the early decades of the Nineteenth Century, were each more than a quarter of a mile in depth, and were considerable producers in their day.

In County Waterford the Knockmahon mines were large producers at one time, the output of finished copper from the mines of this county exceeding 900 long tons in 1843. The ore is mainly cupriferous pyrite occurring in large bodies in clay-slate, and, as selected, gave average returns of about 10 per cent. copper. The cupriferous measures of this county would seem worthy of serious exploitation.

In County Wicklow the Cronnebane mine was the principal property, and, as early as 1799, the Connecree mines yielded 677 tons of fine copper, rendering this one of the largest copper mines of that period. Copper mining practically ceased about 1840, but there was a small production of more or less cupriferous pyrite from the old copper mines for several decades later. In the Ovoca Valley of Wicklow, sulphide ores occur in clay-slates, as in the adjoining county of Waterford, and as in Cornwall and Devon. The ore occurs as chalcopyrite, in small veins, and as cupriferous pyrite, in lenses in Silurian slates, near granitic intrusives. The Ovoca copper belt is about six miles in length, and is of considerable promise, though the average grade of the ore is low.

ITALY. Copper was mined in Italy by the Romans several centuries before the Christian era, and, before their day, in semi-historic times, mines were worked by the Etruscans. The copper production was small during the middle ages, but the industry never has suffered complete cessation since its birth. Several of the Italian copper mines are well equipped, and managed with technical skill, and pro[illegible] In 1902 the output of all Italian mines was 101 [illegible] ore, and in 1907 probably was considerably mor[illegible]

The Italian copper deposits of commercial [illegible] Appenines of Northern Italy, in the departm[illegible] Tuscany and Venetia, those of Tuscany being [illegible] The principal mines are in the districts of V[illegible] and in the western Alps.

Principal developments and production ar[illegible] where the largest Italian copper company is op[illegible]

Massa Marittima, the Massa Metallifera of Roman days. The Grosetto district lies ten to twenty miles southeast of Leghorn, in the foothills of the Etruscan Appenines. The principal ore bodies occur in fissure veins, in a great laccolith of gabbro and diorite intruding Eocene limestone, the intrusive rock being strongly basic, with an altered crushed zone of serpentine. In this district are to be found the largest Italian producers.

The Ligurian mines, above Genoa, lie near the Mediterranean coast, the ore bodies occuring in stratified Azoic rocks, as contact veins between diorite or serpentine and the metamorphic rocks, the ores being mainly sulphide, with quartzose gangue.

The ore of the Volterrano district is mainly chalcopyrite, with a small quantity of chalcocite found in fissures in a red gabbro, known locally as porfido rosso. This district has been the scene of copper mining operations from very early times.

In the Piedmont district mines were worked in Roman days, and traces of old workings are to be seen at many points. The ores occur in stratified archaic rocks, no fissure veins being found, and nickel and cobalt frequently are associated with copper.

In the island of Sardinia there are copper deposits near Freigas, on Monte Tramento, in a bed of clay-slate alternating with limonite schist, the copper ores occuring near the contact and showing considerable chrysocolla above, with chalcopyrite below. There are minor copper deposits, mainly in small bodies and of low grade, at several other points in Sardinia. In 1905 the production of Sardinia was 98 metric tons of copper ore, all from the province of Cagliari.

LUXEMBURG. There is a small copper mine at Stolzenburg, near Diekirch, opened 1896. The vein averages about 20 inches in width and carries ore of good copper tenor.

NORWAY. The copper mining industry of Norway is of considerable antiquity, and in 1799 Norway produced 480 tons of fine copper, mainly from the Röros mines of Trondhjem, and one hundred years later the output was 3,935 long tons of fine copper, Norway being one of the few European countries to increase its copper output during the Nineteenth Century. Most of the Norwegian mines are opened on lenses of cupriferous pyrite, some of these lenticular masses being of large size. As a rule the lenses have a nearly vertical dip, but are deep rather than wide, being comparable in shape to eggs on end, rather than to the ordinary lenses having their greatest length along their axes of strike.

There are copper mines in the provinces of Christiania, Christiansand, Trondhjem and Tromsö. The principal mine of the present day is the Sulitjelma, in the amt of Nordland, [illegible] Tromsö, north of the Arctic circle. The country rock is mica[illegible] Silurian age, with eruptive greenstone flows conformable [illegible] the ore bodies occurring as extended lenses, very perp[illegible] dip, at the contact of the schist with metamorphosed [illegible] the ore being exclusively cupriferous py[illegible], with small quantities of nickel and [illegible]

In the stift of Trondh[illegible] the oldest copper fields of Norway, a[illegible]e, which

remain producers of some present importance. In these districts the ores occur as sulphides, in schist and slates of lower Silurian age.

In Telemarken, Christiansand, there are a number of old mines carrying numerous veins of sulphide ore, mainly of narrow width but great persistence.

PORTUGAL. The important copper mines of Portugal are all in the province of Alemtejo, near the border line of the Spanish province of Huelva, but there are a few small properties in the southern province of Algarve, next south of Alemtejo. As the mines of Alemtejo are opened on the western extension of the Sierra Morena, their geology is practically the same as that of Huelva, described in the article on Spain. The principal Portuguese mines are in the districts of San Domingos, Grandola and Aljustrel, production averaging about 500,000 long tons of cupriferous pyrite annually.

ROUMANIA. There are no large copper mines in this kingdom, the principal producers, all very small, being in the Mehedintze district. In the Carpathian Mountains carbonate ores and chalcopyrite, slightly argentiferous, are found at Valea Choboroasa. Copper ores also exist near Salishtea and in the district of Dobroudja, at the towns of Balabancea, Islam-Geafer and Carapelit, also at Altan-Tepe, near Tcheamourli.

RUSSIA. There are extensive cupriferous districts in the Russian Empire, those of Siberia being treated separately in the chapter on copper deposits of Asia, with the exception that the Transcaucasian copper mines are included in this article on Russia, as also are the copper measures on the eastern slope of the Ural Mountains, that lie in the governments of Perm and Orenburg, each of these divisions lying partly in Europe and partly in Asia.

There are copper mines in the governments of Perm, Orenburg, Ufa and Samara along the Ural Mountains, and in the governments of Viatka and Kasan, next west. In Transcaucasia there are mines in the governments of Elizabethpol, Kutais and Tiflis. In the Russian Empire there are a considerable number of copper mines and nearly or quite 30 smelting plants, mainly small and antiquated in design, though a few properties, notably the Kiadebek, have modern reduction works. The comparatively small output of Russian copper is no criterion of the possibilities of production inherent in the copper measures of this, the greatest empire in existence, and there are various fields of much promise awaiting extensive exploitation at some future time.

The Permian formation, taking its name from the government of Perm, is very extensive, being found in the governments of Perm and Orenburg, on both sides of the Urals, and in the adjoining governments of Ufa, Samara, Kasan and Viatka. The mines of these governments are opened in Permian and Triassic formations, the ores occurring oxidized, and of low average tenor, not to exceed 2 to 3 per cent., but with occasional enrichments, notably as massive malachite, of excellent average tenor. The bedded deposits of the western slope of the Urals are mainly of Permian age, with some cupriferous strata of Triassic age. Among the Permian mines of interest is the Miednoroudiansk, where a single body of massive malachite weighing 339 tons was extracted in 1836. At depth the pockets of carbonate and oxide ores pass into chalcopyrite and cupriferous pyrite.

The Transcaucasian mines, in the three governments of Elizabethpol, Tiflis and Kutais, furnish about half the copper production of the empire. In the Kedabenski district of Elizabethpol, ore occurs as irregular lenses, often of large size, in veins with quartz-porphyry gangue, with walls of diorite and diabase porphyrite, the lenses shading gradually into the country rocks. The ore is a mixture of slightly auriferous and argentiferous covellite and chalcopyrite, carrying sphalerite and occasional galena, associated with pyrite and pyrrhotite, with a heavy barite gangue.

Copper ores were worked in a small way, toward the end of the Eighteenth Century, near Kielce, in Russian Poland, and were reopened for a short time in 1904. There also are old copper mines at Chenciny, Poland, carrying mainly carbonate ores, on which some efforts at mining have been made since the beginning of the Twentieth Century.

SCOTLAND. There are old copper mines, which never were of importance, in Renfrewshire and Rosshire, with deposits of chalcopyrite, apparently of some promise, in Perthshire, and occurrences of copper ores are noted in Kirkcudbrightshire.

SERVIA. There has been a small but fairly continuous copper industry in Servia for some hundreds of years, and it is possible that copper mines were operated by the Romans. The production of fine copper by Servian mines in 1900 was 270 metric tons.

The principal producing copper field is in the vicinity of Majdenpek, and in the adjoining districts of Rebelj and Wis, in northwestern Servia, in the basin of of the Yablonica river, the copper belt running for about 15 miles northwest and southeast along the northern slope of the Povljen Mountains. The Rebelj deposits occur in serpentine, with intercalated argillaceous limestone, in lenses up to 100 feet in length, carrying a core of crystalline pyrite with disseminated chalcopyrite averaging about 5 per cent. copper, with the outer shell of the lense carrying ore up to 15 per cent. in copper tenor. There also are deposits of copper ore at Radanovci, Staninareta and Wuinovatz.

SPAIN. Of all the producing copper fields of the present age, the Hispano-Portuguese cupriferous measures of the provinces of Huelva and Sevilla in Spain, and the provinces of Alemtejo and Algarve in Portugal, are the most ancient. The first copper mining on the Iberian penin[sula] was done, in all likelihood, by the Phœnicians, some three thousand [years] ago, and was continued by their kindred, the Carthaginians. U[ntil the] destruction of Carthage by the Romans, that people succeeded to [the] inion of the peninsula, and extensive traces of their work remain [even] to this day in the copper mines of the Sierra Morena. Mine tim[bers] likelihood set by Roman workmen nearly or quite two tho[usand years] ago, remain in place, effectually protected from the gnawing [of air] by the preserving action of copper sulphate, with which the [waters] are strongly charged. Upon the disruption of the Roman [Empire] and Portugal fell to the lot of the Visigoths, and, a few [years] the Moors conquered the southern half of the peninsula [and held] possession for some seven centuries, and operating the [ancient] mines to some extent. Upon the expusion of the Moors b[y] Isabella, late in the Fifteenth Century, the Spanish gained

rich mines of the Sierra Morena, and the larger of these old properties were worked, in a spasmodic way, with frequent hiatuses, until 1860, when the Tharsis mine—supposedly the Tarsish of the ancients—was reopened, and worked along modern lines. The Rio Tinto, much the greatest of Spanish mines, and one of the four greatest copper mines in the world, passed into the hands of the present owners in 1873, and was reopened in 1876. Further particulars of interest in this connection will be found in the article descriptive of the Rio Tinto mine.

Spain ranks third among the copper producing countries of the world, and was second only to the United States as recently as 1902, having been passed by Mexico in 1903. As recently as the early years of the ninth decade of the Nineteenth Century, the production of copper by Spain, Chile and the United States was practically on a parity. There is no other copper field in the world that has been worked, practically continuously, for three thousand years, notwithstanding which the outlook for the Spanish copper mining industry is excellent.

In the kingdom of Spain there are copper mines of more or less importance in the provinces of Almería, Asturias, Barcelona, Burgos, Cuidad Real, Córdoba, Coruña, Gerona, Granada, Huelva, Huesca, Jaen, León, Madrid, Menorca, Navarra, Palencia, Santander, Sevilla, Teruel and Zaragoza.

In 1901 the official Spanish returns gave 271 productive copper mines in the province of Huelva, but in many cases these counted separately numerous mine openings held by a single company, hence the number of actual producers was much smaller, including only about a dozen with outputs of importance. The active portion of Huelvan cupriferous belt is a zone of about 15 miles average width, with an extreme length of about 80 miles, running practically east and west through the entire province of Huelva, with its eastern end in the province of Sevilla and its western extension in the provinces of Alemtejo and Algarve in the kingdom of Portugal. This district lies along the Sierra Morena, and, in addition to the dimensions before given, which are those of the fairly proven copper territory, there are indications of copper, of more or less promise, in a district of about 30 miles extreme width by 125 miles or more in length, along this range of mountains and beyond its limits. The Sierra Morena, or Andevallo, cupriferous belt, is divided into four zones, the eastern, known as the Cerro Muriano, including various mines near the city of Sevilla, while the western zone lies in Portugal, with the village of Grandola as an approximate center. The northern zone includes the principal mines of Huelva and Alemtejo, while the southern zone includes a number of mines of considerable importance, the largest being the Tharsis. All of these zones present the same general characteristics, carrying lenticular masses of ore, usually at the junction of slates of the lower Carboniferous system with intrusive syenite and diabase. The ore bodies lie parallel with the slate, with northwesterly strike, and dip to the north. The slates are of a yellowish cast at surface, where weathered, but are bluish at slight depth. Apparently the ore bodies, while occurring as immense lenses, may be considered true contact veins. The deposits are of varying size, sometimes of immense proportions, the largest, owned by the Rio Tinto, reaching a length of nearly 4,000 feet, with an extreme width of 500 feet. The ore bodies have, or once had, iron cappings, and the richer ores above ranged about

5 per cent. in copper tenor, being succeeded, at a depth of about 200 feet, by a sulphide zone carrying an intimate mixture of chalcocite and pyrite, with values averaging 3 to 4 per cent. in copper, with some ore of high grade. The decrease in values is fairly steady from the top of the deposits below the altered zone, and at a depth of about 500 feet values range only about 1.5 to 2 per cent. copper, and at still greater depth the copper tenor declines to about one per cent. with indications that the bottom of the immense lenses will carry less than one per cent. copper, though probably they will remain workable, owing to the sulphur values in the pyrite. All ores are slightly argentiferous and auriferous, the precious metals being extracted closely, and while the amount per ton in gold and silver is very small, the aggregate values so saved are very great, owing to the immense tonnage of ore that is treated.

The mines of Sevilla probably rank next to those of Huelva in present importance and future promise, though the production is trivial as compared with the immense Huelvan output. In 1903 there were 23 productive copper mines in Sevilla, which yielded only 2,304 metric tons of copper ore but production has increased largely since.

In 1902 the province of Gerona had 25 mines of copper and 4 mines carrying copper in connection with other metals, all of which were idle.

In the Guadix district, about 15 miles from the city of Granada, in the province of that name, rich copper sulphides are found in a bed of marl, on which some mining has been done.

The province of Huesca has old copper mines and other mines carrying considerable copper values, but copper mining is practically non-existent.

In 1902 there were 41 copper mines, all idle, in the province of Lerida.

The northern part of the island of Menorca shows a copper belt of 16 to 18 miles length, with ore occurring in a bed of marl of one to two feet thickness, lying in clay-shales and sandstones of the lower Triassic system. The Puebla mine shows ore under peculiar circumstances, mainly as chalcocite and chalcopyrite in connection with lignite, the conclusion being inevitable that the copper values were precipitated by the carbonaceous material.

There are copper deposits and attempts at copper mines in the province of Teruel, and the same may be said of the province of Zaragosa. There also are old mines of small importance, now idle, in a considerable number of other Spanish provinces.

SWEDEN. The famous copper mines of Falun have been producing copper for more than 600 years. Copper mines are found in the läns of Dalarne, Östergothland, Kopparberg, Malmöhus, Norbotten, Orebro and Vestmanland. The copper production of Sweden was about 850 long tons in 1799, and 100 years later was only about one-half as much.

The famous mines of Falun are worked by what probably is the oldest stock company now existing, its charter dating from A. D. 1288. The Stora Kopparberg is the best known mine of the district, and furnishes much of the copper and practically all of the gold produced in Sweden. The ore deposits resemble those of the Rio Tinto, and carry 2 to 3 grams gold per ton, occasionally with much higher gold values. The ore is chalcopyrite, disseminated in pyrite, and is divided, as mined, into two classes, known respectively as hard pyrites, carrying about 3.5 per cent. copper, and soft

bokfontein, in the Concordia district, as early as A. D. 1685, and these attempts were repeated in 1799, but the first shipment, of eleven tons of ore, was not made until August 31, 1852, since which time production has been continuous. The ore occurs in lenses, often of great size, in granitic rocks. The predominant rocks are gneiss and schist, with a generally east and west trend, and flat dip to the north, traversed by series of fractures with diorite dykes, in which occur lenses of sulphide ore, mainly chalcopyrite, but with an appreciable percentage of bornite, with dioritic gangue. The principal ore bodies occur at or near the point of intersection of the diorite dykes with barren fissures. The ores range from 7 to 21 per cent. in copper tenor, after careful selection.

CONGO FREE STATE. The principal copper deposits of Congo Free State, as now known, are in Katanga, the southeastern province, around the headwaters of the principal affluents of the Congo river. Principal mining operations of the present are between the Lualaba and Lufira rivers where a considerable area shows oxidized and sulphide ores, occurring in blanket veins, impregnations and stockwerks, mainly in talcose and siliceous schists. These ore bodies are of unusual size, and are said to be of unusual richness, averaging 15 per cent. copper, but apparently this reference is to the enriched ores of the upper workings, and such values are not likely to hold to great depth. There are considerable remains of native workings, and a limited production is secured by natives. More than eighty old workings are shown in one district, where the oxidized ores are smelted in pits, with charcoal, and the product is used for ornaments, buttons and various utensils. This district is of considerable promise.

EGYPT. There are copper deposits in the Nubian region of the Upper Nile, but no attempts at serious mining have been made in historic times.

FRENCH CONGO. Malachite and chalcocite have been found in place in Triassic sandstone, in the Crystal Mountain range, near the coast of Gaboon. Near Comba, between Brazzaville and Loudima, along the line of the Congo Free State, there is a cupriferous district in the Kouilou-Niari basin, ore occurring in cupriferous sandstone above limestone. These deposits have been worked by natives in a primitive way, for centuries, and a considerable trade once existed in copper manufactured from these mines but this became extinct with French occupation. The native workings are pits and trenches not exceeding about 35 feet in depth, and show azurite, malachite, chalcocite and tetrahedrite. The deposits apparently are of low average tenor, but cover a considerable area. This district has been but slightly explored by Europeans, though some work has been done at the Mindouli mine, which seems the principal deposit. The district is about 300 kilometers from the coast, and probably copper mines would not be workable without railroad transportation, now lacking.

GERMAN EAST AFRICA. Copper ores exist at various points in this protectorate, but no mines have been developed.

GERMAN SOUTHWEST AFRICA. This protectorate has copper deposits in Damaraland, Ovamboland and Hereroland, the latter containing the notable Otavi mines. The copper mines of the Otavi Mountains were worked to slight depth, in a primitive manner, by the natives, apparently for some hundreds of years. A great block fault, in limestone, traverses

by numerous cross-faults, producing diverse deposits, shows ore occurring mainly in sandstone, laid down in sink-holes. This district includes Otavi, on the southern side of the range, and Tsumeb on the northern side. The mine shows native workings, deepest about 35 feet only, over an area of about 200 by 500 feet, with irregular fault veins, carrying mainly chalcocite, with occasional malachite, associated with galena, in masses ranging from microscopic size to two tons in weight, with sandstone gangue, and impregnations in both walls.

In Damaraland there is copper in the Rehoboth district and on Gross and Kleinen Spitzkopf, 20 kilometers northeast of Rehoboth. The ores, as developed, are mainly malachite and chalcocite, with quartz gangue. From the Otyizongati district, about 40 miles east of Okahandja, 100 tons of carefully selected ore sent to Germany in 1904 gave returns of 28.5 per cent. copper.

LIBERIA. Copper ore is said to exist in the interior of this country, but the extremely dense forest growth operates to prevent the acquisition of definite knowledge. Copper has been used to a limited extent, in the making of weapons, by the Mandingoes, a tribe in the far interior. The law prohibits the holding of land by other than Liberian citizens, and until this law is repealed, modified or evaded, there can be no copper production of importance from Liberia.

MADAGASCAR. Copper ores have been smelted by natives, in a primitive way, and to a limited extent, for generations. There are small native mines at Ambataofaugehana in the district of Ambositra, and at Vohinana. The ore is mainly malachite, surface workings giving returns of 10 to 45 per cent. copper. Ore is reported to occur in mica schists, and the mines are said to be nearly worked out. Native mines are reported also from the Betafo country, and in the district of Imerinarive. In the Cercle de Tsiafahy native copper has been found, and virgin metal is reported also from the district of Vonizongo. Rich ores are said to exist near Lake Kinkony, in the Cercle de Mahavavy, and traces of copper are reported from the province of Vohemar.

MOROCCO. Copper ores exist at a number of points in this country, and about 1860 were mined and smelted, in a small way, near Tarudant, capital of the province of Sus. There are occurrences of copper ore near Tangier, also at Tablah, near Mequinez, and at Mesfiwa, in the vicinity of Mogador.

NATAL. There are a number of known occurrences of copper ore in Natal, but the colony lacks producing mines. In Zululand sulphide and silicate copper ores are noted near the Insuzi and Umhlatuzi rivers, in the Nkandhla district, but these lack adequate transport. A syndicate was formed, in 1905, to exploit copper deposits on the Buffels River, along the border of Natal and Zululand. Various local syndicates have done more or less exploratory work at Undweni and vicinity, near the Vryheid border, in Zululand, where a vein, said to be traceable for [illegible] shows rich carbonate, silicate and sulphide ores, [illegible] largely as impregnations, but with erratic [illegible] Magdalen properties, in this district, show[illegible]

PORTUGUESE EAST AFRICA. This colony has copper ores in Mozambique, Nyassaland and Zambesia, the latter district showing considerable traces of old mining operations, apparently conducted mainly for gold, but copper ore exists at numerous points, and apparently in promising quantities.

RHODESIA. There are remains of ancient mining operations, for both gold and copper, in the colony of Rhodesia, and it is evident that the ancients possessed small and crude furnaces for smelting. The mining laws of Rhodesia are very liberal, and the harnessing of the Victoria Falls of the Zambesi river should greatly stimulate mining and other industries through furnishing the first cheap power known in Rhodesia.

Copper ores have been found at a number of points, but principal developments are in the northeastern section, in the Victoria district, mainly along the northern reaches of the Kafue river, an affluent of the Zambesi. The cupriferous zone is a limestone belt, lying approximately east and west, with a width of about six miles and length of about sixteen miles, bounded mainly by Cambrian and Silurian schists, carrying deposits with shallow surface zones of oxidized ores, succeeded at little depth by sulphides, these deposits occurring occasionally as pipe veins, and being more or less argentiferous. The Lomagunda district of Mashonaland, circa ninety miles northwest of Salisbury, shows copper impregnations in siliceous and calcareous schists, ores being mainly malachite, with some chrysocolla. The Blue Jacket mine shows old workings to a depth of 100 feet with lateral workings of 10 to 400 feet in length, on ore bodies occurring in limestone and schists. Apparently these mines were worked to the depth of the oxidized ores, the ancient miners stopping when base ores were reached. It is obvious from the depth and extent of these workings, and the remains of crude smelters, that the work was done by some race much further advanced in civilization than the present natives.

SENEGAL. The existence of copper ores has been reported from various points along the Senegal river, but no mines have been developed.

SUDAN. Prospecting has been done in various parts of the Anglo-Egyptian Sudan, but nothing of importance found, though there is believed to be copper in the Suakin district. The only producing copper mine is the Hofret-el-Nahas, in southwest Kordofan, where mining and smelting are conducted on a primitive scale, to secure copper used for purely local consumption.

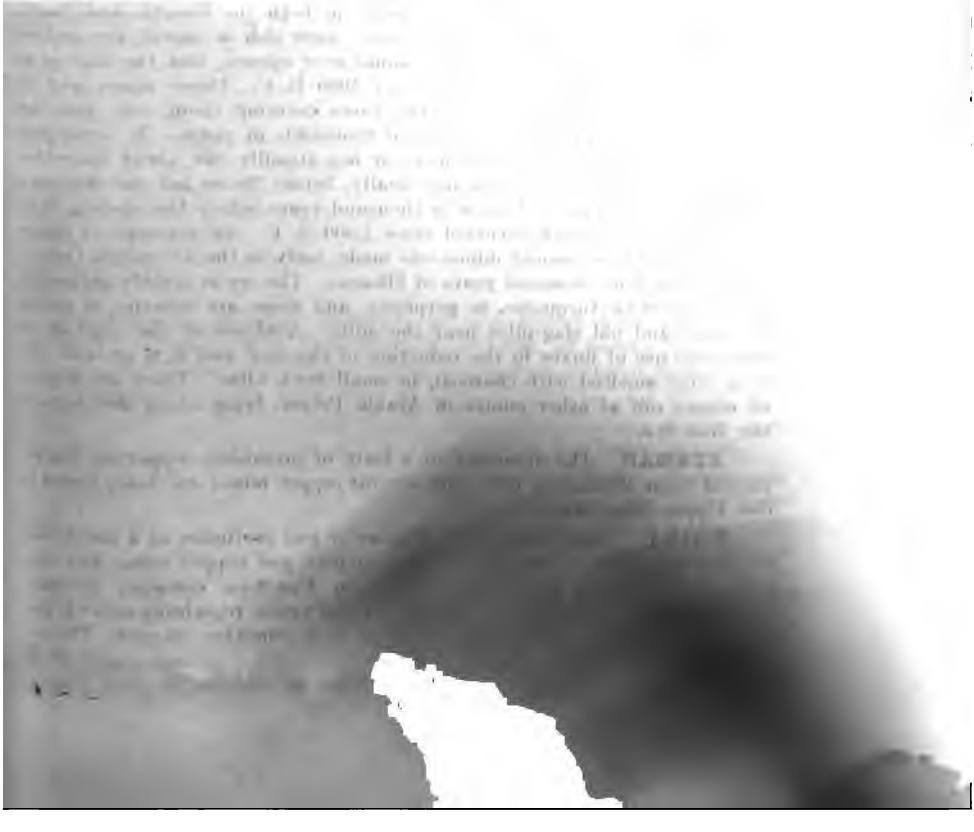
TRANSVAAL. Apparently copper was worked to some extent by the ancients, and there are numerous remains of prehistoric diggings, especially near the Messina mines, in the Zoutpansberg district of northern Transvaal. There has been considerable activity in copper development and even greater activity in the formation of small local mining syndicates since 1905. Copper ores occur in the districts of Lydenburg, Middelburg, Potchefstroom, Pretoria, Rustenburg, Waterburg, Zeerust and Zoutpansberg.

The most promising copper developments are n[ear] mines, near the Limpopo river, in the Zoutpansberg [district], numerous smaller developments, on which a little [work] this district. Work is under way at Barberton and [other]

burg district, and there is a copper belt, on which a number of explorations are being made, near the Olifants River, about 45 miles northeast of Pretoria. Some of the copper prospects of the Transvaal are of promise.

TUNIS. Copper ore exists at various points in Tunis, occurring mainly as oxidized ores in small bodies, and tetrahedrite, frequently rich in silver, these ores being found mainly in limestone, with ochrous iron gangue. Mines have been worked at Chouichia for some time, the production, which is small, being shipped to Europe, as a matte of 35 to 50 per cent. copper tenor. On the little island of Galita, off the northern coast of Tunis, a small mine has been opened on a vein of about 3 feet width, traversing diorite. The ore is mainly chalcopyrite, averaging about 5 per cent. copper and the vein is traceable for several hundred meters. There are several parallel veins, one of which, slightly developed, shows carbonate ores giving average assays of about 12 per cent. copper.

UGANDA. The British protectorate of Uganda, in Central Africa, near Lake Tanganyika, has copper ores in the Central Province, but apparently no serious attempt has been made at development, transportation facilities being poor.



CHAPTER XXI.

Copper Deposits of Asia.

The copper deposits of Asia are treated herein, by countries, in alph betical order, as in the preceding chapters.

AFGHANISTAN. The northern part of Afghanistan is said to be ri in copper, and in this section there are small local mines, worked by o methods for some centuries. The copper deposits are considered valuabl but the government refuses to grant either railroad or mining concessio to foreigners, and will not allow a white man to take up permanent re dence in the country, hence until the present policy is changed there c be no copper developments of importance.

ANNAM. Copper ores are known to occur at various points in t province of Quang-Nam, but nothing has been done in the way of mode mining.

ARABIA. The ancient Egyptians mined both copper and turquoise Maghara, in the Sinaï Peninsula, and it is evident, from old inscriptio that copper was smelted at that point in both the Fourth and Twelf Dynasties. These mines evidently never were rich in metal, but probab were among the very first copper mines ever opened, and the date of t first mining probably is as remote as 5000 B. C. These mines were t cause of various wars between the races coveting them, but were he mainly by the Egyptians, for several thousands of years. It seems pro able that after being worked, more or less steadily, for about three tho sand years, they were abandoned finally, before Moses led the children Israel out of Egypt, and about a thousand years before the opening of t Rio Tinto mine which occurred circa 1,000 B. C. An attempt at reop ing some of these ancient mines was made, early in the Twentieth Centu after about four thousand years of idleness. The ore is mainly chrysocol associated with turquoise, in porphyry, and there are remains of ancie furnaces and old slag-piles near the adits. Analyses of the slags do n show the use of fluxes in the reduction of the ores, and it is probable th they were smelted with charcoal, in small brick kilns. There are depos of copper ore at other points in Arabia Petrea, lying along the shores the Red Sea.

BURMAH. The discovery of a body of promising copper ore was r ported from Mimbu, in 1906, and several copper mines are being opened the Upper Shan states.

CHINA. Copper ores occur in more or less profusion at a considera number of points in the vast Chinese empire, and copper mines have be worked in several provinces, notably in Yun-Nan, certainly for ma centuries, and probably for several thousand years, remaining active to t day, the ores being mined and smelted in a primitive manner. The p duction of the empire is estimated at five million pounds yearly, all which is required for domestic consumption, in addition to [illegible]

Owing to the existence of vast coal measures of prime quality, and a large and steady supply of efficient and tractable labor, the development of copper mining and smelting, when once begun in earnest, along modern lines, should be rapid, and China should become, during the second or third decade of the Twentieth Century, an important producer of the metal.

A few mines, operated in a primitive manner, with correspondingly small production, are found at San-Kia-Tschang, in the province of Ho-Nan.

In the province of Hupeh, near Ichang, there are large beds of cupriferous shale, containing disseminated ores of low average tenor.

There are deposits of copper ore at various points in the province of Kwang-Si, with a few small mines developed along primitive lines.

There are copper mines in the province of Kwei-Chau, in southern China, of considerable antiquity, as evidenced by extensive slags resulting from old smelting operations. The ore bodies of Kwei-Chau resemble those of Yun-Nan.

The mountains of Manchuria contain promising deposits of copper, at several points, and some of these have been worked by natives, in a small way, along very crude lines. The most modern mining and smelting plant in the Chinese empire is found near Kaya, this having been installed early in the Twentieth Century.

Copper deposits and small copper mines are found at several points in the province of Shan-Tung, and this province is believed to be rich in minerals.

A limited copper production is secured from a few small and ancient mines in the province of Sze-Chuan, where the metal is extracted mainly from low grade cupriferous sandstones.

The province of Yun-Nan has the principal copper mines of China, and furnishes the moiety of Chinese copper production, the annual ouput of the mines of Yun-Nan being estimated at one to two thousand tons of fine copper. The copper mines of northeastern Yun-Nan have been exploited for many centuries, and in the aggregate their production is by no means trivial. The ores are mainly sulphide, and are slightly auriferous and argentiferous. The principal centre of copper mining and smelting is at Tung-Chau.

FEDERATED MALAY STATES. In this British protectorate there are copper deposits, some apparently of promise, at several points, but these remain undeveloped, mining efforts having been centered upon tin.

FORMOSA. Copper ores exist at various points on this island, now held by Japan. In the Kinkwaseki gold mines, in the Keelung district, copper ores have been discovered, and their exploitation was begun in 1906.

INDIA. The beginnings of the copper industry of India antedate reliable historical records, but it is known that copper ores have been mined and smelted for a score or more of centuries. India was a considerable producer of copper during the middle ages, and up to about the middle of the Eighteenth Century, after which the output fell off slowly, and has dwindled to merely trivial figures. During the first half of the Eighteenth Century India shipped large quantities of copper to Europe, but in the latter half of that century the current was reversed, and the Indian imports of

copper for 1901 were 7,998 long tons, and at present must range in the neighborhood of 10,000 long tons yearly.

In Bengal there are old copper mines at various points. The last active mining was done from 1887 to 1891, at Baragunda, Hazaribagh, but proved unprofitable, all ore being carted 24 miles to a smelter at Giridhi. The ore occurs as chalcopyrite running 1 to 3 per cent. copper, with gangue of country rock, in mica schist. A single small pocket of ore discovered in the Singhboon district produced a small quantity of 13.5 per cent. ore in 1892, but additional pockets were not found. The Chota Nagpur mines approximately 150 miles from Calcutta, are in about the center of a cupriferous belt of about 75 miles length, showing numerous old workings, and paralleled by a railway. The extensive remains of former work evidence considerable activity, and a respectable production, at some time in the past.

Copper ore exists at various points in the Central Provinces, and a mine is being developed near Sleeminabad, 40 miles from Jubbulpore, in a formation of Silurian age showing dolomite, slate, quartzite and mica schist, folded and metamorphosed, with numerous porphyritic dykes, or occurring in the stratified rocks near the intrusive porphyries. The veins having well defined walls and average width of about 6 feet, have been traced by outcrops for nearly two miles. The ores are auriferous and argentiferous malachite and argentiferous tetrahedrite, giving assays up to 25 per cent. copper, 197 oz. silver and 15 dwts. gold per long ton. In 1901 twenty-five long tons of ore were mined in Rajputana, where chalcopyrite occurs disseminated through black Paleozoic slates. These deposits have been worked in a very small way for centuries.

In the Northwest Provinces copper ores of some promise are found in the Kumaon division, lying in the Himalayan region between Nepal and the Punjab, the Rai mine being the principal property. The ores of the Rai district occur in fissure veins showing gossan cappings, with the usual oxidized and sulphide ores, with quartz gangue, and occur at times as impregnations. Labor is plentiful, cheap and poor, and transportation facilities are inadequate, but the district is considered of some promise. In the division of Garhwal considerable copper mining has been done in the past, at Dhanpur and elsewhere. The Dhanpur deposits occur as bornite and chalcopyrite, in the joints of calcareous clay-slates, and in siliceous limestone, near igneous intrusives, the workable deposits occurring at the intersections of vertical and horizontal bedding and jointing planes, with quartz gangue.

At El Agur there is a stockwerk in quartzite, carrying carbonate ores, chalcopyrite and tetrahedrite, of an estimated average copper tenor of about 5 per cent., the zone being traceable for nearly fifty miles, and being worthy of careful study when adequate transportation facilities are furnished. Small pockets of rich ore have been found at various other points, but the uncertainty of these has not permitted continuously profitable mining.

JAPAN. Copper was discovered in Japan about the beginning of the Seventh Century, and until well toward the close of the Nineteenth Century, mining and smelting were done along primitive lines, the ore being reduced in clay pits, with charcoal for fuel. The first exports, other than

to China, were made in the Seventeenth Century, when the Dutch, who had a monopoly of Japanese foreign trade, exported seven hundred to twelve hundred tons of copper yearly for many years. In 1799 Japanese mines made about 2,800 long tons of fine copper, and in 1899 produced 27,560 tons, a tenfold increase, and the early years of the Twentieth Century have seen a steady gain in production. The modernization of mining and smelting methods was begun in the ninth decade of the last century, but beginning with the tenth decade progress was rapid, and all of the principal mines of the empire now have mining and smelting equipments of a most modern sort, and are managed with as great a degree of technical skill as can be found in any mining field of the world. Several of the largest copper mining companies of Japan have made a regular practice, for ten years or more, of sending their chiefs of departments around the world in search of information, and the benefits of such an unsually wide-awake policy are reflected in the increased outputs and greater profits of the best Japanese copper mines. Foreigners or foreign corporations cannot hold title to Japanese mines, but foreigners can become interested, as partners, with Japanese subjects, in mining properties. The mining industry, however, to all practical purposes, is exclusively in the hands of the Japanese, and likely to remain so.

Copper is much the most important metallic resource of Japan, and this country now holds fourth place among the copper producing countries of the world. The local consumption was about three thousand tons in 1899, and probably was about seven thousand long tons in 1906. Fully three-fourths of the copper produced is exported, this forming an important commercial resource of the empire.

Copper ores are widely spread, occurring on all of the principal islands, and showing nearly every variety of type. There are copper mines of importance in the provinces of Awa, Bingo, Bitchu, Bizen, Hida, Higo, Hyuga, Iwami, Iyo, Izumo, Kaga, Mimasaka, Mino, Nagato Rikuchu, Shimotsuke, Tosa, Ugo and Uzen. There are nearly two hundred copper mines, or mines in which copper is a factor of importance, of which about forty are mines making annual products of one hundred thousand to fifteen million pounds each, fifteen of the number exceeding an average annual production of one million pounds each, three of these making about half of the copper production of the empire. Ores are almost exclusively sulphides, though limited quantities of oxidized ores are noted, with occasional native copper.

The Ashio mine, in the province of Shimotsuke, is the largest copper mine of Japan. The veins are of wonderful profusion, being [illegible] in number, of which about thirty are worked, these [illegible] as synclines, being opposed, in pairs, the seven main [illegible] feet in width. A little melaconite and bornite [illegible] levels, but the principal values are in chalcopyrite, sphalerite, arsenopyrite and pyrite, with clay gouge.

The Kosaka mine, in the province of Rikuchu, [illegible] ern end of the main island of Japan. This [illegible] posedly exhausted, but now is the second largest [illegible] with prospects of becoming first. The ore is chiefly [illegible] sphalerite and pyrite, impregnating and [illegible]

ore bodies, five in number are of enormous size, the largest being 100 to 600 feet in thickness, of one-half mile known length, and proven by drill-holes to a depth of 1,700 feet.

The Besshi is a famous mine in the provinces of Iyo, island of Shikoku. The ore body is a vein of 4 to 30 feet width, with an average of 20 feet, developed for a length of about 6,000 feet, and occurs in alternating layers of chloritic and graphitic schist, each enveloped by a quartz schist known locally as "habu," with interstratification of piedmontite schist. Step-faults run nearly parallel, from east to west, giving throws of 10 to 20 feet, with occasional throws up to 60 feet. The ore is chalcopyrite, disseminated in pyrite, averaging about 4.5 per cent. copper.

Further details of the geography and geology of Japanese ore deposits are given in the detailed descriptions of the various mines.

KOREA. Copper ores are noted at a number of points in the northern and southern parts of the Korean peninsula, but have been found only rarely in the central part. Copper had been mined by natives for some centuries, the product being utilized in the making of household utensils. By Korean law mineral deposits are the property of the crown, hence it is altogether probable that mines will be developed mainly by the Japanese. The production of copper in 1903 was estimated at 280 tons.

The Kap San mine, in the province of Hamgyeng, is the principal property, and is under development by the Japanese firm of Mitsui & Co. Another property of some promise is the Chhyang-Uŏn mine, about one *ri* north of Chhyang-Uŏn, which was opened about 1885 by the Korean throne, and was transferred to Japanese control in 1893, and worked until 1905, when the rich ores were exhausted and the mine closed down. There also are old mines, opened early in the Nineteenth Century, but worked until 1904, at Hu-Chhyang and Sin-Tyŏn.

PERSIA. The empire of Persia is known to be rich in copper, and there are small mines, many of them very old, from which copper ores are mined and smelted, in an exceedingly crude way, the small production being sufficient merely for the limited domestic demand. Until there are better transportation facilities, and foreign capital is enlisted, the copper mines of Persia are not likely to become producers of international importance.

There are primitive copper mines south of Kerman, but these lack facilities for economical transport. At Seman the deposits consist of disseminations and veinlets of oxidized ore in clay-slate, with an estimated average tenor of about 3 per cent. copper. There also are small copper mines at Sabzwar and in the Turbat district, worked on primitive lines.

SIAM. Copper ores were worked at several points by natives until the early years of the reign of the predecessor of King Chulalongkorn, but there is no present production, though copper deposits of more or less promise are found at a number of points, notably, in the mountain ranges along the valley of the Menam river. Outcrops of copper ore are noted frequently along the railroad line leading to Korat, with rather extensive remains of ancient workings, where a little prospecting was done, and some ore found, by a Danish syndicate, circa 1901.

SIBERIA. The extent of Siberia is so great, the lack of transportation facilities so utter, except in a narrow stretch along the Trans-Siberian railroad, and the country is so thinly populated and so new, with the attendant lack of capital, found in all new countries, that it is scarcely to be wondered at that only a beginning has been made in the development of the undeniably extensive and valuable copper measures. The principal copper mines are found in the governments of Semipalatinsk and Akmolinsk. There are two small producers in the Russian Altai, and other small producers nearer the city of Semipalatinsk, the largest making about two million pounds of copper yearly. The output of the Altai mines, in 1903, was only 228 long tons of fine copper.

In the government of Akmolinsk, in the Kirghiz Steppe, there is one highly promising mine, known as the Spassky or Yuspenssky, where considerable production has been secured in the past, along very crude and wasteful lines. This property is now in the hands of an Anglo-French company, but is hampered by lack of rail transport. There are other properties of promise in the government of Akmolinsk.

In the government of Krasnojarsk, in central Siberia, next east of Semipalatinsk, there are copper deposits, apparently large and promising, extending from near the line of the Trans-Siberian railroad to the Altai Mountains.

There are copper deposits of uncertain size and tenor in the vicinity of the city of Tomsk, in the province of that name, lying next north of Semipalatinsk, and to the northward of the Trans-Siberian railroad.

In the Trans-Baikal province, east of Lake Baikal, there are several copper deposits said to be of considerable promise. One of these is in the basin of the Chida river, where native copper occurs in masses ranging up to several pounds in weight, in amygdaloidal melaphyrs, under conditions somewhat similar to the occurrence of native copper in the Lake Superior district.

There are copper deposits, considered promising, in the northern province of Yeniseisk, and it is probable that copper ores exist also in the province of Irkutsk, and very likely in practically all of the other Siberian provinces.

THIBET. Copper is mined and worked in a small way and a primitive manner in southeastern Thibet, but the extent and promise of the copper measures are undetermined.

TONQUIN. Copper mines are found in the provinces of Son-Tay, Lang-Son and Lao-Kay, near the frontier of the Chinese province of Yun Nan, and, like the mines of Yun-Nan, these have been worked in a primitive way for centuries, but never have become as important as those near the Chinese border. Various concessions have been granted for the exploration of copper deposits in Tonquin, but no producing mines have resulted therefrom as yet.

TURKESTAN. There are a number of small copper mines in Turkestan, the largest being the Karankuski, near Tashkent, and since the occupation of Turkestan by Russia there has been renewed interest in copper operations. A small smelter was built in 1903, on the shore of the Syr Daria river, at the foot of the Supetau Mountains, and new ex-

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producer of copper to some extent. The first smelter was built in 1851 at Port Adelaide, and the second at Wallaroo in 1861. There are about 500 mines, or attempts at mines, in South Australia, of which about 25 have been developed to an important extent. The principal mines are in the counties of Adelaide, Burra and Daly, with other mines of less importance in the counties of Flinders, Light and Robe, and in the Northern Territories.

The Wallaroo and Moonta mines, in Daly county, on the Yorke Peninsula, much the most important producers of the state, are old mines, dating from 1863. The country rock is porphyritic and ores are mainly sulphide, though the usual oxidized ores, including a considerable percentage of atacamite, occur in the upper workings, with a barren zone of 50 to 125 feet between the oxidized ores and chalcopyrite.

In the Kapunda district, about 50 miles north of Adelaide, where the first copper discoveries were made, the ores are mainly oxides and carbonates, with an appreciable amount of native copper. In the Burra Burra district, about 125 miles northeast of Adelaide, the predominant rocks are limestone and shale, carrying very irregular deposits of secondary ore, with increased regularity in vein formation noted at considerable depth. The promise offered by various cupriferous fields of this state would seem to justify a much larger copper production than has been secured as yet.

TASMANIA. Copper production on an important scale dates from the opening of the Mount Lyell mine, in 1896, and this remains the only important producer of the state. All of the copper fields under exploration or now producing are in the northwestern corner of the island, in the counties of Montagu, Russell and Wellington.

The Mount Lyell district, in Montagu county, is the only developed field of the state. Rainfall is heavy and the topography of the district is rugged. The principal ore bodies now exploited occur as mammoth lenses of pyritic ore, mainly chalcopyrite, with occasional bornite, disseminated through [illegible], occurring in conglomerate and quartzite, associated with mica schist. [illegible] limited amount of chalcocite, and a little native copper, are shown at [illegible] properties, but the production is almost exclusively from low-grade [illegible]minated sulphide ores, though [illegible] mine is working on native copper. [illegible]onsiderable prospecting [illegible] done on Mount Darwin and Mount [illegible] adjoining peaks known [illegible] field. In the North [illegible] field some prospecting [illegible] considerable ore shown; [illegible] mainly of low grade [illegible]

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Superior district. Work at this point was suspended because of lack of rai transport. There are copper mines in the counties of Beaconsfield, Bowen Cardwell, Clermont, Cook, Gilbert, Lynd, Merivale and Palmerston, an occurrences of copper minerals at other points.

The Herberton district is the third largest producer of the state an includes the Chillagoe sub-district. This is a field of considerable promise and was the largest copper producer of the state previous to the develop ment of the copper measures of the Mount Morgan field. The Chillago district covers about ninety square miles, with smaller subsidiary district adjoining. Copper and lead occur in conjunction with garnet and wollaston ite, usually at or near the point of contact of Carboniferous limestone wit granite-porphyry, the latter being much decomposed. The ore bodies var greatly as to size and dip, ore occurring mainly as irregular segregation and being very bunchy. The existence of ore deposits without regular walls is a feature typical of this field. The surface ores as a rule are de cidedly rich.

The Mount Perry district, in Bowen county, near the coast of southern Queensland, is a field of considerable importance. The predominant rock form is granite, and the fissure veins therein are mineralized only for portions of their width, the rich paystreaks averaging under one foot as a rule. Ore values have disappeared with depth in some cases, but in others have held to at least 800 feet. The ores are highly silicious and the gossans are both auriferous and argentiferous as a rule.

The change at depth of the Mount Morgan mine, in the Mount Morgan field, from a big gold mine to a big copper mine, is referred to in detail in the description of that mine.

The Stanthorpe field is an old district of considerable promise, but is now a small producer only.

The Tenningering district is fourth in the state in point of production, and has several properties of promise.

The Glassford Creek district is a new and promising field, with active development work under way at several properties.

The Cloncurry field, in northern Queensland, shows copper deposits at various points over a district about 75 miles from east to west and about 150 miles from north to south, the center of this district lying about 150 miles south of the Gulf of Carpentaria. The climate is hot and wood supply inadequate, with shortage of water at some points. Ore bodies are numerous and rich, but narrow, though showing good outcrops, and are said by Thos. Gibb to present the appearance of bedded deposits rather than of fissure veins. There also are occasional veins of greater width, but not outcropping so prominently, these carrying a gangue of kaolin, and the slate walls are impregnated with pyritic ore. Indications point to deposits of low grade sulphides at depth, and some of the oxidized ores are considered amenable to cheap leaching processes. Mining and smelting have been hampered by lack of cheap transportation, but a railroad to connect Cloncurry with the port of Townsville, to be in operation about 1908, should greatly stimulate mining and smelting developments.

SOUTH AUSTRALIA. The Kapunda mine was found in 1842, a decade before the discovery of gold, and in 1845 the Burra Burra mine began production, since which time South Australia has been a regular

producer of copper to some extent. The first smelter was built in 1851 at Port Adelaide, and the second at Wallaroo in 1861. There are about 500 mines, or attempts at mines, in South Australia, of which about 25 have been developed to an important extent. The principal mines are in the counties of Adelaide, Burra and Daly, with other mines of less importance in the counties of Flinders, Light and Robe, and in the Northern Territories.

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Considerable prospecting has been done on Mount Darwin and Mount Jukes, adjoining peaks known as the Darwin and Jukes field. In the North Dundas field some prospecting has been done, and considerable ore shown; this being mainly of low grade.

VICTORIA. The principal copper field of this state, so far as er judged from the very limited amount of work done, is the Beechwort trict, where outcrops of ore have been noted at a number of point area of about 50 square miles. Total production of copper ore f the mines of Victoria, to the end of 1905, was only 17,470 long tons at £206,895. Prospecting was resumed, on a small scale, in 1907.

WESTERN AUSTRALIA. Copper ore was discovered in th ampton district as early as 1842, and the first production was 1855, but no large copper industry has been built up, though a small mines, near the coast, were worked in the eighth and nin of the Nineteenth Century. Production has been secured ma selected ores, gained by hand-dressing, shipped to distant s

reduction, and, of course, only high grade ores can afford a profit under such circumstances. Production in 1906 was 7,430 long tons of ore, valued at £50,237, and 296 men were employed in the industry that year. A copper smelter erected by the state has been sold to a private company, with the proviso that custom smelting be done for all comers at reasonable rates, and it is possible that the building of this smelter may mark the beginning of a substantial industry, as Western Australia is by no means devoid of copper deposits of promise. The principal copper fields of the state are in the districts of Ashburton, Champion Bay, Mount Margaret, Mount Morgans, Murchison, Northampton, Phillips River and Pilbarra.

The Mount Margaret goldfield of the Mount Morgans district is much the largest producer, having mined 4,361 long tons of ore, valued at £21,934 in 1906, and the smelter now in operation in this district should stimulate development and production.

The Murchison goldfield has several properties of promise, but the production of 1906 was only 133 long tons of ore.

The Phillips River goldfield, in the extreme southern part of the state, was the only copper producer in 1905, and in 1906 shipped 2,885 long tons of selected ore. The principal ores of this district, as mined, are malachite and chalcocite, giving average assays of 31.48 per cent. copper, 2.16 oz. silver and 0.15 oz. gold per long ton.

The Pilbarra goldfield has copper ore deposits of promise, but these have been idle for several years. In the West Pilbarra district the ore occurs in bodies of considerable size, as oxides and carbonates of high grade, in schistose slate adjoining an igneous intrusive.

NEW ZEALAND. Copper was discovered in 1842 on Kawau Island, and copper mines were opened and worked on Kawau and Great Barrier Islands, circa 1865. A copper property at Nelson, opened about 1880, had a smelter, but none of these mines were successful. Ore has been found at Omaunu, in Whangaroa county. The production of copper ore from 1853 to 1904, inclusive, was valued at £18,211. One copper property was under development at last accounts.

CHAPTER XXIII.

Copper Deposits of Oceanica.

The copper deposits of this grand division are treated under the names of the various islands in which they occur, in alphabetical order, no atempt being made to group the holdings of the various great powers.

BORNEO. Copper ores and other minerals are noted at several points in the northern part of the island, but these remain undeveloped.

CELEBES. A Dutch company has done some development work in the Pagoeat district, south of Palehleh, in the northern part of the island, where the ore occurs as sulphide impregnations in slate. In the same general district, about ten miles west of Somalata, on Demerki Bay, a brecciated vein carries about 20 per cent. of slightly auriferous and argentiferous sulphides in the form of chalcopyrite, sphalerite, galena and pyrite.

JAVA. Pospecting work during 1903, in the Poelonz district, near Soerabaia, exposed a large mineral body carrying fair values in auriferous and argentiferous chalcopyrite, sphalerite and galena. The vein is about two meters in average width, opened by several shallow shafts and 223 meters of tunnels, the ores shown assaying from 0.9 to 5.25 per cent. in copper tenor.

In the Gunong Kendeng district there are springs carrying copper iodides in solution, and from these thermal waters crude iodide of copper is secured by evaporation, the production amounting to 2,346 kilograms in 1899.

NEW CALEDONIA. More or less copper production was secured from the mines of New Caledonia during the last quarter of the Nineteenth Century, but the mines have been practically idle since 1902, when the output was 3,721 metric tons of copper ore, the greatest production having been 6,349 metric tons, valued at f492,310, in 1899.

There are copper mines in the districts of Bonde, Diahot and Noumea, in the northern part of the island, ore occurrences being noted in the valleys of Diahot, Nebeue and Koumac. The ore occurs as lenses in talcose and chloritic schists, and as stockwerks, the oxidized ores near surface carrying 2 to 4 grams gold per metric ton, while the sulphide ores, mainly chalcopyrite at depth, give considerable silver, this ranging up to 200 to 400 grams per ton from selected ores.

NEW GUINEA. Copper deposits are being exploited in the Astrolabe Mountain range, on the Laloki River, about 15 miles from Port Moresby, in the British portion of New Guinea. The stratified beds are mainl limestone, with occasional sandstone and shale and a few conglomerat tuffs, with diabase intrusions, the district somewhat resembling the Mount Lyell field of Tasmania. A shipment of 17 tons of selected ore, in 1906, gave returns of 26.8 to 32 per cent. copper, with traces of gold.

PHILIPPINES. Copper ores occur in the islands of Luzon, Mindana Mindoro, Masbate and Panay, and their occurrence is reported, thou not verified, from the island of Balabac, in the Paragua group. Nati copper is said to occur in stream-copper gravels, in addition to lode depo its. Apparently the Philippines contain considerable copper deposits, a are likely to become a producing field of some importance, eventually.

In the island of Luzon there are occurrences of copper ore in the provi ces of Batangas, Benguet, Camarines Norte, Lepanto and Tayabas. Mu the most important copper measures of the island occur in the province Lepanto, where natives were mining and smelting copper ores before t Philippines were discovered by Magellan. The Mancayan mines we worked by Igorrotes before the Spanish conquest, and their metallurgy w suprisingly good. The processes of reduction consisted of alternate roasti and matting, with eventual production of ingots of good quality, and t methods presumably were derived from Japanese or Chinese sources. addition to supplying their own needs, the Igorrotes exported about twen tons of manufactured copper yearly, leading to an invasion by the Spa ish, ending in the organization of the Cantabro-Filipino mining compan by which the Spanish and natives joined forces, and two mines were work extensively from 1864 to 1874, with an average yearly production stated have been about 1,100 tons, work ending with the death of Don José Mar Santos, an exceptionally able man, who had been in charge of the wor Since 1874 the small production has been secured by natives only, alo crude lines, but important development work is under way by sever companies, notably one composed of American and English capitalist who plan building a railroad from Mancayan to a seaport on the weste side of the island. The Mancayan and Suyoc districts, in the southern pa of Lepanto, are but a few miles apart. The Mancayan ores are said average about 16 per cent. copper, and in the Suyoc district there a several deposits of auriferous tetrahedrite, tennantite and enargite, assay ing 9.7 to 32.9 per cent. copper and 85 cents to $4.75 gold, per short to Chalcopyrite is known to exist in the Bontoc district. In the province Batangas copper ores occur in the Loboo Mountains, in veins of 6 inch to 2 feet width, carrying oxidized ores, secondary sulphides and chalcop rite, all auriferous and argentiferous, with quartz gangue. In the pro ince of Benguet, Luzon, promising copper ores are noted on the Buld Riv In the province of Camarines Norte, in the southern part of Luzon, ther are occurrences of copper ore apparently worthy of investigation. In t Pangasinan district, at Salasa, 10 miles west of Dagupan, auriferous copp deposits are worked to a very slight extent. Copper ore is reported al from the province of Tayabas, in the island of Luzon.

Samples of native copper have come from the island of Masbate, b attempts at mining seem to have proven unsuccessful.

In the island of Mindanao copper ores are noted in the province Surigao, and mines have been worked by Moros and Chinese, in a cru way. A German company did some mining, going to the point of build ing a small smelter, but did not meet with success.

In the island of Mindoro occurrences of copper ore, apparently a chalcopyrite, are reported from various points.

Carbonate ores of good tenor have been secured in the province of Antigue, in the island of Panay.

SOLOMON ISLANDS. In this British protectorate copper is believed to exist on several islands, and some prospecting was done in 1901, and a little ore was found on the island of Rendova, but nothing came of the discovery.

CHAPTER XXIV.

Copper Mines of the World.

As in the six preceding annual editions of this work, the detailed descri tions of copper mines and companies given in this chapter are printed in alph betical order, regardless of location. This plan, though having some obvio disadvantages, is found, upon the whole, the best of any tried or suggested, it renders the work fully self-indexing. In actual practice the plan is not alwa easy to carry out, owing to the large number of duplicate names, and for vario other reasons as well. The definite article has been omitted from all titles English and German, but could not well be omitted from Spanish and Fren titles. In cases where the Spanish or French articles are used, the descriptio have been filed upon the name of the mine rather than the article, except th in the case of American or English companies having Spanish titles, the fili has been done upon the article, whether La, Las, Los or El. This plan of inde ing may seem somewhat awkward, but the difficulties encountered in deali with titles in many different languages, each with its own individual idion are by no means inconsiderable.

There are about 9,000 titles given in the present chapter, as against or 256 titles in Volume I, the first edition of the book.

AAI MINING & MILLING CO. IDAH

Mine office: Lewiston, Nez Perce Co., Idaho. A. B. Williams, manag Lands, 8 claims, at Wild Goose Rapids, on Snake River, 35 miles above Lew ton, developed by a 400′ tunnel, planned to cut, at 1,100′ from portal, the ma vein, showing auriferous and argentiferous copper ore, said to give avera assays of $24 per ton. Mine had several cars of smelting ore on the dum early 1909. Presumably idle.

SOCIÉTÉ ANONYME DES MINES DE CUIVRE DU AALEN. NORWA

Office: Theodore Verstraete, Gand, Belgium. Mine office: Engsvo Aalen, Trondhjem, Norway. Nöerk Olsen, superintendent and engineer. Ca italization, 200,000 kroner. Property includes the Störhogd grube, carryi cupriferous pyrite, at Aalen, and the Sjöla grube at Klaebu. Production, 19 was 287 metric tons cupriferous pyrite.

AAMDAL COPPER MINES SYNDICATE, LTD. NORWA

Dead. Property was sold and company wound up, circa 1903. Former at Mo, Telemarken, Christiansand, Norway.

AAMDAL MINE. NORWA

Owned by Telemarker Copper Mining & Smelting Co., Ltd.

ABBEY MINING CO. NEW MEXIC

Office: 1007 Bessemer Bldg., Pittsburg, Pa. Mine office: Socorro, S corro Co., N. M. Nelson Weddle, Jr., president; Earl A. Wheeler, vice-pre dent; H. A. Spangler, treasurer; J. F. Hinckley, secretary; Nathan Hall, gene manager. Organized December, 1901, under laws of New Mexico, with cap talization $1,000,000, shares $1 par. Lands, 19 claims, area 380 acres. T Abbey group, 22 miles north of Magdalena, shows 2 parallel veins with abo 600′ of workings, carrying ore assaying up to 40% copper and 80 oz. silver p ton. The Washington group, circa 10 miles west of Upham, has a 165′ sha idle some years and apparently moribund.

BBOT CREEK GOLD & COPPER MINING CO. **NORTH CAROLINA.**

Office: Portsmouth, Va. Letter returned unclaimed from former mine ffice, Lexington, Davidson Co., N. C. W. J. Brent, manager, at last accounts. lain shaft, 80′, is in a vein carrying copper and gold, said to give average assay alues of about $15 per ton. Equipment includes a concentrator and mill ith Tremain stamps and crusher. Idle and apparently moribund.

BERDEEN COPPER CO. **NEW MEXICO.**

Dead. Formerly at Lordsburg, Grant Co., N. M. Fully described Vol. V.

BERDEEN MINE. **NEW MEXICO.**

Owned by Penn Mining Co.

BERFOYLE COPPER MINING CO., LTD. **AUSTRALIA.**

Mine office: Armidale, Drake Co., N. S. W., Australia. Organized 1907, nder laws of New South Wales, with capitalization £15,000, shares £1 par. ands, 160 acres, 35 miles from Armidale, on the Aberfoyle River, in the New ngland district, showing a 4′ vein carrying sulphide ore of about 17% average opper tenor. Presumably idle.

INA LA ABUNDANCIA. **PORTO RICO.**

Letter returned unclaimed fron former mine office, Rio Blanco, Porto Rico. line, opened 1869, produced a small quantity of rich oxidised ores from a paytreak of 8″ to 15″, carrying bornite and chalcopyrite averaging 10 to 12% copper, n a vein of cupriferous pyrrhotite of 6′ to 10′ width. Idle many years.

CARI COPPER MINING SYNDICATE, LTD. **PERÚ.**

Dead. Formerly at Acari, Camaná, Arequipa, Perú.

CCIDENTAL MINING & MILLING CO. **COLORADO.**

Dead. Formerly at Granite, Chaffee Co., Colo. Described Vol. VI.

CE MINE. **AUSTRALIA.**

Mine office: Beaconsfield, Kennedy Co., N. S. W., Australia. A. H. Dight, wner. Property shows outcrops of iron gossan estimated to carry 1 to 2.5% opper, traceable for about 1,000′. Underlying the gossan is a vein of 3′ to 6′ ridth, developed by a 231′ main shaft, on the underlay, with levels opened at 70′, 220′ and 270′, the vein at the bottom of the mine being only 18″ wide, with paystreak of 6″ to 8″, remainder of vein being pyrite, estimated to carry 1.5% opper. There are oxide and carbonate ores and gray copper ore on the 170′ evel, with native copper and secondary suphides on the 220′ level, and chalocite and chalcopyrite in the paystreak on the 270′ level, good ores being estinated to carry an average of about 15 dwts. silver per ton, with a trace of gold. At last accounts management planned building a smelter when sufficient ore was developed. Presumably idle.

SOCIÉTÉ ANONYME DES MINES DE CUIVRES DE ACHAICHES. **ALGERIA.**

Office: Rue Godot-de-Mauroi, Paris, France. Mine office: El Miliah, Philippeville, Constantine, Algeria. V. Bargas, J. Delury, A. Warin and T. Warin, directors. Organized Oct. 27, 1906, under laws of France, with capialization f1,000,000, shares f100 par. Mine, 36 kilometers from Collo, has halcopyrite and cupriferous pyrite in schist. A smelter, installed 1907, has a 50-ton water-jacket blast-furnace. Under former ownership, 1905, mine employed 47 men.

C. F. ACKERMANN. **PERÚ.**

Mine office: Islay, Camaná, Arequipa, Perú. Property is the Victoria mine, situated on the railroad line near Mollendo, showing ore of 6 to 10% average copper tenor, with some gold values, in quartz gangue. Mine is well located for shipping.

ACME CONSOLIDATED GOLD & COPPER MINING CO. **WYOMING.**

Office: P. O. Box 2486, Boston, Mass. Mine office: Laramie, Albany Co., Wyo. Otto Gramm, president; L. W. Thompson, vice-president; Arthur S. Howe, secretary and treasurer. Organized May 16, 1905, under laws of

Maine, with capitalisation $1,000,000, shares $1 par. Is a securities-hold corporation, controlling, through stock ownership, the Acme Gold & Cop Mining Co.; also owns considerable timber, and town lots at Laramie and C tennial, Wyo.

ACME COPPER MINING CO. COLORAI

Mine office: Copperfield, Frémont Co., Colo. John M. Glidden, sup intendent. Property is a prospect, on which development work was in progr with a small force at last accounts.

ACME GOLD & COPPER MINING CO. WYOMI

Office: 7 Congress St., Boston, Mass. Letter returned unclaimed fr former mine office, Laramie, Albany Co., Wyo. L. W. Thompson, preside Fred A. Miller, vice-president; Arthur S. Howe, secretary and treasurer. C italization $400,000, shares $4 par. Is controlled, through stock ownership, Acme Consolidated Gold & Copper Mining Co.

Lands, 20 claims, 12 patented, area reported by company as 514 acres, a 60-acre millsite. Property, known as the Gold Hill group, has 2,454′ of wo ings. Improvements include necessary mine buildings, sawmill and sta mill. Idle several years, but management hopes to resume work 1911.

ACME MINING & MILLING CO. COLORAI

Dead. Property adjoined the Queen-Princess group of the Copperf Consolidated Mining Co., and possibly was merged in that concern. Ha 50′ shaft, originally planned to be sunk 800′. Formerly at Cotopaxi, Frém Co., Colo.

ACME MINING & REDUCTION CO. ARIZO

Office and mine: 108 West Pennington St., Tucson, Pima Co., Aris. H. Pilling, president; Adolph Bail, vice-president; Chas. F. Slack, treasu Chas. W. Lewis, secretary; Lyman Bridges, manager; L. W. Waer, mine sup intendent; preceding officers and R. E. Stevens, directors; Benton Dick, resid agent; Arizona National Bank, Tucson, depository. Organised 1907, un laws of Arizona, with capitalization $1,000,000, shares $10 par.

Lands, 24 claims, unpatented, known as the Acme group, including 6 cla carrying gold, silver and lead ores, also 6 placer claims, giving total area of acres, in the Amole district, 12 miles from Tucson. Property is claimed to h ore bodies of 40′ to 150′ width, carrying auriferous and argentiferous copper iron sulphides giving assays of 2 to 38% copper, 2 to 6 oz. silver and $1.40 to gold per ton.

ADA COPPER MINING CO. MONTA

Mine office: Basin, Jefferson Co., Mont. Jas. B. White, manager. ganised 1904, under laws of Montana. Property is the Ada mine and adjoin claims, carrying gold, silver and copper. Idle and apparently moribund.

ADAKAI MINE. JAPA

Mine office: Adakai-mura, Yatsuka-gori, Isumo, Japan. Country ro are Tertiary shale and sandstone, alternating. Principal vein strikes NN Ores are bornite, chalcopyrite and pyrrhotite, accompanied by native cop and sphalerite, with clay gouge. Idle several years.

ADAMS COPPER CO. WYOMIN

Dead. Formerly at Saratoga, Carbon Co., Wyo.

ADAMS COPPER MINING & REFINING CO. COLORAD

Letter returned unclaimed from former office, 513 Cooper Bldg., Denv Colo. Operating office: 317 McCornick Bldg., Salt Lake City, Utah. Mi office: Steamboat Springs, Routt Co., Colo. Boyd R. Adams, president; B. Barnett, vice-president; W. F. McQuarrie, treasurer. Lands, 7 claims, havi a 200′ shaft, carrying ore said to average about 4% copper. Has steam pow Out of funds, idle several years and apparently moribund.

ADELAIDE STAR MINES, LTD. NEVAD

Office: 33 Renfield St., Glasgow, Scotland. Operating office: 3

McCornick Bldg., Salt Lake City, Utah. Mine office: Golconda, Humboldt Co., Nevada. P. Coats, chairman; A. P. S. Macquisten, managing director; preceding officers, R. M. Paterson, G. M. Reid and E. S. Coats, directors; D. M. Boyd, secretary; Glasgow & Western Exploration Co., Ltd., general managers; Otto Stahlman, manager; Martin Iverson, superintendent; Joseph Farren, mine superintendent.

Organized Apr. 21, 1897, under laws of Great Britain, with capitalization £350,000, shares £1 par, fully issued. Statement for year ending Oct. 31, 1908, submitted to shareholders Sept. 14, 1909, showed debit balance increased from £227,348 to £278,879.

Lands, 780 acres, including the Adelaide group of 13 claims, area 238 acres, 10 miles south of Golconda, and the Star group of 11 claims, area 220 acres, at Cherry Creek, White Pine Co., Nev., also a 170-acre millsite.

The Star mine is developed by shaft and tunnel to depth of 800′.

The Adelaide mine, opened to depth of 300′, with circa 3,000′ of workings, has a 300′ shaft, and in the upper levels carried native silver, the 200′ level showing a good body of medium grade auriferous and argentiferous copper ore, a carload mill-test returning $9.40 per ton. Vein is wide, carrying chalcopyrite, with gangue of garnetiferous limestone. Mine equipment includes a 200-h. p. steam plant, hoist and 2 air-compressors. A 12-mile narrow gauge railway connects the mine with the mill at Golconda.

The 100-ton reduction plant includes a 30-ton sampler and treats custom ores as well as company's own production. The mill uses the Macquisten flotation process of concentration, by which ore is first put through crushers, then through steel rolls, afterward through Huntington mills, then going to the Macquisten plant, which has 100 concentrator tubes, each 18″ in diameter and 6′ long, arranged side by side in 4 tiers. More than one-half of the tubes are immersed in water, and ore is carried through by endless screws, passing out of the tubes, at surface, into settling tanks below. Concentrates not caught in the first tier of tubes pass into the next set, and so on, the process being completed in the third set. It is stated by the company that this process gives good extraction from all sulphide ores, and is especially applicable to sulphides where the gangue is of nearly the same specific gravity as the mineral. The mill closed down early December, 1910.

The company also has a new 25-ton mill at Cherry Creek, Nev.

ADELINE MINES, LTD. **AUSTRALIA.**

Office: 50 Lime St., London, E. C., Eng. Mine office: Drake, Drake Co., N. S. W., Australia. G. Martin Inglis, chairman; preceding officers, José Zayas, Alfred A. Westby and Herbert W. Harper, directors; W. N. Redman, secretary. Organized Sept. 5, 1902, under laws of Great Britain, as a reconstruction of Adeline Syndicate, Ltd., with capitalization £100,000, shares £1 par; issued, £30,577, fully paid. Accounts for 3 years to end of 1907 showed a cash balance of £50.

Mine, bought for £3,000 cash and £20,000 in full-paid shares, was, for some years, until circa 1905, the largest copper producer of the New England district. Last recorded production, 1906, was 40 tons of ore, cobbed from old dumps, which returned £250 in copper and £121 in gold. Idle some years and apparently moribund.

ADELINE SYNDICATE, LTD. **AUSTRALIA.**

Dead. Was succeeded, Sept. 5, 1902, by Adeline Mines, Ltd. Formerly at Drake, Drake Co., N. S. W., Australia.

ADIRONDACK MINE. **MONTANA.**

Owned by North Butte Mining Co., at Butte, Silver Bow Co., Mont.

ADMIRAL GOLD & COPPER MINING CO. **NEW MEXICO.**

Office: Sterling, Kansas. Letter returned unclaimed from former mine office, Tusas, Rio Arriba Co., N. M. C. A. Cooper, president; W. M. Bisbee,

Chalmers heads, fitted with Parnall-Krause mortars having 11-16″ opening discharge screens, with two horizontal revolving screens having 5-16″ op ings for each head. The stamp pistons are automatically rotated, equali wear on the shoes. From the revolving screens of the heads crushed goes to the separator jigs, 24 for each head, or 72 for the mill, thence to finisher jigs. There are round slime-tables, 3 Overstrom and 3 Wilfley con trators, and Huntington mills for raggings. Rock-bins have a storage caps of 4,500 tons. Coal is delivered from trestles to boiler-rooms by grav through chutes. The pump is a 16,000,000 gallon Riedler, drawing its ply from Lake Superior through a tunnel extending 1,200′ under the l Miscellaneous improvements at the millsite include an office, smithy, mach shop, dwellings, etc. There is 8′ to 12′ of clear water offshore, permitting landing of cargoes, from scows, in good weather.

Production has been as follows: 23,572 lbs. in 1900; 29,361 lbs. in 1 606,211 lbs. in 1902; 2,182,608 lbs. in 1903; 1,380,480 lbs. in 1904; 1,606,208 in 1905; 1,552,628 lbs. in 1906; 1,244,874 lbs. in 1907, with no later product

AEOLIAN COPPER CONSOLIDATED MINING CO., LTD. IDA

Office and mine: Mullan, Shoshone Co., Idaho. Alfred Andrieux, pr dent and manager; F. Enjolras, vice-president; Clara H. Phipps, secretary; M guerite Andrieux, treasurer; preceding officers, G. E. Phipps and Alexis Cance directors; F. V. Phinney, consulting engineer. Capitalization $1,500,(shares $1 par.

Lands, 9 claims, 2 fractional, area circa 140 acres, fairly timbered, includ a millsite and water-right near the head of Deadman's Gulch, 3 miles fr Mullan, near the Lucky Calumet and west of the Snowstorm, supposedly ca ing the Snowstorm ore zone. Property shows 2 well defined veins in quart and porphyry, about 400′ apart, south vein being 10′ to 40′ and north vein 4 10′ wide. The north vein has given ores, from near surface, assaying up to 2 copper, with high values in native silver, and ore also has been secured assay up to 4% copper and $50 gold per ton. Development is by a 650′ tunnel, the long tunnel of the National mine passes through several claims.

Equipment includes a 24″ Pelton wheel, a 500′ flume of 8″ pipe from east fork of Deadman's Creek, and a 10x12″ single-stage air-compress Buildings include an engine-house, boarding-house and smithy.

AETNA GOLD & COPPER MINING CO. UTA

Dead. J. A. Kauffman was superintendent. Lands carried auriferc and argentiferous copper ores, on which development work, with a small for was done, circa 1904. Equipment included a small steam plant. Formerly Bingham Canyon, Salt Lake Co., Utah.

AETNA MINING CO. COLORAD

Dead. W. A. Covey was superintendent. Property, slightly develop showed argentiferous copper ore, and employed about 10 men, 1902. Forme at Bonanza, Saguache Co., Colo.

AETNA MINING CO. WYOMIN

Office: Merrill, Wis. Mine office: Riverside, Carbon Co., Wyo. H Julius Thielman, president; E. F. Hanf, secretary; Roger Daniel, superintende Organized under laws of Wyoming, with capitalization $1,000,000, shares $1 p

Lands, 7 claims, area 140 acres, in vicinity of Beaver Creek, circa 12 mi south of Encampment, having 4 ore bodies of 3′ to 6′ estimated width, occurri as fissure veins and as contact deposits between granite and quartzite. Mi has a 215′ shaft with upwards of 1,000′ of workings, drifts on the 100′ level sho ing 3 ore shoots assaying up to 15% copper and $8 to $28 gold per ton, ores i cluding chalcopyrite, bornite, covellite and chalocoite, carrying good gold valu Mine also has tunnels of 125′ and 380′. Equipment includes a 40-h. p. stea plant. Work was resumed October, 1909, after 5 years idleness. Proper considered promising.

FORTUNADA COPPER MINES, LTD. **SPAIN.**

Dead. Title was changed, 1903, to Rio Rimal Copper Co., Ltd. Formerly Figueras, Gerona, Spain.

FRICAN & AUSTRALIAN CO., LTD. **AUSTRALIA.**

Dead. Was liquidated, 1910, and property sold to Cuming, Smith & Co. roprietary, Ltd. Formerly at Eulaminna, Mount Margaret Goldfield, West-n Australia. Described Vol. VIII.

FRICAN COPPER DEVELOPMENT CO. **TRANSVAAL.**

Dead. Apparently was succeeded, circa 1907, by African Coppers, Ltd., lso dead. J. F. Davies was consulting engineer. Lands, in the Middelburg nd Pretoria districts, were slightly developed by shafts. Formerly at Middel-urg, Transvaal.

FRICAN COPPERS, LTD. **TRANSVAAL.**

Dead. Formerly at Middelburg, Transvaal. Described Vol. VIII.

AFRICAN NOBLE DUKE GOLD & COPPER MINING CO. **ARIZONA.**

Dead. Former office was at Kingston, N. Y. Geo. W. Vandermark was resident and Jos. Hughes, vice-president. Was organized, circa 1904, as a stockjobbing scheme, by Afro-Americans, to rob their fellow citizens, and 'blew up" circa 1905. Formerly at Bisbee, Cochise Co., Ariz.

AFRO-AMERICAN MINING & MILLING CO. **MONTANA.**

Dead. Formerly at Butte, Silver Bow Co., Mont. Described Vol. VIII.

AFTERTHOUGHT COPPER CO. **CALIFORNIA.**

Office: 400 Meridian Life Bldg., Indianapolis, Ind. Mine and works office: Ingot, Shasta Co., Cal. T. H. Adams, president; T. Walsh, vice-president; Cass Conway, secretary; O. E. Adams, treasurer; preceding officers and Geo. L. Porter, directors; S. E. Bretherton, general manager; John Bull, smelter superintendent.

Organized January, 1909, under laws of Arizona, with capitalization $8,000,000, shares $1 par, nonassessable, in $200,000 of 7% cumulative preferred stock and $7,800,000 common stock; issued, circa $4,200,000. Was organized as successor of Great Western Gold Co., and gave latter $4,000,000 worth of stock for property.

Lands, 19 claims, 18 patented, area 380 acres, with mill and smelter sites and timber lands giving total holdings of 1,704 acres. Lands include the Afterthought, Liberty, Last Chance, Section 16 and Bull groups, mines more or less developed being the Afterthought, Copper Hill and Copper Grand. Lands are on the east side belt, which extends from Ingot to DeLamar, and is entirely distinct from the copper belt on the west side of the Sacramento River. Lands show porphyry, slates and shales, carrying contact deposits with sulphide ores, there being 5 known ore bodies, of which 2 are under development, one being reported by company to be 160x500x35' in size.

The Afterthought mine, in the Furnaceville district, 20 miles east of Redding, had about 2,000' of workings when taken over by predecessor of present company, and now has shafts of 216' and 327', with 7 tunnels, main tunnel being about 2,500' long, with a total of 8,500' of workings, estimated by management to show 400,000 tons of ore, with 300,000 tons blocked out for stoping, ore being estimated to carry 2.7 to 3.4% copper, 10 to 43% zinc, a trace of lead, 6.4 oz. silver and 52 cents gold per ton. Ore is almost exclusively chalcopyrite and sphalerite, a little oxidized ore having been shipped under former ownership. In 1905 ore smelted assayed 2.81% copper, 14.3% zinc, 11.6% iron, 20.25% sulphur, 5.3% alumina, 7.4% barium sulphate, 5.4% calcium carbonate and 18% silica. The main working tunnel cuts a 25' ore body in the Copper Hill mine.

Equipment includes a 115-h. p. steam plant at the mine, with 20-h. p. and 30-h. p. hoists and a 5-drill air-compressor. Company owns a total of 55 buildings, including mine and smelter buildings, shops, dwellings, etc.

copper. Production, 1910, is estimated by company at about 2,910,000 fine copper, secured at a cost of about eleven cents per pound.

ALLAN A'DALE MINING CO. WASHINGT

Office and mine: Chewelah, Stevens Co., Wash. Was organized November, 1909, with capitalization $1,500,000, by H. S. Montgomery, Montgomery, Carl Montgomery, A. V. Montgomery, S. F. Sherwood and Hastings. Property is mining claims in vicinity of Chewelah. No tra operations secured, and apparently no work has been done. Idle and pres bly moribund.

ALLEGHENY MINING CO. NEW JER

Dead. Formerly at Belvidere, Warren Co., N. J. Described Vol. VI

ALLEN MINING CO. ARIZ

Dead. Former office was Chicago, Ill. Lands, in the vicinity of the gon & Arizona Mining Co., had limited development only. Formerly at Glory, Santa Cruz Co., Ariz.

ALLGEMEINE ELEKTRO-METALLURGISCHE GESELLSCHAFT. GERM

Works office: Papenburg a/d Ems, Hanover, Germany. Property small electrolytic plant, with capacity of about 500 pounds of cathodes d treating nickel-copper anodes.

ALLIANCE COPPER CO. MONTA

Office and mine: 3 Lewisohn Bldg., Butte, Silver Bow Co., Mont. ald Campbell, president. Organized May 19, 1906, under laws of Mon with capitalization $400,000, shares $2 par. Property is very small acrea the northeastern portion of the Butte district, with surface rights to su town lots. Development is by shaft, sunk jointly by the Alliance and Fa companies, and a little ore of good grade was shipped, 1907, from the 200' l Ended 1909 with indebtedness of $210,606. Idle several years and out of fu

ALLIANCE COPPER-GOLD CO. BRITISH COLUM

Dead. Formerly at Greenwood, Boundary district, B. C. Desc Vol. VIII.

ALLIANCE COPPER MINING CO. WASHINGT

Dead. Was absorbed, 1902, by Iconoclast Consolidated Mines Co. merly at Keller, Ferry Co., Wash. Described Vol. III.

ALLIGATOR & TIGER LEASING CO. COLORA

Mine office: Red Cliff, Eagle Co., Colo. A. S. Little, manager, at accounts. Lands, 2 claims, showing massive bornite and chalcopyrite, i sure veins, traversing granite, ores assaying up to 15% copper, 5% lead, 5 silver and $10 gold per ton. Idle.

ALLONGORSSUAK MINE. GREENLA

Owned by Grönlandsk Minedrifts Aktieselskab, at Julianshaab, Greenl

ALLOUEZ MINING CO. MICHIG

Office: 12 Ashburton Place, Boston, Mass. Mine office: Allouez, weenaw Co., Mich. Quincy A. Shaw, president; Rodolphe L. Agassiz, president; Geo. A. Flagg, secretary and treasurer; Jas. MacNaughton, ge manager; preceding officers, Harry F. Fay, W. L. Frost, F. L. Higginson F. W. Hunnewell, directors; Geo. G. Endicott, assistant secretary and t urer; F. W. Ridley, superintendent; A. Warne, mining captain. Orga September, 1859, under laws of Michigan, with capitalization $500,000, sh $25 par; reorganized and reincorporated, 1889, with capitalization $2,500 shares $25 par; paid in, $22.35. Last assessment, $3 per share, was levied Annual meeting, second Wednesday in April. Old Colony Trust Co., Bo registrar. American Trust Co., Boston, transfer agent. Owns a half int in the Lake Milling, Smelting & Refining Co. Is controlled through owner of 42,978 shares, by Calumet & Hecla Mining Co., and owes $250,000 in n to same company.

Lands, circa 3,400 acres, including the main tract of 640 acres on which the ine is opened. In 1903 exchanged 11.188 acres with Ahmeek, next north.

The old mine, opened 1859, is on the Allouez conglomerate, a bed underly- g the greenstone. The conglomerate, 30′ wide in many places, with strike of . 39° E., and dip of 39°, averages 0.7 to 1% copper, and is very refractory ıder the stamps. There are 3 shafts, deepest about 3,700′. Mining was be- ın actively in 1869, and stopped in 1877, with an exhausted treasury. The ine was then leased to Watson & Walls, who made money from it, after paying royalty of one-eighth on gross production. In 1880 the company resumed ntrol, to quit once more, financially exhausted, in 1885. Watson & Walls ok the mine again, and once more did well; the company resumed work on its vn account for the third time, and again lost money, stopping all work in 1892. he old mine has been idle for some years, except for exploratory and develop- ent work in 1898-1900, when a shaft was sunk 1,200′ on the Osceola lode, and early 4,000′ of openings secured thereon, with indifferent results. The shaft- ouse at the Osceola shaft has been demolished. The old stamp-mill, on Hills reek, has three old-fashioned heads, and is too antiquated for use. The old llouez made 26,051,528 lbs. fine copper, 1869-1892.

The present Allouez mine is developed on the Kearsarge amygdaloidal ed, which does not outcrop on Allouez lands, though underlying the entire 40-acre tract, hence was opened on the underlay. The mine had but one pro- ucing shaft, until late 1909. Shafts Nos. 1 and 2 are connected by crosscuts nd drift, on the 6th level. The Kearsarge bed, above the 14th level, is opened y crosscuts, uppermost being at the 6th level, below which plats have been cut n the shafts at the 8th, 10th and 12th levels, for crosscuts to be run to the bed. The Kearsarge bed averages about 16′ width in the Allouez mine.

No. 1 shaft, at the extreme southeastern corner of the tract, with 3 com- artments, started May, 1903, and 2,943′ deep, leaves surface at an angle of 5°, but at slight depth takes an angle of 80°, continuing thereon to about 1,435′ lepth, when a curve of 60′ brings the shaft to an angle of 38° 30′, which is the lip of the bed. At the change of angle, on reaching the bed, a single idler with a very wide flange cares for the cables passing at either end. Owing to the steep pitch of the shaft, back-rails of 6x10″ timber are set so close to the wheels of the skips that their flanges cannot leave the steel rails, the wooden timbers serving as guides. The first level is opened at depth of 1,264′. In order to save pump- ing charges on surface-water, a gutter, cut entirely around the shaft, leads to an incline 36′ long, used as a sump. This shaft showed very fine ground in its upper levels, but deeper openings are not so good. Equipment at No. 1 shaft includes a 42x62′ steel shaft-rockhouse having two 18x34″ crushers.

No. 2 shaft, circa 1,500′ northeast of No. 1, is similar to No. 1 in general design, but changes pitch when entering the bed at 2,307′ from surface, from 80° to 42°. The bed above the point of intersection will be reached, to the bound- ary, by crosscuts. This shaft is sunk further in the hanging than No. 1, owing to the proximity of a lake. A new record in shaft-sinking was established, 1908, at No. 2, when, with 2 drills, the shaft was sunk a total of 1,275′, in addition to which 4 plats were cut, and 105′ of crosscutting was done. The collar of No. 2 shaft is of concrete, Washington fir and 16x24″ steel I beams, with 14x14″ square- timber wall-plates and 4″ plank sheathing. The interior, from collar to solid rock ledge, is lined with 22″ of concrete, dividers having their ends bedded in concrete, this giving an impregnable shaft, sunk through 52′ of treacherous quicksand overburden. Both shafts can be sunk to about 9,400′ before reach- ing the western boundary line. New openings, 1909, were 6,263′.

Machinery equipment includes a Nordberg hoist with 32x72″ duplex cylin- ders and 18′ double-conical drum for No. 1 shaft, and No. 2 has a 20x30″ en- gine good for depth of 4,000′. No. 1 enginehouse, of mine-rock, with redstone trimmings, has 12-drill and 18-drill air-compressors, and No. 2 enginehouse has

a 60-drill Laidlaw-Dunn-Gordon air-compressor. The stone boilerhouse ha five 125-h. p. boilers and a 120′ self-supporting steel smokestack. Building include a redstone machine-shop and smithy, and a large warehouse. Ther is a very considerable mine location, with numerous dwellings, some remain ing from forty years ago, and some new. The mine is reached by a spur of th Mineral Range railroad.

Rock stamped, 1908, was 220,905 tons, costing $1.67 per ton, and yieldin 13.8 lbs. fine copper per ton, giving 3,047,051 lbs. fine copper, at a total co of 16.81 cents, and for 1909, production was 253,049 tons of rock stamped, a cost of $1.54 per ton, yielding 15.93 lbs. per ton, giving 4,031,532 lbs. fine coppe at total cost of 13.39 cents per lb. Rock discarded, 1909, was only 5,185 ton or 2.01% of amount hoisted. Rock is stamped by the Lake Milling, Smeltin & Refining Co., and production is marketed through Chas. Raht.

It was proposed, January, 1911, to merge the Alloues in the Calumet Hecla Mining Co., giving old shareholders 17-100 shares of new stock fo share of Alloues. Company made net earnings, 1909, of $3,065.58, ending th year with a balance of liabilities of $142,417.28.

The Alloues has proven a considerable disappointment, especially in vie of the very rich ground first opened, but is steadily improving its position, an seems to have established itself as a permanent mine.

ALLPORT MINING CO. MONTAN

Mine office: Basin, Jefferson Co., Mont. Capitalization $500,000, shar $1 par. Presumably idle.

ALMA COPPER MINING CO. MÉXIC

Office: Des Moines, Ia. Letter returned unclaimed from former mi office, Carbó, Ures, Sonora, Mex. Abner Graves, general manager; Nelson Graves, superintendent, at last account. Lands, 747 acres, in the Ures di trict, showing auriferous, argentiferous and somewhat bismuthiferous cuprit melaconite, azurite, malachite and chrysocolla, assaying up to 37% copper an $13 gold per ton. Has gasoline power. Idle since circa 1905, and apparentl moribund.

ALMADO & TERITO CONSOLIDATED MINING CO. MÉXIC

Dead. Was succeeded by Negociación Minera de Clemente Ybarra. Fo merly at Alamos, Sonora, Mex. Described Vol. V.

ALMA GOLD MINING CO. COLORAD

Office and mine: Idaho Springs, Clear Creek Co., Colo. Theo. Mixse manager. Ores carry gold, silver and copper.

ALMA MAY COPPER CO. WYOMIN

Dead. Lost lands, circa 1908. Formerly at Holmes, Albany Co., Wy Described Vol. VIII.

ALMA MINING & MILLING CO. MÉXIC

Dead. Formerly at Cañitas, Fresnillo, Zacatecas, Mex. Described Vo VIII.

SOCIEDAD MINERA DE ALMANZORA. SPAI

Office and mine: Javier Sanz 4, Almería, Spain. D. Camilo Bilarg agent, at last accounts. Property is several small old copper mines, slightl developed, near Almería. Idle some years and presumably moribund.

ALMA PROSPECTING SYNDICATE. TASMANI

Mine office: Forth, Devon Co., Tasmania. Lands, about 10 miles fro the seacoast, on the north shore of Tasmania, above Wilmot bridge and we of the Forth River, include the old Barrington or Alma mine, opened 1881, a which time about £1,000 was expended, the mine producing a little chalcopy rite. Development is by tunnels of 60′ and 281′, the latter with 2 short cros cuts, showing a little native copper in jointing planes, but mainly chalcopyrit in gangue of barite. Property also has a 35′ shaft. Formation is slate an of Cambrian age.

ALMEDA CONSOLIDATED MINES CO. **OREGON.**

Office: 207 Board of Trade, Portland, Ore. Mine office: Galice, Josephine Co., Ore. O. M. Crouch, president; L. B. Simons, vice-president; R. C. Kinney, secretary and treasurer; John F. Wickham, general manager; P. B. Geer, mine superintendent. Organized July 18, 1905, under laws of Oregon, with capitalization $15,000,000, shares $5 par, as successor of Almeda Mining Co. Annual meeting, second Tuesday in December.

Lands, 17 claims, area 340 acres, also 500 acres of placer ground, giving total holdings of 840 acres, about 22 miles northwest of Grant's Pass, and 17 miles from Merlin, nearest railway station, on the Southern Pacific, with daily stage-line to Galice. Lands include a 200-acre platted townsite, connected with the mine workings by bridge. Lands are well timbered, and have a considerable water power available from the Rogue River. Quartz claims are in 4 groups, known as the Almeda or North Side, Rocky Gulch, which is a continuation of the Almeda, and sometimes known as the Big Yank, both on the north side of the Rogue River, and the Bull Pine and Rand groups on the southern side of the river. Property was worked to slight depth, 1850-1870, for gold.

The Almeda group, including the Rocky Gulch, has 3 claims and 30 acres of placer ground, with 300′ of tunnels, showing a strong ore body, of 40′ to 60′ width, with diorite foot and slate hanging, carrying 10′ to 20′ of ore on the hanging, ore being strongly auriferous and slightly argentiferous chalcopyrite. While ore values are not high, they seem fairly constant and dependable, and the ore body is large. Paralleling the main vein is a body of low grade ore of 20′ to 30′ width, highly silicious, mainly chalcopyrite, with occasional bornite, giving promise of greater values at increased depth. Development is by tunnels of 250′, 160′, 280′, 450′ 150′ and 45′, the Riverside tunnel having a back of about 250′, and No. 1 tunnel a back of about 500′, and by the Almeda 300′ vertical shaft, planned to be sunk to 500′. Mine has about 1 mile of workings, with considerable ore blocked out for production.

The Bull Pine group, of 2 quartz claims, 4 miles southwest of the Rocky Gulch group, has a 100′ crosscut tunnel, intersecting a 3′ vein. The Rand group of 7 claims, with 500 acres of placer ground, has a 900′ tunnel, the outcrop giving small assay values in copper, silver and gold.

Equipment includes a 24-drill air-compressor, and company has made plans for a steel and concrete dam, the Rogue River being estimated as capable of developing up to 8,000 h. p., under a 20′ head.

Buildings include a boarding-house, bunkhouse, office, laboratory, smithy, and a number of dwellings. There also is a 15,000′ sawmill.

The 16-mile mountain road, from Merlin to Galice, is not in the best of condition during the wet season, and company plans a motor-line, with improved roads.

A smelter, begun 1908 and completed 1910, but not blown in, has a 100-ton 36x72″ Willamette Iron & Steel Works blast furnace, for matting. The 80x110′ smelter building covers the power plant and ore crusher also, and is planned for an additional 100-ton furnace. The coke-bins are at Merlin. Company has made a contract with the government, by which it is to pay for damage to trees and vegetation, the smelter being within the limits of a national forest reserve. Smelting has been deferred until the completion of the auto-truck road from Galice to Leland. Property considered promising.

ALMEDA MINING CO. **OREGON.**

Dead. Was succeeded July 18, 1905, by Almeda Consolidated Mines Co. Formerly at Galice, Josephine Co., Ore. Fully described Vol. IV.

SOCIEDAD MINERA EL ALMENDRAL. **CHILE.**

Office: Valparaiso, Chile. Mine office: Coquimbo, Chile. Luis Amenábar, manager. Organized Jan. 5, 1906, under laws of Chile, with capitalization $1,000,000 pesos, shares 50 pesos par. Property is a lixiviation plant, reported

to treat 2% copper ore, securing 60% precipitate. Production, 1907, was 4
lbs. fine copper.

ALMERÍA QUICKSILVER & COPPER CO., LTD. SP

Dead. Was liquidated, voluntarily, 1906. Formerly at Berja, Almería, S

ALMOLOYA MINING CO. MEX

Office: 60 Wall St., New York, N. Y. Mine office: Baca, Ram
Parral, Hidalgo, Chihuahua, Mex. Nils O. Bagge, president; M. L. Graff,
president; C. E. Bernhard, secretary and treasurer; preceding officers, W
Patterson and I. B. Newton, directors; Victor C. Joslyn, mine manager. Or
ized 1903, under laws of Arizona, with capitalization $2,000,000, shares $1
in $800,000 participating noncumulative 10% preferred stock, and $1,200
common stock. New York Trust Co., registrar. Holds title to lands thr
Minas de Almoloya, S. A., a Mexican corporation.

Lands, 177 hectares, including the San Enrique group adjoining the C
rero mine, and 4 other groups, about 4 miles from Baca, in the Allende dist
with rail transportation over a standard gauge line to the Cigarrero mine.

The Sierra de Almoloya is an isolated mountain range, about 9 miles
and 2 wide, carrying limestone beds of the Comanche series of the Lower
taceous, extensively fractured by several systems of faulting, with shear z
of 50 to 90 meters width, principal zones being the northeast system
Eocene age, of which the most prominent is the San Pedro fault zone, and
N. 40° W. system of Miocene age, which are the sources of large and rich
chambers, the most important ore bodies occurring at the intersection of t
faults. Lands adjoin the Cigarrero mine on the northeast, and carry the ex
sion of the San Pedro fault, proven by diamond drilling to occur between
800′ and 900′ levels.

Development includes a number of shafts, deepest 700′, and tunnels of 1
360′, 1,320′ and 1,600′. Present development is confined to the San Enr
and Exploradora groups, having 1,186′ of shafts and winzes, with 2 main
several shorter tunnels, and a total of 4,400′ of workings.

Equipment includes gasoline and air power, with one 15-h. p. and two
h. p. hoists. Property will use commercial electric current as soon as avails

Ore so far found has been in pockets, in leached shear zones, carrying
copper values, which are expected to increase at depth, with about 30% l
700 grams silver and 8 to 80 grams gold. Management expects property
become a regular producer in 1911.

ALMONTE COPPER CO. NEW MEXI

Dead. Was a bad egg. Formerly at Hanover, Grant Co., N. M.
scribed Vol. VIII.

ALPENA COPPER MINING CO. MONTA

Office: Wallace, Idaho. Mine office: Saltese, Missoula Co., Mont.
W. Beale, president; Timothy Kelly, vice-president and manager; A. H. Feat
stone, secretary and treasurer; preceding officers, Alex. Muir, and A. P. Co
rane, directors. Mine, near the Monitor, and 2 miles from the Chicago, I
waukee & Puget Sound railroad, is developed by 2 long tunnels and a sh
showing chalcopyrite assaying up to 34% copper, with small silver and g
values. Equipment includes several buildings. Idle.

ALPHABET COPPER CO. ARIZO

Dead. Formerly at Courtland, Cochise Co., Ariz. Described Vol. V

ALPHA COPPER CO. NEW JERS

Office: 15 Broad St., New York, N. Y. Mine office: Somerville, Som
set Co., N. J. Col. Josiah C. Reiff, president; Reginald Meeks, superintend
Organized circa 1909, as successor of American Copper Mining Co.

Lands are mining rights to about 1,000 acres, and a 50-acre millsite ow
in fee, on Watchung Mountain, circa 2½ miles from Somerville. Ore occur
anket veins between trap and shale, these having an average thickness o

ıd being traceable nearly 4 miles, carrying an estimated average of 2.3% copper, ith small gold and silver values. The oxidized zone shows chrysocolla nearest ırface, succeeded by oxides and carbonates, with chalcopyrite at greater depth, ıcceeded, at circa 700′ depth, by native copper that is slightly auriferous and gentiferous. Considerable work has been done, at intervals, in the past. argest mass of native copper secured weighed about 100 lbs.

Development is by 3 inclines, of 155′, 456′ and 1,300′, and a 500′ crosscut rainage tunnel. Mine is said to have 35 crosscuts of 50′ to 300′ in length, rposing considerable ore.

Equipment includes steam power, a 30-h. p. hoist and a 5-drill Rand air-ompressor. Buildings include a 50-ton concentrator, of wood and stone, said) have been enlarged to 300 tons capacity. Product, when mine is operated, ı concentrates, shipped to smelters on New York Harbor. Apparently present ompany has done little or no work. Idle and does not pay its bills.

LPHA COPPER MINING CO., N. L. **AUSTRALIA.**

Mine office: Cobar, Robinson Co., N. S. W., Australia. Organized 1907, ıith capitalization £1,000, shares £1 par. Presumably idle.

LPHA MINING CO. **ALASKA.**

Office: Grand Rapids, Mich. Mine office: Dolomi, Prince of Wales sland, Alaska. F. L. Loomis, superintendent. Lands, 3 claims, showing a 5′ ore body traceable circa 2,500′, giving assays of 2.5 to 7% copper and $3 to $20 gold per ton. Idle.

ALPS MINING CO. **COLORADO.**

Mine office: Central City, Gilpin Co., Colo. Jas. Williams, superintend-ent, at last accounts. Has auriferous and argentiferous copper ore, with steam power, and employed about 25 men, circa 1904. Idle several years and appar-ently moribund.

ALSACIA DEVELOPMENT CO. **MÉXICO.**

Dead. Was reorganized, 1905, as Alsacia Mining Co. Formerly at Fron-teras, Arizpe, Sonora, Mex. Described Vol. VI.

ALSACIA MINING CO. **MÉXICO.**

Dead. Formerly at Fronteras, Arizpe, Sonora, Mex. Described Vol. VIII.

ALTA CENTRAL COPPER CO. **ARIZONA.**

Office: 506 Citizens National Bank Bldg., Los Angeles, Cal. Mine office: Florence, Pinal Co., Ariz. Julian P. Jones, president; A. R. Hueth, vice-presi-dent and secretary; Citizens National Bank of Los Angeles, treasurer; Col. G. W. Griffey, mine superintendent. Organized Apr. 3, 1907, under laws of Ari-zona, with capitalization $500,000, shares $1 par.

Lands, 7 claims, area circa 125 acres, carrying about one-half mile of the strike of a system of 5 fissure veins, having a north and south trend, in a width of about one mile, passing through Mineral Hill. The Alta Mining & Smelting Co. lies to the north, and the Oklahoma to the south. Country rock is Pinal schist, intruded by porphyry dikes, the 5 fissure veins cutting the schist uncon-formably with strike or dip, sometimes cutting the porphyry dikes and occa-sionally running beside them. The veins outcrop 20′ to 50′ in width. Several prospect tunnels and shafts show 1′ to 6′ of ore carrying copper carbonates, oxides, and chalcocite, with gangue of quartz and manganiferous iron ore, carry-ing combined gold and silver values of $1 to $14 per ton. Geological conditions are said to be markedly similar to those at the Gibson and Live Oak mines, dis-tant about 20 miles to the northeast. Company planned developing through a drift, to be run from the 400′ level of the main shaft of the Alta Mining & Smelt-ing Co. Idle.

ALTA COALITION COPPER CO. **UTAH.**

Office: Salt Lake City, Utah. Mine office: Brighton, Salt Lake Co., Utah. F. R. Snow, president; B. F. Grant, vice-president; N. Y. Stringham,

ALTA-QUINCY MINING CO. U

Dead. Was merged, 1906, in South Columbus Mining Co. Former Alta, Salt Lake Co., Utah. Described Vol. VI.

ALTA-ST. LOUIS MINING CO. U

Dead. Former office was Salt Lake City, Utah. M. J. Craig was man Property had an ore body, reported to be between limestone and shale, c ing a 12″ to 18″ paystreak giving assays of 15 to 25% copper and 15 to 24 silver per ton, with small gold values. Formerly at Alta, Salt Lake Co., U

ALTA-SUPERIOR MINING CO. U

Dead. Formerly at Alta, Salt Lake Co., Utah. Described Vol. VIII

ALTATA MINING CO. ARIZ

Office: 145 La Salle St., Chicago, Ills. Letter returned unclaimed former mine office, Chloride, Mohave Co., Ariz. J. F. McBride, president general manager; L. L. Funk, vice-president; W. A. Barr, secretary and t urer; C. H. Dryden, superintendent. Bonds, $25,000 authorized; $1 issued. Mine has 200′ shaft, showing silver-lead and auriferous copper Has steam power. Idle several years and apparently moribund.

ALTA-ZOANNI MINING CO. NEVA

Mine office: Hamilton, White Pine Co., Nev. Roy W. Schenk, presi and general manager; M. T. Collins, vice-president; G. A. McElery, secre and treasurer. Lands are near the peak of White Pine Mountain. Idle.

KÖNIGLICHES HÜTTENAMT ALTENAU. GERMA

Office and works: Altenau im Harz, Saxony, Germany. Is a cus smelting plant, treating ores of copper and other metals from the mines of Hartz. The electrolytic refinery has a daily capacity of 1,600 to 2,000 lb cathodes.

ALTENS KOBBERGRUBER. NORW

Office: care of Sulitelma Aktiebolag, Helsingborg, Sweden. Mine of Kåfjord, Finmarken, Tromsö, Norway. Lord-Lieutenant G. Tornerhj chairman; Consul N. Persson, vice-chairman; C. Ingelsson, secretary; A. Qu general manager; B. G. G. Tiberg, mine superintendent; Ch. Rosenquist, sme superintendent; Sverre Falch, mill superintendent and chemist. Lands, claims, also a 60-acre millsite and circa 2,000 acres miscellaneous lands. Th the northernmost copper mine in the world, lying near North Cape, in 70° no latitude. Post-silurian schists and slates have been penetrated by dioritic gre stone, showing about 75 ore bodies in diorite and also as impregnations in d mitic strata. The veins have a generally NNW. strike, fissures in diorite d ping at about 30° and dolomitic layers at about 60°. About 20 strong veins many small ones are under development, former ranging 1 to 3 metres in av age width, and traceable 50 to 2,000 metres. The various veins average ab 1.25% copper, ores occurring as chalcocite, bornite and chalcopyrite, diss inated in pyrite.

Development is by numerous tunnels, of which the Sture is 650 metres the Jernmalm 415 metres in length, and by 6 shafts, deepest 100 metres. mine has several miles of workings, exposing fully 600,000 tons of ore, with ci 100,000 tons blocked out for stoping. Mine, opened 1825 and closed 18 was reopened, 1895, by present owner.

Equipment includes 120 hydraulic h. p., 100 electric h. p., 25 steam h. and 15 gasoline h. p. There are 4 small hoists, 2 Sullivan diamond drills and electric light plant. Buildings include a machine-shop of 220 square metres ar a 40-metre carpenter-shop and 170 buildings of all classes, including dwellin

The 100-ton concentrator, of 1,716 square metres area, has 2 Blake crushe 4 Humboldt centrifugal crushers, 2 rolls, 11 jigs, 16 Lüborg vanners and large and 8 small spitskasten. The smelter has a 20-ton water-jacket bla furnace, smelting to a 20% matte, which, by a second fusion, is brought up % copper tenor, and shipped to Helsingborg for refining.

The mine is 300 miles from a railroad, but only 300 feet from the sea. The ompany owns a steamer and a gasoline launch. A school is maintained. Production, 1907, was 25,000 metric tons of ore yielding 1,050 tons of matte and 600 ons of 48% sulphur ore, producing circa 625,000 lbs. fine copper. Idle since 1908.

LTO COPPER CO. **ARIZONA.**

Dead. Was reorganized, circa 1909, as Consolidated Mines, Smelter & ransportation Co. Formerly at Patagonia, Santa Cruz Co., Ariz. Fully escribed Vol. VIII.

LTO MINING CO. **ARIZONA.**

Dead. Lands were sold, Jan. 1, 1908, to Leontine Consolidated Mining Co. ormerly at Poland, Yavapai Co., Ariz.

LTONA MINING CO. **IDAHO.**

Office: Wallace, Idaho. Letter returned unclaimed from former mine ffice, Grand Forks, via St. Joe, Kootenai Co., Idaho. Wm. J. Ward, manager. rganized 1909. Property was reported to have a ledge of circa 40′ to 50′ idth, with a good copper showing, but workings indicate a vein of about 6′ idth, a 30′ shaft showing auriferous and argentiferous copper ore assaying p to 22% copper. A 192′ tunnel is planned to be driven to give a back of bout 250′.

LTON MINING CO. **CALIFORNIA.**

Mine office: Needles, San Bernardino Co., Cal. R. C. Hamilton, president; C. E. Freeman, secretary; M. Freeman, superintendent, at last accounts. Lands 5 claims, northeast of the Dunkirk and southeast of the Eagle, in the Whipple Mountains, 8 miles from the Colorado River. Nearest rail point is Parker, 15 miles by wagon-road. Lands show schists, limestone, diorite and shte, with intrusive dykes, ore occurring in and near the dykes, which frequently are completely metamorphosed. Ore bodies usually have a northwest and southeast strike and carry oxidized copper ores having gold values and a little silver. Development is by prospecting shafts, pits, and an opencut, principal workings being a 50′ shaft and a 300′ tunnel. Property is said to have yielded ore samples assaying up to $35 per ton. Idle several years.

GEWERKSCHAFT ALTVATER. **GERMANY.**

Mine office: Altwalnau, Hirschberg-Grosselmerode, Hessen-Nassau, Germany. Herr Springorum and Herr Bellwinckel, executive committee; Carl Reichel, agent; Herr Müller, superintendent. Property has copper and lead ores, developed by one shaft, and apparently development has not proven very satisfactory. Employs 3 men.

ALVERDSKI MINE. **RUSSIA.**

Owned by Compagnie Française des Mines de Cuivre d'Akhtala.

ALVIN DEVELOPMENT CO. **ARIZONA.**

Office: Houghton, Mich. Mine office: Salome, Yuma Co., Ariz. A. Tennyson Pryor, president; Ward Smith, vice-president; Heaton Wright, secretary; Wm. D. Calverley, treasurer; Dick Wick Hall, superintendent. Organized 1908, under laws of Arizona, with capitalization $200,000, shares $1 par. Gave 25,000 shares for promotion and options on lands. Is controlled by Tank Pass Consolidated Mining Co.

Lands, 18 claims, area 360 acres, known as the Ultimatum group, one-half mile east of the Cobralla mine, east of Tank Pass, and 10 miles from Salome, in the Harcúvar Mountains.

Property shows limestone, alternating conformably with metamorphic schists, dipping to the north at an angle of 45°, with numerous intrusive diabase dykes, standing practically vertical and showing good gossans. Some churn drilling was done, 1909. Development includes tunnels of 30′ and 123′, latter showing rich copper ore carrying gold and silver values, and a 170′ shaft with a 170′ crosscut showing a 12′ ore body carrying bornite, chalcocite, melaconite and cuprite, all strongly auriferous, assaying $30 to $50 per ton in combined

company has made especially notable progress since 1904, when John D. became managing director, he later succeeding H. H. Rogers as presiden 1907 the company again followed the mistaken policy of "holding the umb over the copper market, for the benefit of its competitors, thereby repe though on a less serious scale, the mistake of 1901. The Amalgamated is long ways from being in control of the copper industry, but has made con able progress in that direction, and, through the depressed market cond ruling in the copper industry since 1907, a rapprochement has been reache the leading copper producing interests of North America and Europe, by a small restriction in production was put into effect, August, 1910.

AMALGAMATED COPPER MINING CO. U

Dead. Formerly at Tremonton, Box Elder Co., Utah.

AMALGAMATED COPPER MINING & EXTRACTION CO. WYOM

Dead. Was merged, 1909, in Hecla Consolidated Mines Co. For at Hecla, Laramie Co., Wyo. Described Vol. VIII.

AMALGAMATED GOLD & COPPER CO. ARIZ

Dead. Was a swindle, promoted by Douglas, Lacey & Co., of 66 B way, New York, N. Y. See Douglas, Lacey & Co. Formerly at Huron, apai Co., Ariz. Fully described Vol. VI.

AMALGAMATED GREENWATER COPPER CO. CALIFOR

Dead. Formerly at Greenwater, Inyo Co., Cal. Described Vol. VI

AMALGAMATED METAL & EXPLORATION CO. ARIZ

Dead. Was reorganized, Dec. 13, 1910, as Amalgamated Metals Formerly at Jerome, Yavapai Co., Ariz. Described Vol. VIII.

AMALGAMATED METALS CO. ARIZONA & OREC

Office: Urbana, Ills. Mine office: Jerome, Yavapai Co., Ariz. R Rothermel, president and superintendent; C. H. Rutherford, vice-president counsel; Mrs. Elizabeth Rothermel, treasurer; J. Monroe Layman, secr and general manager; preceding officers and N. D. Ross, directors. Orga July 30, 1907, under laws of Arizona, with capitalization $5,000,000, shares $ par, nonassessable, as Amalgamated Metal & Exploration Co., and title cha Dec. 13, 1910, to present name, with capitalization $5,000,000, shares $10 Of original capitalization, $3,000,000 went to land owners and promoters, $2,000,000 was placed in the treasury. Annual meeting, second Tuesda December.

Lands, 15 claims, area 250 acres, with 35 acres miscellaneous lands, in ing 2 patented claims near Jerome and the Comstock group of 80 acres, 12 m from Grant's Pass, Josephine Co., Ore., and the Sylvanite and Tellurium cl in the southwestern part of Josephine county, near the California line. Pr pal property is the Hogback or Rothermel-Ross group of 8 claims, area acres, touching the Florencia claim of the United Verde, on the southwest, to have circa 1,000' of workings, with about 2,000 tons of ore on the du Management plans installing electric power, hoist and air-compressor, and tinuing the tunnel.

GEWERKSCHAFT VEREIN AMALIA-UND KNOTTENBERG. GERMA

Dead. Formerly at Mornshausen an der Dautphe, Hessen-Nassau, G many. Described Vol. VIII.

AMARANTH GOLD MINING CO. ARIZO

Dead. Formerly at Maxton, Yavapai Co., Ariz. Described Vol. VI.

AMARILLO MINING CO. NEW MEXI

Dead. Formerly at Jarilla, Otero Co., N. M. Described Vol. VIII.

AMATOLA COPPER CO. TRANSVA

Dead. Property was copper claims near the Messina Extension and C don mines, on which a little work was done, circa 1907. Formerly at Zoutp berg, Zoutpansberg district, Transvaal.

MAZON-BUTTE COPPER CO. **MONTANA.**

Office and mine: Forbis Blk., Butte, Silver Bow Co., Mont. J. H. Lyach, esident; Chas. Mattison, secretary and treasurer; preceding officers, D. H. ilson, W. F. Love, J. A. Poor and M. J. Cavanaugh, directors; John Hewett, perintendent. Organized circa November, 1906, under laws of Montana, ith capitalization $2,500,000, shares $5 par. Owners of lands took $1,500,000 stock for property, giving them control. Stock was made assessable later, id assessments levied have been 5 cents, October, 1907, and 4 cents, October, 08. According to statement, 1909, liabilities were $5,000. A plan of re-ancing was under consideration, July, 1910, when it was proposed to organize e Dominion Syndicate, old shareholders returning 15% of their stock to the easury, and pooling the remainder indefinitely.

Lands, 9 claims, 7 fractional, patented, area 123 acres, in 2 groups, lying rca 2 miles east of the center of Butte and separated by the Ida-Montana, utte & Summit Valley and Calumet & Butte. Lands include the Amazon, aynor and west half of the Altoona claims, at the mouth of Horse Cañon, in he southeastern part of Butte, about a quarter-mile south of the Bullwhacker, nd carrying more than 1,000′ of the north and south fault veins of the latter. ands also carry about 1,600′ of the east and west vein of the Ida-Montana, and other veins, 2 veins being of some promise, the Amazon and Altoona claims iving a good showing from slight development. Has a 436′ two-compartment haft, with crosscuts and drifts on the 400′ level. In 1907 nine sets of leasers ere working the Bullwhacker vein on the Amazon claim, and shipping about 0 tons of ore daily. Ore, as developed, is chalcopyrite, about 4′ giving average ssays of 7% copper. Equipment includes several permanent mine buildings, wo 100-h. p. and one 250-h. p. boilers, a 4-drill air-compressor and hoist. Pro-luction was begun circa November, 1906, and shipments to end of July, 1907, ere 1,835 tons of ore, giving average returns of 2.72% copper and 0.01% silver, without gold values. Idle several years.

AMAZON COPPER MINING CO. **CALIFORNIA.**

Dead. Formerly at Victorville, San Bernardino Co., Cal. Described Vol. VIII.

AMAZON-DIXIE MINING CO. **MONTANA.**

Office: Wallace, Idaho. Mine office: Mullan, Shoshone Co., Idaho. Wesley Everett, president and general manager; H. E. Chaney, vice-president; Herman J. Rossi, treasurer; preceding officers, W. W. Woods and Hugh Toole, directors.

Lands, 7 claims, well timbered, at Borax, near Lookout, just across the Montana line, adjoining the Leslie Copper Mining Co. Property shows a 4′ vein in quartzite, exposed by surface trenching for circa 2,000′, carrying galena, chalcopyrite and lead carbonates, associated with pyrite, with values mainly in galena. Development is by a 35′ shaft and 2 tunnels, upper giving a back of about 200′, lower planned to be circa 1,100′ long, with back of 700′, and to be the main working tunnel, with mouth near the Northern Pacific railway. Management plans damming Copper Creek and the St. Regis River, and taking water through 9,000′ of 12″ steel piping. Equipment includes a 10-drill air-compressor, 20,000′ sawmill and a number of mine buildings.

AMAZON GOLD CO. **MÉXICO.**

Office: 107 Commercial Bldg., St. Louis, Mo. Mine office: Chacalá, Tamazula, Durango, Mex. Jas. T. Dugan, president; Edward B. Sowers, manager; J. S. Wilkinson, superintendent. Mine, known as the Candelária, has auriferous, argentiferous and bismuthiferous copper ores. Equipment includes a Bryan mill, 6-ton chlorination plant and 10-ton smelter.

AMAZON GOLD MINING CO. **MÉXICO.**

Dead. Formerly at Culiacán, Sinaloa, Mex.

AMAZON-MONTANA DEVELOPMENT CO. **MONTANA.**

Office: 315 Sellwood Bldg., Duluth, Minn. Mine office: Amazon, Jef-

smaller veins, opened by 5 shafts, deepest 140'. Has secured assays up to copper and $7.20 gold per ton. Idle.

AMERICAN COPPER MINING & EXTRACTION CO. COLOR

Dead. Formerly at Denver, Denver Co., Colo. Described Vol. V.

AMERICAN COPPER MINING & SMELTING CO. NEW ME

Dead. Was a swindle, promoted by J. R. Kerr & Co., formerly at 5 Broadway, New York.

AMERICAN DEVELOPMENT CO. ARIZ

Dead. Was merged, March, 1906, in American-Saginaw Developmen Formerly at Bisbee, Cochise Co., Ariz. Fully described Vol. VI.

AMERICAN DEVELOPMENT, MINING & REDUCTION CO. NEW ME

Office: care of Financial Security & Trust Co., Denver, Colo. returned unclaimed from former mine office, Silver City, Grant Co., N Organized circa 1909, as successor of Geronimo Copper Mining Co., whic a deliberate and intentional cheat, put out by the notorious Financial Se & Trust Co., of Denver, the larcenous concern that promoted the Spanish Bullion and several other downright and deliberate swindles. Former con claimed to have a 200' shaft, which is doubted, and claimed 4 miles of cr tunnels, which are purely imaginary, and claimed to have extracted $2,00 worth of ore, which was equally mythical. The Geronimo claimed, in its lars, to have been formerly paying 24% per year "on the investment," an unfortunate accident caused the total loss by fire of its 125-ton mill, whic was a mere figment of the imagination. The company claims to have a 5 mill, which will be operated 8 months yearly by water power. There such mill, and water power in the vicinity of Silver City remains an irid dream. This company is no better than its predecessor, and the entire should be jailed.

AMERICAN EAGLE COPPER MINING CO. WYOM

Dead. John Morris was manager. A little work was done, circa mine having a shallow shaft, from which ore specimens gave high assays. merly at Encampment, Carbon Co., Wyo.

AMERICAN EAGLE GOLD & COPPER CO. CALIFO

Mine office: Needles, San Bernardino Co., Cal. A. L. Crew, presider treasurer; G. H. Berding, vice-president; H. LeClair, secretary and man Lands, 17 claims, in the Whipple or Monument district, 10 miles west Colorado River, about 18 miles north of Parker and 35 miles south of Ne Property shows a main vein of 10' to 20' width, traceable circa 2,000', w number of smaller parallel veins. Development includes shafts of 60' and latter with crosscuts on the 100' and 200' levels, showing oxidized ores to of about 75', succeeded by a considerable body of auriferous copper sulp Mine is said to have on the dump several hundred tons of ore of 10 to copper tenor, carrying $1.50 and up in gold. The mine water has been le to a small extent, for copper. Equipment includes a 20-h. p. gasoline ho

AMERICAN EXPLORATION & MINING CO. MÉXICO & NEW MEX

Office: 60 State St., Boston, Mass. Operating office: 518 Trust El Paso, Tex. Mine offices: Steeple Rock, Grant Co., N. M.; Ahu Bravos, Chihuahua, Mex., and Terrazas, Iturbide, Chihuahua, Mex. W. F lin Burnham, president, secretary and general manager; Henry A. Haile, urer; preceding officers, Jas. Duckworth, Geo. Emmell, Hinsdale. S Arthur Smith, Jesse W. Morton and Harry Hinckley, directors; Wm. A. F consulting engineer; John A. Rice, engineer; John Searls, superintendent muda mines; Frank Hickman, superintendent Steeple Rock mines. Orga Sept. 28, 1907, under laws of Maine, with capitalization $500,000, shar par; nonassessable; issued, $275,748.

Lands, 600 acres, including 16 claims in New Mexico and 12 different properties in México, also 3 millsites at the different properties.

Property includes mines known as the Burnham at Terrazas, San Ignacio Ahumuda, and Hinckley at Steeple Rock.

The New Mexican property has tunnels of 100′, 313′ and shafts of 100′, 100′ and 150′, with 1,223′ of workings, carrying mainly silver ore.

The property at Ahumuda has shafts of 25′, 100′, 160′ and 474′, giving ore assaying about 30% lead, 6% zinc and 12 to 20 oz. silver per ton.

The property at Terrazas shows contact deposits between limestone and porphyry, giving assays of about 3% copper, 24% lead, 8 to 20 oz. silver and $.50 to $12 gold per ton. Development is by shafts of 187′ and 200′. Equipment includes a 55-h. p. gasoline plant, and necessary mine buildings.

Company plans milling about 30 tons daily at Ahumuda, concentrating into 1, and continuing development work at the various properties.

AMERICAN FLAG MINING CO. **UTAH.**

Office: 815 Newhouse Bldg., Salt Lake City, Utah. Mine office: Park City, Summit Co., Utah. Geo. H. Rathman, president, treasurer and general manager; Wm. M. Curtis, vice-president and manager; John Cain, secretary; J. V. Bodfish, superintendent. Organized, 1902, under laws of West Virginia, with capitalization $500,000, shares $1 par, assessable; fully issued. A 3-cent assessment was levied June 28, 1910. Company has voted unanimously to incorporate under the laws of Nevada, and increase capitalization to 1,000,000, shares $1 par, issuing new stock to retire a bond issue of $150,000 and pay for the Constellation group.

Lands, 300 acres, patented, adjoining the Ontario and Silver King Coalition mines, and including the Constellation group. Property is served by the Ontario drain tunnel. Main shaft has 2 compartments, with a steel headgear, and mine is developed by shafts and tunnels, to depth of 1,100′, with about 2½ miles of workings, showing values mainly in gold and silver. Ore averages about 2% copper, 5% lead, and up to 60 oz. silver and $7.50 gold per ton.

Equipment includes steam power and a 60-h. p. air-compressor, with necessary mine buildings. Production, August, 1904, to September, 1910, was 8,550 dry tons of ore, yielding net smelter returns of $272,235. Property said to have been leased, 1910, for 5 years, to American Exploration Co.

AMERICAN GOLD & COPPER CO. **ARIZONA.**

Office and mine: Globe, Gila Co., Ariz. O. W. Thompson, director. Organized June 20, 1907, under laws of Arizona, with capitalization $500,000, shares $1 par. Idle and apparently moribund.

AMERICAN GOLD & COPPER CO. **ARIZONA.**

Dead. Was merged, 1904, in the Poland-American Gold Mining & Milling Co. Formerly at Morristown, Maricopa Co., Ariz. Described Vol. VI.

AMERICAN GOLD & COPPER CONSOLIDATED MINING CO. **ARIZONA.**

Dead. Was a tentative reorganization, circa 1905, of the American Copper Co. Formerly at Blanchard, Yavapai Co., Ariz.

AMERICAN GOLD & COPPER MINING CO. **WYOMING.**

Dead. Formerly at Jelm, Albany Co., Wyo. Described Vol. VI.

AMERICAN GOLD MINING COMPANY OF NEW MEXICO. **NEW MEXICO.**

Dead. Formerly at Nogal, Lincoln Co., N. M. Fully described Vol. VIII.

AMERICAN GULCH MINING CO. **UTAH.**

Dead. Formerly at Bingham Canyon, Salt Lake Co., Utah. Described Vol. VIII.

AMERICAN METAL CO., LTD. **U. S. A. & MÉXICO.**

Office: 52 Broadway, New York, N. Y. Mexican office: 3 Calle de San Agustin, México, D. F. Also has branch offices in Denver and St. Louis. Company is American agent for Henry R. Merton & Co., Ltd., of London;

Metallegesellschaft und Metallurgische Gesellschaft, of Frankfurt-a
Société le Nickel, of Paris, and Balbach Smelting & Refining Co., of
N. J. Controls the Compañía Minera de Peñoles, of Mapimí, Mex.; C
de Minerales y Metales of México; Ohio & Colorado Smelting & Refin
of Salida, Colo.; Bartlesville Zinc Co., of Bartlesville, Okla.; Lanyon-Sta
ing Co., of Bartlesville, Okla., and Metallurgical Company of America,
York. Company also is an extensive dealer in copper, spelter and lead

AMERICAN METALS CO. NEW M

Dead. Formerly at Organ, Donna Ana Co., N. M. Described V

AMERICAN-MÉXICO MINING & DEVELOPING CO. M

Office: Watertown, S. D. Mine office: Velardeña, Cuencamé, D
Mex. W. A. Merrifield, president; A. L. Selenberger, vice-president; J
Martin, secretary; F. O. Smolt, general manager. Organised 1902, un
of South Dakota, with capitalization $3,000,000, shares $1 par. Com
1906, reported $1,267,544 stock issued, and, 1908, reported $857,550 stoc
Has authorized $50,000 bonds, at 6%. Dividends paid, though unearn
$357,318.

Lands, 21 claims, area 110 hectares, with 49 hectares in millsites,
hectares miscellaneous lands, including La Roca Negra, Tecolotes and
bres mines. La Roca Negra mine has a 400′ shaft; Los Libres mine a 13
and 34′ tunnel, and the Tecolotes mine has a 160′ shaft and 350′ tunn
Roca Negra mine, sometimes called La Victoria, area 10 hectares, bou
$60,000, is a good small mine, having 3 veins averaging 3″ to 9″ width o
not 3 metres, as claimed by company. Equipment includes a 180-h. p
plant, with 3 hoists.

The smelter, at San Lorenzo, 4 to 8 miles from the mines, has
furnaces, with 80 to 150 tons daily capacity.

The monthly dividends, aggregating $357,318, paid from April, 1
January, 1906, were purely fraudulent, money therefor being taken fro
sales. Seven of the promoters were indicted, these being Dr. W. S.
former president and scoundrel-in-chief, who was sentenced, May, 191
years imprisonment, for fraud in promoting this company. The others i
were A. T. Grove, Walter S. Dillon, W. A. Arms, Marc Sherwood, J. B. S
and H. G. Graham.

The present management is composed of deluded shareholders, w
endeavoring to save something from the wreck. Apparently a little silv
copper ore was shipped, 1909, from Los Libres mine. Idle at last accoun

AMERICAN MINES DEVELOPING ASSOCIATION. CALIFO

Dead. Former office was 610 South Spring St., Los Angeles, Cal.
ently very little mining work was ever undertaken. Formerly at Needl
Bernardino Co., Cal.

AMERICAN MINES DEVELOPMENT CO., LTD. ARI

Dead. Was a fake. Formerly at Globe, Gila Co., Ariz. Described Vo

AMERICAN MINES & EXPLORATION CO. ARI

Office: Central Bldg., Los Angeles, Cal. Mine office: Hillside, Y
Co., Ariz. Robt. D. Grant, president; Philip Wiseman, general manager.
pany was said, July, 1909, to have sold large interests in the Ray Consol
and Gila companies to Bernard N. Baruch for $782,000. Idle.

AMERICAN MINES SYNDICATE.

Office: Houghton, Mich. Mine office: Eureka, Juab Co., Utah.
R. Van Evera, president; J. H. Rice, vice-president; Wm. P. Seager, sec
and treasurer; preceding officers, Walter Fitch and F. W. Denton, dir
Organized circa 1907, under laws of Arizona, with capitalization $1
shares $100 par; paid in, $80 per share; issued, $84,900. Is a holding co
purely, controlling the Chief Consolidated Mining Co. through owners
one-half of stock issue.

ERICAN MINING CO. ARIZONA.
Mine office: Globe, Gila Co., Ariz. Mine, near the Gibson, has a 300′
t. Idle.

ERICAN MINING CO. MÉXICO.
Dead. Lands were sold, 1906, to Cananea Central Copper Co. Formerly
a Cananea, Arispe, Sonora, Mex. Described Vol. VI.

ERICAN MINING CO. MICHIGAN.
Dead. Formerly at Central Mine, Keweenaw Co., Mich. Described
VIII.

ERICAN MINING CO. UTAH.
Dead. Formerly at Callao, Juab Co., Utah. Described Vol. VI.

ERICAN MINING CO. UTAH.
Office: 27 Latimer Blk., Salt Lake City, Utah. Mine office: Brighton,
Lake Co., Utah. I. A. Benton, president; A. L. Headberg, first vice-presi-
and general manager; B. F. Nevins, second vice-president; Wm. Crome,
etary and treasurer; David Scott, superintendent. Organised 1896, under
of Utah, with capitalization $500,000, shares $1 par, assessable; 18 assess-
its levied, to end of 1910. Lands, 16 claims, 10 patented, on Scott Hill, in
Big Cottonwood district, 5 miles from a railroad. Mine, opened by shafts
tunnels, has about 1,400′ of workings, showing auriferous and argentiferous
per ore.

ERICAN MINING CO. WASHINGTON.
Mine office: Monte Cristo, Snohomish Co., Wash. H. D. Cowden, man-
r. Lands are at Silver Lake, on the divide between the Silver Lake and
nte Cristo districts. Mine has a vein of 15′ reported width, carrying cuprif-
s pyrite and auriferous arsenopyrite. Planned, 1908, shipping some ore to
ker Hill smelter, near Index. Presumably idle.

ERICAN MINING CO., LTD. IDAHO & MONTANA.
Office: 115 Granite Block, Helena, Mont. Letter returned unclaimed
n former mine office, Council, Washington Co., Idaho. R. H. Kleinschmidt,
sident; Maria Kuphal, vice-president; A. H. Kleinschmidt, secretary and
surer; preceding officers are the directors; Geo. W. Boggs, operator, under
e. Organized Oct. 2, 1910, under laws of Montana, with capitalization
,000, shares $1 par, nonassessable; fully issued. Annual meeting, second
nday in January.

Property consists of a number of patented claims in Montana and Idaho,
luding the Blue Jacket and Queen mines, at Decorah, Washington Co., Idaho,
joining properties that really are one, formerly held by the Blue Jacket Consol-
ted Copper Co. The Blue Jacket mine, area 295 acres, has a 400′ shaft, and
said to have produced about $200,000 in ore, with smelter returns up to
% in copper tenor. This group was leased, March, 1910, for 10 years.

Holdings also include an interest in the Peacock mine, at Council, Washing-
n Co., Idaho, held jointly with A. M. Holter and Hon. E. S. Houser.

The Peacock mine, formerly held by the Peacock Copper Co., and a consid-
able number of other companies and parties, under bond, at various times, is
e claim, 3 miles from the Snake River, and about 50 miles northwest of Weiser,
nnected therewith with a fair wagon-road. This mine, discovered 1869, is the
ost noted property and the largest producer of the Seven Devils district,
ving about 1,500′ of workings, said to have produced about 15,000 tons of
gh grade ore, and estimated to show about 200,000 tons of 15 to 60% copper
e blocked out, which is a serious overestimate, as ore blocked out has been
herwise estimated as 6% in copper tenor, and apparently carries about $5
mbined gold and silver values per ton. Ten shipments, 1903, to the Bing-
am smelter, returned 13.3 to 18.3% copper, from 3 to 5 oz. silver and from noth-
g to $1.33 gold per ton, and 11 shipments to the Oregon Smelting & Refining
o. gave returns of 20.5 to 40.2% copper, 1.15 to 8.7 oz. silver, and $1.20 to

$3.40 gold per ton. Mine is said to have considerable ore ready for shipmer soon as transportation is available, and a railroad line has been planned to nect with the Pacific & Northern. Production, 1905, was circa 500 tons o of about 15% copper tenor, equal to circa 150,000 lbs. fine copper.

AMERICAN MINING CO., S. A. MÉX

Mine office: León, Guanajuato, Mex. Organized Oct. 27, 1900, under of México, with capitalization 25,000 pesos. Property is the América y A mines, carrying copper and lead ores. Presumably idle.

AMERICAN MINING & DEVELOPMENT CO. CALIFOR

Office: 165 Broadway, New York, N. Y. Mine office: French C Nevada Co., Cal. Letters returned unclaimed from former mine offices, nett, Shasta Co., Cal., and Marysville, Yuba Co., Cal. T. F. Warden, ge superintendent, at last accounts. Supposedly is controlled by American S ing & Refining Co.

The Red Ledge mine, near French Corral, carrying copper ore, has s and water power. The property at Sweetland, 20 miles east of Marys Yuba Co., Cal., shows a considerable body of auriferous copper ore. Idle.

AMERICAN MINING & DEVELOPMENT CO. MÉX

Dead. Formerly at Naco, Arispe, Sonora, Mex. Described Vol. VII

AMERICAN MINING, MILLING & SMELTING CO.

Dead. Was a brazen swindle, domiciled in London, owning no pro whatever, and promoters went to jail. Fully described Vols. VI and VII.

AMERICAN MINING & SMELTING CO. WASHINGT

Office: Spokane, Wash. Letter returned unclaimed from former office, Twisp, Okanogan Co., Wash. Lewis Husk, president; C. O. Cobbs, president; J. M. Moore, secretary; F. W. Isham, engineer. Organized February, 1909, under laws of Arizona, with capitalization $2,500,000, s $1 par. Lands, near Twisp, are said to show ore assaying 20 to 30% copp a vein hoped to be 70′ wide. Company is said also to have bonded claims i Princeton district of Montana. As the management has the husk and co was hoped the shareholders might get the corn, but mine is idle, and appare moribund.

AMERICAN PROSPECTING & DEVELOPMENT CO. ARIZO

Letter returned unclaimed from former office, Bisbee, Ariz. Mine o Jerome, Yavapai Co., Ariz. Lands, adjoining the Equator mine, have a shaft, with a 112′ drift in ore. Idle and apparently moribund.

AMERICAN QUEEN MINING CO. COLORA

Mine office: Gold Hill, Boulder Co., Colo. Property is the Cash m having auriferous and argentiferous copper ores, copper being a limited product. Is said to have considerable low to medium grade ore on the du Equipment includes a 10-stamp mill, of 25 tons daily capacity. Presum idle.

AMERICAN-SAGINAW DEVELOPMENT CO. ARIZO

Office: 1400 Alworth Bldg., Duluth, Minn. Mine office: Wa Cochise Co., Ariz. W. B. Mershon, president; Chas. d'Autremont, Jr., president; Frederic R. Kennedy, secretary; Wm. G. Hegardt, treasurer; ceding officers, Henry B. Hovland, Thos. G. Collins, Benton Hanchett Watts S. Humphrey, directors. Organized March 7, 1906, as a merge American Development Co. and Saginaw Development Co., with capital tion $1,000,000, shares $10 par; $7 paid in. Balance sheet, of Dec. 31, 1 showed expenditures for year of $3,885.45, and balance on hand, in c $61,542.21; with accounts payable of only $84.30.

Lands, 26 claims, owned outright, being the American group of 9 cla lying next east of the Junction, the Saginaw group of 17 claims, area 297 a also favorably located, and the Muheim and World's Fair groups. Mine ha old 384′ shaft, sunk at an angle of 70° with the horizon, showing 35′ of lea

on the 300′ level, and a new 1,100′ three-compartment shaft connected with Denn-Arizona, which cut a 35′ body of low-grade ore on the 350′ level. A siderable body of ore was found on the 750′ level of the Saginaw, with pros-ts of commercial ore at greater depth. Management is permitting the Denn-zona and Superior & Pittsburg, adjoining this property, to develop the ground, l hopes to profit by their work. Development at these adjoining properties icates strongly that the ores of the American-Saginaw probably will lie 1,800′ 2,000′ in depth. Former equipment was removed to Courtland. Manage-nt good and property considered promising.

IERICAN SMELTERS EXPLORATION CO. **U. S. A. & MÉXICO.**

Dead. Was organized March 25, 1905, under laws of New Jersey, with ɔitalization $77,000,000, shares $100 par, and name was changed, May, 1905, American Smelters Securities Co. Formerly at numerous points in the United ıtes and México, as given under title of American Smelters Securities Co., rt following.

IERICAN SMELTERS SECURITIES CO. **U. S. A. & MÉXICO.**

Office: 165 Broadway, New York, N. Y. Mine and works offices, at merous points, given hereinafter. Daniel Guggenheim, president; Barton well, Silas W. Eccles, Edgar L. Newhouse and Edw. Brush, vice-presidents; . E. Merriss, secretary; Morris Guggenheim, treasurer; W. C. Potter, Mexican ınager. Organized March 25, 1905, under laws of New Jersey, and name anged to present title, May, 1905, with capitalization $77,000,000, shares 00 par, in $17,000,000 Series A cumulative 6% preferred stock; $30,000,000 ries B cumulative 5% preferred stock, and $30,000,000 common stock. ries A has preference as to dividends, and both preference series have equal ghts as to assets, both having priority rights to assets and dividends over com-on stock. Is controlled by American Smelting & Refining Co., through the wnership of a majority of the issue of common stock, and the American Smelt-g & Refining Co. guarantees the Series B preferred stock. Of the common ock, the American Smelting & Refining Co. owns 177,510 shares, and the uggenheim Exploration Co., an affiliated corporation, owns 122,490 shares. nnual meeting, first Wednesday in September.

Company's surplus, May 31, 1910, was $1,688,197.52. First quarterly div-lend was paid July, 1905, on Series A. A plan of refinancing, brought out late 910, provided an issue of $15,000,000 of 15-year 6% gold bonds, to liquidate he floating debt of $10,816,406, mainly due to the American Smelting & Re-ning Co., the entire bond issue going to same, and bonds are convertible, under clause permitting conversion into common stock of the American Smelting & Refining Co., when bonds sell at par or above. Net earnings have been as ollows, for fiscal years ending May 31st: $2,367,426 in 1908; $4,432,069 in 909; $5,431,980 in 1910.

The American Smelters Securities Co. is a securities holding company, con-rolling, through ownership of shares, or otherwise, a number of smaller corpo-ations, and is very closely affiliated in ownership, management and operations, ith the American Smelting & Refining Co. and the Guggenheim Exploration Co. The corporations and principal mines controlled are as follows:

Balaklala Consolidated Copper Co., Coram, Cal.
Dairy Farm Mining Co., Van Trent, Cal.
Selby Smelting & Lead Co., Selby, Cal.
A. Y. & Minnie Mining & Milling Co., Leadville, Colo.
Silver Lake Mines, Silverton, Colo.
Western Mining Co., Leadville, Colo.
Federal Mining & Smelting Co., Wallace, Idaho.
Federal Lead Co., Federal, Ills.
Central Lead Co., Flat River, Mo.
Federal Lead Co., Flat River, Mo.

Puget Sound Reduction Works, Everett, Wash.
Tacoma Smelting Co., Tacoma, Wash.
Monte Cristo Mining & Concentrating Co., Monte Cristo, Wash.
Bonanza Mines, Bonanza, Zacatecas, Mex.
Botello Mines, Parral, Chihuahua, Mex.
Dolores Mines, Matehuala, San Luis Potosí, Mex.
Jibosa Mines, Jiménez, Chihuahua, Mex.
Tecolotes Mines, Santa Bárbara, Chihuahua, Mex.
Velardeña Mining & Smelting Co., Velerdeña, Durango, Mex.
National Metallurgical Co., Matehuala, San Luis Potosí, Mex.
Baltimore Copper Smelting & Rolling Co., Baltimore, Md.

Control of the Garfield Smelting Co. is held through ownership of t stock issue of $1,000,000 and includes control of the Garfield Improve and Garfield Water Co., subsidiaries of the Garfield Smelting Co.

The company also owns the San Bruno smelter, with a site of 65 San Francisco Bay, 8 miles south of San Francisco, construction of w begun 1907, but stopped shortly.

At Matehuala, S. L. P., Mex., company owns the Dolores, Trini Azul mines, area 162 acres. Edw. Thornton, mine superintendent properties, 7 miles west of Matehuala, have 7 shafts, with gasoline ho carry carbonate, silicate and sulphide ores, slightly argentiferous and a averaging about 4.5% copper. Production, for year ending May 31, 1 116,000 metric tons of ore. Production is estimated at circa 7,000 fine copper in 1910.

The Jibosa mines, at Jiminez, Chihuahua, Mex., area 87 acres, have and carry sulphide ores, assaying up to 10% copper. Production, for y ing May 31, 1907, was 22,436 metric tons of ore.

The Zaragoza mine, at Parral, Chihuahua, Mex., area 69 acres, is d through a 1,000′ tunnel, and has plumbiferous iron ore, zinc carbonates phides, and copper sulphides. Production, for 2 years ending May 3 was 11,357 metric tons of ore.

The Veta Grande mine, area 58 acres, at Parral, Chihuahua, Mex 984′ shaft, well equipped, and produces silicious silver ores. Produc 2 years ending May 31, 1907, was 38,723 metric tons of ore.

The Tecolotes mines, at Santa Bárbara, Chihuahua, Mex., incl acres of mining rights, and 40 acres of surface rights. W. Maynard manager. Mines are extensively developed, and carry auriferous and s erous oxidized and sulphide ores of lead and copper, of both smelting a centrating grades. Equipment includes a 600-ton mill, putting about yielding an average of about 100 tons of concentrates daily. Property about 500 men.

The Bonanza mines, area 335 acres, with 13,000 acres of ranch l Zacatecas, Mex., have 7 shafts, and carry lead and zinc ores.

Production, by mines owned directly, and by subsidiary corporatio trolled, has been as follows: 95,200,000 lbs. fine copper, 98,280,000 lb 19,726,529 oz. silver and 1,460,328 oz. gold in 1908; 113,947,000 lbs. fine 106,422,000 lbs. lead, 20,338,832 oz. silver and 1,503,493 oz. gold i 174,150,000 lbs. fine copper, 135,424,000 lbs. lead, 18,327,277 oz. silv 2,095,640 oz. gold in 1910. These figures include smelter production from ores.

AMERICAN SMELTING & REFINING CO. U. S. A. & M

Office: 165 Broadway, New York, N. Y. Works offices: At nu addresses, given hereinafter.

Daniel Guggenheim, president; Barton Sewell, vice-president; S Eccles, vice-president in charge of operating department; Edw. Brus president and assistant to the president; Edgar L. Newhouse, vice-presi

: of smelting operations; Isaac Guggenheim, treasurer; S. R. Guggenheim, ıan executive committee; Murry Guggenheim, chairman finance committ- ıdd Stewart, general auditor and assistant to the president; Wm. Sproule, manager; John N. Steele, general counsel; Frank W. Hills, comptroller; lin Guiterman, general manager Colorado department; Wm. C. Potter, l manager Mexican department; John K. MacGowan, purchasing agent; ling officers, Jos. Clendenin, Karl Eilers, Jas. B. Grant, M. Robert Gug- im, W. S. McCornick, Willard S. Morse, Walter T. Page, Grant B. Schley, Mahlon D. Thatcher, directors; W. E. Merriss, secretary; F. R. Foraker, ant secretary and assistant general counsel; Lucius A. Chapin, assistant ırer; R. P. Reese, auditor; Geo. C. Kaufman, manager mining department; . Whitley, general manager Utah department; I. M. Stettenheim, manager ance department; E. A. Behr, sales agent lead department; H. M. Moran, al representative in México; F. D. Aller, agent in Chile; Chas. Beach, fer agent; Chase National Bank, New York, registrar.

Organized Apr. 4, 1899, under laws of New Jersey with capitalization 00,000, later increased to $100,000,000, shares $100 par, in $50,000,000 ılative 7% preferred and $50,000,000 common stock, and again increased, 5, 1911, by $15,000,000 common stock, provided to exchange for 6% ature bonds of American Smelters Securities Co., at any time, before st, 1918, that bonds may sell at par. Annual meeting, first Wednesday ptember. Has about 6,000 shareholders.

The American Smelting & Refining Co. controls the American Smelters rities Co. through the ownership of $17,751,000 of the common stock issue 0,000,000, and owns 25,000 shares, par value $2,500,000, of Series B pre- d stock of same company, bought for $2,302,270, and has guaranteed 5% lends on the entire stock issue of Series B preferred stock of the American lters Securities Co. Company has loaned upwards of $10,000,000 to the rican Smelters Securities Co., to be taken up by the bond issue of latter, r 1911. Balance of common stock of American Smelters Securities Co. is ed by Guggenheim Exploration Co.

Company's statement, of April 30, 1910, shows assets of $119,871,786.20, uding $11,620,400.59 cash and demand loans, latter being advances to Ameri- Smelters Securities Co. and affiliated corporations. Surplus, same date, $16,797,546.97.

Income account, for fiscal years ending April 30th, showed total earnings 0,146,387.46 and net earnings of $7,664,284.20 in 1909, and total earnings 8,887,788.41 and net earnings of $7,507,916.39 in 1910. Net earnings for vious fiscal years were $1,979,907.85 in 1900; $3,828,441.27 in 1901; 61,619.01 in 1902; $7,576,785.57 in 1903; $7,905,572.84 in 1904; 96,811.36 in 1905; $10,161,356.12 in 1906; $11,509,669.20 in 1907.

Dividends on common stock have been as follows: 5% in 1904; 5½% in 1905; in 1906; 7½% in 1907; 5% in 1908; 4% in 1909; 4% in 1910. Preferred idend rate is 7% annually, in quarterly dividends of 1¾%. Total dividends end of calendar year 1909, were $50,213,053.

Following is the list of metallurgical plants of the company:

Perth Amboy plant, Maurer, N. J., copper and lead smelting and refining.

National plant, South Chicago, Ills., lead refinery.

Omaha plant, Omaha, Neb., lead refinery, copper smelting and converting.

Globe plant, Denver, Colo., lead smelting.

Pueblo plant, Pueblo, Colo., lead smelting.

Eilers plant, Pueblo, Colo., lead smelting.

Durango plant, Durango, Colo., lead smelting.

Arkansas Valley plant, Leadville, Colo., lead smelting.

Murray plant, Murray, Utah, lead smelting.

Everett plant, Everett, Wash., lead smelting and arsenic refinery.

Helena plant, East Helena, Mont., lead smelting.
El Paso plant, El Paso, Tex., lead and copper smelting.
Aguascalientes plant, Aguascalientes, Mex., lead and copper smelting.
Monterey plant, Monterey, Mex., lead smelting.
Chihuahua plant, Chihuahua, Mex., lead smelting.

Control of the various smelting plants previously listed is held thro number of subsidiary corporations, these including the United States Sm & Refining Co., of Helena and Great Falls, Mont.; National Smelting & Re Co., of Chicago, Ills.; Omaha & Grant Smelting Co., of Omaha, Neb., and De Colo.; San Juan Smelting & Refining Co., of Durango, Colo.; Pueblo Sm & Refining Co. and Colorado Smelting Co., both of Pueblo, Colo.; Ha Smelting Works, at Salt Lake, Utah; Globe Smelting & Refining Co., of De Colo.; Consolidated Kansas City Smelting & Refining Co., of El Paso, Kansas City, Mo., and El Carmen, Chihuahua, Mex.; Pennsylvania Lea and Pennsylvania Smelting Co., of Pittsburg, Pa., and Salt Lake City, Bi-Metallic Smelting Co., of Leadville, Colo.; Germania Lead Works, o Lake City, Utah, and Chicago & Aurora Smelting & Refining Co., of Ch and Aurora, Ills., and Leadville, Colo.

In addition to the foregoing smelting plants, the company has othe tensive interests, and controls the United States Zinc Co. of Pueblo, Aspen Mining Co., of Silverton, Colo.; Carbon Coal & Coke Co., of Trin Colo.; Cook's Peak Mines, of Cooks, N. M., and has extensive interests i leading mining states of México.

In addition to smelting and mining properties, the company owns th clusive rights, in the United States and México, to the Huntington-Heb ore-roasting patents. There also are various subsidiary corporations, fo purchasing and other purposes, copper ores being handled mainly throug American Smelters Securities Co.

Of the various smelting plants owned by the company, 12 are oper These had an estimated capacity, 1909, of 4,365,300 tons of ore yearly, and an average of about 10,000 tons daily, or circa 3,500,000 tons annually.

The Helena, or East Helena smelter, at Helena, Mont., of about 600 daily capacity, with 4 blast-furnaces, treats mainly silver-lead ores, with copper, and includes a baghouse. Frank M. Smith, manager; C. C. T assistant manager; P. A. Mosman, superintendent.

The Murray smelter, successor of the Germania, at Murray, Utah, cir miles south of Salt Lake City, of circa 1,500 tons daily capacity, has 8 blast naces, with steam, electric and air power. A 100x216' baghouse has 4,200 c bags, each 30' long and 18" in diameter, the cloth therein being sufficie cover 16 acres of ground. The baghouse, in addition to saving consider values previously lost, has greatly reduced the volume of fumes, which form caused much trouble and expense, through damage to a valuable farming tract surrounding.

The Arkansas Valley smelter, at Leadville, Colo., has 10 furnaces, daily capacity of circa 1,500 tons, and handles mainly lead ores, with some co Wm. B. MacDonald, manager; Guy M. Kerr, superintendent. The other p at Leadville have been dismantled for some years.

The Globe or Globeville smelter, at Denver, Colo., with 7 furnaces, about 800 tons daily capacity. Lincoln G. Eakins, assistant manager.

The old Grant smelter, at Denver, Colo., was dismantled, circa 1907.

The Durango smelter, at Durango, Colo., has 4 furnaces, with about tons daily capacity, and treats both lead and copper ores. Daniel McL manager; F. C. Gilbert, superintendent.

The Omaha smelter, at Omaha, Neb., is operated under a lease exp 1927. The smelter, with 2 furnaces, of about 250 tons daily capacity, h

opper converting plant of about 35 tons daily capacity, and a 250-ton lead refinery, with steam and electric power. Wm. T. Page, manager.

The Eilers smelter, at Pueblo, Colo., with 6 furnaces, of about 700 tons aily capacity, closed circa 1908, and probably will not be reopened.

The Pueblo smelter is a lead plant, securing gold and silver as by-products, aving 7 furnaces, with about 800 tons daily capacity. Geo. P. Marsh, superintendent.

The El Paso smelter, at El Paso, Tex., has a 1,500-acre site, with 10 furnaces, nd a daily capacity of about 1,200 tons, with 2 reverberatory furnaces being uilt at end of 1910, to increase the daily capacity to about 1,500 tons. Matte ormerly was shipped to the Aguascalientes smelter, but is to be converted in he El Paso works, and blister copper shipped to the refineries at Perth Amboy nd Baltimore.

The Aguascalientes smelter, at Aguascalientes, Mex., is the largest plant ontrolled by the company, having 10 furnaces, 2 lead and 8 copper stacks, ith 2,000 tons daily capacity, and employing about 2,500 men. This plant inludes a model townsite, with good water and sewerage. A special fume charge f $3 per ton is exacted from ores treated, considerable trouble having been exerienced with surrounding agricultural interests. Kuno Doerr, manager; R. . Webb, superintendent.

The Chihuahua smelter, at Chihuahua, Mex., is a comparatively new plant, ated at 800 tons daily capacity, having 4 blast-furnaces, treating mainly lead, ith steel buildings, a 370′ brick stack with inside diameter of 16′, steam and lectric power, 8 miles of railroad track, a hotel, and 192 dwellings for workmen. A fifth furnace under construction, 1910, will give the works a capacity of 1,000 tons daily. Geo. B. Squires, superintendent.

The Monterey smelter, at Monterey, Nuevo León, Mex., has 10 blast-furnaces and 15 reverberatories, with daily capacity of about 1,250 tons. Philip Zimmer, manager; J. F. Austin, superintendent.

The Everett plant, at Everett, Wash., has a lead smelter and an arsenic refinery.

The Perth Amboy plant, also known as the Guggenheim works, at Perth Amboy, Middlesex Co., N. J., is a copper refining plant, built 1895, and since repeatedly enlarged, last enlargement having been in 1909. These works, having the advantages of tidewater frontage and rail connections, have copper and lead furnaces, with large lead and copper refineries, of circa 150 tons daily capacity each.

The National plant, at South Chicago, Ills., is an extensive lead refinery, having a yearly capacity of about 90,000 tons of finished lead and 18,000,000 oz. refined silver.

The Angangueo mine, W. H. Mitchell, superintendent, is at Angangueo, Michoacán, Mex. Lands, 12 hectares, carrying argentiferous copper ore, developed by a 150-meter shaft, and 2 tunnels, with about 1 mile of workings. This property formerly was a considerable silver producer, and includes an antiquated smelter, of about 150 tons daily capacity.

The Asientos group, at Asientos, Ocampo, Aguascalientes, Mex., Corey C. Brayton, superintendent, includes the Santa Francisca, Cinco Señores and El Dragon mines, having silver-lead ores and employing about 700 men. The Santa Francisca, area 317 hectares, with 3 tunnels and 4 shafts, deepest 250 meters, has about 6,000 meters of workings, with a daily productive capacity of 500 metric tons of ore. Equipment includes a 1,500-h. p. steam plant, and mine employs about 700 men.

The Coahuila mines, area circa 150 hectares, at Cuatro Ciénegas, Coahuila, Mex., include La Reforma and other mines, carrying silver-lead ores. La Reforma has 3 shafts, deepest 500 meters, and 4 tunnels, longest 1,500 meters, with circa 28,000 meters of workings. Equipment includes a 200-h. p. gasoline plant

steam power, and a 300-ton mill, properties employing about 300 men. Kaufman, general manager; H. P. Palsgrove, superintendent.

The Sierra Mojada mines, at Sierra Mojada, Coahuila, Mex., incl San José, San Salvador and Fronterisa mines producing argentiferous l copper ores, with values mainly in silver and lead. Mines have 8 shaf tunnels, with productive capacity of about 1,000 tons of ore daily, em circa 800 men. Equipment includes a 500-h. p. steam plant.

The Siete Amigos mines, at Topia, Durango, Mex., have auriferous gentiferous copper and lead ores, with steam power. Thos. J. Lawrenc ager.

Copper production is merely an incident with the company. The ing figures of production include the outputs of the American Smelter Se Co., Guggenheim Exploration Co., Nevada Consolidated Copper Co. an Copper Co.: 72,952,000 lbs. fine copper in 1905; 85,810,000 lbs. i 94,600,000 lbs. in 1907; 187,544,000 lbs. in 1908, circa 240,000,000 lbs. i and about 250,000,000 lbs. in 1910.

The American Smelting & Refining Co. is much the largest general ing and metallurgical enterprise of the world, and continues to do b successfully, while the independent smelters that are built to put th out of business continue to "blow up." There is very general com throughout the mining districts of the United States and México, re the exactions of this company, but there is something to be said on bot of the argument, and the small independent smelters, unless except well located for securing a variety of ores permitting proper smelter mi are unable to compete with the trust. It seems obvious that the A Smelting & Refining Co. continues to expand and prosper, mainly bec its superior metallurgical and business ability, backed by large and works and adequate capital, rather than because of special advantage

AMERICAN STAR MINING CO.

Office: 403 Dooly Bldg., Salt Lake City, Utah. Letter return claimed from former mine office, Eureka, Juab Co., Utah. A. N. Hol president; Jas. B. Graves, vice-president; Imer Pett, secretary and tre Organized, late 1909, as successor of Tintic Mines Co., with capital $1,000,000, shares $1 par. Lands, 68 acres, patented, including the View group and other properties lying between the Victoria and Chie solidated mines, and touching the Plutus on the east and Eagle & Bl on the west. Mine has about 1,000′ of workings, made from the 900′ l the Eagle & Blue Bell mine, and plans a 1,100′ shaft, about one-half mile east of the Chief Consolidated. Workings show an ore channel of abo width. Property considered promising.

AMERICAN VENTURE CO. **MÉ**

Dead. Formerly at Ayutla, Autlán, Jalisco, Mex.

AMERICAN ZINC EXTRACTION CO. **ARIZ**

Dead. Formerly at Tucson, Pima Co., Ariz. Described Vol. VI.

AMYGDALOID MINING CO. **MICH**

Dead. Lands were sold, 1905, to Calumet & Hecla Mining Co. Fo at Central Mine, Keweenaw Co., Mich. Described Vol. II.

SOCIEDAD MINERA LA AMISTAD. **S**

Dead. Formerly at Albuñuelas, Granada, Spain. Described Vol.

AMY SILVERSMITH MINING CO. **MONT**

Letter returned unclaimed from former office and mine, Butte, Silve Co., Mont. Property is in the silver-zinc zone, to the north of the p copper belt. Is an occasional small producer from work of lessees.

ANACONDA CONSOLIDATED COPPER CO. **CALIFO**

OF GREENWATER.

Dead. Formerly at Greenwater, Inyo Co., Cal. Described Vol. V

ACONDA CONSOLIDATED COPPER MINES & SMELTING WORKS. AUSTRALIA.

Dead. Property was sold to Murrin Copper Mines, Ltd., also dead, and ıpany liquidated. Formerly at Murrin Murrin, Western Australia.

ACONDA COPPER MINING CO. MONTANA.

Office: 42 Broadway, New York, N. Y. Mine office: Butte, Silver w Co., Mont. Works offices: Anaconda, Deer Lodge Co., Mont., and ıat Falls, Cascade Co., Mont. Benj. B. Thayer, president; Frederick P. dicks, vice-president and treasurer; preceding officers, John D. Ryan, Urban Broughton, H. H. Rogers, Wm. Rockefeller and Geo. H. Church, directors; rnelius F. Kelly, secretary and counsel; A. H. Melin, assistant secretary l treasurer; John Gillie, general superintendent; E. P. Mathewson, mill l smelter superintendent; J. P. O'Neil, and Jas. Higgins, mine superinıdents; J. E. Totman, general superintendent lumber department; F. W. C. hyte, manager fuel department; E. S. Woodworth, superintendent Butte npling works; Reno H. Sales and F. A. Linforth, geologists; Louis J. Clergy, perintendent Belt coal mines; Thos. Good, superintendent Washoe coal nes; Jerry Sullivan and Daniel Griffin, foremen.

Organized June 18, 1895, under laws of Montana, with capitalization 0,000,000, shares $25 par, as successor of Anaconda Copper Co., and capitalıtion increased, March 23, 1910, to $150,000,000, shares $25 par; issued, ca $105,500,000. Company has a very broad charter, permitting it to quire, mortgage, lease, assign and transfer the capital stock, bonds or seırities of any other corporation. Is controlled, through ownership, directly d indirectly, of 3,045,862 shares, or 72% of issued stock, by Amalgamated ıpper Co. Annual meeting, in May. National City Bank, New York, ansfer agent. Pogson, Peloubet & Co., auditors. Stock is listed on the ew York, Boston and London stock exchanges, and on the New York Conlidated stock exchange. Dividend coupons are payable in England by the ndon Joint Stock Bank, Ltd., Princes St., E. C. Warrants to bearer are ued, in England, in denominations of 5, 20 and 50 shares.

Dividends have been as follows: $4,800,000 in 1900; $3,900,000 in 1901; ,250,000 in 1902; $1,200,000 in 1903; $1,200,000 in 1904; $2,400,000 in 1905; ,850,000 in 1906; $7,800,000 in 1907; $2,400,000 in 1908; $2,400,000 in 1909; ,400,000 in 1910. Regular dividend rate is 2%, or 50 cents per share, quarrly.

Net earnings for 1907 were $3,378,220.42, including $581,281.74, earned y various subsidiary corporations and departments, outside of regular mining perations. Net earnings for 1909 were $2,134,773.24. Company ended 1909 ith a surplus of $4,679,216.09.

The increase in capitalization, 1910, was effected to provide for the absorpon of all of the Butte mining companies controlled by the Amalgamated Copr Co., and several other mines in Butte, also the coal mining and lumbering ompanies controlled by the Amalgamated. The companies so taken over, ad the prices paid for each were as follows: Boston & Montana Consolidated opper & Silver Mining Co., 1,200,000 shares, or $30,000,000; Washoe Copper o., 380,000 shares, or $9,500,000; Trenton Mining & Development Co., 20,000 shares, or $3,000,000; Red Metal Mining Co. (Butte Coalition), 00,000 shares, or $12,500,000; Butte & Boston Consolidated Mining Co., 00,000 shares, or $7,500,000; Parrot Silver & Copper Co., 90,000 shares, or 2,250,000; Alice Gold & Silver Mining Co., 30,000 shares, or $750,000; Big Blackfoot Lumber Co., 300,000 shares, or $7,500,000; Diamond Coal & Coke o., 100,000 shares, or $2,500,000. In addition to the affiliated companies before named that were taken over, the Anaconda bought the entire property of the Colusa Parrot Mining & Smelting Co. and Original Consolidated Min-

ing Co., controlled by Senator Wm. A. Clark, for which $12,000,000 ca
supposed to have been paid.

In addition to the mining property hereinafter described, the Anac
owns fractional interests in a number of other mining claims in the Butte c
The Anaconda is in litigation over apexes with the Raven Mining Co.
Ticon mine of Jas. A. Murray, and the Butte-Ballaklava Copper Co., ha
sued the Butte-Ballaklava, 1910, for $1,800,000, for ore alleged to have
extracted wrongfully from a vein claimed to apex on the Mountain Chief
of the Anaconda.

For 1909 net earnings of all principal companies now merged in
Anaconda, excepting the two Clark companies, were as follows: Anaco
$2,134,773.24; Boston & Montana, $3,029,119.65; Washoe, $1,732,673.48; T
ton, $165,111.91; Butte & Boston, $751,712.22; Diamond Coal & Coke
$86,420.65; Big Blackfoot Lumber Co., $191,724.30; Mountain Trading
$23,380.29, a total of net earnings of $10,151,915.74. During 1909 the P
made a net loss on operations of $132,965.31, leaving net earnings for
properties for calendar year 1909, at $10,008,953.43. The Alice also ma
small net loss on operations for 1909. The Butte Coalition for 1909
net earnings of $695,382, and net earnings of the Original for calendar
ending June 1, 1910, were $181,359, as per returns to the authorities of S
Bow county. Net profits for 1909, from operation of the various prope
now merged in the Anaconda, were approximately $11,000,000.

Mining lands in Butte are approximately 2,138 acres, in the follo
groups: Anaconda, 572 acres; Boston & Montana, 483 acres; Butte & Bo
261 acres; Trenton, 220 acres; Butte Coalition, 145 acres; Alice, 340 acres;
rot, 40 acres; Washoe, 37 acres; Original, circa 40 acres. In addition to
copper mining lands, the Diamond Coal & Coke Co. owned 13,280 acres of
land, and the Big Blackfoot Milling Co. owned upwards of 1,100,000 acr
timber land.

A detailed description of the geology of Butte will be found in the a
on Montana, in the chapter on American Copper Deposits.

By the merger of the Anaconda and Boston & Montana, both among
six largest copper producers of the world, and the addition of a number of
mines of second and third rank in productive capacity, the Anaconda be
incomparably the largest copper mine in the world, employing about 12,000
at high wages, and with a payroll in Butte alone of nearly $1,000,000 mon
with very large additional payrolls at its works in Anaconda and Great F
and with considerable forces employed in its coal mines and lumbering op
tions. The copper mines of the company are so very extensive that it has
deemed best to group the descriptions under department heads, the grou
being according to former ownerships, previous to the merger.

In the Anaconda department the principal mines are the Anaconda, St. L
rence, Never Sweat, High Ore, Diamond, Green Mountain, Mountain
solidated, Belmont and Modoc.

The Anaconda was opened, 1880, as a silver mine, but at about 150′ d
the silver values decreased, being succeeded, a little lower, by high-grade co
ores, mainly chalcocite, and bornite, while at depth there is a large amoun
enargite. Net earnings of the mine, during the 15 years, 1880-1894, are unkn
but may be estimated safely as not less than $50,000,000. At a depth of a
1,600′ the mines of the Anaconda showed impoverished values, there being
siderable marcasite, but an improvement was noted at 1,800′ and 2,000′,
very rich ore has been found below 2,200′, while high-grade chalcocite is b
mined at a depth of 2,800′ in the High Ore mine of the Anaconda, this being
deepest level now worked in the Butte camp. The various mines of the A
conda have immense reserves of ore, of all grades from low to high, and a
siderable number of stopes of high-grade ore remain untouched. The

racted from the various mines give an average return of nearly 60 lbs. of per per short ton, or 3%, with circa 2.5 to 3 oz. silver and 35 cents gold per ton.

The Anaconda mine proper has a 3-compartment main shaft, 2,450′ deep, bered with 10x10″ square sets, with about 30 exits, being connected under- und with the Never Sweat, St. Lawrence, Bell, Wild Bill, East Grey Rock, falo and Mountain Consolidated mines. Ventilation normally is good, but siderable trouble has been had, at times, with gases from the adjoining St. wrence mine, and it is probable that the fire has crept from the St. Lawrence) several of the upper levels of the Anaconda. The mine has electric lights l signals, and electric locomotives for tramming were installed, 1907, on eral levels. Hoisting is by 8-ton skips, swung under double-deck cages and rked in counterbalance.

The St. Lawrence mine has a 2,100′ three-compartment main shaft, being pened to 2,600′, with 22 exits, connected underground with the Anaconda, ver Sweat, Mountain View and Pennsylvania mines. The mine has elec- : lights and bells, and a chain system of endless-haulage on the 14th level. e St. Lawrence has been on fire since 1889, in an extensive area above the 00′ level. The fire has been fought constantly, and walled off by bulkheads erever possible, but cannot be extinguished, and must be allowed to burn elf out, though it is possible to control its progress to a considerable extent. complete fire-fighting brigade is kept constantly on duty, working 8-hour fts. While the fire is troublesome, it does not result in the loss of copper, as : sintered ore remaining after the burning of the sulphur can be mined later, d the mine waters are strongly charged, carrying 9 to 13 lbs. copper per ton, ich of which is recovered by underground precipitation in concrete sumps, : water leaving these sumps carrying only 2 to 4 lbs. of copper per ton, and ing leached again on surface. The hoist has 32x72″ cylinders, raising 9-ton ps swung under double-deck cages.

The Never Sweat mine has a 2,500′ three-compartment main shaft, re- nbered, 1905, with false sets, allowing an 18″ play for squeeze. Square-set nbering is used, with back-filling, and tramming is done by horses. The ne has electric lights and bells, and is connected underground with the Parrot,)lusa-Parrot, and Moonlight mines. Some trouble has been had with fire)m the St. Lawrence. Normal productive capacity is about 400 tons daily. ie surface plant includes a 3,000-h. p. hoist with 30x72″ cylinders, raising 8-ton ips swung under double-deck cages. There are 5 Ingersoll-Sergeant air- mpressors, 2 being electrically driven, with aggregate capacity of 32,000 cubic et of free air per minute, capable of running 360 power drills.

The High Ore mine is one of the deepest in Butte, having a 2,816′ three- mpartment shaft with lowest level at 2,800′, producing high-grade chalcocite. eing the deepest mine of the group, the High Ore does the pumping for a umber of connecting mines of the Anaconda and Amalgamated groups, hand- ng all water from the Anaconda, Washoe and Parrot properties. The mine is)owing very well on the 1,400′ level and below. The High Ore has 7 power- l pumps, including 3 Dixon pumps on the 2,200′ level, 2 pumps on the ,600′ level and 3 on the 1,000′ level. The mine has electric lights and bells, nd tramming is done mainly by horses. Hoisting is done with two 3-deck ages.

The Diamond mine has a 2,956′ three-compartment shaft, the deepest in Butte, developing the Corra vein on the 2,800′ level, which is showing good ore. Equipment includes a 32x72″ Risdon hoist, operating double-deck cages with -ton skips. The compressor plant has 4 electric air-compressors, fitted with uxiliary steam cylinders, with an aggregate capacity of 16,000 cubic feet of ree air per minute.

The Green Mountain mine has a 2,260′ three-compartment shaft, not leepened for several years.

The Mountain Consolidated mine has a 2,280′ three-compartme with a good ore showing on the 1,400′ level and below, and an especia showing on the bottom level, at 2,200′. The mine has a 28x72″ Un Works hoist, operating two 4-deck cages.

The Belmont mine, about 1 mile south of the main shaft of the A and circa 275′ lower, has a new 1,500′ four-compartment working sh largest in the district, which is to be deepened to 2,200′. The upp showed ore rich in silver with an impoverished zone at depth of 350′, s by good ore at 1,000′ and below. Equipment includes a powerful n with capacity of 3,500′, taken from the Corra mine.

The Bell mine has a 1,600′ three-compartment shaft, and is c underground with the Anaconda. A 28x40″ hoist raises double-deck ca

The Bell No. 4 mine has a 365′ shaft, and is idle.

The Wild Bill mine, in vicinity of the North Butte, has a 400′ t partment shaft, and is idle, surface plant having been dismantled, a now extracted through shafts of adjoining mines.

The Modoc mine has a 1,000′ three-compartment shaft, connec the High Ore and Butte-Ballaklava mines. The Modoc vein is on largest in Butte, ranging up to 100′ in width, but is low in grade to t opened, ore carrying only 1.5 to 2% copper only, but should impr depth, and is a property of promise. Equipment includes a 1,000-h. p hoist.

The Ramsdell-Parrot mine has an 800′ shaft, now idle, being through the Never Sweat shaft, and is connected underground with th mine.

The Gallatin mine has a 250′ two-compartment shaft, equippe 5x10″ hoist.

The Moniter mine is connected underground with the J. I. C. and Squirrel mines.

The J. I. C. mine, lying east of the Belmont, has a 645′ shaft, mainly low-grade concentrating ore, and has shipped a little ore from a 300′ level. This mine has an electric hoist.

The Sunnyside mine has a 700′ two-compartment shaft, equippe 5x10″ geared hoist.

In addition to the foregoing mines, the Anaconda group includes th up-Jim, Buffalo and a number of smaller properties, idle or operated other shafts.

The Trenton department includes the properties formerly held Trenton Mining & Development Co. and the Original Consolidated Mi The Trenton lands were 35 quarts and placer claims, mainly fractio 220 acres, in the western limits of the Butte copper zone, including the and Otisco mines, carrying argentiferous and highly zinciferous copp averaging circa 2.75% copper and 3.5 oz. silver per ton.

The Gagnon mine has 2 shafts. The old 2,300′ three-comp incline shaft, sunk at an angle of 74° is only 150′ from the Origin Equipment includes a 22x48″ Dickson hoist, raising 3-ton skips, with of about 800 tons daily. There also is an 1,800′ air-shaft, circa 700′ the Gagnon incline shaft. A new 3-compartment vertical shaft, start was circa 1,200′ deep at end of year, and is to be sunk to 2,300′, to t place of the old incline shaft and will be given a modern hoist, with cap 1,500 tons daily. The Gagnon mine, connected with the Original, is t with square sets, has electric call bells, and is equipped with 3 Aldrich quintuplex pumps, of 100, 200 and 425 gallons capacity per minute, against a 1,000′ head. For 1909 development work was 6,010′, prov the 2,000′ to 2,300′ levels, an extensive body of ore of good grade t unknown on the upper levels, and the mine was producing about 500

ily at end of 1910. Surface equipment at the Gagnon includes a 20-drill air-compressor.

The Original group included the Original, East Stewart, West Stewart, Mount Moriah mines, and the Fashion, Woolman, Burt, Dives, Little ure, Skip, Whitmore, Spur and other fractional claims, of about 40 acres

The property was taken over by the Anaconda June 1, 1910.

The Original mine has a 2,400′ two-compartment shaft, which was straight- and retimbered, 1908. The Original mine was located 1864, in the first pede to the new Silver Bow diggings, and was the first mine patented in :. In 1866 a 90′ shaft was sunk, without disclosing values. First- ore, formerly of about 8% copper tenor, has shrunk, with depth, to 5%. uction, at end of 1910, of the Original group was about 650 tons daily. pment at the Original mine includes a 126′ steel headgear, and a 36x72″ motion duplex hoist, good for circa 2,600′. There are 4 steam air-com- ors and 2 Ingersoll-Sergeant electric air-compressors, each of latter being n by a 200-h. p. induction motor.

The East Stewart mine has a 1,200′ shaft.

The Parrot department includes former holdings of Parrot Silver & Copper 19 fractional claims, area 40.6 acres, also the West Stewart mine, formerly by the Original. Property includes the Parrot, Little Minah, Bellona, inal No. 6 and West Stewart mines, also the Oro Butte, Champion and per Reef mines, idle for some years, and various other small properties.

The Parrot mine, opened 1884, is one of the pioneer mines of the camp. property shows a barren zone, at depth of circa 1,000′, succeeded by fair bodies below, ore of the mine averaging about 3% copper, and carrying silver and small gold values. The Parrot mine has a 2,100′ shaft, with 3 partments to fourth level and 4 compartments below, timbered with 10x10″ are sets and round timbers, connected underground with Colusa-Parrot, er Sweat, Nipper and Original No. 6 mines. The workings on the different s lie underneath the Washoe, Red Metal and Anaconda claims. The lower kings show an ore body up to 30′ in width, apparently a continuation of Anaconda vein, carrying some high-grade chalcocite and bornite, but the e Vein fault cuts the Anaconda vein in such a manner that the Parrot loses ut one foot in length of workable ground with each foot gained in depth. Parrot also is mining the Nipper vein, which shows ore up to 10% copper 15 oz. silver per ton, and formerly owned therein only a 5-36 interest, ance belonging to Butte Coalition. Best ore produced latterly has come n the intermediate levels, notably the 1,600′ and 1,800′ but levels below 00′ are not showing as well as formerly. Equipment at the Parrot shaft luded a 112′ steel gallows-frame, with maximum load capacity of 50 tons, l a 28x96″ Union Iron Works hoist, capable of raising 10-ton loads from depth 3,000′, hoisting 2 double-deck cages with 10-ton skips swung under, using lat steel rope 5-8″ thick and 8″ wide, but the surface plant was dismantled, e 1910.

The West Stewart mine has a 2,100′ vertical shaft, showing, in the bottom rkings, a 30′ vein carrying ore of good copper tenor, with fair silver values. uipment includes a 120′ steel headgear and a 36x72″ first-motion duplex ist, good for 2,600′.

The Little Minah mine has a 1,200′ two-compartment shaft, with levels ened at 600′, 800′, 1,000′ and 1,200′, and was connected, late 1910, with the st Stewart mine. The mine is supposed to be opened on a continuation of e Nipper vein, showing on the 1,000′ level an ore body of 4′ to 18′ width, rrying 3 to 4% copper and circa 6 oz. silver per ton. The Blue Vein fault rries some concentrating ore in this mine. Temporary equipment is planned be replaced by a hoist good for 2,000′ depth. Production, at end of 1910, as about 250 tons daily.

The Original No. 6 mine, having a shaft of circa 1,000′ depth, a
nected underground with the Parrot and adjoining mines, is a compa
small producer.

Equipment at the Parrot includes an 80-drill Ingersoll-Sergeant
pressor and a 22-drill Rand air-compressor. Mine buildings, mainly
stone and brick, include an engine-house, boiler-house, compressor-ho
a model two-story change-house, with cement floors, 24 shower-ba
lockers for 350 men.

The Washoe department, including former holdings of the Washoe
Co., is 14 claims, area circa 92 acres, with partial interests in 11 ad
claims.

The Moonlight mine, which is the principal producer of the Washo
has ore averaging about 1 oz. silver for each unit of copper. The Mo
has a 1,500′ three-compartment shaft, connected underground, with t
Jay, Never Sweat, Anaconda and Pacific mines, and is timbered with
square and round timbers, in square sets. Equipment includes a 20x48″ I
hoist, raising 2 double-deck cages with a 6″ flat cable, and 2 Ingersoll-S
air-compressors, of 50 drills aggregate capacity.

The Cambers mine has a 225′ two-compartment shaft, connected w
Dutton and Henry George mines, equipped with a 10x14″ hoist raising
deck cages with 1″ round cable.

The Clear Grit mine has an 825′ two-compartment shaft, and is op
depth of 1,000′ by a 400′ winze, being connected underground with th
Stewart and Mountain Consolidated mines. Hoisting was by bucket,
Clear Grit is now worked through the Little Minah shaft, from the 1,000

The Poulin mine has a 1,200′ shaft, not deepened for several yea
is operated through the 1,500′ Buffalo shaft. The Poulin mine prod
limited quantity of low-grade ore, averaging about 2% copper and 5 oz
per ton.

The Butte & Boston department comprises the former holdings of th
& Boston Consolidated Mining Co., area 261 acres, including sundry
and undeveloped claims, with fractional interests in several other pro
and also several thousand acres of placer lands, all in the Butte district.
cipal mines of this department are the Silver Bow, Berkeley, East Grey
and West Grey Rock. The ore occurs largely in shoots in well defined
and was said, 1908, to average about 3.5% copper and 5 oz. silver p
with considerable gold values.

The East Grey Rock mine, which has been the principal producer, y
about 600 tons of ore daily, has a 1,600′ three-compartment shaft, eq
with a 20x48″ hoist operating two double-deck cages, and a 28-drill No
air-compressor.

The West Grey Rock mine, producing about 125 tons daily, ore ca
values mainly in gold and silver, with a small percentage of copper, has an
shaft, of 2 compartments to 700′, and 3 compartments below.

The Silver Bow No. 1 mine has a 1,000′ three-compartment shaft, tim
with 8x8″ square sets, and is connected with the Pennsylvania, Berkele
Silver Bow No. 3 mines, having an 800-gallon Riedler pump on the
level. A 16x42″ hoist raises 2 single-deck cages.

The Silver Bow No. 2 mine has been idle for some years, its ore
tributary to other shafts.

Silver Bow No. 3 mine has a 700′ four-compartment shaft, planned
deepened, and is timbered with 10x10″ square sets, with a 500-gallon Kr
pump on the 600′ level. A 12x14″ Risdon hoist operates 2 single-deck ca

The Berkeley 3-compartment shaft was 800′ deep at the end of 1910
a 200′ raise nearly completed to the bottom. Production is about 350
daily. An 18x32″ hoist raises 2 single-deck cages.

The Blue Jay mine has a 1,075′ incline shaft, sunk at 72°, having 2 com-ments to the 600′ level and 3 compartments below. Hoist is 16x32″, ating 2 single-deck cages, with skips swung under.

The Belle of Butte mine, in Walkerville, has a 500′ shaft, developing ntiferous copper ore, with values mainly in silver, and has been worked, small scale, by lessees, since circa 1895.

The Josephine mine, supposed to have a continuation of the Lexington of the La France, was operated, 1906-1907, by lessees, mainly for silver ies, but is idle.

Miscellaneous properties of the Butte & Boston group include the Kane 3 mine, having a 200′ shaft, and various other properties having but slight elopment.

The Red Metal department includes former holdings of the Red Metal ing Co., which held direct title to the lands of the Butte Coalition Mining , and which succeeded to the holdings of the Montana Ore Purchasing Co., per Consolidated Copper Co., Guardian Copper Co., Minnie Healy Mining , Belmont Mining Co., Johnstown Mining Co., Hypocka Mining Co. and ra-Rock Island Mining Co. Lands are about 60 claims, mainly fractional, h area of circa 145 acres, also mineral rights to 108 town lots in Butte, on of which the Glengarry mine is located. Principal productive mines are Rarus group, which includes the Tramway, Snohomish, Rarus and Minnie aly mines, adjoining the Leonard and Colusa mines of the Boston & Montana.

The Minnie Healy mine, area circa 5 acres, is now, to all practical pur-es, a part of the Tramway mine. The old 1,400′ two-compartment shaft burned, 1908, by an underground fire, and the shaft abandoned, the entire face plant being dismantled.

The Rarus mine has a 2,000′ three-compartment shaft, and is connected the 1,700′ level with the Tramway mine. Shaft is to be retimbered, early 11, from surface to the 1,200′ level. There are no 1,800′ and 1,900′ levels, numbers change below the seventeenth, to correspond with actual depth. ne shows a fine body of 6% ore on the bottom, or 2,000′ level. Mine is bered with square sets. Veins are not thoroughly defined or regular, the re important veins being known as Nos. 14, 16 and 19. The veins have rergent branches, and constitute a sort of a magnified stockwerk, with an zone up to 300′ in width, in places. The mine was producing only about 0 tons of ore daily, 1910. A 32x32″ Webster Camp & Lane hoist operates louble-deck cages, with 6-ton skips swung under.

The Rarus air shaft has been enlarged to 4 compartments, giving in-eased ventilation, and has a 16′ fan.

The Johnstown mine, area 6.66 acres, is a fractional claim, lying next st of the Rarus, and is operated as a part of the Rarus.

The Tramway mine, lying between the Minnie Healy and Rarus, formerly rned one-third by Butte Coalition and two-thirds by Butte & Boston, has a w shaft that is being made the central shaft for the Minnie Healy-Rarus oup. The Tramway shaft, 2,200′ deep, has 3 compartments, each 5x4′ 2″ the clear. The first of the new levels in the Minnie Healy is the thirteenth, bout 50′ below the old 1,500′ level, in which fire was burning, 1908–1909. he Tramway has numerous bodies of ore, of 5 to 6% copper tenor, with good ld and silver values, the really great ore bodies coming in between the 1,300′ nd 1,400′ levels, and on the 1,700′ level there is an ore body up to 75′ in width, veraging nearly or quite 7% copper.

Equipment at the Tramway mine includes a 92′ steel headgear with 12′ leave-wheels. A 32x72″ Allis-Chalmers 2-cylinder Corliss hoist, with 12′ rums, using 1½″ round wire cables, has capacity to raise 7-ton skips from a epth of 3,500′. One compartment has 4-deck cages, and one has 2-deck ages, an auxiliary hoist being used for sinking and handling supplies and men,

through the third compartment. The main surface plant of the depa
at the Tramway shaft, includes a boiler-house, engine-house, carpent
machine-shop, office building, warehouse, and changing-house with h
cold water and shower baths for 150 men. Electricity is used exte
and the entire surface plant cost $365,000.

The Snohomish mine, adjoining the Tramway and south of the
Healy, formerly owned half and half by Butte Coalition and Butte &
is operated partly through the new Tramway shaft, and partly throu
Berkeley shaft of the Butte & Boston department.

The Mountain Chief mine, area 1.15 acres, lies next north of the
Ballaklava, and is said to have produced about $1,500,000 worth of o
a shallow shaft, which was dynamited, under the Heinze regime, on
of litigation, injunctions and dynamite being the favorite weapons i
happy days. The Mountain Chief is developed, and is to be operated,
the High Ore mine. It is claimed by the Anaconda that the Butte-Bal
is mining ore from the Mountain Chief vein, at depth, which contentio
nied by the Butte-Ballaklava, with consequent litigation.

The Nipper group of the Red Metal department includes the
Chief Joseph, Balm and L. E. R. claims. The Nipper mine, area 15.1
has 2 shafts, of circa 1,000′ and 1,200′ depth, with 12 exits, being co
underground with the Parrot, Never Sweat and Little Minah mines,
been operated to some extent through the Parrot shaft. Mine is ti
with 10x10″ square sets. Some ore has been mined from the Nipper,
the Parrot shaft.

The Corra group includes the Corra and Rock Island mines, with
interest in the Silver Queen; a third interest each in the Robert Emme
Robert Emmet II; a seventh interest in the Snoozer of the Raven co
and a half interest in the Blackfoot mine. Area of this group is circa 3
including the Corra mine of 13.15 acres, Rock Island mine of 5.15 acr
Snoozer claim of 9.37 acres.

The Corra mine has a 2,300′ shaft, with a drainage crosscut on the
level, through the Diamond mine, to the main pumping plant of the Hi
mine. The mine shows mainly silver values above the 1,000′ level,
which ore is low in copper, but higher in silver than the average of t
trict. Mining was in progress on the seventeenth level, November
when the surface plant was dismantled, the air-compressor going to the
mine, and hoisting engine and headgear to the Belmont mine.

The Glengarry mine, having an 800′ shaft, has the mineral rights
town lots in Butte.

Miscellaneous claims, slightly developed or practically virgin, ow
whole or part, include the Little Ida claim, area 1 acre; Nightingal
1.5 acres; Swetser, area 8.5 acres; Highland Chief, area 12 acres; Mo
Chief No. 8, Black Diamond, Wild Goose, A. J. P., Hanley, Pompey, Mo
Curran, Scottish Chief, Lioness, Kinkaid and Taffy.

The Boston & Montana department, taken over from the Boston &
tana Consolidated Copper & Silver Mining Co., has 44 claims, mainl
in all, area 483 acres, in addition to various fractional interests in sund
and undeveloped veins in the Butte district. This property was inferior
known as ore in area of above ave., but was fully as large a produ
ducer, and even more profitable. The mine has some stopes of medi
but extends over a 20° in width and is developed several years ah
and possible requirements. Production is approximately 15°c smeltin
also 8°c to concentrating ore. The ores are notably rich in silver and
and returned 1909, an average of 3.225 oz. silver valued at 1³₈ cents, a
cent in gold, for each pound of copper produced. In 1909 the Boston &

opened 51,818′ of workings, or nearly 10 miles. Normal productive city is about 4,500 tons of ore daily.

The Leonard, which is the principal mine of the Boston & Montana development, has an old 1,400′ shaft that became badly drawn, circa 1905, and now used for an air-shaft, and No. 2, a new shaft of 4 compartments, 2,000′ . Mine is timbered with 12x12″ and 14x14″ square sets, requiring monthly verage of about 1,000,000′ of mine timber, board measure, as solid bulking is necessary in most stopes, owing to the great width of the vein, which es exceptionally good gold values. The mine has electric lights and bells, n and electric pumps, and electric haulage on the lower levels. Some ble was had, 1907, on account of fire. Mine is connected with numerous r workings, on various levels. Water from the Mountain View, East isa and West Colusa mines drains to the 1,200′ level of the Leonard and rked thence to surface by 2 Nordberg quintuplex pumps, with steam ends 10x42″ and 42x7½″ plungers, steam ends being fitted with Corliss valves fly-wheels. The water ends were made in the Silver Bow foundry, at te. Valves are of pot form, and the entire water-end is phosphor-bronze, mns being lined with wood, thoroughly soaked in oil, and coated on the de with hot tar, to withstand the corrosive action of the mine waters. There 2 Nordberg quintuplex pumps on the 400′ level. Regular production of Leonard is about 1,200 tons daily.

The surface plant at the Leonard is very complete, including a 152′ steel dgear and 2,000-ton ore-bins. The power plant has ten 250-h. p. boilers, l a 32x72″ Nordberg hoist, good for 3,500′ depth, raising cages with 10-ton ›s swung under, with 1½″ round table. There also is a 12x14″ Risdon king engine. Plant includes 3 air-compressors, of 3,000, 4,000 and 5,000 ic feet capacity per minute, respectively.

The West Colusa mine has an 1,809′ three-compartment shaft, with levels ′ feet intervals to depth of 1,200′, and thereafter at 200′ intervals. Shaft s retimbered, early 1910, and cut down to 3 compartments, being given e sets, to obviate squeezing, which caused much trouble in the past. ne is timbered with 10x10″ and 12x12″ square sets, and shows vein-matter to 400′ in width. Connection is had underground with the Mountain ew and Leonard mines. Fire from the Minnie Healy caused trouble, 1909, t was gotten under control. Normal production is about 800 tons daily. rface equipment includes a 60′ Nordberg hoist, operating 2 single-deck ges, and a 13x12″ Iron Bay sinking engine.

The East Colusa mine has a 785′ three-compartment shaft, with levels ened at 100′ intervals from 300′ to 700′. The mine has a vein of about 65′ idth, averaging 3 to 4% copper, with streaks ranging up to 12%. Production is about 200 tons daily. Equipment includes a 16x32″ Griffith & Wedge ›ist.

The Pennsylvania mine includes the East Pennsylvania and West Pennlvania shafts, with an air shaft 1,600′ deep, having a blower, on the 1,200′ vel, of 60,000 cubic feet air capacity per minute. The East Pennsylvania as a 400′ shaft, and the West Pennsylvania has an 1,875′ three-compartment haft, with levels at 100′ intervals from 100′ to 1,000′, and at 200′ intervals elow. Connection with the Mountain View mine is had on the 1,800′ level, nd the Pennsylvania also is connected with the St. Lawrence and Silver Bow No. 1 mines. This property has extensive stopes above the 600′ level, ore ying nearer surface than in most of the Butte mines. Equipment includes a 350-gallon electric pump on the 1,800′ level, forking water through a crosscut o the Mountain View mine, and thence through a long drift to the Leonard mine, whence it goes to the precipitating plant. Average daily production is about 1,100 tons. Surface equipment includes 2,000-ton ore-bins, a 19x48″ Allis hoist, operating 2 double-deck cages, a 12x24″ sinking engine and an

Ingersoll-Sergeant air-compressor, with 20x30″ steam cylinders and 20
air cylinders.

The Badger State mine, in the northeastern part of the camp, adj
the North Butte mine, about 300′ south of the Elm Orlu and about
from the Butte & Superior, develops the Badger State, Auraria, Ken
Silver and Silver City claims. The mine has an 1,800′ four-compar
shaft, and formerly produced a little good ore from shallow workings.
1,300′ level shows copper ore of fair grade, and stoping was begun, c
1,300′ and 1,400′ levels, May, 1910, when several hundred tons daily
being produced. Shaft shows improvement in the bottom workings,
supposed to develop the Jessie vein. The Speculator vein, on the 1,200′
was found to run high in zinc and low in copper. This property bids
become an important producer.

The Mountain View mine has a 2,249′ three-compartment shaft,
1,200′ air-shaft, to be deepened to 1,800′. Mine is connected with the
Colusa and West Pennsylvania on the 1,800′ level, and with the Hig
on the 2,200′ level. The Mountain View shows 6 veins, of 8′ to 60′ widt
averaging up to 5% in copper tenor, being among the richest mines i
camp. Production is circa 1,400 tons daily. Equipment includes 4,500-to
bins, a hoist good for 3,000′ depth, a 12x14″ Risdon sinking engine, a
Allis air-compressor with 20x24″ steam cylinders and 40x42″ air cylinders

The Gambetta mine, in the vicinity of the Pennsylvania, has 2 shaft
1 of 300′ and No. 2 of 200′, and is idle.

The Moose mine has a 400′ shaft, and is but slightly developed, h
been idle for some years.

The Greenleaf mine, located east of the proven ore zone of Butte,
1,000′ shaft, with a hoist good for 2,500′. Mine has about 800′ of lateral
ings, showing an 11′ ore body, with a southerly dip, carrying several pron
streaks of copper ore. Work was suspended, July, 1908, but the property
no means devoid of promise.

The Comanche mine is but slightly developed, and this departmen
a number of other properties with shallow shafts, on which more or less e
ratory work has been done, at various times.

The Alice mine group, 17 claims, area 340 acres, taken over from the
Gold & Silver Mining Co., includes the Alice mine, located in the northwe
part of the Butte camp, which was a considerable producer in the past, m
of silver, with some gold and a little copper, the mine showing increased c
values at depth. The 1,500′ shaft has been filled with water to the 700′
for some years past. The upper levels carry good values in silver and
associated with lead and zinc, and the old workings show a large tonna
argentiferous zinc ore, left unmined because of difficulty in treatment.
mine is said to be opened slightly by drifts from the 1,900′ level on the Valda
claim of the Corra-Rock Island mine. In 1906, under former ownership,
duction was 3,170 tons of ore, giving gross returns of $7.70 per ton, and co
to mine, mill and smelt, $9.30 per ton.

The merging of a great majority of the copper mines of the Butte dis
in the Anaconda permits the effecting of great economies, expected to am
ultimately to the equivalent of nearly one cent per pound in the cost of fini
copper. Butte hill is a network of metalliferous veins, with nearly east
west strike, crossed by a number of north and south dykes, some of which
ore bearing for a short distance, near their intersection with the veins.
matter of clearly defining apex and extra-lateral rights, under the arc
Federal mining laws, is one of the greatest possible difficulty, and in
past had led to litigation costing millions of dollars, all of which ultima
had to be paid out of the profits from copper produced. The merging of
various mines permits a number of economies to be put into immediate ef

will allow other economies requiring several years to work out completely. :after, ore will be mined through the most accessible shafts, instead of, as tofore, through shafts often poorly located for such extraction, and good hitherto remaining unstoped, because inaccessible, without the sinking stly new shafts, will be readily available for extraction. Mules are being aced by electric trolleys for underground haulage, and, among other things, company plans creosoting all mine timbers, which will add greatly to their

During 1908, the mines now owned by the Anaconda, excluding the Alice Butte Coalition, made 141,858′ of new openings, and the average of new ings made yearly is about 30 miles.

The mine waters, being highly charged with copper, leaching plants have built at practically all of the big mines merged in the Anaconda. Old p-iron, tin cans and wire rope are used as precipitating agents, these articles manding a standard price of 1 cent per pound. The flow of the water in precipitation tanks and launders is much more rapid than is the case in large Spanish lixiviation plants. The principal leaching plant, and the t modern and best planned in the district, is at the Leonard mine. This it, costing about $20,000, and treating water from all of the Boston & Montana es, includes a building for drying and shipping the copper precipitate.

Originally, all of the mines in Butte were operated by steam power, and ly of the mines had very extensive steam plants. Circa 1900, commercial tric current became available, from the United Missouri Power Co., and use of electric power has increased steadily, this offering great advantages r steam, in initial cost, and flexibility of service. The management plans substitution of electricity for steam throughout the mines and works, which uld effect a saving of about one-third cent per pound on finished copper—an ount that seems small, measured by the pound, but which, on the maximum ductive capacity of the Anaconda, reaches the magnificent sum of nearly 00,000 yearly.

A feature of great interest in connection with the substitution of electricity steam, as the prime motive force, is the very extensive use of compressed generated by electricity, for operating hoists, power drills and other uses. e new air compression plant at the Leonard mine is the most extensive in world, and was planned to go into full commission early 1911. The con- ller house at the Leonard was doubled in size, 1910, and has transformers in -proof compartments. The new air compression plant, built as the first t for a plant of double the present size, has three 1,200-h. p. Nordberg air- mpressors, each with a capacity of 7,500 cubic feet of free air per minute. A ilding 300′ long contains 25 receivers, each 10x30′ on the ground, for the mpressed air, this air-storage plant having reserve power for 8 hours. In nection with this plant is the largest steel water tank in the world, 100′ in ameter. The hoists at the Mountain View, High Ore and Diamond mines ll be first operated by this plant, and eventually all hoists at all mines. The sent electric-pneumatic power plant cost about $1,000,000.

Electric power is brought from Canyon Ferry, 70 miles distant, and from joining hydro-electric installations in Broadwater county, current being ired to the mine with a primary voltage of 50,000 volts, reduced to 2,000 lts in a transformer station, just outside of Butte, power being distributed the various workings from a main station at the Never Sweat mine, the current ing used at 440 volts.

Power from the plants in Broadwater county being found inadequate, nd the company desiring to fully control its own power, current was brought, ne, 1910, from Great Falls, a distance of 130 miles.

The hydro-electric power installations on the Missouri River, in the vicin- y of Great Falls, include the Black Eagle Falls and Rainbow Falls plants. he Black Eagle Falls plant has a 42′ effective head, generating 8,700 h. p.,

except at the lowest stage of water, and also includes a 3,000-h. p. au steam plant. This plant was practically ruined, June, 1908, by flood was rebuilt.

The Rainbow dam, 4 miles below the Great Falls smelter, complete at a cost of about $1,500,000, is of heavy timbering, concrete and ro high and 1,200′ in length, generating a minimum of 30,000 and a maxin 40,000 h. p., and transmits current at a voltage of 100,000. It is plan eventually furnish power for Anaconda, as well as Great Falls and Butt this plant.

The company also has given tentative consideration to another electric plant, at Big Falls, 8 miles below Rainbow Falls, on the Missouri this fall having a drop of 60′.

The Washoe sampler, formerly known as the Taylor & Brunton sa works, at Butte, bought 1904, by the Washoe Copper Co., was burne 1910, and is being rebuilt, of reinforced concrete, with capacity of abou tons daily, and is to be completed circa May, 1911.

The Butte Reduction Works, formerly owned by the Colusa-Parrot & Smelting Co., were overhauled, and largely rebuilt, 1905-1906, at a about $300,000, but partially destroyed by fire, February, 1906, after again thoroughly rebuilt. The smelter, which was fully described V under title of Colusa-Parrot, has been dismantled, but the 1,000-ton c trator has been leased to Senator Wm. A. Clark, for concentrating the zi of the Elm Orlu Mining Co. The mill, of 1,000 tons capacity, putting 1, includes a 15x24″ Blake crusher, five 9x15″ crushers, ten 6′ Chilean nine 16x30″ Cornish rolls, 62 two-compartment and 3-compartment jigs, and 76 Wilfley tables.

The Parrot smelter, at Butte, idle since 1900, is antiquated, and fi for scrap. The Parrot also owned a copper refining plant at Brid Conn., equally antiquated and valueless, and idle some years.

The Trenton smelter, at Butte, includes a small concentrator and fu with 750 tons daily capacity, but lacks a converter plant. This plant general custom business, until closed, 1905, and is idle, and likely never to be in commission.

The old Butte & Boston concentrator and smelter, at Meaderville, were closed, 1905, and demolished, large quantities of slag, which may smelted, remaining at the old site.

The Washoe works, 2 miles east of Anaconda, and 28 miles by rai Butte, have cost upwards of $10,000,000, and are rated at 10,000 tons capacity, though nearly or quite 12,000 tons have been treated in 24 the plant being much the largest in the world. The site, of about 240 is on Washoe Hill, across the valley from the location of the old Ana works, which have been dismantled. The Washoe plant was designed by Klepetko, and built and equipped with the able assistance of Messrs. Mathe Repath and Gulberg, and the late Wm. F. Evans and R. C. Collins. G was broken May, 1900, and smelting was begun February, 1902, since time numerous modifications, improvements and additions have been The construction of the original plant required 20,000 tons of structural 25,000,000 feet of lumber, 1,000 carloads of brick, 15,000 cubic yards of ma and 500,000 cubic yards of excavation. The annual productive capac the plant is about 150,000,000 lbs. blister copper yearly, in addition to gold and silver values, those works being one of the largest silver produc the world, although silver is merely a by-product.

Being located upon the side of a [illegible] full advantage is taken of g [illegible] The grounds are of exceptional neatness, an plant as a whole is nearly ideal in design, construction and equipment.

The concentration plant, covering 7 acres, includes a number of buil

ıe bins, of wood and steel, include 8 second-class ore storage bins of 1,250 ıs capacity each, thirteen 200-ton sampling ore-bins, and a 2,500-ton coal-ɔrage bin.

The sampling mill, 40x60′ in size and 6 stories high, is in 2 sections, each 1,800 tons daily capacity. Ore is taken from sampling bins by electric omotive and dumped into the mill-bins, whence delivered to crushers, ıshed material being raised to the top of the building by bucket elevators. ıe descending stream of ore is cut four times by Brunton automatic samplers, :h taking 20%, giving a final sample of 3.2 lbs. per short ton of ore. Dis-:d from the sampling mill is elevated and dumped into the concentrator ore-ıs, or, in the case of smelting ore, is sent to the blast furnace storage-bins. ıe final sample is quartered by a Brunton quartering shovel, the resulting nple dried on a steel dryer, ground on an Engelhart sampling grinder, cked to pass through a 100-mesh sieve, and divided into 3 sample packages, e going to the laboratory for analysis and one to the owner of the ore, while e third is filed as a control, in case of dispute.

The concentrator power-house, 136x150′ in size, stands between and nnects the two halves of the concentrator proper. The construction is of ːel, with brick walls, and there are three 15-ton traveling cranes, of 44′ span. ıuipment includes two 4-cylinder triple-expansion condensing engines of 300 indicated h. p. at 200 lbs. steam pressure, but run at 150 lbs. pressure, veloping 1,750 h. p. each, with an 1,150-h. p. 4-cylinder triple-expansion gine held in reserve as an auxiliary. There also is a complete electric plant, king power from an installation near Helena, and from Flint Creek Falls, 22 iles west of Anaconda, electric power being used in preference to steam, but ıth the steam plant remaining intact for emergencies. This plant operates ıe mill and furnishes power for lighting the works, lighting the city of Ana-ɔnda, operating the city street-car system, etc.

The concentrator boiler-house, of brick and steel, located behind the coal-ıns, has ten 300-h. p. Stirling water-tube boilers, feed pumps, etc., with an ıdependent steel stack, 160′ high, of 14′ diameter.

The concentrator plant proper consists of 2 steel and wood buildings, on ɔone foundations, each 255x350′, each containing 4 complete sections, or 8 in ll. Each section contains a 12x24″ Blake crusher, two 7x10″ Blake crushers, Hartz jigs for coarse concentrates, 1 set of 15x42″ coarse rolls, 1 set of 15x42″ ıe rolls, 36 Evans jigs for fines, 1 set of 15x42″ rolls for middlings, 18 Evans ıgs for middlings, 3 six-foot Huntington mills, 18 Evans finishing jigs and 33 Wilfley tables, with a large number of classifiers, settling tanks, dewatering ıanks, elevators and trommels. The first crusher reduces ore to 3″ size, which ɔasses over 2 sets of trommels for sizing, oversize material going thence to 2 ɔmaller crushers, which reduce it to 1½″ size. Two belt-elevators take this material to a series of trommels for coarse sizing, oversize going to coarse jigs which produce coarse concentrates for the blast-furnaces. The waste from the coarse jigs goes to 2 sets of 15x42″ rolls for crushing, and is thence elevated and rejigged. In the jigging department all undersize material from crushers ıs treated automatically. The jigging sections have Evans jigs in 3 double rows, with Evans hydraulic classifiers making 3 sizes of concentrates, which go to the storage bins, while middlings go to the middling department, where 2 sets of 15x42″ rolls crush the material to about 1¼″ size, this going by belt-elevators to 4 sets of trommels, from which the undersize goes automatically to 4 hydraulic classifiers, which feed 18 double Evans jigs, set in a triple row. Concentrates from the middlings department are mixed with concentrates from the jigging department, going thence to storage bins. Middlings are collected in launders, and taken by elevators to the regrinding department, where three 6′ Huntington mills are fed from V-shaped tanks, the ground material passing through 1¼″ screens to hydraulic classifiers, thence to the jigs, both concen-

trates and tailings being carried by water, in launders. The slimes ment has 33 Wilfley tables, fed from the bottoms of V-shaped tanks, trates being washed in launders to the settling tanks, at the foot of t centrator building. Tailings carry an average of about 0.7% copper a silica.

The tankhouse, of wood, is 70x670′, containing 9 settling tanks f section, each tank being 19x19x15′, with a capacity of 420 tons. Each of 9 tanks is divided into 6 tanks for the first settlement of concentrat 3 for settling the overflow of the first settlement tanks, the overflow fr second settling tanks going to 3 large tanks, common to all 4 sections half of the mill, the overflow from the final settlement tanks going to pond, together with slum-water from all the settling tanks and Wilfley The product of the first settlement tanks is known as fine concentrate of the second tanks as second settlement concentrates, and that of th series of tanks as tank-slum. The fine and second settlement concé are treated in the roaster building, and the tank-slum goes to the briq plant.

The 6 slum-ponds, in the valley below the works, are each of about 3 average size. As soon as one pond is filled the slum-water from the w diverted to an empty pond, and as much water as possible is drained fr filled pond, slimes being excavated by one of 2 Lidgerwood traveling cab operating 5-ton buckets, the slimes being piled in heaps on the edges pond, and allowed to drain. Dried slimes are removed by buckets, and into hopper-cars, thence to railway cars conveying them to storage-bin ing the briquetting plant. Slum-water containing the least values is u condensing purposes and for sluicing slag at the reverberatory and furnaces. Settling tanks containing fine and second settlement concen after draining, are emptied from the bottom into cars and material ta the charging floors of the calcining building, being weighed and sampled dumping. Throughout the works material is weighed and sampled on ing and leaving each building, giving an accurate check on the work department.

The 96x412′ roaster building, of steel frame on stone foundations, c 64 McDougal calcining furnaces of the Evans-Klepetko type. Each fur 16′ in diameter and 18′ high, with 6 hearths having revolving water- shafts and arms driven by top-gearing, rabbling arms being so set as to material from circumference to center, and vice versa, on alternate h until the material drops from the lower hearth into 2 calcine hoppers each furnace, beneath which run the railroad tracks, hopper cars transp calcines to the reverberatory building. No carbonaceous fuel is re except occasional fine coal for charging a cold calciner. Gases are through brick flues into 40x40x300′ brick and steel dust-chambers havin crete inner walls, where much of the flue-dust settles. The bottom of th chamber has a series of hoppers, underneath which are railroad tracks, flu going direct to the reverberatory furnaces for smelting. The barrings ing to the rabbling arms and shafts are removed and sent to the blast-fur In charging the roasters, finely crushed limestone and screenings from class ore are admixed, in the feed-hoppers, for the purpose of produ balanced charge for the reverberatories. The capacity of each calcine tons per day.

The reverberatory department consists of two 183x225′ steel buil each containing 4 coal-fired furnaces with hearths 19′ wide and from 1 116′ in length, with grate area of 8x16′, having a smelting capacity tons daily, on natural draft. Fuel is Wyoming coal, dumped into h having 4 discharges directly above the fire-box. The flames, after l the furnaces, pass through two 375-h. p. Stirling boilers, in tandem, re

temperature of the gases to about 600° Fahrenheit when reaching the main and securing about 600 h. p. from the waste gases. Ashes and partly burned drop from the fire-boxes into launders carrying them over a grizzly, the er pieces of ash going to the slag-sluice, while the smaller pieces, containing urned coke and coal, are sluiced to the coal-washery. Slag is skimmed n the reverberatories, at 4-hour intervals, into a stream of slum-water, ch granulates and sluices it, through a launder with cast-iron lining, to the dump. By allowing slag to accumulate until 3′ or 4′ above the skimming-e, it is possible to skim the furnace very rapidly, 60 tons of slag being amed in 20 minutes. Matte is kept some distance below the skimming-e, rendering it impossible to pull out any of the matte, thus obviating casions. Matte is tapped from the side of the furnace through copper tap-plates, and run through cast-iron launders, lined with silicious material, 0-ton hot-metal ladles that go by tram to the converters. Fire-brick used he reverberatories are made by the company's brick plant, bricks being x15′ in size. Bridge-walls and sides are luted with clay every 30 days, n necessary. Bridge-wall plates are kept cool by the circulation of air ough pipes connecting with the main flue. Fumes from the reverbera-es are taken through underground flues, 1 for each row of furnaces, to the n flue. Flue-dust is not briquetted, but is treated in reverberatories with . The reverberatory department has given exceptionally satisfactory re-s, effecting an increase of about one-third of the normal smelting capacity, eduction of about one-third in fuel charges, saving about 10% of unburned in the coal washery, reducing labor costs and securing about 600 h. p. of rgy from the waste gases.

The briquetting plant occupies a 55x192′ frame building containing 4 ambers end-cut auger-type briquetting machines, each of about 700 tons y capacity, 2 machines usually being sufficient to handle all material. quettes are made of fine concentrates, fine first-class ore and pond-slums, ed with crushed coke and coal from the coal-washery. Materials are ught from storage-bins by belt conveyors to a pug-mill, whence they are charged into the briquetting machines, where further mixed and forced ough a former in a continuous bar, which is cut into 10-pound briquettes by revolving cutter. Briquettes are taken by a series of belt-conveyors to rage hoppers, whence loaded into charging-cars for the blast-furnaces.

The blast-furnace building, of steel frame, 82x269′ in size, has 3 floors, the t carrying the railroad tracks, second being the main operating floor and rd the charging floor. There formerly were numerous furnaces of 56x180″ tion at the tuyeres, and 40′ high, of about 400 tons daily capacity each, these have been made into 3 furnaces by building connections between, 2 the 3 furnaces being 51′ in length, while the third is 87′ long, with a uniform dth of 56″ at the tuyeres. The two 51′ furnaces have a maximum capacity 1,800 tons each, and the 87′ furnace has smelted 3,100 tons in 24 hours. It possible to repair one end of any of these furnaces while frozen, with full elting in progress at the other end. The large blast-furnaces of the Ana-nda mark perhaps the most important step taken in copper smelting since e invention of the bessemer process of copper conversion. The bottom of e centre of each furnace is of silica brick, laid on water-cooled cast-iron plates ounted on cast-iron columns, with a gradual slope to each discharge spout. e 87′ furnace has 3 discharge spouts and three 16′ settlers, with 150 four-inch yeres, the 51′ furnaces having 88 four-inch tuyeres and two 16′ settlers each. e credit for these gigantic furnaces is due to Mr. Mathewson. Among the vantages are increased hearth area, with but two ends to hold crusts, while usts forming on the sides can be disposed of by permitting the furnace to run wn, in which case the crust will drop, or, if necessary, can be barred. The ge furnace has a smaller radiating surface for the same hearth area, requires

The local transportation system of the Washoe works includes 48 m standard-gauge railroad tracks, equipped with 17 Porter air-locomotiv 12 to 22 tons weight each, and 240 cars. The air receivers of the locom are charged at 900 lbs. pressure, cut to 150 lbs. pressure at the cylinders by ing valves. There are charging stations at frequent intervals, fed by an sive system of high-pressure pipes. Locomotives are recharged about ev minutes, 2 minutes being required for the work. The tram system h about 13,000 tons of material daily.

The laboratory sampling mill, of brick, 29x63′ in size, cares for all lurgical samples taken throughout the works, there being about 9,000 sa of different kinds of material monthly.

The laboratory, of brick and stone, 2 stories high, is one of the most oughly equipped at any metallurgical plant. All samples taken in the and at the sampling mill are sent to this department, and there analyzed, being about 15,000 actual determinations monthly, for copper, gold, silver zinc, sulphur, alumina, silica, etc. There are testing and photographic d ments in the basement of this building.

In addition to the various milling and smelting departments prev described, there are large and well equipped shops, including a smithy, b shop, machine-shop, carpenter-shop and electric repair shop. There als large foundry and machine shop at Anaconda, about 2 miles from the sm doing new work and heavy repairing, in addition to a general custom bus

The general office building, of brick, contains offices for the ma assistant superintendents, accounting department, engineering department also a large telephone exchange, there being a private system connecti departments of the works, with long distance connections for Butte, H Great Falls and other Montana points. There also are private telegraph connecting with the Western Union and Postal companies at Anaconda.

The amount of water required by the Washoe works, when in full oper is about 35,000 gallons per minute. Water is stored in Storm Lake and Lake, about 15 miles west of Anaconda, water from both creeks and lakes gathered by a dam, about 4 miles west of Anaconda, and diverted to the in a 5x7′ flume, 7 miles long.

Much trouble has been experienced by the Washoe works from time to through damage suits, because of fumes thrown off by the smelter, and sums have been paid to farmers in the Deer Lodge valley, in liquidation of claims, some of which undoubtedly were genuine, while it is equally certain a large number were brought by professional "smoke-farmers." The bui of a very high stack, on the top of a high hill, and the installation of the ar plant, have greatly reduced the percentage of solids in the smelter smoke. Federal government has taken a hand in the proceedings, but Judge Hun cided, Jan. 25, 1910, that there had been some damage from arsenic, bu appreciable damage from sulphur fumes. Despite this decision by Judge H the government sent experts to take samples of the soil, vegetation, grains, t etc., and the Anaconda company did similarly. The government again bro suit against the Anaconda, March 18, 1910, alleging that a tract of approxim 1,000 square miles, in 5 counties, has been damaged by fumes, placing damage to standing timber at a figure that seems ridiculous to all who know quality of the timber in that vicinity. The government has asked a perma injunction, and that the company be compelled to operate its plant in such ner as to end the destructive sulphur and arsenic fumes. The government claims that damage has arisen from the pollution of water in streams by Washoe works, and the government experts have suggested that the plant its sulphur fumes into sulphuric acid and make superphosphates there but, the government having withdr[illegible] own phosphate lands from en and none other being available, it [illegible] where this suggestion

solution of the problem. Some wag has suggested that the Anaconda build ipe-line to the Pacific ocean, and pump its acid into the sea. It is commerly impossible for the Washoe works to turn its sulphur fumes into sulphuric l, and find a market therefor, owing to the immense quantity of acid that uld be made if all of the fumes were turned into that product—an output of l that would swamp the markets of North America, if not of the world.

In concluding a description of this wonderful metallurgical plant, which is largest in the world, it is but justice to give credit to Mr. Mathewson and corps of able assistants for the great technical skill and executive ability that manifested, in a remarkably high degree, in every department. An inspecn of the plant is a genuine pleasure. The Washoe works employ about 2,000 n directly, and 500 men indirectly.

The Great Falls smelter, at Great Falls, Mont., 172 miles northeast of Butte, eives ore over the Great Northern railway, at a freight charge of 75 cents per . This plant was opened, 1891, with a capacity of 1,000 tons daily, inased, 1903, to 2,000 tons, and later to 4,000 tons, and, with improvements ce made, has a maximum capacity of nearly 5,000 tons daily. The smelter ats, normally, about 400 tons daily of ore, and the mill-product of 2,500 to 00 tons of concentrating ore.

The concentrator, second only in size to the monstrous Washoe plant, is 6 sections, each a complete mill in itself, the 6 having a total capacity of 2,700 s daily. The building, of wood, is equipped with six 10x20″ and twelve 2″ Blake crushers, 16 Huntington mills, 18 rolls, 317 sieves, 68 Hartz jigs, Evans jigs, 5 Overstrom tables, 42 Wilfley tables, 10 six-foot vanners and four-foot vanners.

The smelter equipment includes 22 McDougal calciners and five 500-ton ter-jacket blast-furnaces, which apparently are to be coupled into long furces, similar to those at the Washoe works. There were four 175-ton reverratory furnaces, and additional reverberatories were being installed, 1910, the vacant spaces between. The converter department has 12 stands, with x170″ shells of the upright type. Product is blister copper of about 99% per, including circa 40 oz. silver and 0.25 oz. gold per ton.

A new smokestack built 1908, at a cost of about $250,000, is the largest in world, and effects a saving, in flue-dust, of about $150,000 yearly. This ck is set on a foundation 38′ deep and 97′ in diameter, composed of 10,000 s of concrete. The stack is of 506′ height, 78′ 6″ outside diameter at base d 53′ outside diameter at the top, weighing 16,600 tons. Material of stack perforated segmental brick, slightly shaped to fit the curvature of the stack, uivalent in contents to 5,700,000 common brick. The stack has a sectional ing, and is capable of carrying about 4,000,000 cubic feet of gases per minute, capacity being equal to any possible increase in the works. A new flue, conecting the smelter and stack, has a 125x175′ dust-chamber and a 1,450′ fluection 48′ wide and 28′ high.

The electrolytic plant has a capacity of 70 tons of refined copper cathodes ily, gold and silver slimes being reduced in a separate refinery. Equipment ludes 3 furnaces for melting cathodes and for casting refined copper into ge-bars and cakes. A considerable portion of the blister copper from the elter is sent for refining to the Raritan works, at Perth Amboy, N. J. Curnt for the electrolytic tanks is carried by solid overlapping slabs of copper.

Extensive fuel tests, made 1910, proved that Great Falls coal was available r smelting use, which was not believed formerly. In 1909, the Great Falls rks treated 1,092,168 tons of ore.

Coal lands of the Anaconda are extensive, including the former holdings f the Diamond Coal & Coke Co.; 1,900 acres of coal lands on Bear Creek, near ed Lodge, Carbon Co., Mont., formerly held by the Washoe Copper Co., Castle & Sand Coulee, 16 miles from Great Falls, formerly held by the Bos-

The cost of Anaconda copper, laid down, after deduction of included and silver values, probably was a little under 10 cents per pound at the en 1910; and for 1911 should be in the neighborhood of 9½ cents, with the pros of a further small reduction in cost, eventually, through various economie operation, power and otherwise, that should more than offset the gradu decreasing ore values, which decrease is due mainly, though by no means enti to decreasing values with depth, but also is brought about, to some extent the extraction and treatment of ore that in former years, with less pe methods of mining and reduction, was not amenable to treatment at a pr

The statements appearing in the mining and financial press, at irreg intervals, that Anaconda is a decadent property, and has but a few yea profitable life ahead, are not made by those who are conversant with the m and the district. Never again will the Anaconda mine and smelt ore of anyt like the average richness of earlier days, but there remain unmined, in its ne four square miles of choice territory, in the heart of one of the richest mi districts of the world, tens upon tens of millions of tons of ore, of sufficie high average grade to net the company profits of scores of millions of dol The management, in its various departments, is thoroughly efficient and cap

ANACONDA-CORRAL CONSOLIDATED MINES CO. ARIZO

Dead. Formerly at Bouse, Yuma Co., Ariz. Described Vol. VIII.

ANACONDA MINING CO. MONTA

Dead. Was dissolved Apr. 11, 1907. Was the parent of the Anaco Copper Mining Co. Former office was 42 Broadway, New York, N. Y. merly at Butte, Silver Bow Co., Mont.

ANACONDA MIZPAH COPPER CO. NEVA

Dead. Was merged, circa June, 1907, in the Ely-National Copper Formerly at Ely, White Pine Co., Nev.

ANACONDA PROPRIETARY COPPER, GOLD & SILVER MINE. AUSTRA

Dead. Was liquidated and succeeded by Melrose Copper Mines. merly at Condobolin, Cunningham Co., N. S. W., Australia. Described Vo

ANACONDA-SONORA COPPER CO. MÉXI

Dead. Was a bit of stock-jobbery. Formerly at Sahuaripa, Sonora, M Fully described Vol. VIII.

ANCHORIA COPPER MINING CO. WYOMI

Office: 55 High St., Oshkosh, Wis. Mine office: Copperton, Carbon Wyo. Hon. David H. Craig, president; H. O. Granberg, secretary-treas Organized April, 1901, under laws of Wyoming, with capitalization $1,000, shares $1 par. Lands, 4 claims, area 80 acres, patented, in the Battle Lake trict, developed by a 200′ shaft and tunnels of 45′ and 60′, showing an ore b estimated at 45′ width, giving average assays of 17% copper, and from a t to $5 gold per ton. Has a 40-h. p. steam plant, with hoist good for 500′, 3 p drills and 4 substantial mine buildings, of logs. Idle several years.

ANCHOR MINING CO. UT

Office: Hancock, Mich. Operating office: 608 Boston Bldg., Salt L City, Utah. Mine office: Myton, Wasatch Co., Utah. Chas. A. Wr president; John D. Cuddihy, vice-president; F. W. Taylor, secretary and tr urer; preceding officers and Henry L. Baer, directors. Organized June, 1 under laws of Michigan, with capitalization $150,000, shares $25 par; iss $45,000. Annual meeting, second Tuesday in June. Lands, 9 claims, patei area 131 acres, in the Snake Creek district.

COMPAÑÍA MINERA DE ANDACOLL CH

Office: Santiago de Chile. Mi Coquimbo, C Organized July 4, 1906, under 1,125,000 p shares 15 pesos par.

mineral lands at Tambillos. Mines are wet, showing considerable quantities of 5 to 6% sulphide ore, with ferruginous gangue. Property has extensive old dumps

A leaching plant, built 1907, treats the mine-water, which carries less than 100 grams of copper per cubic meter, and also is leaching old ore from the dumps. with sulphuric acid. Equipment includes a central electric power plant, with a 75-h. p. gas engine and producer gas plant.

ANDERSON-APACHE COPPER CO. **NEW MEXICO.**

Office: Douglas, Ariz. Mine office: Hachita, Grant Co., N. M. Hon. Geo. H. Neale, president; Harry Duey, vice-president; Chas. H. Howe, secretary and treasurer; L. K. Houlton, superintendent. Organized June 1, 1907, under laws of Arizona, with capitalization $500,000, shares $5 par. Holds lands under a $100,000 bond and lease, with $20,000 paid.

Lands, 5 claims, area 100 acres, 5 miles southeast of Hachita, known as the Apache mine. Mine, opened 1883, was worked continuously until 1907, by chloriders, producing approximately $200,000. Property shows contact deposits between porphyry and Carboniferous limestone, carrying cuprite, malachite, chalcocite, chalcopyrite and chrysocolla, ores being mainly oxidized to present depth, and running 4 to 30% copper, being estimated by company to average 10% copper and 20 oz. silver per ton, which seems high. Ore is bunchy. Development is by a 300′ two-compartment shaft, with about 3,500′ of workings, estimated by management to show 250,000 tons of ore, with about 40,000 tons blocked out for stoping, which estimates are excessive. Equipment includes a 25-h. p. Fairbanks & Morse gasoline hoist. Shipped a little ore, 1908, to Copper Queen smelter, giving net smelter returns of about $17 per ton. Idle.

ANDERSON MINING CO. **BRITISH COLUMBIA.**

Dead. Office was Five Sisters Blk., Victoria, B. C. J. C. Anderson was president. Lands were 12 claims, area 600 acres, having limited development, by tunnel, said to show some good ore. Had steam power and, 1903, employed 10 to 20 men. Formerly at Alberni, Vancouver Island, B. C.

ANDES COPPER MINING & EXPLORATION CO., LTD. **CHILE.**

Dead. Formerly at Huatacondo, Tarapacá, Chile. Described Vol. VIII.

SOCIEDAD BENEFICIADORA DE MINERALES ANDINA. **PERÚ.**

Mine office: Chico, Yauli, Junín, Perú. Has argentiferous copper ores. Idle and apparently moribund.

SOCIÉTÉ DES MINES DE CUIVRE ANDREA. **SPAIN.**

Office: Brussels, Belgium. Mine office: Andrea, Badajoz, Spain. Organized Sept. 27, 1907, under laws of Belgium, with capitalization f1,000,000, in 10,000 shares of f100 par, and 10,000 shares without assigned value. Lands include the Andrea, Esperanza and Nuestra Señora del Carmen mines, in the district of Lloreña. Development work supposedly in progress.

ANGANG COPPER CO. **MÉXICO.**

Office: Coliseo Nuevo 4, México, D. F. Letter returned unclaimed from former mine office, Chirangangueo, Zitácuaro, Michoacán, Mex. Arthur Chippendale, superintendent, at last accounts. Stock issued supposedly is owned by Arimex Copper Co., a short-winded promotion put out by Thomas W. Lawson. Property has a considerable body of low to medium grade chalcopyrite, with a limited amount of development. Idle practically since birth, and apparently moribund.

COMPAÑÍA METALURGICA DE ANGANGUEO. **MÉXICO.**

Dead. Formerly at Angangueo, Zitácuaro, Michoacán, Mex. Described Vol. VIII.

COMPAÑÍA MINERA LOS ANGELES. **BOLIVIA.**

Mine office: Coro Coro, La Paz, Bolivia. Was a small producer of native copper, from conglomerate strata, at last accounts.

ANGEL MINING CO. **ARIZONA.**

Dead. C. Frank Hathaway was president and Jonah H. Diffenderfer, man-

ager. Property, including the Angel and Bess groups, was sold, circa 1905, Arizona Gold & Copper Mines Co. Formerly at Wickenburg, Maricopa Co., A

ANGLO-AMERICAN COPPER CO., LTD. ARIZO

Dead. Was succeeded, June, 1907, by Ray Consolidated Copper (Formerly at Kelvin, Pinal Co., Ariz. Described Vol. VIII.

ANGLO-AMERICAN COPPER MINING CO. OF PARRY SOUND, LTD. ONTAR

Dead. Formerly at Parry Sound, Parry Sound district, Ont. Fully scribed Vol. VIII.

ANGLO-AMERICAN DEVELOPMENT CO. MÉXI

Letter returned unclaimed from former office, El Paso, Tex. Mine of Barranca de Cobre, San Andrés del Rio, Chihuahua, Mex. H. T. R. Co president. Was said, 1908, to plan taking over property of the Barranca Co Co. Presumably idle.

ANGLO-AMERICAN GOLD & COPPER CO. MÉXI

Dead. Formerly at La Cananea, Arizpe, Sonora, Mex. Fully descri Vol. IV.

ANGLO-BUTTE COPPER, LTD. MONTA

Dead. Was liquidated, 1909. Formerly at Butte, Silver Bow Co., M Described Vol. VIII.

COMPAÑÍA ANGLO-CHILENA DE COLLAHUASI. CHI

Office: Valparaiso, Chile. Mine office: Collahuasi, Calama, Ant gasta, Chile. Organized May 17, 1906, under laws of Chile, with capitaliza £200,000, shares £1 par. Property is the Mina Emilia, slightly developed, ing steam power. Production, 1908, was circa 70 metric tons monthly of 2 ore, exported to Europe. Production, 1908, estimated at 325,000 lbs. fine cop

ANGLO-CHILIAN EXPLORATION CO., LTD. CHI

Dead. Was liquidated, 1905. Formerly at Canutillo, Huasco, Chile.

ANGLO-CHILIAN NITRATE & RAILWAY CO., LTD. CHI

Sold its mining property to Sociedad Beneficiadora de Tocopilla. merly at Tocopilla, Antofagasta, Chile. Described Vol. VIII.

ANGLO-MEXICAN MINING & EXPLORATION CO. MÉXI

Office: Commonwealth Trust Bldg., St. Louis, Mo. Letter retur unclaimed from former mine office, Guachinango, Mascota, Jalisco, Mex. C B. Clark, president, Thos. B. Rowe, general manager; Chas. L. Rucker, se tary; E. W. Farnham, treasurer. Capitalization $650,000. Is said to b holding company. Was offering stock, November, 1908, at $1 per share.

Lands are said by company to be upwards of 3,500 acres of valuable m eral and timber lands, including about 20 gold, silver and copper mines. La in 9 groups, include the Santa Laura group, area 67 hectares, south of Ajuchit de las Cañas, Tepic; mineral lands in Durango, and the Jalisco group of 42 h tares, circa 42 miles from Guachinango, latter carrying several small veins auriferous and argentiferous copper sulphides, and one gold vein, apparently antigua, said to be 15′ in width and to carry 20 grams gold per metric t Company said to plan a 50-ton mill and plant to treat gold ores by direct cya dation. Idle.

ANGLO-NEWFOUNDLAND DEVELOPMENT CO. NEWFOUNDLAN

Mine office: Millertown, Newfoundland Lands, west of Millerto developed by several pits and shallow shafts show an ore body carrying mi copper, lead and zinc sulphides, in Lower Silurian strata. Company was pr pecting vigorously, 1910.

ANGLO-ROUMANIAN FINANCE & TRADING CO., LTD. ROUMAN

Dead. Was dissolved, August, 1904. Formerly at Baia Arama, Meh intze district, Roumania. Described Vol. V.

ANGLO-SIBERIAN CO., LTD. RUSS

Office: 5 Fenchurch St., London, E. C., Eng. Mine office: Kyshtim, Pe

Russia. T. Blair Reynolds, chairman; L. Urquhart, managing director; preceding officers, C. F. H. Leslie, A. J. Hugh Smith and S. G. Sheppard, directors; John Owler, secretary. Organized Dec. 6, 1906, under laws of Great Britain, with capitalization £100,000, shares £1 par. Company floated the Perm Corporation, Ltd., to take over the Kyshtim property, and the latter, 1908, promoted the Kyshtim Corporation, Ltd. Property of the Anglo-Siberian Co., Ltd. is a 50% share interest in the Kyshtim Corporation, Ltd.

ANGLO-SPANISH COPPER CO., LTD. **SPAIN.**

Dead. Was in process of liquidation, December, 1910. Formerly at Alosno, Huelva, Spain. Fully described Vol. VIII.

ANGLO-WESTPHALIAN COPPER CO., LTD. **GERMANY.**

Office: 9 St. Mildred's Court, London, E. C., Eng. Mine office: Hövelsknapp, Westfalen, Germany. P. G. Hamilton Carvill and Ferdinand Binhold, Jr., directors; A. E. Ferry, secretary. Organized Aug. 29, 1904, under laws of Great Britain, with capitalization £100,000, shares £1 par; issued, £67,507, of which £56,000 went to vendors. Property includes the Kampf mine, area 84 hectares, also the Gottessegen and Gottesgabe concessions, area 874 hectares, reported by German authorities as undeveloped.

ANIMAS MINING & SMELTING CO. **MÉXICO.**

Dead. Formerly at Llano, Magdalena, Sonora, Mex. Described Vol. VIII.

ANI MINE. **JAPAN.**

Owned by Furukawa Mining Co.

ANITA CONSOLIDATED COPPER CO. **ARIZONA.**

Dead. Was reorganized, 1903, as Anita Copper Co. Formerly at Williams, Coconino Co., Ariz. Described Vol. II.

ANITA COPPER CO. **ARIZONA.**

Dead. Property was sold, under foreclosure, and company practically succeeded by Titanic Copper Co. Formerly at Williams, Coconino Co., Ariz. Fully described Vol. VI.

ANITA COPPER MINES CO., S. A. **MÉXICO.**

Office: 42 Broadway, New York, N. Y. Mine office: Cocorit, Alamos, Sonora, Mex. Courtney DeKalb, president and general manager. Organized, under laws of México, and controlled, through ownership of 98% of stock issue, by Douglas Copper Co., which is to be liquidated, and stock transferred to Pacific Smelting & Mining Co., Ltd.

ANITA MINING CO. **MÉXICO.**

Dead. Formerly at Colotlán, Jalisco, Mex. Described Vol. VI.

SOCIEDAD ESPAÑOLA DE FUNDICIÓN DE LOS ANJELES. **CHILE.**

Dead. Property was sold to Felipe Bodelon y Ca. Formerly at La Ligua, Aconcagua, Chile. Described Vol. VI.

ANNABEL MINING CO. **ARIZONA.**

Dead. Was merged, circa, September, 1909, in Hillside Consolidated Mining Co. Formerly at Cherry, Yavapai Co., Ariz.

ANNANDALE COPPER MINES & SMELTERS, LTD. **AUSTRALIA.**

Now owns no copper property. Formerly at Blayney, Bathurst Co., N. S. W., Australia. Described Vol. VIII.

ANNANDALE MINE. **AUSTRALIA.**

Owned by Blayney Copper Mines & Smelters, Ltd., at Blayney, Bathurst Co., N. S. W., Australia.

ANNIE MINING CO. **WYOMING.**

Letter returned unclaimed from former office, Laramie, Wyo. Mine office: Jelm, Albany Co., Wyo. J. F. Johnson, treasurer; Louis Miller, president and general manager; L. A. Hancock, secretary. Organized 1903, under laws of Wyoming, with capitalization $250,000, shares $1 par. Lands, 100 acres, 32 miles southwest of Jelm, said to show two 4′ contact veins between granite and schist, opened by a 140′ shaft and a 138′ tunnel, showing azurite and bornite,

assaying up to 20% copper and $10 gold per ton. Idle since 1904, and app ently moribund.

ANNIVERSARY COPPER MINES, LTD. AUSTRAL

Office: Townsville, Queensland, Australia. Mine office: Herbert Cardwell Co., Queensland, Australia. J. M. Hollway, president; H. S. M mine manager. Organized circa April, 1909, under laws of Queensland, as s cessor of New Anniversary Copper Prospecting Syndicate, Ltd., with capi ization £40,000, shares £1 par; fully issued, in £15,000 full-paid and £25, part-paid stock. Of the fully paid shares, £12,500 went to vendors and £2, for flotation expenses. Apparently Mount Molloy, Ltd., owns £15,000 st and seems in control. The New Anniversary paid, 1907, a small dividend.

Lands, 17 claims, leasehold, developed by tunnel and shafts, with shal workings. The 391′ tunnel, planned to be continued to the western bounda shows a 3′ vein of copper ore. The Engine shaft, to be connected with the t nel, shows a 2′ vein of 10% ore at bottom, and a drift therefrom shows a vein giving average assays of 13% copper and 9 oz. silver per long ton. N shaft is 66′ deep.

Transportation facilities have been bad, but the completion of the Atl ton-Herberton railway permits ore to go to the Mount Molloy smelter, inst of, as formerly, to the Chillagoe smelter. Equipment includes steam power an air-compressor. Production, 1907, was 208,320 lbs. fine copper and 5,(oz. silver. Property considered promising.

ANTELOPE GOLD & COPPER CO. CALIFORN

Mine office: Loyalton, Sierra Co., Cal. In 1907 was sinking on a qua vein of fair size. Presumably idle.

ANTELOPE MINING CO. UTA

Office: Provo, Utah. Letter returned unclaimed from former mine off Eureka, Juab Co., Utah. John D. Dixon, president; Wm. D. Wilson, v president; Arnold Dixon, secretary. Organized March 31, 1909, under law Utah, with capitalization $15,000, shares 5 cents par, assessable. Lands claims. Idle, apparently since organization.

ANTELOPE MINING & MILLING CO. CALIFORN

Office: 704 Columbia Bank Bldg., Pittsburg, Pa. Mine office: Clio, P mas Co., Cal. C. E. Christman, president; Henry Rosser, treasurer; Ro Dilworth, secretary. Organized under laws of Arizona, with capitalizat $1,000,000, shares $1 par. Lands, 6 claims, in 2 groups, carrying considera timber and having a vein of 2′ to 4′ width giving assay values of $15 to per ton, mainly in gold and silver. Presumably idle.

ANTELOPE SPRING MINING CO. NEVA

Office: 83 Commercial Bldg., Salt Lake City, Utah. Mine office: Hu boldt House, Humboldt Co., Nev. Wm. H. Fitch, president; Gust Holm, vi president; John W. Geiger, secretary and manager; Allen C. Eakin, treasu preceding officers, Edith M. Brounzell, Fred Hubbard and E. R. Reitsch, rectors. Organized Apr. 11, 1906, under laws of Utah, with capitalizat $300,000, shares $1 par, assessable; 5 assessments levied.

Lands, 20 claims, unpatented, 15 miles from Humboldt House, develo by an 800′ tunnel and a 65′ blind shaft, with about 1,100′ of workings, show argentiferous lead and copper ores, reported by management to average 2.7 copper, 16.45% lead, 12.9% zinc and 32 oz. silver per ton.

ANTERO MINING CO. COLORA

Office: Spirit Lake, Iowa. Letter returned unclaimed from former m office, Salida, Chaffee Co., Colo. C. W. Budd, president; A. R. Rose, vice-pr dent and superintendent; John Burmeister, secretary and treasurer; preced officers, B. E. Nefzger and W. L. McKelvey, directors. Organized under l of Colorado, with capitalization $1,000,000, shares $1 par.

Lands, known as the Tip Top group, are on the northeast slope of Mount Antero, in the Chalk Creek district, 4 miles from the Gunnison branch of the Colorado Southern railroad, and 25 miles northwest of Salida. Property has a vein of 4′ to 12′ width, with a claimed average of 6′, carrying mixed sulphides and oxidized ores, with assay values, in copper, gold and silver, up to $120 per ton. Property also has a vein 60′ from and apparently parallel with the main vein, carrying auriferous and argentiferous copper, lead and zinc sulphides, and also has various smaller veins. Idle.

ANTIGUA COPPER CO. **MÉXICO.**

Office: 201 Ward Bldg., Battle Creek, Mich. Letter returned unclaimed from former mine office, Alamos, Sonora, Mex. H. A. Clapp, general manager; D. H. Livingston, superintendent; A. W. Davis, treasurer. Organized 1906, as successor of Sonora Mining Co. Lands, 261 acres, showing contact fissures between granite-porphyry and limestone, carrying copper, lead, silver and gold values, mainly in sulphide ores. Has 5 shafts, deepest 105′, and about 700′ of tunnels, longest being the Margarita, 340′, showing 4 veins, having claimed average widths of 3′, 10′, 12′ and 15′, said to give average assays of 6.8% lead, 17 to 30 oz. silver and $1 to $2 gold per ton, from oxidized ore. Company claims that its gold, silver and lead will leave the copper without cost, as a by-product, which claim is not warranted. Is not regarded favorably. Idle and presumably moribund.

ANTIGUA GOLD-COPPER CO. **HONDURAS.**

Office: 612 Hibernia Bank Bldg., New Orleans, La. Mine office: Minas de Oro, Comayagua, Honduras. O. M. Dunn, president; Jas. L. Wright and Jos. Weckerling, vice-presidents; L. S. Scott, secretary and treasurer; preceding officers, Sylvan Levy, Lionel L. Lyons and E. L. Chappuis, directors; D. H. Lawrence, mine manager; E. B. Thompson, mine superintendent. Organized March 26, 1907, under laws of Arizona, with capitalization $2,000,000, shares $5 par. Annual meeting, first Tuesday in September.

Lands, 531 acres, near the Honduras Rosario mine, circa 100 miles southeast of Puerto Cortez, carrying considerable timber in both hard and soft woods. Mine shows antigua workings, with about 3,500′ of new openings, developing argentiferous and auriferous copper ores, giving assays of 2 to 3% copper, 2 to 4 oz. silver and $2 to $4 gold per ton, in limestone. Improvements include 4 buildings and a 48x80′ frame stamp-mill, of 30 tons estimated daily capacity, having 5 Allis-Chalmers stamps and 3 Huntington mills. Company is said to plan installing a smelter.

COMPAÑÍA DE COBRES DE ANTOFAGASTA. **CHILE.**

Office: Blanco No. 144, Valparaiso, Chile. Mine office: Chuquicamata, Antofagasta, Chile. Federico Lesser, chairman; Edourado I. I. Sandiford, vice-chairman; Carlos R. Harrison, secretary; Alejandro Muirhead, general manager. Organized Oct. 5, 1900, under laws of Chile, with capitalization £65,000, shares £10 par. Lands, 30 claims, area 100 hectares, also 2 kilometers of river frontage for water power. Property, served by a branch of the Bolivian Railway, is considered well located.

COMPAÑÍA INDUSTRIAL DE COBRE DE ANTOFAGASTA. **CHILE.**

Dead. Formerly at Antofagasta, Antofagasta, Chile. Described Vol. VIII.

AOSTA CENTRAL MINING CO., LTD. **ITALY.**

Dead. Formerly at Aosta, Piedmont, Italy. Described Vol. IX.

APACHE CHIEF MINING CO. **ARIZONA.**

Dead. Lands were sold, circa 1907, to Arizona Success Mining Co. Formerly at Salome, Yuma Co., Ariz.

APACHE CONSOLIDATED COPPER CO. **ARIZONA.**

Office: P. O. Box 101, Denver, Colo. Mine office: Globe, Gila Co., Ariz. Hon. John I. Mullins, president; F. S. Pfister, vice-president and general manager; Chas. T. Martin, secretary; E. M. Hurd, treasurer; preceding officers and

Joseph Pfister, directors; Frank Pfister, mine superintendent. Organized M 1906, under laws of Arizona, with capitalization $2,000,000, shares $1 issued, $1,200,000.

Lands, 15 claims, unpatented, area 300 acres, in the Richmond dist showing fissure veins and contact deposits between limestone and quartzit which 1 vein, of about 5′ width, is traceable about 1,200′. Mine has shaft 65′, 45′ and 20′, with 6 tunnels, longest 335′, giving 719′ of workings, sho about 400 tons of ore averaging about 3.5% copper, up to 15 oz. silver, and f a trace to $2.50 gold per ton. In 1907 produced 148 tons of ore returning 3.8 copper. Idle several years.

APACHE COPPER CO. ARIZO

Dead. Formerly at Bouse, Yuma Co., Ariz. Described Vol. VIII.

APACHE DEVELOPMENT CO. NEW MEXI

Dead. Lands were sold, 1907, to Anderson-Apache Copper Co. Form at Hachita, Grant Co., N. M. Described Vol. VI.

APACHE MINING CO. WASHINGT

Mine office: Nespelem, Okanogan Co., Wash. Lands, in the Moses trict, are developed by a 100′ incline shaft and a 350′ tunnel, showing ore wi high grade footwall paystreak and quartz gangue, main ore body carrying 3% copper and about 5% lead, with some antimony and zinc, and occasi high values in gold and silver. Idle since circa 1907, and apparently moribu

APEX COPPER CO. COLORA

Office: 504 Colorado Bldg., Colorado Springs, Colo. Mine office: H man, Park Co., Colo. Officers: John K. Vanatta, president; J. J. O'Dris vice-president and general manager; C. W. Dolf, secretary. Organized Ma 1903, under laws of Arizona, with capitalization $2,000,000, shares $1 Lands, 9 claims, area circa 90 acres, on Apex Hill, in the Lower Tarryall distr showing 2 nearly vertical contact veins, of 3′ average width, between spar limestone, carrying chalcopyrite and bornite assaying 2 to 30% copper, 7 silver and $1.20 gold per ton, opened by shafts of 50′, 120′ and 250′, and b tunnels of 500′ aggregate length. Has a 10-h. p. steam plant, with hoists, a 7-drill Leyner air-compressor.

APEX COPPER CO. IDA

Dead. Formerly at Lost River, Blaine Co., Idaho. Described Vol. V

APEX MINING CO. UT

Letter returned unclaimed from former office, Provo, Utah. Mine off Eureka, Juab Co., Utah. Jesse Knight, president; Elmer B. Jones, vice-pr dent; R. E. Allen, secretary; M. H. Walker, treasurer; preceding offic Lafayette Hanchett, W. Lester Mangum and Amanda M. Knight, direct Frank P. Schwindler, general manager. Organized circa October, 1908, un laws of Utah, with capitalization $1,000,000, shares $1 par. On February 1909, company had $21,125.11 cash on hand. Lands, near the Grand Cen mine, are developed by a 3-compartment shaft of 1,325′ depth. Equipment cludes a good hoist and air-compressor. Idle.

APOLLO CONSOLIDATED GOLD MINING CO. WASHINGT

Letter returned unclaimed from former office, New Haven, Conn. M office: Republic, Ferry Co., Wash. W. A. Case, superintendent, at accounts. Property is the California mine, carrying auriferous and argenti ous copper and lead ores, equipped with steam power. Presumably idle.

APOLLO COPPER MINING & MILLING CO. UT

Dead. Formerly at Frisco, Beaver Co., Utah. Described Vol. V.

APPLE TREE COPPER CO., N. L. AUSTRAL

Office: 371 Queen St., Brisbane, Queensland, Australia. Mine off Mount Cannindah, Bowen Co., Queensland, Australia. Wm. Hasley, secret T. J. B. Howard, mine manager. Organized 1906, under laws of Queensla with capitalization £1,200, shares £6 par. Lands, 4 leases, area 45 acres,

s from Mount Cannindah, having old workings consisting mainly of a 20′ ch 500′ long, showing a 6′ vein with paystreaks of 2′ to 4′ width carrying 10 7% copper and up to 5 oz. silver and 3½ dwts. gold per long ton. Mine is to show about 2,000 tons of ore. Presumably idle.

CIETÀ ANONIMA PER LE MINIÈRE APRILE. **ITALY.**

Mine office: Santa Lucia del Mela, Italy. Salvatore Aprile, manager, at accounts. Property shows chalcopyrite and cupriferous pyrrhotite, latter ng average assays of 1.83% copper, 26.66% sulphur and 120 grams silver per ric ton, the chalcopyrite giving average assays of 9.96% copper and 7 grams l per metric ton. Property was under development, 1908. Presumably idle.

SLEY MINE. **AUSTRALIA.**

Mine office: Perth, Bathurst Co., N. S. W., Australia. Francis Drake, nager, at last accounts. Mine, 5 miles from Perth, has been worked inter- tently, under different owners, since about 1875, and production, 1876, was ons fine copper. Mine was reopened, February, 1907, by a syndicate under management of T. K. Longton, but operations were suspended shortly, and ion was then taken by Mr. Drake. The ore occurs as impregnations in ists, without defined walls, but the payable ore usually ranges 3′ to 5′ in th. Development is by a 240′ shaft. On the 180′ level, for a length of 45′ l width of 5′, the ore was chalcopyrite and sphalerite, associated with pyrite, aying 7.13% copper, and for 53′ on the 240′ level, with an average width of ′, the ore averaged 7.92% copper. Ore carries up to 3 oz. silver per long ton, h a trace of gold. Property considered promising. Presumably idle.

ADOS COPPER CO. **MÉXICO.**

Office: 267 Central St., Lowell, Mass. Mine office: Moctezuma, Bravos, ihuahua, Mex. C. R. Hoyt, president. Lands, circa 2,000 acres, presumably en over from Chihuahua Copper Co. Company is exploring and developing ntry-rock disseminated ores, and is said to plan a large concentrator.

AGON COPPER MINES, LTD. **SPAIN.**

Office: 12 Lime St., London, E. C., Eng. Mine office: Tobed, Zaragoza, ain. Baron Gaston de Fontenilliat, chairman; Aimé Bonna, vice-chairman; eeding officers and J. D. O'Brien, directors; A. Lewis Lanseigne, secretary d treasurer. Organized Oct. 29, 1903, under laws of Great Britain, as Rio io District Copper Co. (Tobed & Codos Exploration), Ltd., with capitaliza- n £100,000, shares £5 par, increased, May, 1904, to £130,000, shares £1 par; ued £120,621 and name changed, January, 1907, to present title. Lands, 14 ims, reported by company to be of 1,100 acres area, bought for £96,000 in full id shares. Ore is claimed to average about 7% copper. Idle several years, ing to lack of funds.

RAKAWA MINE. **JAPAN.**

Owned by Mitsu Bishi Goshi-Kwaisha.

RAMO COPPER MINES, LTD. **SPAIN.**

Office: 2 Metal Exchange Bldg., London, E. C., Eng. Mine office: Pola Lena, Asturias, Spain. A. van Strallen, Z. Merton, E. R. Merton, H. Gardner nd L. Corvilain, directors; C. W. Aston Key, secretary. Organized July 3, 97, under laws of Great Britain, with capitalization £40,000, shares £10 par. roperty is the Aramo copper and cobalt mines, bought for £20,000 in full-paid ares. No accounts are made public. Idle some years and apparently mori- und.

RAPAHOE GOLD & COPPER MINING CO. **COLORADO.**

Mine office: Sunset, Boulder Co., Colo. Organized, circa 1899, under ws of Colorado. L. D. Longhi, president and treasurer; J. S. Riggs, secretary. ands, 4 claims and a tunnel-site, in the Sugar Loaf district of Boulder county, olorado. Idle since 1902, except for annual assessment work, done at the per- onal expense of the president.

ARCADE-ARIZONA MINING CO. ARIZON

Mine office: Silver Bell, Pima Co., Ariz. Is said to have been organiz by Michigan interests. Lands, 16 claims, area 320 acres, near the Imper mine, showing copper, gold and silver ores. It is claimed that samples, tak at random, from workings and outcrops gave values of $48 to $280 per t These samples must have been taken with great random. Very little work do idle several years, and apparently moribund.

ARCADIAN COPPER CO. MICHIGA

Dead. Was succeeded May 5, 1909, by New Arcadian Copper Co., a wound up March, 1910. Formerly at Houghton, Houghton Co., Mich. Ve fully described Vols. II and VIII.

ARC GROUP MINING CO. WASHINGTO

Dead. Former office was 502 Empire State Blk., Spokane, Wash. Pr erty included the Queen claim, showing an 8′ vein, carrying gray copper c developed by a 70′ shaft. Formerly at Kettle Falls, Stevens Co., Wash.

ARCTIC CHIEF COPPER MINES. YUKO

Letter returned unclaimed from former office, Peyton Blk., Spokane, Wa Mine office: White Horse, Yukon. Thos. B. Garrison, president; Capt. Jo Irving, vice-president; W. J. C. Wakefield, secretary and treasurer; preced officers, H. W. Boane and R. Insinger, directors; W. W. J. Elmendorf, manag F. Jones, superintendent. Organized March, 1907, under laws of Washingt with capitalization $500,000, shares $1 par, nonassessable.

Lands, 6 claims, 4 crown-granted, area circa 250 acres, including the Arc Chief mine, area circa 110 acres, crown-granted, the Best Chance mine, a 45 acres, held under bond and lease, and the White Horse and Golden G mines. Lands are 6 miles west of White Horse, with a good wagon-road c necting, and property is served by the White Pass railway.

Principal development is on the Arctic Chief mine, having mainly openc workings, with 2 tunnels, one of 235′, in ore after first 65′, with short crosse to walls, and a 50′ blind shaft, with a 55′ upraise to surface, in about the cen of the ore body. Work was begun 1902, but has proceeded rather slowly. is a contact deposit between limestone and hornblende-granite, with mine ization proven for 1,000′ length and about 400′ width, in limestone, along contact, ore shading out from the contact, where the mineralization is strong with original rocks almost entirely replaced by limonite bands, and masses garnet and pyroxene. The outcrop is of practically unaltered magnetite, stai in places with copper carbonates, with strong evidences of glaciation, wh probably removed the oxidized portion, only small quantities of carbonates be shown near surface and along the walls. The magnetite carries bornite chalcopyrite, in grains and small patches, unequally distributed, and the m level, 65′ below surface, shows a body of magnetite 45′ to 50′ wide and 1 long, with 2 small parallel lenses of ore, mainly bornite and chalcopyrite, pr ably averaging better than 4% copper, about 2 oz. silver, with assays up to oz., and from traces up to $40 gold per ton, with a gold average of about $4, apparently the gold values are not influenced by the copper tenor.

The White Horse mine is south of the Arctic Chief, in a granite area, de tute of limestone, so far as known, ore values being mainly in chalcopyr with development by a few shallow pits.

The Best Chance mine, held under bond and lease, shows an outcrop cupriferous magnetite 25′ to 60′ high, 60′ wide and 400′ in length, carrying bo ite and chalcopyrite, with some oxidized ores, and several seams of chalcoc developed by opencuts, two 15′ pits and a 35′ shaft, showing ore assaying 2 copper and 3 oz. silver per ton.

Company employs about 15 men, miners being paid $3.50 per day board, for 8-hour shifts. Ore is taken 110 miles to Skagway by rail, and the to coast smelters by steamer. Shipments, to end of 1908, of 737 tons, to

fton, Tyee and Tacoma smelters, gave average assays of 4.45% copper, 1.54 silver and 0.194 oz. gold per ton.

CTIC COPPER MINING CO. **MICHIGAN.**

Dead. Formerly at Belt, Ontonagon Co., Mich. Described Vol. II.

DILLA COPPER MINES, LTD. **PORTUGAL.**

Dead. Property was seized, 1905, by debenture-holders; company was idated 1908. Formerly at Barrancos, Alemtejo, Portugal. Described Vol. VI.

EACHAP COPPER MINES, LTD. **CAPE COLONY.**

Office: 2 Transvaal Bank Bldgs., Fox St., Johannesburg, Transvaal. ne office: Upington, Gordonia, Cape Colony. Wm. Edwin Bleloch, chair-n; preceding officers Frank E. Rivas, Francis Oats, Robt. Bleloch, R. A. gman, N. Langkilde and J. A. Thorburn, directors; J. S. Richardson, secre-y; J. M. Calderwood, consulting engineer; Wm. Fletcher, manager; J. Jones, elter superintendent. Organized Nov. 10, 1908, under laws of Transvaal, h capitalization £20,000, increased, November, 1908, to £25,000, and again reased, September, 1909, to £30,000, shares £1 par. Annual meeting, second ursday in August.

Lands, 45,000 acres, circa 16 miles from Upington, held under a 2-year lease, a royalty of 3s. per long ton on ore shipped, with option to purchase the base neral rights for £25,000 cash and £23,000 in shares. Property shows Ar-ean schists, standing nearly vertically, and traceable 4 miles. Vein, having 0' gossan, is exposed for length of 1,750', with width of 20' to 60'. Develop-nt is by shafts of 180' and 200', and a 61' tunnel. For first 20' in depth, ore oxidized, succeeded by chalcocite, reported to average about 15% copper. ne is rather wet. Mine also has an opencut, known as Bezuidenhout's quarry, d 3 smaller cuts. Surface trenching, at intervals, for 750', shows a cuprifer-s zone up to 200' in width, with strike NNW., between granite and schist, th a strongly cupriferous capping. Some diamond drilling has been done.

The experimental reduction plant has a Robey crusher and 10-ton rever-ratory smelter, burning wood. Mine has shipped about 150 tons of selected e, of 29% copper tenor. Property considered promising. Presumably idle.

RENILLAS COPPER MINES, LTD. **SPAIN.**

Dead. Was voluntarily wound up, May, 1904. Formerly at Valverde l Camino, Huelva, Spain. Described Vol. V.

RGENTA COPPER CO. **UTAH.**

Dead. Formerly at Robinson, Juab Co., Utah.

RGENTA-DILLON MINING CO. **MONTANA.**

Mine office: Dillon, Beaverhead Co., Mont. A. H. French, superintend-nt. Lands have a vein of 8' to 10' width, giving assays of 3 to 4% copper, to 8 oz. silver and $5 gold per ton, opened by shaft. The Ferdinand mine, pparently leased to Argenta-Dillon Leasing Co., is said to show a good body lead-zinc sulphides, on the 140' level. Has steam power.

RGENTA MINES CO. **BRITISH COLUMBIA.**

Dead. Was a poor proposition. Formerly at Ainsworth, Kootenay dis-rict, B. C. Fully described Vol. VIII.

RGENTA MINING CO. **IDAHO.**

Mine office: Mullan, Shoshone Co., Idaho. Lands, 3 claims, on the west ork of Willow Creek, near the Idaho Giant, including water rights. Develop-ment is by 30' and 300' tunnels, latter driven from Willow Creek, planned to ive an ultimate back of 1,400', and showing chalcopyrite sparingly, with quartz angue. Presumably idle.

ARGENTINE COPPER MINING CO. **UTAH.**

Mine office: Bingham Canyon, Salt Lake Co., Utah. Lands adjoin oldings of the Utah Consolidated. Idle several years.

ARGENTINE & GENERAL EXPLORATION CO., LTD. **ARGENTINA.**

Office: 35 Queen Victoria St., London, E. C., Eng. Mine office: Min-

eral El Salado, Rodeo, San Juan, Argentina. G. G. Milne, R. W. Skipw J. S. P. Sanbourne and W. Knox d'Arcy, directors; G. A. V. Narraway, se tary. Organized March 23, 1908, under laws of Great Britain, with capi ization £[illegible], shares £1 par. Property includes Las Animas, Desengaño Restauradora mines, bought of Sr. D. Justo Pastor Fonseca. Presumably i

ARGENTINE MINERALS, LTD. **ARGENTI**

Dead. Formerly at Perico de San Antonio, Jujuy, Argentina. Descri Vol. VIII.

ARGHANA MAADEN MINES. **TURK**

Office: care of Imperial Minister of Forests & Mines, Constantino Turkey. Mine office: Arghana Maaden, Diarbekir, Turkey. Property owned and operated by the Turkish crown.

Mines were opened circa A. D. 1600, and have been operated with mor less vigor for three centuries. Lands, in the Armenian Tauros, between D bekir and Kharput, include 6 different properties, of which only 3 have b worked latterly, 2 by the government and 1, to a small extent, by private part An excellent water power near the property is available from the western bra of the Tigris River. At the beginning of the century these mines were produc about 1,500 tons fine copper yearly, exported mainly to England, via Alex dria. Development is principally by tunnels, and the mine water is stron impregnated with copper, and should be leached.

Selected ore, averaging about 12% copper, is smelted, with charcoal a matte of 60% copper tenor, fuel being scarce and expensive. The gove ment has planned a new smelter, 1¼ miles from the mines, the ministry scribing that the plant must be of the latest type, and reserving first call on tons of copper at current market prices, net profit to be divided between government and operators, in case the property is taken over by a private c pany. It was said the ministry had decided, October, 1909, to give a 60-y concession on this property, but apparently same was not granted.

Production is about 3,[illegible] lbs. fine copper yearly, part of which is ta by the Turkish government at a fixed valuation. The copper is shipped camel to Tokat. The workmen are paid in food, clothing and tobacco, mining and smelting processes are archaic in all respects. The property, un modern methods, and with good equipment, is capable of materially enla production.

ARGO COPPER MINING CO. **MONTA**

Dead. Was merged, March 7, 1904, in Eclipse-Argo Mining Co. F merly at Canyon Ferry, Broadwater Co., Mont. Described Vol. V.

ARGOLIS COPPER MINING SYNDICATE, LTD. **GREE**

Dead. Was liquidated voluntarily, 1910. Formerly at Nauplia, Epic ros, Greece. Described Vol. VIII.

ARGO MINING, DRAINAGE, TRANSPORTATION & TUNNEL CO. **COLORA**

Office: 79 Milk St., Boston, Mass. Mine office: Idaho Springs, C Creek Co., Colo. Chas. C. Parsons, president; H. W. Robinson, secret Geo. E. Collins, treasurer; R. F. Schirmer, assistant manager. Capitaliza $[illegible]. Is controlled, through ownership of entire stock issue, by Argo M ing & Tunnel Co., Ltd. Property is the Newhouse or Argo tunnel, descri under title of Argo Mining & Tunnel Co.

ARGO MINING & TUNNEL CO. **COLORA**

Office: 79 Milk St., Boston, Mass. Mine office: Idaho Springs, C Creek Co., Colo. F. A. Schirmer, president; E. W. Cates, secretary; Geo Collins, manager. Organized 1909, under laws of Delaware, with capital tion $[illegible], shares $5 par, issued $812,500. Debentures, $150,000 aut ized $[illegible]. Company succeeded Argo Transportation & Tunnel Ltd., which succeeded Argo Tunnel & Mining Co., Ltd., which succeeded N

td. Property is the entire stock issue of Argo Mining, tion & Tunnel Co., which holds direct title to the tunnel. house tunnel, 21,968′ long, with nearly 20 miles of workings, elebrated mining tunnel in existence. It starts at Idaho nder Russell Gulch and Quartz Hill, with terminus in the unnel has double tracks, of 18″ gauge, laid with 30-lb. rails. he tunnel is 9′ high and 10′ wide, balance being 8′ high and per 100′. The tunnel was begun January, 1894, and com-

which this tunnel passes are estimated to have produced metallic values, and the tunnel cuts sundry veins of ore lead and copper, and several laterals have opened various or less promise. The Eureka shaft, sunk to depth of sev- planned to connect with the tunnel at depth of 1,600′. team and electric power.

TUNNEL CO., LTD. **BRITISH COLUMBIA.**

Greenwood, Yale district, B. C. Ole Lofstad, president ; A. S. Black, secretary and treasurer; preceding officers, me McConnell and Oscar Hartman, directors. Organized laws of British Columbia, with capitalization $125,000, Lands, 3 claims, near the British Columbia smelter. The shafts of 20′ and 40′, and two 20′ tunnels, showing aurifer- rve Out mine has incline shafts of 40′, 80′ and 115′, show- na and native silver.

TATION & TUNNEL CO., LTD. **COLORADO.**

ceeded, 1909, by Argo Mining & Tunnel Co. Formerly r Creek Co., Colo. Very fully described Vol. VIII.

MINING CO., LTD. **COLORADO.**

rganized Nov. 29, 1905, as Argo Transportation & Tunnel at Idaho Springs, Clear Creek Co., Colo.

CO., LTD. **ARIZONA.**

Vincent St., Glasgow, Scotland. Letter returned un- mine office, Prescott, Yavapai Co., Ariz. A. Mitchell, Dec. 29, 1900, under laws of Great Britain, with capital- res £1 par; issued, £66,000. Lands, 2 claims, area 40 xaminer and Mineral Hill, near Huron, Yavapai Co., Ariz. pparently moribund.

CO. **ARIZONA.**

lway, New York, N. Y. Mine office: Safford, Graham Co., president; Herman R. Elias, vice-president; Z. S. Spauld- Reich, treasurer; preceding officers, Hon. Edw. Lauterbach, Tomsing, Fred Christe, Wm. H. Davidor and H. K. Car- E. Carpenter, general manager. Organized Jan. 30, 1907, , with capitalization $2,500,000, shares $1 par, nonassess- 00. Annual meeting, second Tuesday in October.

, known as the Buena Vista group, 10 miles north of Saf- r district, Gila Mountains. Property shows rhyolite and ying 3 ore bodies, one having a 100′ shaft and a 530′ tunnel, n of medium grade copper ore. Shipped a little ore, 1907.

DE L'ARIÈGE, LTD. **FRANCE.**

n Wall Bldgs., London, E. C., Eng. Mine office: St. e. Albert Simon and Thos. Turketine, directors; J. Edsall ganized March 8, 1901, under laws of Great Britain, with 0, increased, 1905, to £15,000, shares £10 par; issued, , £1,110, at 6%. Lands include mining properties in

the communes of Riverenert, Esplas, Rimont and Castlenau-Durban, arrondissement of St. Girons. Presumably idle.

ARIMEX CONSOLIDATED COPPER CO. **ARIZONA & MI**

Office: 85 Ames Bldg., Boston, Mass. Letter returned unclaime former mine office, Red Rock, Pinal Co., Ariz. Chas. H. Dickey, pre C. D. Burrage, secretary. Organized circa 1901, under laws of New Jerse capitalization $5,000,000, shares $25 par. Property includes the Copper group of 30 claims, in the Silver Bell district, Pima County, Arizona, held t Oxide Copper Co.; an 87½% stock interest in the Table Mountain Copp which has 27 claims in the Bunker Hill Mining district of Pinal County, A and a 90% stock interest in the Angang Copper Co., which holds abo hectares, known as the Chirangangueo mines, near Zitácuaro, Michoacán Neither of the Arizona properties is of apparent promise, but the Mexican might be of some value, if properly developed. Company was promo Thomas W. Lawson, and, like his other copper mining companies, app is merely a stockjobbing scheme. Lawson, A. C. Burrage and Chas. I rage were sued, 1909, as promoters, by shareholders, for $500,000 damag suit was lost. Idle several years.

ARIO COPPER CO. **MI**

Office: 1525-25 Broad St., New York, N. Y. Mine office: A Rosales, Ario, Michoacán, Mex. Letter returned unclaimed from forme ating office, Calle de la Palma 1, México, D. F. Frederick Moser, pre Geo. H. Walsh, Jr., treasurer; A. P. Stramler, superintendent. Capital $2,000,000, shares $10 par. Holds lands through Ario Copper Co., S. A., ized Apr. 13, 1907, under laws of México, with capitalization 500,000 pes

Lands, 126 hectares, including the Flora, Roma, Bohemia, San A and San Valentin mines, old properties showing silver and copper ores, s miles from the Inguarán mines, on the projected line of the Morelia y T baro railway, partly constructed. Principal development is on the Flo Bohemia mines, with 7 shafts aggregating 500' depth, and 12 tunnels ag ing 2,600' length. La Roma has ore assaying up to 25% copper. ment includes steam and gasoline power.

Patzcuaro, 70 miles distant, is the nearest railway point, but compa said, 1909, to plan an electric tramway, from Patzcuaro through Ario de I to the Rio Balsas, in the state of Guerrero, a distance of 150 kilomete apparently this line remains only an idea. Equipment includes a 10-ton imental smelter. Company was said, 1908, to employ about 200 men.

ARIZONA AMALGAMATED COPPER CO. **ARI**

Dead. Was organized circa 1907, under laws of Maine, with capi tion $15,000,000, shares $5 par, and property was sold, circa November to Coppermines Co. of Arizona, Ltd. Formerly at Clifton, Graham Co.

ARIZONA-APACHE MINING CO. **ARI**

Dead. Formerly at Tucson, Pima Co., Ariz. Described Vol. VIII.

ARIZONA & ARKANSAS LEAD, ZINC & COPPER MINING CO. **ARIZONA & ARKA**

Dead. Formerly at Gila Bend, Maricopa Co., Ariz. Described Vo

ARIZONA BANNER COPPER CO. **ARI**

Dead. Formerly at Globe, Gila Co., Ariz. Described Vol. VI.

ARIZONA BELLE MINING CO. **ARI**

Dead. Formerly at Vail, Pima Co., Ariz. Described Vol. VI.

ARIZONA BLUE BELL COPPER CO. **ARI**

Mine office: Mayer, Yavapai Co., Ariz. Properties were dispos apparently on a royalty basis, to Arizona Exploration Co., and company litigation to recover certain royalties, in hands of United States court. described Vol. VIII.

MINING CO. ARIZONA.
abe, Yavapai Co., Ariz. Organized October, 1909, with
0. Lands, 2 claims, 3 miles north of McCabe, in the
g an old 100′ shaft, which has been deepened to 140′, and
od ore. Equipment includes a 60-h. p. boiler and a 30-

COPPER CO. ARIZONA.
at Globe, Gila Co., Ariz. Described Vol. VIII.

PPER CO. ARIZONA.
anized, June, 1909, as Little Butte Consolidated Mines
e, Yuma Co., Ariz.

MINES CORPORATION. ARIZONA & MÉXICO.
way, New York, N. Y. Mine offices: La Cananea,
nd Globe, Gila Co., Ariz. T. E. Otis, president; Robt.
Paul A. H. van Daell, secretary; Geo. N. Hamlin, treas-
Frank N. Stackpole, Stephen R. Dow, Harry F. Fay,
rble, Jr., Jas. Gardner and John T. Morrow, directors;
nsulting engineer. Organized circa August, 1910, under
capitalization $5,000,000, shares $5 par, nonassessable.
ew York and Boston curbs. Federal Trust Co., Boston,
Registrar Co., New York, transfer agents; State Street
Security Transfer & Registrar Co., New York, registrars.
k over lands formerly held by the Kansas-Cananea
anea Copper Co., Miller Mining Co., Ortega Mining Co.,
ning Co., Red Cloud Mining Co., Consolidated Gold &
Northern Mining & Development Co., and Compañía
The financing of these various corporations taken over
is incorporations, mergers, holding companies and recon-
e paid for by $2,000,000 in stock, the underwriters
r $1,800,000, at par, for $720,000 cash, of which $160,000
outstanding liabilities of the various merged companies,
able for development and equipment, with $1,200,000
ied in the treasury. Company was said, November,
er the property of the Boston Miami Development Co.,

4,427 acres, carrying considerable timber, located in a
ing 5 to 15 miles south of La Cananea, some of the prop-
gs of the Greene-Cananea. The property, as a whole,
rkings, and lands are connected with La Cananea by a
said that about $300,000 has been expended in develop-
t the various properties.
area 1,151 acres, has an 800′ tunnel, showing an ore
30′ wide, assaying 2.75% copper, and another vein, of
med to average 4% copper. No. 4 Ortega shaft is said
′, a 10′ ore body, averaging 8.8% copper. Ore is mainly

p, area 342 hectares, circa 6 miles south of La Cananea,
hwestern Mining Co., shows quartz-porphyry, altered
mestone, formation being somewhat similar to that of
ore zone of 800′ estimated width, opened by shafts of
r being wet. The mine has about 1,500′ of workings,
tcrops of bournonite, said to assay up to 41% copper,
gold per ton, which statement is obviously an error, as
ximum of only 13% copper, with about 42% lead.
up of 741 acres, and the Chapultepec group of 789 acres,
s, about 6 miles south of La Cananea, with formation

Exploration Co. Lands are in Copper Gulch, 3 to 4 miles northeast o lying just north of the Old Dominion, and adjoining the United Gl Superior & Boston mines. The property has large bodies of low gr bonate ore, but principal values, as developed, are mainly in sulph of medium to high grade.

The Copper Hill group, area 56 acres, carrying the Old Domin Copper Hill ledges for about 1,500′, has an 800′ shaft, showing a ve 20′ in width, with a 5′ paystreak assaying about 4% copper, and is c underground with the Gray mine of the Old Dominion. There are opencuts, showing silicious surface ores, from which about 15,000 to been shipped.

Principal developments are on the Black Hawk group, area 9 which carries the Black Hawk and Old Dominion ledges for about The Black Hawk has a surface capping of low grade iron ore, above 50′ vein, leached to considerable depth, followed by silicious ore, esti average about 4% copper, with excess of iron. There also is a hema of 3′ to 4′ width giving assays of 4.5% copper, with small silver valu vein is stronger at depth, and carries sulphide ore of 6 to 7% copp Development is by the 1,030′ three-compartment Eureka shaft. I drilling, in advance of the lower workings, has shown good ore, includ siderable chalcocite. The mine is decidedly wet.

Equipment at the Eureka shaft includes a 72′ headgear, and a W Seaver-Morgan second-motion double-drum hoist, good for 1,500′, Hendrie & Bolthoff auxiliary hoist, and an 18-drill Sullivan strai air-compressor.

Buildings include a 32x70′ machine-shop, well equipped, a 72x7 house, office, hospital and a number of miscellaneous buildings. A 20,00 water-tank affords high pressure for fire protection.

The 500-ton smelter, blown in October, 1909, has a furnace buildi powerhouse, of steel, also a small sampling mill, with 2,000-ton steel ore and fluxes, and 2,200-ton coke-bins. The blast-furnace is rated tons daily capacity, with a dust-chamber 32x54′ and 28′ high, of steel, crete foundations, and a 125′ smokestack, 8′ in diameter. Slags are out by a 10-ton General Electric locomotive, in 3 slag-cars, of 45 c capacity each. The 72x80′ powerhouse has two 700-h. p. Babcock & boilers, a No. 9 Connersville blower, Nordberg air-compressor, 2 N engines and a 100-kw. General Electric generator. Fuel is petroleum in steel tanks. When in blast, the smelter treated about 225 tons Arizona Commercial ore, in addition to custom ore from the Superior &

Production was begun before building of smelter, when rail co was secured, March, 1907, but was suspended, September, 1907, on of the drop in metal prices. Smelting was resumed, October, 1909, continued March, 1910, pending further development. During 1909 t pany expended about $315,000 in development; $211,000 on smelting and pumping plants, and $51,000 on general construction.

Production has been as follows: 939,102 lbs. fine copper in 1906; 1 lbs. in 1907; 595,693 lbs. copper and 9,354 oz. silver in 1908; 1,171, copper and 16,827 oz. silver in 1909, and circa 900,000 lbs. copper an oz. silver in 1910.

ARIZONA CONSOLIDATED COPPER MINES, LTD. AR

Letter returned unclaimed from former office, Throgmorton Hous hall Ave., London, E. C., Eng. Mine office: Clifton, Graham C Hon. H. A. Stanhope, Jas. H. Hosking, and E. A. Schneidau, direct Fairhall, secretary. Organized June 17, 1899, under laws of Great with capitalization £150,000, shares £1 par; issued, £135,007.

Lands, in the Copper Mountain district, bought, 1900, from Con

for £135,000 in full-paid stock, are said by company
l and Chillicotta properties, which presumably should
nd Chillicothe, and which are said, by the company,
ies, though residents of the district have not yet dis-
erty includes a millsite, on the San Francisco River.
eins of 5′ to 10′ width, carrying a considerable variety
nt grades. Idle since organization, 12 years, except
raise money for a 50-ton smelter. Is not regarded

TED GOLD & COPPER CO. ARIZONA.

z. Mine office: Winkelman, Gila Co., Ariz. H. B.
igene Brady O'Neill, vice-president; H. H. McNeill,
preceding officers, C. F. Leonard, E. L. O'Malley and
s. Organized June 12, 1907, under laws of Arizona,
0,000, shares $1 par.

npatented, area 260 acres, known as the Hardwick
a 20-acre millsite, in the Saddle Mountain district.
s fissure veins, of which 4, under development, are
width. Mine has a 40′ tunnel, and pits and shafts
sumably idle.

TED MINES CO. ARIZONA.

n, Yuma Co., Ariz. Organized circa August, 1909,
,000, shares $10 par, by Geo. R. Bentel, F. M. Prescott
Lands, 56 claims, 14 miles from Wellton, including
Consolidated Mining Co., and 2 adjoining properties.
ut 4,000′ of workings, and is claimed to have about
dump, with 70,000 tons developed underground, with
for entire 100,000 tons, of $43.35 per ton, which figures

TED MINING CO. ARIZONA.

ed, circa February, 1909, by Arizona United Mining
n, Cochise Co., Ariz. Fully described Vol. VIII.

LT MINING CO. ARIZONA.

d St., New York, N. Y. Mine office: Constellation,
J. Dilthey, president: P. R. Wilbur, vice-president;
ry; Chas. H. Peckworth, treasurer; preceding officers
tors; Francis A. Crampton, general manager; Edw.
. Organized February, 1906, under laws of Arizona,
0,000, shares $1 par, nonassessable; issued, circa

patented, area 240 acres, well watered, include the
d Texas group of 10 claims, in the Black Rock district
t of Wickenburg, the nearest railroad point. The
r ore, and the Texas group, apparently idle, carries
granite and schist, said to carry 15 ore bodies. The
ing shafts of 32′, 37′ and 200′, and tunnels of 78′, 90′
old ore, reported by company to have average values

removed to the Wren group, circa July, 1910. Wren
ted average width, shows mainly chalcopyrite, and
some oxidized ores, estimated by company to average
d $8 gold per ton. Development includes a 35′ shaft
0′. The president, in an interview, November, 1908,
ng $22 to $76 gold per ton, and a 15′ vein assaying 23%
on, which figures are excessive. Property as a whole

has about 1,100′ of workings, and is estimated by management to show 2 tons of ore, with 2,000 tons blocked out for stoping.

Equipment includes 5 small mine buildings, and work was started, on a 10-stamp mill, which remains uncompleted. Management planne stalling a 30-ton smelter, but has decided to wait until the ore blocke warrants a 100-ton smelter. Two small test shipments gave net returns c and $47 per ton. Company, in a prospectus, quotes E. W. Sebben, E. stating that this property is second only to the United Verde, which state must have been due to gross ignorance, or intent to deceive.

ARIZONA COPPER CHIEF SMELTING CO. ARIZ

Dead. Former office was 714 Hartford Bldg., Chicago, Ills. Com claimed, July, 1906, to have hundreds of tons of copper glance in sight. A ently was a fake. Location of lands, if any, unknown.

ARIZONA COPPER CO., LTD. ARIZ

Office: 29 St. Andrews Square, Edinburgh, Scotland. Mine and v office: Clifton, Graham Co., Ariz. Employs circa 2,000 men. John chairman; preceding officers, P. Dickson, J. P., G. Readman, J. Wilson, Pentland, Alex. McNab, J. P., and Lord Salvesen, directors; Norman C. michael, general manager; Wm. Exley Miller, secretary; Robt. Addie, consu engineer; Geo. Fraser, smelter superintendent; Archibald Morrison, mill s intendent; C. D. Clark, mechanical engineer; J. B. Cooper, purchasing a

Organized Aug. 5, 1884, under laws of Great Britain, with capitaliz £755,000, originally in £40,000 of A preference shares, 5s. par, upon whi calls have been made, but with £7,840 1s. paid in advance; £320,000 autho and £316,530 issued in full paid preference shares; £320,000 authorized £316,530 issued, shares 5s. par, of fully paid preferred stock, and £7 authorized, £63,440 issued, shares 5s. par, of fully paid deferred stock. 1909, a change was made, by which old preferred and deferred ordinary s were succeeded by one series of original shares, of 5s. par, of which 1,51 shares have been issued. Profits were divided as follows: 10% cumul dividends on A preference shares; 7% cumulative dividends on prefe shares, 10% noncumulative dividends on preferred ordinary shares, and noncumulative dividends on deferred shares, balance, if any, to be di pro rata between preferred ordinary and deferred ordinary shares. £175,210 of 5% terminable debentures, falling due at Whitsun, 1912. year ends Sept. 30th. Dividends on issued capital for recent years have be follows: 60% in 1904; 75% in 1905; 105% in 1906; 75% in 1907; 50% ea 1908, 1909 and 1910. Net earnings for fiscal years ending Sept. 30th £333,479 in 1909 and £229,981 in 1910. Reserve, Sept. 30, 1910, was £555 About 20% of the stock issue is held in the United States.

Lands are circa 4,000 acres, including 8 producing mines, at Mo Metcalf, Longfellow, Garfield and Coronado, in Graham County, Ari Ores, as produced, give average returns of about 3.5% copper, production about 10% smelting ore and 90% concentrating ore. Mines, except the nado, are developed to a depth of about 500′ only, being opened mainly by nels, giving cheap extraction. Notwithstanding the comparatively sh zone of development a tremendous amount of ore is in sight, ore reserves, M 1905, being estimated at 10,370,600 tons, practically in sight. Conside diamond drilling has been done.

The Humboldt mine, which is the principal producer, shows a large bo low grade disseminated chalcocite. Extraction from this property is p opencast, but mainly through tunnels equipped with electric lights and el traction. The haulage system uses the overhead trolley, power being furni by a 150-h. p. Crossley gas-engine, driving a 100-h. p. generator that furn a 225-volt current. Electric locomotives of 10-h. p. haul 40-ton loads, the having a single track laid with 10-lb. rails, running 600′ directly through

reaching all workings of the Humboldt mine, the tunnel
ational Hill direct to the new concentrator.
he oldest important copper mine of Arizona, dating from
nnel driven from Chase Creek connects with a 600′ blind
3 miles of railroad haulage over bad grades. The Long-
as developed into a good property.
, 7 miles from Clifton, worked opencast, is an extensive
oxidized ores, which are concentrated with the sulphide
t and Yavapai groups.
up, 9 miles from Clifton, has 3 shafts, deepest 700′, the
bottom, in the granite, an ore body of about 5.5% copper
oving the claim that all ore values cut off at about 500′
group shows considerable high grade ore.
s developed to important dimensions, and shows a large
dium grade ore.
the different mines by 6 gravity tram-lines to storage
ailroad, whence hauled to the reduction plant at Clifton.
is of standard gauge for 4 miles, from Clifton to Long-
e for 3.2 miles, from Longfellow to Metcalf, the road

operates the Arizona & New Mexico railroad, a highly
ge line of 107 miles, running from Clifton to Hachita,
n is had with the El Paso & Southwestern railway. Net
ending Sept. 30, 1909, were £130,276.
ks use about 3,000 h. p., supplied in about equal portions
istillate engines. The gas-engine plant is exceptionally
planned to develop hydro-electric power and transmit
t 50 miles distant.
tered works, at Clifton, Morenci, Longfellow and Metcalf,
larged, 1902, 1904, 1905, and 1909-1910, the reduction
concentrators, a smelter, lixiviation plant and acid plant.
wrecked by fire, 1909. No. 5 concentrator of 700 tons
n shut down, and is to be dismantled and machinery
l No. 6 concentrator, which is to be enlarged from 800
capacity, to 1,500 tons.
, of steel frame, has two 600-ton crushers and a 250-h. p.
-connected to a 125-h. p. dynamo, steam being furnished
ng water-tube boilers. Equipment includes 2 Hancock
daily, which replaced 35 Frue vanners, 2 Wilfley tables
the Hancock jigs being highly economical of floor space
t includes Allis-Chalmers high-speed rolls, for crushing,
for regrinding. No. 6 mill has a large settling basin,
emoved, and filled into the mine. Company had trouble,
a preliminary injunction was set aside, on the company's
endeavors to keep its tailings from entering the river.
ned, to prevent tailings going into the Frisco River, and
hey caused considerable damage to farmers and ranchers,
ase Creek brought about floods that have caused great
, and to the village of Clifton, hence, a pipeline was built,
ngs and discharge same on the flat, several miles down
k, about 1 mile above the town, with an 18″ wood pipe-
ater at flood times, and in dry seasons, the tank being
ng-water.
steel frame with slate roof and floor of iron plates laid
six 300-ton water-jacket blast-furnaces, each 39x240′ at
t supplied by Nos. 7, 9 and 10 Connersville blowers,

operated by a 275-h. p. engine. Gases from the blast-furnaces pass thr a 480′ tunnel and 300′ stack. Slag settlers are 7x14x3′, with a 6″ fire- lining. Matte of 50 to 55% copper tenor is charged into the converte a 10-ton ladle, handled by a 30-ton electric crane. The converter plan 3 stands and six 7-ton shells, with a daily capacity of 50 tons of 99.5% h copper. Disintegration of slag by running water was tried, but discontin and molten slag again is handled in ladle-cars, by a steam locomotive. smelter was badly damaged by fire, 1909, and company is said to plan a smelter, which is needed.

The 25-ton briquetting plant, built 1905, uses coal-breeze for a bi under a pressure of 2,000 lbs. per square inch. Plant is entirely auton fines going into one end and briquettes being loaded on cars at the othe new 300-ton briquetting plant was built, 1910, at the upper end of the works, using a briquetting machine invented by chairman Gill.

The acid plant makes about 3,000 tons of sulphuric acid yearly, fro fumes of the roasters, the entire product being used in the leaching p which treats an average of about 250 tons of low grade oxidized ores o In connection with the leachery there is a 125-ton bluestone plant, turnin bluestone equivalent to about 3,000,000 lbs. fine copper yearly. This is haps the most successful leaching plant in the United States.

Miscellaneous enterprises include a well equipped foundry, machine- sawmill, planing-mill and 20-ton ice plant, all of brick. The company has general merchandise stores at Clifton, Longfellow and Metcalf, and a library is maintained for employés.

Recent production has been as follows: 26,836,000 lbs. fine copp 1905; 25,937,006 lbs. in 1906; 30,794,092 lbs. in 1907; 34,694,918 lbs. in 31,150,263 lbs. in 1909 and circa 33,150,000 lbs. in 1910. For comp fiscal year ending Sept. 30, 1909, production was 35,853,440 lbs.

The company is entitled to much credit for its conservatism and su but its plant is criticised severely by engineers, and the company could both money and credit by modernizing its works. A start in this dire has been made by abandoning some of the older and smaller concentra and enlarging No. 6 mill. The matter of building a new and modern sm also is under consideration.

ARIZONA COPPER-GOLD MINES CO. **ARIZ**

Office: 1011 Pabst Bldg., Milwaukee, Wis. Letter returned uncla from former mine office, Prescott, Yavapai Co., Ariz. R. H. Burm president and general manager; Chas. McKenney, vice-president; J. E. Wil secretary; F. L. Wright, treasurer; preceding officers, T. G. Norris, W Jones, C. N. Smith, Dr. J. W. Powell and H. P. Dickinson, directors; Shechan, superintendent. Organized Oct. 12, 1903, under laws of Ari with capitalization $1,000,000, as Arizona Gold Lode Mines Co., and ganized, Apr. 10, 1906, under present title, with capitalization $1,500 shares $1 par.

Lands were 17 claims, area 340 acres, in the Cherry Creek district, 15 miles northeast of Humboldt, but the Bugler group of 4 claims was 1909, to Smith & Oliver, reducing holdings to 13 claims, area 260 acres. velopment includes several short tunnels, and the Leghorn shaft of 485′ d with circa 3,500′ of workings, on a 2′ fissure vein, reported by company' gineer, circa 1908, to have 17,329 tons of ore in sight. The ore appar averages about 2% copper, with gold values.

Equipment includes a 40-h. p. hoist, good for 1,000′ depth, and a 3 air-compressor. A mill, at the Leghorn shaft, rated at 40 tons daily capa has a 10′ Lane slow-speed Chilean mill, and made a test run, circa 1907, foundation proving defective, it was repaired, permitting another test August, 1909, that gave a $500 gold brick. Company was promoted by P

s faker, and advertised extensively, with some very but apparently the present management is trying to ult bargain.

GOLD MINING CO. ARIZONA.
laimed from former office, Phœnix, Ariz. Mine office: . Company owns a 20% stock interest in the Savage Co. Lands, 5 claims, unpatented, in the Harcúvar 5′ tunnel showing a 5′ vein of auriferous copper ore, ed in a vein of circa 20′ width carrying malachite and imed to have about 1,000 tons of smelting ore on the

ILL MINING CO. ARIZONA.
as sold under foreclosure. Formerly at Oracle, Pinal Vol. VI.

TD. ARIZONA.
t 1 Lombard St., London, E. C., Eng. Jos. Brailsford lirectors; G. E. O'Hanlon, secretary. Organized circa ws of Great Britain, with capitalization £500,000, umably stock did not go to allotment. Property was , 17 patented, including the Leszynsky mine, claimed s of ore ready for stoping, assaying 2.5 to 3.5% copper, s were claimed also to include a 200-acre millsite, with water, which presumably was mythical. Company's vith glaring misstatements, including an estimate of nts per lb. Formerly at Clifton, Graham Co., Ariz.

INES & SHIPPING CO. ARIZONA.
laimed from former office, El Paso, Tex. Mine office: Ariz. I. M. Moore, president; C. F. Elliott, secretary; anager. Organized circa June, 1909. Mining lands, agoon, are between the Centurion and Empire mines, ols the Dragoon townsite. Mine has several pits and wing ore at depths of 30′ and 60′.

INING CO. ARIZONA.
Tucson, Pima Co., Ariz. E. C. Griffith, president; -president; Vincent Brunner, secretary and treasurer; . G. Turner, directors; B. C. Brechta, superintendent, s, 20 claims, in the Tucson Mountains, having a 400′ 8′ vein carrying ore of good grade. Idle.

OUNTAIN MINING CO. ARIZONA.
t Peach Springs, Mohave Co., Ariz. Fully described

OUNTAIN MINING CO. ARIZONA.
hanged, 1904, to Copper Butte Mines. Formerly at Described Vol. II.

ACER MINING & MILLING CO. ARIZONA.
ce was 269 La Salle St., Chicago, Ill. No trace of secured, and apparently was a stockjobbing scheme is unknown, but undoubtedly the title was adequate did some advertising, 1903, but apparently no mining. Yuma Co. Ariz.

UEEN MINING CO. ARIZONA.
Life Bldg., Kansas City, Mo. Mine office: Mayer, annon C. Douglas, president; Edwin Herrider, secre- treasurer; Wm. Burr Douglass, general manager; pre- C. Crowell, directors; John McIlwhee, superintendent. , under laws of Arizona, with capitalization $5,000,000,

shares $1 par. Lands, 6 claims, on Copper Creek, circa 25 miles south
Mayer, claimed to show 10 practically parallel veins, carrying ore ass
to 84% copper, 2 to 57 oz. silver and $10 to $100 gold per ton. Develo
is by various trenches and by shafts of 30′, 30′, 35′, 40′, 60′ and 90′.
ment includes a power plant with air-compressor. Idle since Nov
1907, and apparently moribund.

ARIZONA COPPER SMELTING CO. ARI

Dead. Was a stockjobbing enterprise. Formerly at Kelvin, Pin
Ariz. Fully described Vol. VIII.

ARIZONA COPPER SYNDICATE. ARI

Dead. Formerly at Clifton, Graham Co., Ariz. Described Vol.

ARIZONA COPPER SYNDICATE, LTD. ARI

Dead. Was an English twin of the Arizona Copper Syndicate. Fo
at Clifton, Graham Co., Ariz.

ARIZONA COPPER SYNDICATE OF PROVIDENCE. ARI

Office: 171 Westminster St., Providence, R. I. Mine office:
Cochise Co., Ariz. T. F. Gilbane, trustee and manager. Organized Fe
1907, by a pool of old shareholders of the Copper King of Arizona, a c
of evil reputation and frequent reconstruction, which lost its property,
foreclosure, August 28, 1905. Lands, 28 claims, 17 patented, and 2 m
Mine has a 225′ incline shaft, with about 350′ of tunnels, showing so
of good tenor. Smelter, having a 30-ton water-jacket blast-furnace, h
idle since 1902. Idle some years, and property for sale.

ARIZONA DEVELOPMENT CO. ARI

Dead. Former office was El Paso, Tex. C. E. Woodson was m
Organized circa December, 1909. Lands were variously reported as 6
and as 19 claims, in the Sparks district, circa 12 miles south of Safford, a
an iron-stained quartz outcrop of about 18″ width at surface, said to
capping of a vein 13′ wide at depth of 50′, having a 75′ incline shaft,
show, on the 50′ level, chalcopyrite, some bornite and occasional native
with quartz gangue, vein above being oxidized and leached. Ore gave
of 1 to 4.5% copper, up to 3 oz. silver and $1 to $8.40 gold per ton. Fo
at Safford, Graham Co., Ariz.

ARIZONA & EASTERN CONSOLIDATED MINING CO. ARI

Office: 637 Endicott Bldg., St. Paul, Minn. Mine office: Glob
Co., Ariz. W. H. Sisson, president; T. W. Teasdale, vice-president; M
L. DeLestry, secretary and general manager; preceding officers, A. C. C
W. H. Ulmer, Otto Bremmer, and M. P. Ryan, directors; A. J. Pat
superintendent. Organized December, 1905, under laws of District of C
bia, with capitalization $1,500,000, shares $1 par.

Lands, 19 claims, area 380 acres, with a 20-acre millsite and 60
miscellaneous lands. Mineral lands are the Contact group of 8 clain
the New Era group of 11 claims, adjacent, making practically one block
on Mineral Creek, a branch of the Gila River, circa 4 miles north of th
Consolidated. Properties are said to show 3 veins, of which one, unc
velopment, is reported by company as of 7′ average width, traceable
and to carry chalcopyrite, bornite and covellite averaging 2% copper,
50 oz. silver and $2.25 gold per ton. Developments include the 100′ Old
shaft; the New Era 200′ two-compartment shaft, and tunnels of 75′, 31
195′, latter in schist carrying traces of disseminated copper. The 75
Fool tunnel shows copper ore on the walls, covered with bluestone, and
a strong solution of copper sulphate, this perhaps being the most pro
showing of the property. Mine as a whole has about 1,150′ of workin
apparently no commercial ore has been developed, notwithstanding the
uous claims of the management, which, circa 1908, estimated 116,000
ore in sight.

s steam power, with boiler and a 500′ hoist. Buildings thy, framing-shed, barn, warehouse, boarding-house and rtation facilities are poor.

& MONTANA SMELTING SING CO. MONTANA.

dle, promoted by the notorious parson-swindler, Dr. R. C. d, 1904, but escaped from jail, and was rearrested, Jan- of fraud in connection with this company. Location of vn.

PER MINING CO. ARIZONA.

laimed from former office, Pasadena, Cal. Mine office: . Organized 1906, under laws of Arizona, with capital- es $1 par. Lands are claims near the Signal mine, on River. Idle and apparently moribund.

PPER CO. ARIZONA.

kjobbing scheme. Formerly at Wickenburg, Maricopa ibed Vol. VIII.

OPPER MINES CO. ARIZONA.

s, Cal. Mine office: Parker, Yuma Co., Ariz. W. A. E. Bouton, vice-president; L. H. Knowlte, secretary; er; preceding officers and F. X. Pfaffinger, directors; manager; Jas. H. Watson, superintendent. Organized capitalization $5,000,000, shares $5 par.

Carnation Mining Co., are 41 contiguous claims, area s north of Parker and 3 miles from Eagle Landing on the ng the Eagle, Carnation, Belcher and Cyclone groups. acres of ranch lands on the Colorado River, including r a smelter site. Geological conditions are markedly lanet and Clara mines. The Carnation ore body, trace- at 50′ to 100′ width, and the Eagle group shows veins g assays of 4 to 25% copper and $2 to $20 gold per ton. e, has about 6,000′ of workings, deepest circa 300′, show- opper carbonates, with sulphide zone not yet reached. cline shafts of 70′ and 300′, and 1,500′ of tunnels, show- smelting grade, with several hundred tons of ore on the 5% copper, and $5 to $20 gold per ton. The Walters 0′ vein, with back of 300′, assaying about 5% copper On the 200′ level of the Carnation shaft an ore body of aid to assay 5% copper and $5 gold per ton, carrying a to average 10% copper and $6 gold per ton. Man- ng a 200-ton smelter at Eagle Landing, but failed to ve sold the Wardwell & Osborne group, circa March,

ION CO. ARIZONA.

er, Yavapai Co., Ariz. Chas. Carman, superintendent; ng engineer. Is controlled, through stock ownership, a Smelting Co. Property is the Blue Bell mine, con- t & Eastern railway by aërial tram. Lands, 3 claims, n Algonkian slates with quartzite footwall and grano- ed by 6 shafts, deepest 600′, and by tunnels of 70′ and alachite, chalcopyrite and chalcocite, all slightly argen- with large ore body opened on the 300′ level. Nos. 1 art, are connected on the 500′ level. The ore body is wide and to average 5.5% copper and $3.50 in combined per ton, which figures are considered excessive, though ered valuable. Equipment includes an electric power

plant, taking current from a 10-mile transmission line. Product 922,268 lbs. fine copper, 19,656 oz. silver and 784 oz. gold in 1907.

ARIZONA EXPLORATION & DEVELOPMENT CO. AI

Dead. Formerly at Globe, Gila Co., Ariz. Described Vol. VIII.

ARIZONA GIANT COPPER CO. AI

Office: 229 Byrne Bldg., Los Angeles, Cal. Letter returned unclai former mine office, Ehrenberg, Yuma Co., Ariz. R. M. Furlong, p H. Franklyn Hiller, secretary and treasurer. Capitalization $3,000,00 $1 par. Lands, 320 acres. Old management, which sold considerab at fancy prices, was ousted, September, 1903. Long idle, and moribun

ARIZONA GOLD CO. AI

Office: Prescott, Ariz. Mine office: Wendendale, Yuma C M. B. Hazeltine, president; Benj. Blanchard, vice-president and gene ager; preceding officers, Homer Wood, Dr. O. L. Greer, A. J. Herndo Philbrook and O. A. Helsa, directors. Lands, 32 claims, including th Springs group, in Golden Gulch, about 14 miles east of Wendendal group near Cunningham Pass, in the Harcúvar Mountains. The India property is claimed to show 5 parallel veins, of good width, one bei claimed width, said to give good assays in copper, with gold values $8 per ton, opened to depth of 120′. Idle and apparently moribund.

ARIZONA GOLD & COPPER CO. AI

Mine office: Winkelman, Gila Co., Ariz. Organized circa Janua under laws of Arizona, with capitalization $500,000, by Chas. Baue A. Bauer—presumably the right and left. Lands are 6 miles nort Winkelman, near the Saddle Mountain mine. Idle since organizat apparently moribund.

ARIZONA GOLD & COPPER CO. AR

Dead. Lands were sold, January, 1907, to Trenton Mining Co. at Patagonia, Santa Cruz Co., Ariz. Fully described Vol. VI.

ARIZONA GOLD & COPPER MINES CO. AR

Dead. Formerly at Wickenburg, Maricopa Co., Ariz. Described

ARIZONA GOLD & COPPER MINING CO. AR

Dead. Formerly at Prescott, Yavapai Co., Ariz.

ARIZONA GOLD & COPPER REDUCTION CO. AR

Dead. Was swindle, perpetrated by the notorious Theodore Formerly at Planet, Yuma Co., Ariz.

ARIZONA GOLD LODE MINING CO. AR

Dead. Was reorganized, circa 1906, as Arizona Copper-Gold M Formerly at Humboldt, Yavapai Co., Ariz.

ARIZONA GOLD MINING CO. AR

Dead. Formerly at Wickenburg, Maricopa Co., Ariz. Described

ARIZONA GOLD MINING CO. AR

Mine office: Clifton, Graham Co., Ariz. Wood Poland, superin at last accounts. Property shows gold and copper ores, and has steam plant. Presumably idle.

ARIZONA GOLD MINING & DEVELOPING CO. AR

Dead. Formerly at Bisbee, Cochise Co., Ariz. Described Vol. V

ARIZONA GOLD MINING & MILLING CO. AR

Dead. Formerly at Briggs, Yavapai Co., Ariz. Described Vol.

ARIZONA-HANCOCK CONSOLIDATED MINING CO. AR

Office: Hancock, Mich. Mine office: Florence, Pinal Co., Ari D. Cuddihy, president; Alfred C. Sicboth, vice-president and superin Henry L. Baer, secretary and treasurer. Organized March 26, 1903, un of Arizona, as successor to Arizona & Hancock Mining Co., with capit $500,000, shares $10 par. Annual meeting, first Tuesday after first Mo March. Lands, 4 claims, patented, 2 miles south of Superior, showin

llel to the vein of the Lake Superior & Arizona, with dia-
ne hanging, opened by a short tunnel and a winze of 55′,
showing lead above and copper below. Idle some years.

K MINING CO. **ARIZONA.**

ed, March 26, 1903, by Arizona-Hancock Consolidated
t Florence, Pinal Co., Ariz. Described Vol. III.

COPPER MINING CO. **ARIZONA.**

Bldg., Los Angeles, Cal. Mine office: Ray, Pinal
ham, president and general manager. E. G. Thomas,
superintendent. Organized Sept. 15, 1906, with cap-
ares $10 par, nonassessable, issued $6,500,000. An-
ay in September.
patented, area 248 acres, and a 75-acre millsite, in the
ext east of the Ray Consolidated. Lands show Ray
and diabase, the schist carrying disseminated chalco-
e copper. Development includes 7 pits and shafts,
l of circa 750′ of workings, and a new 3-compartment
gust, 1910, is planned to be sunk 1,000′. Principal de-
urn drilling, begun early 1909, with 2 Star drills, which
of holes, No. 13 being 1,000′ deep. Property carries
he mammoth body of disseminated ore in schist devel-
lated, and apparently has about 50 acres of this forma-
he Ray fault. It has been claimed, in the press, that
ifferent blanket veins of ore, said to assay up to 20%
, which obviously is untrue, and it also has been stated
ole passed through 60′ to 70′ of disseminated ore, assay-
ich figures are taken cum grano salis, and it also has
that the ore bodies are much higher in grade than those
, which statement does not seem fully verified. It
, however, that churn-drill borings have proven a
d ore, with occasional native copper, the ore assaying
er tenor. Management declines to state ore tonnage
it is large, which undoubtedly is true. Management
gotiating, early 1911, with the Ray Consolidated, for

ONAL MINING CO. **ARIZONA.**

Yucca, Mohave Co., Ariz. Described Vol. VIII.

PPER MINING CO. **ARIZONA.**

Kingman, Mohave Co., Ariz. J. N. Turrentine, presi-
e-president; Maj. W. A. Mensch, secretary, treasurer,
eceding officers, W. S. Shafer, Geo. H. Craig, Francis
Sampson, directors. Organized Nov. 17, 1906, under
italization $1,000,000, shares $1 par; issued, $552,000.
Tuesday in January.
patented, area 140 acres, in the Maynard district, ad-
ining, Reduction & Improvement Co., circa 18 miles
od wagon-road from Kingman to within a mile of the
granite exposures, with porphyry dykes, carrying 4
r development, with strike N. 20° W., is estimated by
′ width, and is claimed to be traceable 3 to 4 miles,
ove and sulphides below, estimated to average 2.5%
silver and $3 to $12 gold per ton, which figures are

LE TRANSPORTATION **ARIZONA.**

h, Kans. Mine office: Casa Grande, Pinal Co., Ariz.

Capitalization 1,000,000 shares, presumably $1 par. Lands, 5 claim millsite, near Casa Grande. Is said to have a 20-stamp mill and smelter. Is not regarded favorably. Idle.

ARIZONA METALS CO. AR

Office: 115 Broadway, New York, N. Y. Mine office: T Cochise Co., Ariz. Hon. Chas. F. Dick, president; Wilbur C. Brov president; Ernest Suffern, secretary; M. E. Kinchala, manager; prece cers, H. B. Fernald, W. H. Stayton, Samuel M. Jarvis and F. R directors. Windsor Trust Co., New York, registrar and depository.

Lands, 27 claims, area 540 acres, being 20 gold claims and 7 coppe on the Southern Pacific railway. Gold ore is said to be free milling, an claims are said to show a 4′ vein, assaying at surface about 3% coppe gold, with assays up to 23% copper. Development includes a 125′ sh the copper claims have a tunnel which should strike the vein at abou extended. Property was a limited producer in the past. An attach $2,086 against the company, was taken June, 1910, by Frank Kiernan day note, dated Feb. 24, 1910, for advertising, and a levy on the office proved ineffective, the company having borrowed the furniture. Is not favorably. Idle and moribund.

ARIZONA-MEXICAN COPPER CO. M

Office: Phœnix, Ariz. Letter returned unclaimed from former mi Caborca, Altar, Sonora, Mex. J. E. Hubinger, president; W. E. Def president and consulting engineer; W. C. Foster, treasurer. Organized 1902, under laws of Arizona, with capitalization $3,000,000, shares

Lands, 79 pertenencias, known as La Gran Provedora de Cobre, from the Sonora railway. Country rock is granite, ores carrying an spar gangue, giving a self-fluxing ore. Vein is up to 228′ wide, giving assays of 6.7% copper, 12 oz. silver and $2 gold per ton, and is opened of 102′ and 200′, and by tunnels of 209′ and 228′, with a total of about mile of openings. From the 400′ level down some ore bodies assayed 22 copper and as high as 131 oz. silver per ton. Idle since circa 1907.

ARIZONA-MEXICAN MINING & SMELTING CO. **ARIZONA & CALIF**

Dead. Property was sold, December, 1909, to United States S Refining & Mining Co., which organized thereon the Needles Mining & Co. Formerly at Needles, San Bernardino Co., Cal. Fully described V

ARIZONA & MICHIGAN DEVELOPMENT CO. AR

Office: Benson, Ariz. Mine office: Johnson, Cochise Co., Ariz Pidgeon, president and general manager; P. N. Lindley, secretary; Frank ern, superintendent. Organized 1904, under laws of Arizona, with capit $2,500,000, shares $5 par. Lands, 7 claims, patented, area 140 acres, porphyry and limestone carrying 4 ore bodies, one, opened by vert incline shafts and by tunnels, showing a 5′ vein with poorly defined v impregnations in the limestone hanging and porphyry footwall. Ha two-compartment main shaft with 24 openings showing cuprite, malac copper sulphides said to give average assays up to 12% copper, 18 o and $1 gold per ton. Has a 60-h. p. gasoline engine with double-dru and has shipped a little good ore to El Paso smelter. Idle sever except for annual assessment work; in bad shape financially, and a was asked, November, 1910.

ARIZONA & MICHIGAN MINING CO. AR

Office: Calumet, Mich. Mine office: Globe, Gila Co., Ariz. C Chynoweth, president; Frank L. Van Orden, vice-president; S. C. Chy secretary; Wm. B. Anderson, treasurer; preceding officers, James L. K and Anton Trojanovich, directors; Spencer W. Clawson, general manag A. Nelson, superintendent.

er, 1908, under laws of Arizona, with capitalization par, fully issued, divided into $150,000 full paid and ck, latter $1 paid in. Levied a 50-cent assessment, nts & Miners Bank, Calumet, Mich., registrar. Annual in January.

rea circa 620 acres, known as the Trojanovich group, of Globe, adjoining the Superior & Boston on the north- t of the Black Hawk mine of the Arizona Commercial. r a $230,000 bond and lease, with $180,000 remaining e agreed to take stock for this balance.

les the 368′ Blackbird shaft, and the 519′ vertical 3- haft, sunk through shale carrying leached iron, with ing some specks of chalcopyrite in diorite. The 500′ er-mile of crosscuts, showing considerable pyrite. The roves to be merely a gash vein.

ein, cut on the 500′ level, with a 120′ winze sunk thereon, e, but no copper. Property is supposed also to carry the Arizona Commercial. Equipment includes a 25- 10 buildings, one a boarding-house. General work was and all work suspended, Dec. 13, 1910, but diamond 911. Company is practically out of cash.

WYOMING.

are of Horace E. Adams, owner, Hecla, Laramie Co., area 80 acres, in the Silver Crown district, opened els of 100′, 100′, and 120′ showing native copper, oxides, and chalcopyrite. Has gasoline power and a small veral years, except for annual assessment work, owing

ARIZONA.

s St., Boston, Mass. Mine office: Wickenburg, Mari- E. Dow, president; Geo. W. Smith, vice-president; Bruce reasurer; Mark Bradley, general manager; preceding ll, directors; J. W. Nicholson, superintendent. Organ- laws of Arizona, with capitalization $2,000,000, shares Federal Trust Co., Boston, registrar; State Street fer agent. Stock is listed on the Boston curb.

a 140 acres, in the Castle Creek district of the Bradshaw es from Wickenburg. Property, known as the Tomboy y up to 50′ in width, traced by trenching for nearly 1 ludes several short tunnels, and a 220′ shaft, showing 3′ of disseminated malachite, said to assay 14% copper re being exclusively oxidized to depth opened. Mine quarter-mile of workings. Company estimates average per, 8 to 10 oz. silver and $8 gold per ton. Equipment st, good for 600′ depth, and necessary mine buildings. ening shaft and continuing development.

ARIZONA.

Grande, Pinal Co., Ariz. C. L. Shaw, superintendent, opment work was done, 1905-1906. Idle several years d.

D. NEW MEXICO.

ni Bldg., St. Louis, Mo. Letter returned unclaimed Pinos Altos, Grant Co., N. M. Idle several years and

MILLING CO. ARIZONA.

d, Yavapai Co., Ariz. Chas. J. George, general mana-

ger, at last accounts. Organized under laws of Arizona, with capitali $1,250,000, shares $1 par; issued, $1,000,000. Lands, immediately south Poland mine, were held formerly by Poland Extension Gold Mining & Co. Development is by the 170′ Fitzhugh Lee tunnel, run jointly wi Cardinal Mining Co., with a blind shaft, showing argentiferous copper, le zinc sulphides, with values mainly in silver and lead. Equipment incl hoist and air-compressor. Idle.

ARIZONA MINING & REALTY CO. MÉ

Office: 404 Burlington Bldg., St. Louis, Mo. Mine office: Na Moctezuma, Sonora, Mex. W. L. Musick, president; J. F. McCourtney president; W. N. McCourtney, secretary. No trace of operations secure presumably idle.

ARIZONA MINING & TRADING CO. MÉ

Office: Douglas, Ariz. Letter returned unclaimed from former office, Nacozari, Moctezuma, Sonora, Mex. E. O. Wolf, general manag C. Holbrook, mine superintendent. Organized 1906. Lands are in 2 g 8 miles and 16 miles southeast of Nacozari, former, known as Los Angeles having a 75′ shaft showing chalcopyrite of good grade. A carload of ore shi 1907, to the Copper Queen smelter, gave returns of 12.5% copper and silver per ton. Has a concentrator. Resumed work 1910, after several idleness and shipped some ore. Property considered promising.

ARIZONA & MISSOURI COPPER MINING CO. ARIZ

Dead. Thos. C. Job was agent. Lands were 5 claims, on which litt annual assessment work ever was done. Formerly at Humboldt, Yavapa Ariz.

ARIZONA-MORENCI COPPER CO. ARIZ

Office: 27 William St., New York, N. Y. English office: Palm House, New Broad St., London, E. C., Eng. Mine office: Morenci, G Co., Ariz. Hon. J. B. McCreary, Hon. John P. Jones, Hon. Steph Dorsey, Gustavus A. Muller, L. H. Hole, Maj.-Gen. C. F. Humphrey, Cameron, W. B. Mathews, W. Douglas Reid and Walter B. Puckle, directors; Edwin Habben, secretary; Henry G. Catlin, engineer; J. O. B superintendent. Organized Nov. 22, 1909, under laws of Arizona, with ca ization $10,000,000, shares $5 par, in $5,000,000 preferred and $5,0 common stock, preference shares at 7% rating pari passu with common s "after payment of 7%." Company was a reorganization of the Copper Co. of Arizona, Ltd., which denied being the successor of the Arizona gamated Copper Co., though it bought its lands mainly therefrom, an dently succeeded the Copper Co. of Arizona. Stock was offered in En by the Clifton-Morenci Syndicate, Ltd. It was stated in the press, M 1910, that according to the company's annual report, it had on hand $3,00 which statement is not credited.

Lands, 108 claims, area circa 2,000 acres, in 7 tracts, mainly nort northwest of Morenci, also a 620-acre millsite 1 mile west of Clifton, 620-acre townsite adjoining; these being on the San Francisco River, acc to company's prospectus. Lands, held apparently under bond and lea the Coppermines Co. of Arizona, Ltd., predecessor of this corporation, inc the Stevens, Bonanza, Celtic, Monte Carlo, Keystone-Merritt, Corona, B O'Donnell and Crystalina "mines," for which the Coppermines Co. of Ar planned exchanging $4,000,000 "worth" of stock. In December, 1907 company preceding the Coppermines Co. of Arizona secured an extensi the bonds on these properties, under option. The prospectus of the pr company claims that these lands include 98 of the copper mines of the trict, which is absolutely untrue, as these properties are almost exclus mere prospects, most of them exceedingly raw, and not mines. The Co

hich formerly held these claims, then reported as up-
imed a total of about 4 miles of workings, and also
eeding 200,000,000 tons, which was a sinful lie. The
the Keystone and Celtic groups, with 2 churn drills,
hows oxidized ores at and near surface, followed by
claims that the surface is rich in oxidized ores averag-
s untrue, with copper sulphides of 2.5 to 4% tenor,
e true.

pectus states that the concentrator "will be" of 2,000
in 4 units, but the concentrator remains purely theo-
also stated that the smelter "will be" of 1,000 tons
, smelter also remaining hypothetical. The company
cal mill and hypothetical smelter would yield, "con-
lbs. fine copper per annum, at a cost of 8.5 cents per
seaboard. These figures, based upon hypothetical
nd a smelter yet to be built, are bolstered up by the
that the management and development of this proposi-
of practical mining men of long experience and un-
success, which assures that the operations will be
nd intelligent lines, with every guaranty of success"—
nportant if true. Success in politics does not neces-
nining.

ıer states that no examination could be more complete
made on the company's mines, but the prospectus is
ıeralities and figures of profits made by other mines.
ent advanced by the prospectus is the statement that
ound would give annual profits of $2,760,000, which
reasing the output to 2,000 tons smelted daily. This
l be increased a hundred-fold by merely mining and
hypothetical ore) per diem.

ırently was organized mainly by ex-Senator Stephen
e fame, and includes 3 "ex" United States senators.
London, April, 1910, but in the following September
ıange committee had not yet granted a settlement,
ıerally made in 4 to 6 weeks time. The company's
rely too much, and is filled with generalities, crudities
ns of the truth. Company is regarded with suspicion.

COPPER CO. **ARIZONA.**

., Williamsport, Pa. Mine office: Globe, Gila Co.,
s, president and treasurer; C. S. Messerly, secretary;
perintendent. Organized Feb. 1, 1906, under laws of
on $3,000,000, shares $10 par. Bonds $300,000, at 5%.
so a 15-acre millsite and 100 acres timber lands, for-
Nelly-Crowley property, on Pinto Creek, carrying con-
and granite, said to average 14′ in width and traced
le high-grade oxidized ores, including chrysocolla and
e chalcopyrite and occasional bornite. The 80′ ledge
slightly impregnated with copper sulphides. Develop-
′ and 85′, and by tunnels of 195′, 250′ and 300′, with
workings. Has steam power. President Hicks has
for statements emanating from other officers claiming
ıtrating ore, and 3,297,000 tons of smelting ore in sight,
ed out for stoping.

option to Cactus Development Co., which was suc-
Co., and apparently a stock interest is or was held by
on the property during the past 2 years are described

under title of Cactus Copper Co., which apparently relinquished its bo
the lands, late 1910. Idle.

ARIZONA-NEVADA CONSOLIDATED GOLDFIELD MINING CO. ARIZ

Dead. Clarence H. Woodcock was manager. No trace of oper
secured, and company apparently was organized chiefly to sell stock.
merly at Bisbee, Cochise Co., Ariz.

ARIZONA-NEVADA COPPER CO. ARIZ

Office: 1201 Union Trust Bldg., Los Angeles, Cal. Mine office:
dad, Yavapai Co., Ariz. Jas. A. Snedaker, president; W. T. Hook, vice
dent; E. B. Bronson, secretary; Benjamin E. Page, treasurer; preceding of
Jos. L. Giroux, Eugene L. Giroux and Ralph C. Lupton, directors; Her
Geisendorfer, superintendent. Organized Apr. 9, 1909, under laws of
ware, with capitalization $5,000,000, shares $5 par.

Lands, on Copper Creek, 27 miles northwest of Hillside, include f
holdings of Copper Creek Development Co., taken over 1909, to which 28
were added, circa April, 1910, these including the Niagara group of 8 c
bonded for $50,000, giving total holdings of 70 claims, area circa 3,400
being prepared for patent. Old workings include a tunnel said to show
good average tenor, with copper values increasing at depth. Majori
claims show leached porphyry at surface, and present work is being done
the hope of developing a disseminated ore mine, in porpyhry and conglom
from which assays are said to run 2 to 3% copper. Considerable diamon
churn drilling was done, 1910, some holes being sunk to 500′, and 2 churn
were running, late 1910, with 2 additional drills planned. Transportati
by a poor wagon-road to Hillside but it has been proposed building a ra
from Seligman on the Santa Fé railway to the mines, a distance of 50
with an easy grade obtainable. Property is considered promising, but fu
extensive drilling will be required to determine its actual value.

ARIZONA & NEW SOUTH MINING CO. ARIZ

Dead. Formerly at Oracle, Pinal Co., Ariz. Described Vol. IX.

ARIZONA-PACIFIC COPPER CO. ARIZ

Office: 705 State Life Bldg., Indianapolis, Ind. Mine office: Flo
Pinal Co., Ariz. F. P. Jeffries, president; John W. Sharpe, vice-presiden
general manager; Henry Severin, treasurer; Murat W. Hopkins, secre
Manuel Villar, superintendent, at last accounts. Organized March 30,
under laws of Arizona, with capitalization $5,000,000, shares $1 par.

Lands, 16 claims, area 320 acres, also an 80-acre smelter site and 160 ac
possible oil lands, lying at Wooley, south of the Gila River, and about 7
south of Kelvin, connected by 4-mile wagon-road with the Phœnix & Ea
railway. Property shows sundry minor veins, assaying 3 to 20% copper a
to $20 gold per ton. A much shattered quartz-porphyry dyke, 1,200′ long
about 500′ in extreme width, with axes east and west, is cemented by veins c
ing cuprite, melaconite, and chalcocite, having estimated average values o
copper, 1 oz. silver and $2 gold per ton, which figures probably are too
Has shafts of 80′ and 350′, also tunnels of 260′ and 342′. Has two gasoline
air-compressor, power drills, and necessary mine buildings. Property i
garded as promising, owing to great size of the ore body, though the ore i
in tenor, but apparently well adapted to close and economical concentra
Idle at last accounts.

ARIZONA-PITTSBURG MINING & SMELTING CO. ARIZ

Letter returned unclaimed from former office, Pittsburg, Pa.
office: Patagonia, Santa Cruz Co., Ariz. H. W. Graib, president; Joh
Wilson, vice-president; R. A. McDonald, secretary and treasurer; prec
officers and Julius Bieler, directors; C. R. Reno, manager; Frank T. Clevel

ed June 7, 1907, under laws of Arizona, with capital- $1 par.
wned and 31 held under bond and lease, area circa 640 agonia. Development includes a 200′ shaft, showing erage width, said to be traceable 6,000′, estimated by eraging 5 to 7% copper, about 20% lead and 12 oz. e argentiferous chalcopyrite and galena, with quartz and copper increasing with depth. The mine is lo-, the principal of the two important veins on the Pata-tita Mountains. Equipment includes a 40-h. p. hoist, d a 3-drill Sullivan air-compressor. Idle.

NG & DEVELOPMENT CO. **ARIZONA.**

nburg, Maricopa Co., Ariz. H. E. LeCompte, presi-r. Organized circa January, 1909. Lands include the lator, or Maricopa, groups, latter said to show good up, 6 claims, about 2 miles from the Vulture mine, has carry argentiferous and auriferous copper and lead

MINES CO. **ARIZONA.**

on, Cochise Co., Ariz. Property, known as the Neale w shafts, deepest of which was being cleaned out, pre-f sinking, circa October, 1909. Presumably idle.

CO. **ARIZONA.**

y, New York, N. Y. Works office: Humboldt, Yava-ed February, 1905, under laws of New Jersey, with presumably increased later. Is controlled, through issue, by Consolidated Arizona Smelting Co. Bonds, al meeting, first Monday in December. Property is Consolidated Arizona Smelting Co.

TERN COPPER CO. **ARIZONA.**

Trade, Pueblo, Colo. Mine office: Cedar, Mohave president; Louis Hoffman, vice-president and general n, secretary and treasurer; preceding officers, R. H. and E. J. Mischler, directors; C. J. Price, engineer; tendent. Organized 1907, under laws of Arizona, with , shares $1 par, nonassessable. Annual meeting, first

patented, area 176 acres, including the Pittsburg mine, lley district, Hualapai Mountains, 21 miles from Yucca, Property has 2 ore bodies under development, estimated 0′ in width and to be traceable 2 miles, opened by tun-, and by a 300′ shaft connecting with the main tunnel, kings. Mine, which is quite wet, shows chalcopyrite, timated by company to average 5% copper, 8% lead, d $5 gold per ton, which figures seem high. Company cked out for stoping, and 700,000 tons in sight, which

a 15-h. p. gasoline hoist, and there is a boarding-house.

INING CO. **ARIZONA & NEVADA.**

burg, Yuma Co., Ariz. B. T. Hickman, president; sident; Adolph Moltzen, secretary. Organized under italization $1,000,000, shares $1 par. Lands include 2 meralda county, Nevada, 8 claims southeast of Quartz-ache Chief Mining Co., having circa 800′ of workings, in the Plomosa district, Arizona, latter said to show 5 , of 21′ average width, are said to carry oxidized ores

giving average assays of 15% copper, 40 oz. silver and $1 gold per ton, figures are high. Property has shafts of 50′, 75′, 110′ and 250′, and is s have circa 1,700′ of workings. The equipment includes a 16-h. p. hois several mine buildings, and company is said to plan a concentrator. A ore shipment to the Humboldt smelter is claimed to have netted $1,087. pany claims to guarantee a dividend of 1½ cents per share on all stock pla 5 cents per share, and is regarded with suspicion. Idle and apparently mori

ARIZONA SYNDICATE. ARIZ

Dead. Formerly at Kelvin, Pinal Co., Ariz. Described Vol. VI.

ARIZONA TURQUOISE MINES CO. ARIZ

Mine office: Kingman, Mohave Co., Ariz. Lands, 12 miles nor Kingman, in the Mineral Park district, include the I. X. L. and adjoining c showing turquoise near surface, turning to copper values at depth. opened to depth of 170′, has been a considerable producer of turquoise, previous to 1885 is said to have netted a profit from rich silver ore, work arrastras and shipped to San Francisco. Was producing a little turquoi last accounts.

ARIZONA UNION CONSOLIDATED GOLD & COPPER MINES CO. ARIZ

Dead. Former office was Cincinnatus Bldg., Cincinnati, Ohio. Jo Mageer was secretary. Capitalization supposedly was $7,500,000. Lands said to be 54 claims in northern Arizona, circa 150 miles from Fairfield, the nearest railroad station. Company's literature dealt liberally in glitt generalities, and company apparently was merely a stockjobbing scheme. mer location of lands, if any, unknown.

ARIZONA UNITED COPPER CO. ARIZ

Dead. Office was 35 Wall St., New York, N. Y. Officers were Ed D. Willetts, president; Geo. F. Jacobs, assistant treasurer. Arvid Lund & of 150 Nassau St., New York, N. Y., were fiscal agents when company floated, circa 1900, but the fiscal agents, after this flotation, went out o mining promotion business, and advertised a sure cure for obesity. For at Clifton, Graham Co., Ariz.

ARIZONA UNITED MINING CO. ARIZ

Office: 1420 Chestnut St., Philadelphia, Pa. Mine office: Joh Cochise Co., Ariz. Alfred S. Miller, president; Wilson H. Brown, vice- dent; A. Jackson Wright, secretary; David H. Ross, treasurer; I. Wayn Leer, manager; Alfred S. Miller, Jr., assistant manager; F. Justice Gr consulting engineer. Organized July 21, 1904, under laws of Delaware, capitalization $1,000,000, shares $1 par, as Arizona Consolidated Mining and name changed, February, 1909, to present title.

Reconstruction was for the purpose of retiring preferred stock formerly standing, and combining the ownership of the Copper King claims. All ferred stock issued by the Arizona Consolidated Mining Co. has been withd and cancelled, present company having no preferred stock, bonds, mortga encumbrance of any sort. Company is operated as a close corporation.

Lands, 21 claims, 18 patented, circa 7 miles northwest of Cochise sta on the Southern Pacific railway. Property includes the Mammoth and Re lic or New Republic groups, 12 claims of which formerly were owned by Russell Consolidated Copper Co., and the townsite of Harmer. Lands 5 ore bodies, of which 3, under development, range 4′ to 6′ in estimated av width, carrying carbonate and sulphide ores, mainly latter, estimated by fo company to average 8% copper and 1.2 oz. silver per ton. Sulphide ore encountered at depth of 671′. Development is by 6 shafts.

The Republic mine has an 820′ incline shaft, wet at bottom, and at d of 750′ was claimed to have copper sulphide ore of about 37% copper tenor the mine has about 1 mile of workings. The Mammoth mine has a 350′ s

erals and tunnels. The Chicora mine is claimed to show
5% copper and 75 oz. silver per ton, which figures seem

es a power plant, with good hoists at the Republic and
l electric plant and 4 Ingersoll-Temple electric drills.
railway from Johnson to Dragoon, connecting with the

er, blown in October, 1909, makes matte only, of about
n operated, having no converters, matte being sent to the
for reduction. Production was 245,040 lbs. fine copper
1907; 237,600 lbs. copper, 2,400 oz. silver and 15 oz. gold
ork circa May, 1910, awaiting a higher price for copper,
money at metal prices then prevailing.

PPER CO. **ARIZONA.**
at Jerome, Yavapai Co., Ariz. Described Vol. VIII.

T COPPER CO. **ARIZONA.**
Springs, Yavapai Co., Ariz. Property, about 8 miles
tion, and 50 miles northwest of Phœnix, is developed by
w a good body of silver-lead ore and auriferous and argen-
imed to average $100 per ton in assay values.

LAKE COPPER CO. **ARIZONA.**
at Bisbee, Cochise Co., Ariz. Described Vol. V.

RE DE ARIZPE. **MÉXICO.**
at Arizpe, Sonora, Mex. Described Vol. VIII.

OPPER CO. **MÉXICO.**
ecurred 1905, under suspicious circumstances. Formerly
.

MÉXICO.
173-29 Broadway, New York, N.Y. Edw. Quick was presi-
secretary and J. J. Evans, general manager. Organized
alization $6,000,000, shares $5 par, assessable; $2 paid in,
Arizpe Mining Co., and was merged, circa November,
als Co. Property was circa 6,700 acres, described Vol.
pe Mining Co. Formerly at La Cananea, Arizpe, Sonora,

MÉXICO.
ceeded, April, 1910, by Arizpe Mines Co., which was
1910, by Mexican Metals Co. Formerly at La Cananea,
Fully described Vol. VIII.

ONA COPPER CO. **ARIZONA.**
ern Trust Bldg., Little Rock, Ark. Mine office: Jerome,
. M. Kavanaugh, president; J. E. Leeper, vice-president
Chas. T. Lynch, secretary and manager; Walter C. Miller,
ficers, J. T. Robertson, S. P. Park and Wm. R. Tucker,
June 25, 1906, under laws of Arizona, with capitalization
ar.
area 280 acres, known as the Royal Irish group, in the
a 770′ shaft sunk through alluvium carrying a little gold,
unk in a deep basin. Shaft is planned to be deepened to
d drilling was done, 1909-1910.
es a 50-h. p. Leyner electric hoist, good for 1,500′ and an
essor. Has 8 buildings, including a 30x40′ power-house.
tember, 1910, immediate installation of reduction works,
terialized.

CO. **MONTANA.**
at Helena, Lewis & Clark Co., Mont. Described Vol. VIII.

ARKANSAS VALLEY SMELTING & REFINING CO. COLO

Works office: Leadville, Lake Co., Colo. Is controlled by the A Smelting & Refining Co.

ARK MINING & MILLING CO. WASHIN

Dead. Property supposedly was claims in vicinity of the land Arzard Mining Co. No trace of operations secured. Formerly at Cl Stevens Co., Wash.

ARLINGTON-BURNS COPPER-GOLD CO., LTD. BRITISH COL

Dead. Formerly at Greenwood, Boundary district, B. C. Described

ARLINGTON COPPER CO. NEW J

Dead. Lands were sold Sept. 30, 1903, for debt. Formerly at A Hudson Co., N. J. Described Vol. II.

ARLINGTON MINING CO. MO

Office: Wallace, Idaho. Letter returned unclaimed from form office, Thompson, Sanders Co., Mont. Cyrus W. Gossert, president; Fisher, secretary. Capitalization $1,500,000, shares $1 par.

Lands, 20 claims, well timbered, in the Mountain House unorganiz ing district, near the Idaho-Montana divide. Property shows a ledge, be traced 6,000′ by surface cuts, 30′ to 100′ in claimed width, carrying, low depth, galena of concentrating grade, with some ore assaying up lead. The 175′ upper tunnel is said to show 3′ of good concentrating and the 900′ lower crosscut tunnel shows a 10″ stringer assaying 8% 15% lead and 15 oz. silver per ton. Resumed work June, 1909, and v for $850 on a promissory note, June, 1910. Idle and apparently moribu

ARLINGTON MINING CORPORATION. WASHIN

Dead. Formerly at Conconnully, Okanogan Co., Wash. Described V

COMPAÑÍA MINERA ARMANDO. M

Dead. Formerly at Zautla, San Juan de los Llanos, Puebla, Me scribed Vol. VIII.

FRANCISCO ARMENDAIZ SUCESORES. M

Office: Apartado 37, Monterey, N. L., Mex. Mine office: Nuevo León, Mex. Francisco Armendaiz, manager. Property inclu Refugio, Barredon and Purisima mines, carrying slightly argentifer ores, which are properties of merit, and the Colorado mine, carrying u in copper tenor. Mines, which have been small but fairly steady p of argentiferous lead ores, with a little copper, are under lease to other i

ARM EXPLORATION CO. CALIF

Letter returned unclaimed from former office, Kennett, Cal. Mi Raymond, Madera Co., Cal. Property is said to have a fair-sized vei ing high grade melaconite. Idle and apparently moribund.

COMPAÑÍA LA MINA ARMONIA.

Mine office: Carrizal Alto, Freirina, Atacama, Chile. Propert old mine, opened to depth of 414 metres, which has been a considera ducer in the past, but production has been trivial for some years.

ARNOLD MINING CO. MIC

Office: 64-50 State St., Boston, Mass. Mine office: Copper Fa weenaw Co., Mich. C. Howard Weston, president; John Brooks, s and treasurer; Capt. Wesley Clark, superintendent. Annual meeting, Tuesday in May. Organized 1864, under laws of Michigan, with capit $2,500,000, shares $25 par; issued, $1,550,000.

Lands, 3,323 acres, in T. 58 N., R. 31 W., in two tracts, including Copper Falls mine and the Arnold mine proper, with frontage of about on Lake Superior. The Copper Falls mine, worked, circa 1850 until 1893, made 25,686,429 lbs. fine copper, mainly from the Owl Creek and paid dividends of $100,000. The Arnold mine proper, developed Arnold ashbed, was opened 1863, reopened 1897, closed 1901, rock

opper. Has a stamp-mill and 2½-mile narrow-gauge
d & Eagle Harbor, rolling stock of which has been sold.
l is about 1,000′ deep, sunk at an angle of 26° with the
1908, employing 5 to 8 men, shipped, from the Owl
copper, including barrel-work and 7 or 8 heavy masses,
s, averaging a production of about 1 ton of copper per
oducing enough metal to pay all expenses, including
at end of 1910, on exploratory and scramming work.

RY COPPER MINING CO., N. L. AUSTRALIA.

St., Melbourne, Australia. David Blair, manager.
stralia, shows sandstone beds of Permian age, ore oc-
hin veins following the joints and fissures of the sand-
oxides and carbonates, with a little sulphide ore ex-
one formation, occupying a basin with gneiss walls, is
nile long. Bulk parcels of ores shipped have given re-
opper. Property has rail connections, but the process
ores of such unusual nature and occurrence had not
accounts. Idle several years and apparently moribund.

WASHINGTON.

elah, Stevens Co., Wash. L. Bryant, manager, at last
cres, patented, on Round Mountain, 5 miles south of
80′ tunnel, said to show a 30′ vein of medium grade
idle.

BECK BRÜGGEN- GERMANY.
BERT.

hl, Westfalen, Germany. Idle some years

MICHIGAN.

St., Boston, Mass. Mine office: Copper Falls, Ke-
n Brooks, secretary and treasurer; Capt. Wesley Clark,
g officers, T. P. Farmer and W. C. Fiske, directors.
ws of Michigan, with capitalization $1,000,000, shares
g, second Tuesday in March. Charter expired 1910,

in vicinity of Copper Falls, adjoining the Arnold mine.
ginally as the Petherick mine. The last work, of an
done 1905-1906. Very fully described Vol. II.

MINING CO. NORTH CAROLINA.

oro, Randolph Co., N. C. H. D. Landers, president;
esident; W. C. Hammond, treasurer; M. W. Parrish,
r, manager. Organized under laws of North Dakota,
,000, shares $1 par. Lands, 93 acres, just north of
ttle mining was done in the Nineteenth Century. A
ns of $16.85 per ton, with 8.6% copper and small gold
tion on 400 acres of gold-bearing lands at last accounts.

JAPAN.

a Mining Co.

O. COLORADO.

Gunnison Co., Colo. Carroll M. Carter, superintend-
Property is the Carter group, carrying gold, silver, lead,
Has steam power. Presumably idle.

CO. ARIZONA.

an, Graham Co., Ariz. Arthur J. Murphy, Jr., man-
ys giving high values in copper, silver and gold. Has
e-bins. Production, 1907, was 18,214 oz. silver. Pre-

ASIENTOS MINING CO.

Office: Baltimore, Md. Mine office: Asientos, Ocampo, ientes, Mex. Chas. Adler, vice-president; B. Strouse, secretary and Abram Rapp, general manager. Organized 1898, under laws of Delaw capitalization $1,000,000, shares $10 par, nonassessable; fully issued.

Lands, 190 acres, including the Nopensada and Alta Palmira min are antiguas, and the Veta Grande and Refugio mines.

The Nopensada and Alta Palmira mines were leased, Oct. 1, 19 Nopensada, said to have been a considerable producer in early da mainly slightly argentiferous copper ore, of about $40 per ton avers Equipment includes steam and electric power.

The Alta Palmira mine, having a 300′ shaft, produces aurife argentiferous copper ore, and yielded, 1910, circa $250,000 in gold, s copper. Equipment includes a 150-h. p. steam plant and hoist.

The Refugio mine shows ore carrying up to 10% copper and 1,1 silver per metric ton, with small gold values.

COMPAÑÍA MINERA DE ASIENTOS, S. A.

Office: Tepezalá, Aguascalientes, Mex. Abram Rapp, mana ganized June 3, 1900, under laws of México, with capitalization 1,000,0 Probably is the Mexican incorporation of Asientos Mining Co., or under lease to that company.

ASMUS BOYSEN MINING CO. WY

Letter returned unclaimed from former office, 226 South Clark St., Ills. Mine office: Thermopolis, Frémont Co., Wyo. Asmus Boys dent; N. C. Brorson, secretary and treasurer; C. E. Breniman, superi Organized under laws of Wyoming, with capitalization $25,000,000, sh par. Boysen claimed the right to locate 180,000 acres on the Shosho reservation, in consideration of relinquishing a contract with the Shos Arapahoe Indians, but fell afoul of the United States government, a compromised on 640 acres. Company claims to own silver, oil and c Several long tunnels have been driven, and a tram built, but whethe been found or not is known only to the management. Company ow and power plant. No trace of mining operations secured.

ASPEN MINE CO. COL

Office: 165 Broadway, New York, N. Y. Mine office: Silve Juan Co., Colo. J. L. Campbell, superintendent, at last accounts. Com posedly is controlled by American Smelters Securities Co. Mine carries and copper sulphides, and employed, 1907, about 25 men. Presumabl

ASSOCIATED COPPERS CORPORATION. A

Office: Cassville, N. Y. Mine office: Vicksburg, Yuma Co., B. Moore, president; S. Howard Leech, vice-president; John H. Spri tary and treasurer; Col. L. S. Judd, manager. Capitalization $1 Property supposedly was the Eagle Eye group, about 10 miles south burg. Manager Judd writes that company owns no property of any in fact has no legal existence, as some New York promoters organized pany, and sold some stock, but turned in no cash. John H. Spring the company—or himself. Obviously a fake.

ASTOR MINING CO. COL

Mine office: Eureka, San Juan Co., Colo. E. C. Condit, superi Property includes the Surprise, Mogul and other claims, carrying ore silver, lead and copper. Has steam, water and electric power, and concentrator, employing 25 men.

ASTROLABE MINING SYNDICATE. NEW

Mine office: Port Moresby, British New Guinea. Lands, 150 a Sapphire Creek, circa 16 miles from Port Moresby, main tract of 120 a a reward claim for discovery. The main tract has a 50′ shaft, said to

and arsenical pyrite, giving assays of 3% copper, with
but the surface ores, in alluvium, are mainly malachite,
shipment of 17 tons, of 26.8 to 32% copper, with traces
s ore was secured from detrital material, deposited by
cre tract lying one mile east of the main workings shows
carbonate stains assaying 3 to 4% copper, and a short
lachite and cuprite. Made, 1908, bi-monthly 40-ton
of ore ranging 20 to 40% in copper tenor. Idle.

AL DE ATACAMA. CHILE.

Atacama, Chile. Works office: Tierra Amarilla,
. Mine office: Almolanos, Copiapó, Atacama, Chile.
y the British house of Edwards & Co.
e Descubridora, San Pedro, Rincon and Lautaro mines.
dora, at Puquios, opened to depth of 220 meters by
ular ore bodies, with barren rock between, in veins, in
strata, carrying mainly chalcopyrite, associated with
nt includes a steam plant with Stirling water-tube
ver. The mine employs about 80 men. Production,
0 metric tons monthly of 15% copper ore.
in the San Antonio district, carries large quantities of
tenor, with limestone gangue, in a porphyry dyke.
has a fissure vein, opened by a 50-meter shaft, having
lina Rincón, opened to length of about 400 meters, has
y also owns mines at El Morado, Copiapó, but costs of
c ton for ore impede any great production.
Lautaro, built 1904, has a large hydro-electric installa-
of a nearby river.
vo smelters, known as the Tierra Amarilla and Caldera,
ó & Interior railway, which do a general custom busi-
d ores, as well as copper.
smelter has 6 reverberatory furnaces, two 3-deck cal-
eratory furnaces for Chile bars, and two 54x54″ blast-
ncludes four 110-h. p. boilers and 3 small electric motors.
d coke, latter used in charges of 1 ton to 6 tons of ore.
is argentiferous and auriferous Chile bars and matte.
lter is idle, as the mines cannot feed both smelters.
r, of about 200 metric tons daily capacity, is modern,
atory furnace and two 100-ton 40x120″ blast-furnaces,
used for the water-jackets corrodes and destroys them.
re employed. There are 2 Connersville blowers, actu-
volt Bullock electric motor. Slag is hauled in cars, by
the sea. Management plans installing sintering pots.
nt has 2 stands and 8 Allis-Chalmers shells, 72x100″ in
Dodge crusher with 35-h. p. motor, for linings, and a
press with a 30-h. p. motor, of 30 metric tons capacity
matte, containing about 130 grams silver and 9 grams
ped to New York for electrolytic refining, as converter
le since 1907. The power plant includes a producer
pacity, with a 266-h. p. 2-cylinder gas engine, and 240-
k electric generator. Equipment includes an electric
d electric accumulators. Apparently the gas producer
There also is an electric lighting plant. Owing to inter-
f production was materially increased, 1908-1909.
has been as follows: 3,887,230 lbs. fine copper,
nd 728,645 grams gold in 1907; 2,166,235 lbs. copper
s. copper in 1909.

ATACAMA MINERAL CO., LTD. C

Dead. Was liquidated, voluntarily, July, 1902. Formerly at Atacama, Chile. Described Vol. III.

ATBASAR COPPER FIELDS, LTD. SIB

Office: 60 London Wall, London, E. C., Eng. Mine office: Djes K Atbasar, Akmolinsk, Siberia. Arthur Fell, M. P., chairman; preceding R. Gilman Brown, A. Davidson, E. T. McCarthy, D. J. Neame, Hon. Parker and H. Alan Scott, directors, John A. Clark, secretary; Algernon general manager; Wm. T. Hall, mine superintendent; W. Pellew-H consulting engineer. Organized Nov. 28, 1906, under laws of Great Britai authorized in Russia, with capitalization £250,000, shares £1 par; fully issued, £244,583. Annual meeting is in December. Is closely connec management with Spassky Copper Mine, Ltd.

Lands, in the Kirghis Steppes, about 230 miles northeast of Pet lovsk, the nearest railway station on the Orenburg-Tashkent railwa 28½ square miles in area, including 12,000 acres bought from the Siberian cate, Ltd., for £125,000 in full paid shares. Original claims were 2 square in area, latter claims, 1910, being of 1 square verst area. In 1910 sev new claims were added, 14 being near the original claims, and with 1 for stone and 1 for iron ore, for fluxing, respectively 15 versts and 120 versts Lands also include coal claims. Company has prospected 5,340 acres, in a of about 7 miles long and 6,000′ wide. Coal lands are about 9 square m area.

The country shows sedimentary sandstones, shales and conglom on a plateau of circa 20 square miles area, lying about 70′ above the level district, carrying numerous outcrops of malachite, and, at depths of 50′ from surface, are found sandstone beds mainly 18″ to 8′ thick, and of 3′ est average thickness, carrying bornite, claimed to average about 13% Property shows a number of old pits, of 30′ to 50′ depth, in an area of ab acres, where oxidized ores were mined in the past. Eight different beds 25′ in thickness, are being developed, showing malachite to depth of 30′ from surface, succeeded by bornite, chalcocite and a little chalcopyrite. opment is by 8 shafts, of 40′ to 150′ depth, shafts being shallow, owing to of the bedded formation. The mine has about 3,000′ of workings. agement estimates that diamond drill borings show about 190,000 tons developed, estimated to average 13% copper and 5 oz. silver per ton. Di drill boreholes have shown ore assaying 2 to 35% copper. The company an ore body 7 miles long and 1½ miles wide, with a secondary ore body of 3 miles length and 1 mile width.

Lands include the Nadrozhdenski mine, having "C" shaft, 52′ dee Marienski mine, having "B" shaft, of 45′ depth; the Petropovlovsky having "D" shaft, of 48′ depth, said to show a 3′ bed of ore with a assays of 14.83% copper; the Pokrofsky mine, having "A" shaft, of 17 deepest, and "F" shaft of 50′; the Kresto mine, having No. 8 shaft, 141′ and the Annensky mine, having "G" shaft, of 50′, and No. 7 shaft, of 40′ said to show a 33′ bed of ore assaying 1 to 18.5% copper.

Equipment includes steam boilers and hoists of small capacity at th ous shafts. Company has about 30 buildings, the main camp at the Pok mine including an office, laboratory, smithy, machine-shop, stables and ings. The old office at the Kresto mine has been made a hospital. F balesh, or small bushes, and coal from the company's mines, latter estima cost, delivered, about 25s. per ton. Company plans further extensive de ment, with preliminary smelting tests, and survey for a 60-mile railway be the coal and copper mines, and hopes that development will warrant con tion of a smelter in 1912. Property considered promising.

JAPAN.

atsu, Kaga, Japan. Saichi Moriyama, owner. The
s, in liparite and brecciated tuff, one being a fissure and
ese veins cross, the intersection giving the richest ore,
e from the point of intersection the veins thin out and
Ore is mainly chalcopyrite, associated with pyrite,
enorite, and averages about 10% copper in the upper
silver or gold.
a 350-h. p. steam installation, and mine employed an
1908. Recent production has been as follows; 231,484
194,305 lbs. in 1907; 134,087 lbs. in 1908.

MINING CO., LTD. BRITISH COLUMBIA.

ed, 1907, by Dominion Copper Co., Ltd. Formerly at
ict, B. C. Described Vol. IV.

POT MINING CO. BRITISH COLUMBIA.

ed, 1904, by Montreal & Boston Consolidated Mining
rly at Phœnix, Boundary district, B. C.

CO. MICHIGAN.

St., New York, N. Y. Mine office: Atlantic Mine,
Jos. E. Gay, president; J. Wheeler Hardley, secretary;
rer; preceding officers, Wm. A. Paine, Hon. E. B. Hins-
nd S. L. Smith, directors; Frank McM. Stanton, agent;
endent; Capt. Thos. Stratton, mine superintendent;
uperintendent; Hon. A. D. Edwards, clerk; John Grigg,

r, 1872, under laws of Michigan, reincorporated, 1901,
lization increased, 1902, to $2,500,000, shares $25 par,
.80. Last assessment was $2, Oct. 11, 1909, the first in
idends of $990,000, last in 1905. Owns $40,000 stock
). Boston Safe Deposit & Trust Co., registrar; Ameri-
Boston, transfer agent. Annual meeting, second Tues-

including 1,351 acres of mineral lands, 4,760 acres of
acres miscellaneous lands, latter including the millsite,
on Portage Lake. Mineral lands are South ½ of Sec-
¼ of Southeast ¼; North ½ of Section 9; Northwest ¼
16, all in Town 54 North, Range 34 West. Principal
ntic mine, 640 acres, including the mines known before
ic and Adams, located about 2 miles south of Portage
est of Houghton, and the Section 16 tract of 640 acres.
described in Vol. V., was opened on an amygdaloidal
the lode being the most westerly worked in Houghton
y as an ashbed. This bed returned an average of about
There are 6 shafts, lettered in order from north to south
aft was abandoned after the fire of 1908; "E" shaft was
nd "F" shaft was put out of commission in 1902. Begin-
was experienced from caving ground and air-blasts, the
cial earthquakes caused by subsidence of the hanging
erage about 15' width for nearly a mile in length and
depth. Air-blasts continued with increased severity,
and putting the mine out of commission, May, 1906.
usly to work on a modification of the caving system,
e mine was lost. It may be reopened at some future
line shafts on the footwall. Probably 2 new shafts of
ufficient to operate the entire mine, which is estimated
0 tons of stamprock, which, though low in grade, should

be worked at a fair profit, as the Atlantic was noted, for two decad lowest grade profitable mine in the world, the management performin in the way of economical extraction of values that, under ordinary circu would have been hopelessly unpayable. About 950′ of crosscutting from the bottom of the old mine, on the 25th level, and some diam ing to the eastward of the ashbed was done, 1910, apparently withou ing results. The lands of the old Atlantic mine should carry the sou tension of the Pewabic bed, worked by the Quincy, though this never located. Sections 4, 9 and 10 were tested, 1907, by trenching and drill bores, and a shallow shaft was sunk on the so-called Calico lo parallels the Atlantic ashbed about one-half mile to the eastward, bu of especial promise was developed.

At the old mine there is an unusually well-built and cleanly minin 2,000 population, having about 500 buildings, half owned by the comp several churches, and one of the best graded schools in the state. Min ment includes a number of shops, engine-houses and shafthouses, with and effective hoists, air-compressors and general mining machinery, scribed Vol. VI.

The Section 16 mine, lying between the Baltic and Superior m tract of 640 acres, an exchange of 39 acres, 1905, between the Atlantic tic, having corrected the boundaries for both and obviated pocketing of each, near the line. The Atlantic secured the hinterland of the B necessary for engine-houses, shafthouses and general plant, with suffi crop of the Baltic bed to sink 2 shafts. Exploratory work on Secti begun 1897, and discontinued 1903, resumed circa 1906, and since c Section 16 mine has a 3-compartment shaft, circa 2,500′ deep, conne the Baltic on the sixth level, and nearly connected on the twelfth. C teenth level there is a 1,600′ crosscut to the eastern sandstone, and a 5 cut to the west. The mine had a total of 12,802′ of workings at end The Baltic bed, as developed on Section 16, is wide and strong, but dis great depth, the first ground to carry good copper values having bee on the twelfth level. The workings show occasional short stretche ground, but it is broken and disturbed, as a rule, to the present depth one-half mile. The unfavorable conditions existing in Section 16 are t disappointment because the property lies between two such fine min Baltic and Superior. Equipment at Section 16 includes 4 boilers and 3 pressors, one of 15 drills capacity, and the old mine has ample mac equip 2 shafts on the Baltic lode with a good plant, while leaving suffi chinery to operate 2 new shafts at the old mine, if reopened.

Equipment includes steam power and commercial electric curren hoists, 2 good for 4,000′ and 2 for 6,000′, at the old mine, and comp 50 drills aggregate capacity. Buildings include a 50x60′ frame mach a 50x57′ frame smithy, a 30x50′ frame carpenter-shop, and a considera ber of miscellaneous mine structures, office, store, and about 250 dw the old mine location.

Both mines are served by the Copper Range railway, and the owns a private line, known as the Atlantic & Lake Superior railroad, 1 in length, running from the mine to the old millsite on Portage La there are coal and merchandise wharves for receipt of fuel and sup from the old mine to the millsite. Equipment includes 4 Baldwin and locomotives, with 200 cars for ore, wood and general freight.

The stampmill, built 1895, at Redridge, Lake Superior, on a si nearly 2 miles of water frontage, is 151x234′, of wood, on stone fou Water is furnished from a dam, described in the article on Baltic. has 6 stamps with 18″ cylinders, of about 400 tons daily capacity each. regrinding mills are used for raggings, and round tables have been

is supplied by a 14x42″ Reynolds engine of Corliss pat-
12″ Gardner fire-pumps in the mill and boiler-house ad-
op in the mill is supplied with all tools required for re-
Adjoining the mill is the 71x101′ boiler-house, of wood,
A Green fuel economizer saves about 12% in coal bills.
r of comfortable dwellings for workmen, a 30x36′ frame
ng and smithy. The mill, since the closing of the old
work, and treats rock from the Superior mine, and, until
n by the Michigan mine, treated rock therefrom. The
as in 1909.

mine, which began in 1904, was reflected by decreased
ng 5,505,598 lbs. fine copper in 1903; 4,049,731 lbs. in
2 lbs. in 1906, with no production since.

of the Atlantic is experienced, economical and efficient,
ed in the Lake Superior district, that developments at
so disappointing. In May, 1911, the matter of selling
per Range Consolidated Co. was under consideration,

COPPER CO. **CALIFORNIA.**

Smith River, Del Norte Co., Cal. Described Vol. VIII.

N. **CALIFORNIA & WASHINGTON.**

at Granite Falls, Snohomish Co., Wash. Described

N & MINING CO. **ARIZONA & MÉXICO.**

Douglas, Cochise Co., Ariz. R. O. Johnson, president;
; D. T. Dunlap, secretary; James Ray, superintendent.
2, under laws of Arizona, with capitalization $5,000,000,
meeting, first Tuesday in January. Has undeveloped
as the Atlas group, in the Warren district, of Cochise
prospect about 15 miles south of Douglas, in the north-
district of Sonora, México, latter showing auriferous
years and apparently moribund.

YUKON.

Wash. Mine office: Whitehorse, Yukon, Canada.
. R. K. Neill, president; Wilbur D. Greenough, gen-
ed December, 1909, under laws of Washington, with
shares $100 par.

rea 720 acres, taken over from the Yukon Pueblo Mines
rter Creek, 4 to 7 miles west of White Horse, including
acres, and the Carlisle group of 300 acres.

nainly developed by opencast workings 215x325′ in size,
y about 170x300′ in extreme dimensions, with a surface
square feet, proven to depth of 100′ by a shaft. The
entirely enclosed in crystalline limestone, near a granite
y the limestone replaced by the ore body was cut by
which remain. There also is a porphyry dyke of 3′ to
re body, decomposed and showing copper stains. Ore
s hematite, varying in texture from compact to coarse,
ut no complete conversion of hematite to limonite, ex-
urface, and with irregular silicification. The copper sul-
have been largely altered into carbonates, oxides and
alcopyrite and no bornite having been found to depth
mercial ore is malachite, disseminated in hematite, with
, and some cuprite occurring in veinlets and small
n 1 to 10% in copper tenor, and smelter returns, 1907,
he Crofton smelter, were 5.5% copper and 1.25 to 2 oz.

silver per ton. Ore also is slightly auriferous, carrying assay values of gold per ton.

The Carlisle mine, 2 miles from the Pueblo, has a vein of circa 15 with a paystreak up to 4′, of nearly solid bornite and chalcopyrite, de by shafts of 50′ and 137′. A smelter shipment of 100 tons gave re 22.64% copper and 6 oz. silver per ton.

Equipment includes steam power and a 10-drill air-compressor, an sary mine buildings were erected, 1910. Mine has a spur-line to the Wh & Yukon Railway, built 1910.

Production, 1907, was 700 tons, with no production for 2 years th and output, 1910, shipped to the Tacoma smelter, was circa 5,000 ton estimated to have yielded about 350,000 lbs. fine copper and 6,000 oz Property considered promising.

ATTUNGA COPPER MINING SYNDICATE. **AUST**

Office and mine: Attunga, Inglis Co., N. S. W., Australia. R. bons, secretary; W. H. Edwards, manager. Organized 1902, as a priv dicate, with capitalization £12,000, shares £1 par; issued, £11,500.

Lands, 5 claims, area 75 acres, and a 20-acre smelter-site, 9 miles Attunga, in the Tamworth division of the Peel and Uralla district. P shows contact deposits between limestone and granite, in a garnetifer mation 5′ to 60′ wide. One ore body, under development, of 16′ es average width, traceable 1,200′, is opened by pits and shafts of 20′, 3 38′, 280′, and 302′, and by 7 tunnels, 2 longest 310′ and 910′, working estimated to show 30,000 tons of ore, with 13,000 long tons blocked out for Mine has 6 levels opened. Ore, oxidized to depth of about 750′, is car ranging 1 to 21% in copper tenor, with sulphides at bottom, includin nodules of bornite assaying 1.5 to 11.9% copper, average of ore bei mated by management at about 6% copper, 7 oz. silver and 10 dwts. g long ton. Mine has steam power and several buildings. The Tamworth 1910, destroyed Nos. 1 and 2 shafts, and greatly injured the long tunn apparently all of 1911 will be required to repair this heavy damage.

AKTIEBOLAGET ATVIDABERGS KOPPARVERK. **SW**

Office, mine and works: Atvidaberg, Ostergothland, Sweden. Theodor Adelswärd, president and general manager; Axel Nygren, super ent; C. A. Rudelius, smelter superintendent. Organized 1900, under Sweden, with capitalization 900,000 kroner, shares 1,000 kroner par, full

Lands include the Atvidaberg and Bersbo mines, developed by 8 sh 90 to 410 meters depth, latter being the deepest in Sweden, with abou of workings. Development has proven large quantities of chalcopyri sphalerite, in quartzose gangue, with increasing zinc and decreasing co depth. Ores are difficult of reduction, requiring special treatment.

Equipment includes a hydro-electric power plant operating the mi works. The former smelter, at Bersbo, 9 kilometers from the mine, w connections, burned 1905, was described Vol. VIII. The new smelte Atvidaberg. Mine has been developing, without production, since 190 production was 163,270 lbs. fine copper.

GEWERKSCHAFT AUGUSTE I. **GERI**

Dead. Formerly at Herscheid bei Bärenstein, Westfalen, Germany

AUGUST MINE. **ARI**

Mine office: Patagonia, Santa Cruz Co., Ariz. Wm. Kemp, genera ager. Mine has a 250′ shaft, showing sulphide ore from 3% copper up with occasional ore carrying up to 17% copper and 7 oz. silver. Shipp siderable ore, 1909-1910, to Old Dominion smelter, employing about 30

AURILLA CROWN MINING CO. **WASHIN**

Mine office: Lucerne, Chelan Co., Wash. Chas. Rubin, superinte Lands, 36 claims, area 720 acres, and 2 millsites of about 30 acres. P

er-lead and molybdenite mines, having 6 tunnels, of ngth, and several opencuts. The Crown Point gold eins of 5′ to 100′ width, carrying free-milling ore, and 3 tunnels, said to develop 2,000 tons ore. The Silver a 6′ fissure vein. Tunnel No. 3, on the copper vein, o 6′ width, carrying ore assaying 7.3 to 32.68% cop-2.50 gold per ton. Mine has an aërial tram.
hydraulic plant, with 2 Pelton wheels and 832′ of 10″ ble-riveted steel hydraulic pipe. There is an air-com-e a machine-shop, engine-house, sawmill, warehouse as 2 stamps and a crusher.

K AURORA. **GERMANY.**

imed from former mine office, Huckelheim, Bavaria, her, superintendent. Property, near Schöllkrippen, meinde Huckelheim. Mine, developed by shaft and . Idle several years.

ED MINING CO. **MÉXICO.**

ulegé, Sur, Baja California, Mex. Described Vol. VIII.

PER MINING CO. **COLORADO.**

Gulch, Gilpin Co., Colo. Organized circa June, 1909, ith capitalization $1,000,000. Property includes the Gulch, and lands in Clear Creek county, Colorado.

NEW MEXICO.

Lordsburg, Grant Co., N. M. Described Vol. VIII.

MÉXICO.

La Cananea, Arizpe, Sonora, Mex.

CO., LTD. **AUSTRALIA.**

ed, voluntarily, 1908. Formerly at Reedy Creek, . Described Vol. VIII.

MINING CO. **MONTANA.**

ash. Letter returned unclaimed from former mine s & Clark Co., Mont. W. H. Hill, president and gen-lwin, vice-president; J. W. Beckett, secretary; C. E. Lands, 10 claims, area 200 acres, in Avalanche Gulch, Helena, said to show 3 veins, one of 20′, in an ore zone e has several shallow shafts and short tunnels, and a ng a 20′ vein carrying a 3′ paystreak of smelting ore, r, 1 oz. silver and $12.40 gold per ton. Management, entrator or a small smelter, apparently not built.

MÉTALIQUES DE L'AVEYRON. **FRANCE.**

olysée, Paris, France. Mine office: Sauclières, Mil-. Mougin, president. Property is lands carrying cop-res, in the communes of Sauclières and Saint Jean-veyron. Presumably idle.

MÉXICO.

y House, London, E. C., Eng. Mine office: Avino, , Durango, Mex. Lionel W. Harris, chairman; pre-per and Capt. C. L. Willoughby Wallace, directors; H. Jeffrey, general manager; Geo. Fairbairn, assistant rch 6, 1909, under laws of Great Britain, with capitali-000 priority shares and 1,000,000 deferred shares of 1s. ty shares and 978,429 ordinary shares. Was a recon-of México, Ltd., which was reorganized Feb. 24, 1903, f same name, organized Feb. 13, 1899, which was the ate, Ltd. Present company took possession of prop-

erty Aug. 1, 1909. Stockholders of old company were given one ordin par 1s., fully paid, for each fully paid £1 share of the old company, with to buy priority stock at par, share for share. After payment of 200% o shares, they became ordinary shares. Shares are listed on the Lond Exchange.

Lands, 250 acres, and a 350-acre damsite, 10 miles from Gabri Mexican International railway, the nearest rail point. Property in Sangre de Cristo mine.

Mine has an 800′ shaft and 600′ tunnel, with several large tajos o being nearly 400′ in width and of considerably greater length. Pro estimated, under former management, to show about 2,000,000 metr low-grade silicious argentiferous copper ore, and is estimated by present ment to show 107,000 tons, with 57,527 tons blocked out for stoping. value of ore produced, July and August, 1907, was reported at 36s. p ton. Mine is claimed to have produced about $60,000,000 in the pas in silver, but presumably this should be 60,000,000 pesos, or about $3 Mine yields a little smelting ore, but product is mainly ore of conc grade. Ore shipped formerly averaged about 26.60 pesos per metr value, with returns to company of circa 14 pesos per ton. Ore is a c auriferous and argentiferous lead and copper sulphides, and a new body and lead ore was opened, 1910, on the 5th level.

Equipment includes steam power and a 300-h. p. electric plant, op a Crocker-Wheeler gas-engine.

A large concentrator was found unsuitable, after built, and was re a hyposulphite lixiviation plant, which was claimed to save 85% of and 30% of the gold values. Present mill, of 150 tons daily capa ting about 2½ into 1, has a Wood mill, installed 1909, and tailings t are sized and fed to Wilfley and Deister tables. Careful testing is b with various methods of concentration, ore being difficult of reductio

The mine was poorly handled in the past, the former management too much money on surface, and not enough underground, in addition t a serious mistake in the plan of ore treatment. The mine has a con amount of ore, of dangerously low average grade, and there were t changes in local management and processes, by reason of which no ma or process was given a fair trial, the predecessors of this company hav trouble with refractory ores and deficient finances.

From April 28 to Sept. 21, 1909, production was 2,834 metric tons which 2,397 tons were shipped to smelters, returning an average of o pesos per ton, with working costs of about 11.84 pesos. Productio months to June 30, 1910, was 43,350 long tons of ore, of which 17,937 rejected and 18,094 tons shipped, yielding 910,499 lbs. fine copper, 26 silver and 993 oz. gold, giving a profit of £4,338.

AVINO MINES OF MÉXICO, LTD.

Dead. Was succeeded, Aug. 1, 1909, by Avino Mines, Ltd. For Avino, Gabriel, San Juan del Rio, Durango, Mex. Fully described V

AVINO SYNDICATE, LTD.

Dead. Was succeeded, Feb. 13, 1899, by Avino Mines of Méxi which was reorganized, Feb 24, 1903, under same title, and again recon March 6, 1909, as Avino Mines, Ltd. Former property is described u of Avino Mines, Ltd., in this volume. Formerly at: Gabriel, San Juan Durango, Mex.

AWAYA-IKEDA CO., LTD. **BRITISH COL**

Dead. Was succeeded, 1910, by Ikeda Mines, Ltd. Formerly Bay, Moresby Island, Queen Charlotte Group, B. C. Fully described V

AXIS COPPER MINING CO. **WY**

Dead. Former holdings laid between the Doane mine and the

d were but slightly developed. Formerly at Rambler,

NORTH CAROLINA & TENNESSEE.

Bldg., Chattanooga, Tenn. Mine office: Ducktown,
. Axley, president and general manager. Organized
s of Tennessee, with capitalization $100,000. Lands
Cherokee county, N. C., just over the line from Duck-
ngum mines, area circa 1,000 acres, of the Isabella lead,
merican Civil War, when ores were shipped, via Charles-
lting. Ores so shipped were said to average 5 to 8%
4% from black copper oxide, which presumably was
operations secured.

MÉXICO.

s sold, circa 1907, to Carrizo Copper Co. E. J. Coff-
r. Property included mining lands, and a 30-ton con-
crusher and 2 sets of rolls, and was claimed to have a
yutla, Autlán, Jalisco, Mex.

MÉXICO.

Copper Co., at Ayutla, Autlán, Jalisco, Mex.

PERÚ.

lorococha, Junín, Perú. Lands, 2 pertenencias, known
ines, former yielding ore of about 10%, and latter about
orces, 1907, averaged 14 men, at average wages of 1 sol
, was 115,609 lbs. fine copper, and, 1907, was only
d 55 kgs. silver.

LA AZTECA y ANEXAS. MÉXICO.

s superintendent. Property, said to employ circa 30
d argentiferous copper ores. Formerly at Ensenada,
lex.

VELOPMENT CO. MICHIGAN.

Greenland, Ontonagon Co., Mich. Described Vol. VI.

MÉXICO.

laimed from former office, Guadalajara, Mex. Mine
Jalisco, Mex. Juan D. Isabel, president and general
. Capitalization $500,000. Property includes El Zopil-
s, at Ayutla, and the San Francisco mine, near Carrizo,
per ores and the latter carrying silver-lead ore. Idle.

ARIZONA.

Prescott, Yavapai Co., Ariz. Described Vol. VIII.

MICHIGAN.

anged, Aug. 9, 1909, to South Lake Mining Co. For-
nagon Co., Mich. Described Vol. VIII.

NEW MEXICO.

lo Bldg., Washington D. C. Mine office: Organ,
en. H. H. C. Dunwoody, president; Gen. B. K. Roberts,
receding officers, Col. M. C. Wyeth, Col. S. Ellis Briggs
ctors. Capitalization $1,000,000, shares $1 par, non-
ims, area 100 acres, known as Poorman's Friend, in
tephenson and Torpedo mines, carrying a silver vein,
e giving assays of 16% copper.

NG & SMELTING CO. MÉXICO.

ed by Aztec Copper Smelting Co. Formerly at Gua-
o, Mex. Fully described Vol. VI.

TING CO. MÉXICO.

n Girard Bldg., Philadelphia, Pa. Operating office:
ara, Mex. Mine office: Guachinango, Mascota.

Jalisco, Mex. Dr. Pemberton Dudley, president; J. W. Tyrell, vice-p
Geo. J. Graham, manager; preceding officers, Perry H. Dudley, G. H. D
F. B. Graham, Wm. A. Young, and E. J. Fithian, directors; J. F. Gra
retary. Organized June, 1901, under laws of New Jersey, as success
Aztec Copper Mining & Smelting Co., with capitalization $300,000, shar

Lands claimed are circa 10,000 acres, of which 8,000 acres are s
well timbered with oak and pine, and to be well watered, with an
water power on the Rio Ameca. Lands include 2 mines, known as La
and La Perla, opened by shafts and tunnels, claimed by company
ore averaging about $30 per ton in values. Has an 80-ton concentrat
Elspass mills and 6 tables. Present officers apparently are not respo
the atrocious lies of a former management, which promised speedy d
which of course have not materialized. Idle and presumably moribund

AZTEC GOLD & COPPER MINING CO. COL

Office: 67 Milk St., Boston, Mass. Mine office: Needleton,
Co., Colo. David W. Williams, president; Chas. A. Howland, vice-p
Geo. F. Bradstreet, secretary and treasurer; Josiah Moore, general
W. C. Kinney, engineer. Organized Nov. 10, 1899, under laws of Ma
capitalization $2,000,000, shares $1 par; issued, $1,250,646. Annual
second Wednesday in November.

Lands, 19 claims, in 5 groups, lying in the Needle Mountains, circ
south of Silverton, showing 2 fissure veins in granite and porphyry, th
aging about 2′ width, one, opened by a 1,500′ tunnel, showing arge
galena above and copper sulphides below, ores giving assays of $30 t
ton. Equipment includes a 25-h. p. electric motor and 25-h. p. gasolin
with a 3,000-h. p. waterfall available for development. Has 7 mine bu

AZTEC MINES CO. AI

Office: 413 Fort Dearborn Bldg., Chicago, Ills. Mine office:
Yavapai Co., Ariz. Perry L. Turner, president; Col. Emil Rautman, s
treasurer and general manager; preceding officers, F. N. Thompson,
Manley, and C. A. Baker, directors. Organized, 1908, under laws of
with capitalization $3,500,000, shares $1 par, practically as successor
Copper Mining Co.

Lands, 7 claims, area circa 100 acres, well timbered and watered
west of Poland and 13 miles south of Prescott, in the Senator district,
Hasayampa River. Property includes the Peacock, Mountain View
Duke claims. Property is said to show 10 fissure veins, of 2′ to 15′ wi
main development on the 15′ vein, by a 600′ tunnel cutting auriferous an
iferous copper ore of low average grade, said to assay up to $30 per ton
bined copper, gold and silver values. Management was talking of a
1910, but a mine should be developed first.

The company claims to have a copper bonanza of inexhaustible an
richness, an honest and efficient management, and to be certain to enri
shareholder, and the management states, modestly, that the propert
tined to excel the Copper Queen or United Verde. One L. D. Finn was
circa 1908, by the company, as guaranteeing, if given a 200-ton smelte
20% dividends in one year's time, and was further quoted as claiming t
a 200-ton smelter, he would earn a profit of $1,600 per day, on ore a
$17.50 per ton, and that if this smelter was increased to 500 tons cap
would guarantee to pay dividends of $3,500,000 per year, which shows
Finn, if correctly quoted, is a fool or a faker. Is not regarded favorably

AZTEC MINES CO. COL

Mine office: Central City, Gilpin Co., Colo. H. Irving Jones
was general manager. Property carries auriferous and argentiferous
ores, and equipment includes steam and electric power, and an air-com
Presumably idle.

O. ARIZONA.
N. Y. Mine office: Kingman, Mohave Co., Ariz.
R. Grant, secretary; E. J. McNulty, general manager.
d, in the Mineral Park district, circa 12 miles north of
nts company planned diamond drilling and crosscut-
low the turquoise mine, already developed.

NEW MEXICO.
ay, New York, N. Y. Mine office: Tyrone, Grant Co.,
, when in full operation. Louis Kahn, president; M.
and treasurer; Wm. Rogers Wade, superintendent.
ws of New York. Is operated as a close corporation.
ea circa 600 acres, near the Burro Chief group of the
d 73½ acres, circa 1909, to Mangas Development Co.
zonite and quartz porphyries and granite, with fissure
ular veins in porphyry, there being 7 known ore bodies,
lopment, the Santa Fé vein, ranging 15′ to 75′ in width,
40′, being traceable circa 6,000′. Development is by
vels, with 1,255′ of workings, showing turquoise and
uoise mine has 2 tunnels, and large opencast workings,
width of 150′ and length of 750′, also having consider-

nta Fé vein, carrying oxidized ores, the property car-
ite, and lenticular lenses in monzonite, and along the
orphyry and monzonite-porphyry, one lens, with top
, being of 152′ width, and circa 500′ length, carrying
t 2½% copper, with merely traces of gold and silver.
ne, 1905, by churn drills, and 1907, by diamond drills.
h. p. hoist. Property has been a successful turquoise
been at one time the world's largest producer of this
n has practically ceased, and attention recently has
usively to the development of copper ores. Manage-
d property decidedly promising.

ARIZONA.
Williams, Coconino Co., Ariz. Described Vol. VI.

GOLD CO. ARIZONA.
sold to Mineral Hill Consolidated Copper Co. For-
o., Ariz. Described Vol. V.

NING CO. ARIZONA.
Globe, Gila Co., Ariz. Described Vol. VIII.

WYOMING.
Oshkosh, Wis. Letter returned unclaimed from former
on Co., Wyo. Henry L. Larsen, president; Arthur
. O. Granberg, secretary, treasurer and general man-
erintendent; Frank Earle, consulting engineer. Or-
der laws of Wyoming; with capitalization $1,000,000,
5,000. Lands, 5 claims, area 100 acres, in the Battle
issure veins, in gabbro, of 15′ to 20′ estimated width,
70′ tunnel, showing ore giving assays of 18% copper.

INING CO. OREGON.
er, Baker Co., Ore. L. G. Lilley, manager, at last
tly developed, has auriferous and argentiferous lead
eam power, and employed circa 10 men, 1904. Idle
ly moribund.

ADORA DE BACA ORTIZ. MÉXICO.
anes, Santiago Papasquiaro, Durango, Mex. Property

is the Candelaria mine, carrying auriferous and argentiferous copper o
sumably idle.

BACHELOR GOLD MINING CO. COL

Dead. C. F. Meek was superintendent. Mine, slightly develo
auriferous and argentiferous lead and copper sulphides, employing
men, 1904. Formerly at Lake City, Hinsdale Co., Colo.

BACKUS & JOHNSTON CO.

Office: 304 Calle San Pedro, Lima, Perú. Works office: Casapalc
Junín, Perú. J. Howard Johnston, president; A. J. Bennett, vice-pres
R. Storrek, secretary and treasurer. Organized July 31, 1896, under law
Jersey, as successor of Backus & Johnston, who began business cir
Employs about 350 men at the smelter and 450 at the mines.

The Natividad mine, said to be owned jointly by this company
Cerro de Pasco Mining Co., is opened to about 300 meters depth, dev
vein of about 4′ wide, carrying ore averaging about 14% copper and 14
silver per ton. A new tunnel, planned to be 750 meters long, is bein
under the old workings. Production, 1907, was 2,150 metric tons of ore
with a force of about 200 men.

The Carlos Francisco mine, in the department of Lima, has arge
lead and copper ores, and, 1908, employing 150 men, produced circa 7,2
tons of ore, assaying about 2.5% copper, 10% lead and 0.16% silver.

The Pachapata mine carries argentiferous copper ore. Producti
was 79,365 lbs. fine copper and 218 kgs. fine silver, secured with a force
50 men.

The San Gerardo mine, carrying argentiferous copper ore,
335,650 lbs. fine copper and 1,102 kgs. silver in 1906; 760,016 lbs. co
3,382 kgs. silver in 1907; 396,828 lbs. copper, 1,587,312 lbs. lead and 2
avoirdupois of silver in 1908.

The reduction works, known as the Fundición de Casapalca, on t
railway, 88 miles from Lima, at an altitude of 6,606′, include a mill and
doing a general custom business as well as treating ores of the compan
mill, of 80 metric tons daily capacity, treats ore mainly from the Car
cisco mine and lean ores from El Carmen mines.

The smelter treats only concentrates and ores of 12% or better i
tenor. This formerly had two 75-ton water-jacket blast-furnaces, but
larged, circa 1909, to 350 tons daily capacity, with 150 and 200 ton wat
blast-furnaces. Water power is used, and fuel is mainly German and
coke, costing 25 sols per metric ton, delivered, though Peruvian coke i
times, through necessity. Experiments with pyritic smelting apparer
not successful. The works employ about 350 men, and production, 1
3,540 tons of argentiferous copper-lead matte, assaying about 30% co
15% lead, with high silver values.

Production, 1907, was 785,381 lbs. fine copper and for 1908 w
2,000,000 lbs. fine copper and 1,750,000 lbs. lead, with large silve
Property considered valuable, and management good.

BADAJOZ COPPER MINES, LTD.

Office: 14 Bishopsgate St. Without, London, E. C., Eng. Mi
Pueblada, Badajoz, Spain. Lord Armstrong, chairman; preceding
W. Chalkley and G. A. Harrison, directors; M. Rae, secretary. Organ
25, 1906, under laws of Great Britain, with capitalization £10,000,
par; issued, £3,007, fully paid. Lands, 320 hectares, including the S
Extramena copper mines. Idle, apparently since organization.

BADEN-BADEN GOLD MINING CO. COL

Dead. Formerly at Black Hawk, Gilpin Co., Colo. Described V

BADGER COPPER CO. WY

Dead. Former office was Laramie, Wyo. Was organized 1902.

r mine on the northeast, had several shafts and a short
lso had lands in Albany county, Wyoming. Formerly
o., Wyo.

MINING CO. **WISCONSIN.**
at Gordon, Douglas Co., Wis. Described Vol. VIII.

ING CO. **ARIZONA.**
Ariz. Mine office: Paradise, Cochise Co., Ariz. Organ-
of Arizona, with capitalization $1,000,000, shares $2 par.
wnership of entire stock issue, by Bisbee-Sonora Develop-
claims, area 545 acres, said to show an ore body 62′ wide
at depth of 200′, opened by tunnel.

N MINING & MILLING CO. **COLORADO.**
at Florissant, Teller Co., Colo. Described Vol. IX.

NE. **MONTANA.**
da Copper Mining Co., at Butte, Silver Bow Co., Mont.

NING & MILLING CO. **WYOMING.**
Saratoga, Carbon Co., Wyo. Gustav Jensen, president
Davis, vice-president and superintendent; C. E. Jensen,
ougal, secretary. Organized Dec. 26, 1901, under laws of
alization $1,000,000, shares $1 par. Lands, 8 claims,
ck Creek, showing 3 fissure veins, averaging 4′ width,
e assays of 50% copper, 50% lead and from a trace up
n, opened by shafts of 60′ and 105′, and by a 90′ tun-
and apparently moribund.

COPPER CO. **CALIFORNIA.**
at Bagdad, San Bernardino Co., Cal. Described Vol. VIII.

MILLING CO. **CALIFORNIA.**
claimed from former office, San Diego, Cal. Mine office:
no Co., Cal. John Denair, president; Norman E. Rich,
Coapman, secretary; preceding officers, C. E. Hunter and
Organized circa January, 1910, as successor of Orange
lling Co.
including the Bengal mine, and a millsite, about 10 miles
velopment is by a tunnel and two 2-compartment incline
the Orange Blossom claim, with about 4,000′ of workings,
copper ore. Equipment includes a steam plant and 15-
h electricity planned to be substituted. Has a number of
with 20 stamps, takes water through 8 miles of 4″ and 5″
having a flow of about 60,000 gallons daily. The mill
ver anything like assay values from the ore, reorganiza-

ON SYNDICATE. **BRAZIL.**
nglish corporation. John Butterfield was manager. Did
, 1902, at the Carahyba mines, developing ore assaying
nerly at Praba, Jaguarary, Bahia, Brazil.

LTD. **TRANSVAAL.**
3170, Johannesburg, Transvaal. Mine office: Barber-
svaal. A. Y. Niven, chairman; L. K. Jacobs, secretary.
907, under laws of Transvaal, with capitalization £15,000,
, 96 base metal claims, in the De Kaap Valley, near the
dicate, on which work was begun circa July, 1907. Prop-
accable a quarter-mile, opened by 2 shafts, "A" shaft
mably idle.

E MINES DE CUIVRE DE BAILOR. **HUNGARY.**
le Namur, Brussels, Belgium. Baron d'Inkey de Pallin,

director. Organized Feb. 14, 1907, under laws of Belgium, with capitali
f2,000,000, shares f100 par. Property is in Hungary. Presumably idle.

COMPAÑÍA MINERA y BENEFICIADORA DE LA BAJA y SANTA ROSA. MÉ

Mine office: Trinidad, Sahuaripa, Sonora, Mex. Property is La Azc
mine, carrying argentiferous and auriferous copper ore, also La Bons
Anexas group, carrying gold copper-ore. Was operating, circa 1905. Pr
ably idle.

BAKER CONSOLIDATED COPPER CO. ARIZ

Letter returned unclaimed from former office, Tucson, Ariz. Mine
Cerro Colorado, Pima Co., Ariz. Chas. E. Udall, manager, at last acc
Property shows mainly gold and silver ores. Equipment includes steam
and an air-compressor. Has a 20-ton mill and concentrator with 5 s
Presumably idle.

BAKER CONSOLIDATED COPPER MINING CO. CALIFORNIA & GEO

Office: 142 Bagg St., Detroit, Mich. Mine office: Pierceville,
Co., Ga. John Baker, president and general manager. Property, acr
river in Georgia from the Tennessee mine, was said, by Baker, early 1910
in operation. Company also claims 1,250 acres of patented mineral l
Siskiyou county, Cal., and 1,860 acres of mineral land under option. Fo
held the United and Queen copper groups, now known as the Oregon
solidated mine, at Copley, Shasta Co., Cal. Is not regarded favorably.

BAKER MILLING, SMELTING & REFINING CO.

Office: 4 Campau Bldg., Detroit, Mich. John Baker, president; J
Rolland, secretary and treasurer. Organized under laws of Oklahoma
capitalization $10,000,000. President claimed to be putting a plant in D
to be in operation during 1906, but no such plant materialized. President
writes that he has never deceived anybody, and simply holds the charter, k
it in force for the present, with no stock for sale, and would deem it a favo
mention of the company were made in this work. Is regarded with sus

BALACLAVA COPPER MINING CO. AUSTE

Dead. Formerly at Broken Hill, Yancowinna Co., N. S. W., Aus

BALACLAVA IRON & COPPER CO. AUSTR

Dead. Was organized circa 1887, and developed, slightly, the Bal
iron and copper mine, 10 miles southwest of Broken Hill. Went out of bu
circa 1894, after securing a limited production of high-grade hematite ca
small copper values, used for fluxing silver-lead ores at the Broken Hill sm
Formerly at Broken Hill, Yancowinna Co., N. S. W., Australia.

BALADE MINE. NEW CALED

Mine office: Ouegoa, Arama, New Caledonia. Mine, near the A
Pilou, opened to depth of 150 metres, produced ore which was concen
to average tenor of 17 to 20% copper, and exported to Australia for sm
Idle since circa 1885.

BALAKLALA CENTRAL MINING & SMELTING CO. CALIFO

Office and mine: Coram, Shasta Co., Cal. Thos. J. Barbour, pres
John C. Montgomery, vice-president; W. M. Downs, secretary; pre
officers, T. M. T. Raborg and J. R. Howell, directors. Organized unde
of Wyoming, with capitalization $5,000,000, shares $5 par. Is cont
through ownership of one-third of stock issue, by Balaklala Consoli
Copper Co. Lands, 3 claims, patented, area circa 50 acres, surrounded
sides by lands of the Balaklala Consolidated. Mine apparently has o
100 tunnel. Idle.

BALAKLALA CONSOLIDATED COPPER CO. CALIFO

Office: 111 Broadway, New York, N. Y. Mine office: Kim
Shasta Co., Cal. Works office: Coram, Shasta Co., Cal. Thos. J.

Brevoort, vice-president; W. A. Kerr, secretary; T. M. preceding officers and Edgar L. Newhouse, directors; nanager; Frank L. Sizer, mine superintendent; R. B. endent. Organized Feb. 24, 1906, under laws of Ne- n $10,000,000, shares $25 par. Bonds were $1,500,000, ast lot of $375,000 having been paid July, 1910. Com- ion of the Balaklala Mining Co., control of which was two parties, making a snarl requiring reconstruction lled, through ownership of entire stock issue, by Balak- apparently is merely a halfway holding company for per Co. Is dominated by the Guggenheim interests. v York, and Federal Trust Co., Boston, transfer agents, erica, New York, and First National Bank, Boston, ross income was $2,521,790.

patented, area 1,169 acres, also 800 acres of miscellane- meltersite, the townsite of Coram and right-of-way for lings are in the Flat Creek district, about 4 miles north- ain mine, and adjoining the Trinity. Property for- carry 12 ore bodies, but is now reported to carry 5 ore d. Apparently 4 ore bodies are portions of the same faulting. Lands carry 3,040′ of the strike of the main about 1,100′. Country rock is rhyolite, ore occurring replacement of country rock, in flat bodies, with slight est extension east and west, with a series of north and ng displacement from a few feet to more than 100′. es are developed for lengths of circa 900′ and 1,100′. e, copper values being mainly in chalcopyrite, with a ellite, all carrying gold and silver values, estimated by about 2.65% copper, 0.9 oz. silver and 50 to 60 cents er ore body, developing about 1,000,000 tons, gives a % copper, 0.95 oz. silver, 0.03 oz. gold, 21.4% silica, 3.4% alumina, 2.2% zinc and 35.2% sulphur. Prin- n as the Windy Camp and Weil. The mine has large . Development is by a large glory-hole, and by tunnels, g for opencast mining, giving cheap extraction, there including the Weil tunnel of circa 6,000′ length. Man- ore body, opened 1910, which is believed will more is ore reserves.

ncludes a steam plant installation of about 1,000 h. p., achinery includes a number of hoists, 5 compound air- 40 rock-drills.

n office, store, school, hospital, sawmill and about 75 ecessary mine buildings being located in the townsite

ter are connected by a Bleichert aërial tram of 16,130′ ly capacity, operated by gravity, having 62 wooden he 1,700-ton smelter is thoroughly modern and well ustom business, having treated some Trinity ore, under $3.25 per ton. The smelting plant includes a furnace ling, binhouse, powerhouse, machine-shop, smithy and nd laboratory. The smelting plant was completed approximately $2,000,000, and is near the mouth of ffluent of the Sacramento River.

4x10′ revolving sizing drums, coarse material going d fines to the calciners. The 500′ binhouse has bins The roast building has four 50-ton McDougal calciners.

The furnace building, of steel frame, no wood being used, has t
ton water-jacket blast-furnaces, each 56x240", first blown in Octob
and a 17x96' reverberatory furnace, of 150 tons daily capacity, for fir
ing petroleum, the waste heat generating power in 2 Stirling boilers, t
house having 3 additional Stirling boilers, burning petroleum. The
plant has 96x150" shells of horizontal type, and an electric travelli
turning out 99% blister copper carrying 75 oz. silver and 1.5 oz. gold
sent to Perth Amboy works for electrolytic refining. Power plant i
Connersville blowers, each driven by a 450-h. p. tandem compou
engine, direct-connected. The slag-line has electric locomotives.
stack is 250' high and 20' in diameter.

Although the smelter is about 14 miles from the nearest cultivat
the "smoke farmers" of northern California have been exceeding
and serious controversy has been had with the Shasta County Farm
tective Association. This has led to the installation of the Cottrell el
fume process, devised by Prof. F. G. Cottrell, the plant being planned
70,000 cu. ft. of smoke per minute. The Cottrell plant consists of an
tic precipitating device, in 9 units, installed in a new 120x180' dust
each unit being a steel chamber 10' square, with hopper-bottoms fro
the dust is removed by a screw conveyor. Each series of positively
electrodes consists of 2 stands of asbestos, set between a series of
iron plates for negatives, the electrodes being strips of iron about 4'
¾" wide, with saw-teeth the entire length. Each chamber contains
trodes, taking current at 27,000 volts. After leaving the chamber
are received by 2 fans, 186" in diameter, which cool the smoke and
reduce the percentage of sulphurous gas remaining. The Cottrell pro
not a complete success at first, but gives promise, and is steadily i
in efficiency, being claimed, early 1911, to be removing about 90%
objectionable solids from the smoke.

The detailed estimates of costs given in Vol. VIII, controverting w
ments claiming costs as low as 8 cents per lb., have been borne out b
results, and the estimate given therein of a maximum extraction o
copper was verified by the average recovery of 2⅓% copper and $1
in gold and silver, or practically 2 cents per pound, effected in 191
management now estimates that copper can be laid down in New Yo
cents per lb. with 3 furnaces running, but only 2 furnaces ever have
blast at once, and management estimates a cost of 11 cents per lb., d
with 2 furnaces, or 12 cents per lb. with one furnace. Taking everyth
consideration, the figures of Vol. VIII, of minimum cost of 11½ cents
mum of 14¼ cents, seem to hold good. After 7 months' idleness, one
was blown in Dec. 28, 1910. Actual recovery, 1909, was exactly 2⅓%
2.54 oz. silver and 0.078 oz. gold per ton, giving an average value
$1.50 silver and $1.60 gold per ton, or 6.6 cents per lb. of copper, this i
custom ore smelted. The company had some financial troubles du
panic period and has been greatly hampered by fume litigation, and t
agement deserves great credit for continuing development in the face
a series of troubles. The property has been well handled, from a min
metallurgical standpoint. The company also has been injured, fin
by the connection of Thos. W. Lawson. While the Balaklala is not o
woods yet, its prospects have been materially improved, and the min
not capable of making the low-cost copper originally estimated is a
of merit. Production was 11,509,314 lbs. copper, 653,252 oz. silver an
oz. gold in 1909, and 8,451,653 lbs. copper in 1910.

BALAKLALA COPPER CO. CALIF

Office: 111 Broadway, New York, N. Y. Mine office Coram
Co., Cal. Clarence K. McCormick, president; N. Adams Egbert, m

M. T. Raborg, treasurer; preceding officers, Edgar L. . Baird, directors. Organized Feb. 24, 1906, under apitalization $10,000,000, shares $25 par; capitalization to $4,000,000, and increased immediately thereafter 10 par. The only property of the company is the en- Balaklala Consolidated Copper Co. Company becoming of 1907, has been practically reorganized through the ational Copper Co., which, March, 1908, loaned $450,000 er Co., taking as security therefor the entire stock Consolidated. About 98% of the shareholders of the have deposited their stock for new stock of the First the Balaklala Copper Co. a mere shell, which, to all urposes, is out of business.

G CO. **CALIFORNIA.**

eeded, circa 1904, by Balaklala Consolidated Copper am, Shasta Co., Cal.

G & REFINING CO. **NEW JERSEY.**

111 Passaic Ave., Newark, Essex Co., N. J. E. Bal- acob Langeloth, vice-president; Edw. Randolph, secre- F. Dieffenbach, superintendent; preceding officers and irectors. Organized 1891, under laws of New Jersey, 0,000, shares $100 par, nonassessable, in $300,000 pre- ommon stock.

trolytic refinery, having in connection a small smelting as 446 tanks, in parallel, with two 360-kw generators. f about 3,600,000 lbs. electrolytic copper monthly, em- e metallurgical practice of the works ranks deservedly 9, was circa 16,000 tons of electrolytic copper.

INING CO. **WASHINGTON.**

r Lake, Skagit Co., Wash. A. H. Rogers, superintend- In March, 1907, was said to have secured ore assaying lle.

INING & SMELTING CO. **MONTANA.**

ese, Missoula Co., Mont. E. W. Conrad, superintend- Was developing, with a small force, in 1907. Presum-

COPPER MINES, N. L. **TASMANIA.**

St., Melbourne, Australia. Mine office: Mt. Bal- smania. Bowes Kelly, chairman; preceding officer, ex. Campbell, directors; John Brandon, secretary; A. anager. Organized Nov. 13, 1909, under laws of Vic- on £20,000, shares £10 par; issued, £17,000, of which ares went to vendors.

rea 80 acres, adjoining the Balfour Consolidated Copper haft in quartzite gave fine specimens of chalcocite at am power.

DATED COPPER MINES, N. L. **TASMANIA.**

nt Balfour, Russell Co., Tasmania. Lands, near the blocks, leasehold, being 2 adjoining blocks to the south. o the north, shortly north of the Balfour Blocks Copper portation facilities are poor. Idle at last accounts ernment to build a 13-mile wooden tram from Whales cost of £300 per mile.

EVELOPMENT CO. **TASMANIA.**

St., Melbourne, Australia. Mine office: Mount

Balfour, Russell Co., Tasmania. H. H. Schlapp, chairman. Lands Frankland River, and practically adjoining the Balfour Blocks Copp N. L., and Balfour Consolidated Copper Mines, N. L., have about 300' ing, showing various quartz seams, and a 47' shaft, said to show ch excellent average tenor. Was prospecting with a small force at last

BALFOUR PROSPECTING ASSOCIATION. TA

Office: 352 Collins St., Melbourne, Australia. Mine office: Russell Co., Tasmania. Hal Sheppard, chairman; preceding offi Gorler and J. A. Graham, directors; H. M. Fielder, local manager; superintendent. Capitalization £500, shares £10 par. Planned, organizing with capitalization £5,000.

Lands, two 40-acre leases, formerly known as Chester's mine, on th slope of Mount Balfour, about 3 miles southwest of Murray's Rew 160 acres in the Norfolk range, 11 miles south of Murray's Rewar acres one-half mile eastward of latter group. The 160-acre tract, dev tunnel, has a schistose ore channel of 145' reported width, showing st bands, from a few inches to 4' in width, carrying bornite and chalcopyr ing up to 20% copper. This property also shows a 25' quartz outcro

BALHANNAH COPPER & GOLD MINE, LTD. AUS

Dead. Apparently was successor of Balhannah Copper Mining Mine was a small producer of copper, and yielded £7,000 worth of bism cobalt, antimony and plumbago also were found. Former property is in this volume under title of Balhannah mine. Formerly at Onk Adelaide Co., South Australia.

BALHANNAH MINE. SOUTH AUS

Mine office: Onkaparinga, Adelaide Co., South Australia 14 miles southeast of Adelaide, have 8 shafts, deepest 300', showin variety of ores, including argentiferous copper, lead and zinc sulphid and antimony, also a deposit of plumbago. Was operated, 1867-1876, b nah Copper Mining Co., Ltd., which was succeeded by Balhannah Gold Mine, Ltd., and mine is credited with having produced abou worth of copper, and circa £7,000 worth of bismuth. Idle many year

BALKAN COPPER CORPORATION, LTD.

Office: 6 Great St. Helen's, London, E. C., Eng. Letter returned u from former mine office, Yardimli, Salonika, Turkey, with notation "u Sir Owen R. Slacke, chairman; Mario Krieger, managing director in preceding officers, Alex. B. Crispin and J. Rowley, directors; Ernest secretary. Organized Sept. 5, 1899, under laws of Great Britain, wit ization £250,000, shares £1 par; issued, £197,360, fully paid.

Lands include the Yardimli mine, area 7,900 acres, and the Ch mine, area nearly 2,500 acres, in the Rhodope Mountains, northwest of tinople, held on a 99-year lease, by firman from the Turkish crown, royalty of £300. Property also includes a small undeveloped mine Khaneh, in the district of Xanthi, held under annual royalty of £1 some years and apparently moribund.

BALLA BALLA COPPER MINES, LTD. AUS

Dead. Was reorganized, Apr. 16, 1901, as New Balla Balla Copp Ltd., also dead. Lands were 130 acres, in 2 groups, known as the Ba and Mons Cupri groups, 14 miles from Port Balla Balla, with a 30-ton Formerly at Port Balla Balla, Pilbarra Goldfield, Western Australia.

BALLARAT COPPER MINES CO. WASH

Dead. Was merged, circa 1908, in Bornite Mining & Smelting Co. on Pend d'Oreille River, 5 miles below Newport, had a shallow shaft, tunnels of 100' and 200', and an opencut showing a strong vein, wi gangue, carrying circa 2' of ore giving good assays in copper, silver Formerly at Newport, Stevens Co., Wash.

INES, LTD. **TASMANIA.**

ed, voluntarily, 1908. Formerly at Mt. Lyell, Mon-
scribed Vol. IV

ARIZONA.

Bldg., Los Angeles, Cal. Mine office: Winkelman,
. Finney, president; Jos. Ball, vice-president; Robt.
l treasurer; E. W. Brooks, consulting engineer; pre-
ey, C. T. Joslin, and John M. Ross, directors; Harry
Organized Feb. 1, 1908, under laws of Arizona, with
shares $10 par. Bonds, $50,000 authorized, at 6%.
Wednesday in February.
London Arizona on the south, with the same manage-
railway, with wagon-road connection. Development
ft. Presumably idle, but company plans deepening

MICHIGAN.

re St., Boston, Mass. Mine office: Baltic, Houghton
: Redridge, Houghton Co., Mich. Wm. A. Paine,
anwood, secretary and treasurer; preceding officers,
y Brooks, R. Townsend McKeever and Thos. S. Dee,
n, general manager; John Jolly, superintendent; Edw.
nt; Wm. Polkinghorn, Sr., mill foreman; Clarence G.
Cole, clerk; W. J. Richards, master mechanic.
, 1897, under laws of Michigan, with capitalization
r; fully issued, $18 paid in. Is controlled, through
wnership, by Copper Range Consolidated Co. Owns
igan Smelting Co. Annual meeting, first Monday in
of $5,550,000 to end of 1909, dividends being $12.50
in 1907; $9 in 1908; $10 in 1909. Net earnings, 1909,
npany ended the year with a surplus of $510,558.24.
r the eastern sandstone of the Keweenawan copper
g on the sandstone and non-mineralized. Holdings
l except the southeast quarter, and the west half of
th, Range 34 West. Lands are bounded on the north
Section Sixteen of the Atlantic; on the east by St.
; on the south by St. Mary's lands, lands of Hussey,
imountain mine; on the west by the Trimountain.
, with the Atlantic mine, which will enable the Baltic
uch greater depth than otherwise possible. To the
in and Champion mines are opened on the same bed,
3° E., from Baltic shafts 2 to 5, and to the northward
the same bed. The dip of the bed averages about
any developed cupriferous bed in the Lake district.
idal bed, taking its name from its first mine, was
oned at 90′ depth, because a wrongly pitched drill hole
. The Baltic is an exceptionally strong bed, ranging
l mineralized that at most points it must be more or
om wall to wall. The great width of the stopes has
a walling system, by which waste rock is built into
, thus saving timbering, while giving stronger walls
pply, and saving the cost of hoisting lean rock. The
tic has proven a success under actual test, and is now
s district, the credit being due Mr. Denton. A little
rrow fissures crossing the lode, these being too small
oxide ore mined in the stopes is saved in the milling,
pper as dressed, and smelts readily with the native

copper mineral. The native copper of the Baltic is arsenical, and it is that some copper arsenides are mined and milled, as narrow arsenic veins occur occasionally in the district south of Portage Lake. W finished copper is arsenical, it makes wire of great tensile strength.

The shafts are numbered from south to north, with a distance between the extreme shafts, there being room for one additional sha southern end. Mine makes about 2 miles of new openings yearly.

No. 1, the discovery shaft, located between Nos. 2 and 3, was s wrong angle, and was abandoned at depth of 219′.

No. 2, the southernmost shaft, is 1,680′ deep, and began product The surface plant at No. 2 includes a boiler-house with two 250-h. p boilers, and an engine-house with a Nordberg air-compressor reducing free air per minute to a pressure of 70 lbs. per square inch, and a Nordl with double-conical drum. The shaft-rockhouse has a crusher oper trically, and the shaft has concrete stringers.

No. 3 shaft, 1,170′ northeast of No. 2 and 1,917′ deep, has a st rockhouse, built 1908, by the Wisconsin Bridge & Iron Co. This is c cular type, with 1,200-ton bins, equipment including a 16x18″ engine, tw Blake crushers and a large crusher operated electrically.

No. 4 shaft, 900′ northeast of No. 3 and 1,882′ deep, has a fra rockhouse sheathed with steel, 36x71′ with 17x31′ wing, 88′ high, with rock-bins and two 18x24″ Blake crushers.

No. 5 shaft, the northernmost, 855′ northeast of No. 4 and 1,5 has a shaft-rockhouse duplicating that at No. 4. Stoping is in progr 9th to 14th levels, inclusive, and drifts have been run to the Atlantic l The ground was considerably disturbed in the upper levels, but is more settled at the bottom. Hoist is a duplex Nordberg, good for 1,5

Hand-power cranes for handling mass copper have been install shafts, and the mine has electric pumps.

The compressor-house, between shafts Nos. 3 and 4, is 36x58′ in concrete foundations, stone walls and steel roof, housing a compre capacity to reduce 4,000 cubic feet of free air per minute to a pressure per inch. Adjoining is a boiler-house of similar material, 49x76′, w 12x62′, having four 250-h. p. Stirling boilers and a 140′ self-suppor smokestack. This boiler plant supplies steam for shafts 3 and 4. the boiler-house is a 300′ coal-trestle, of 5,000 tons capacity, underne a 5x8′ concrete tunnel, through which coal is hauled in tram-cars, or grade by endless cable. There also is a coal-trestle at No. 2 shaft is a 50x132′ combination machine-shop and smithy, with stone walls pans; a 42x72′ carpenter shop; a 30x60′ miners' changing house, supp hot and cold water, bathtubs and lockers; a good office building and of 100 washbasins and closets for employes. The mine has a complet light plant. A concrete reservoir has been built about the mine, on lan by the company. The property is served by the Painesdale branc Copper Range Railroad, under the same control as the mine.

The [illegible] on Lake Superior, one-half mile west of the Atlantic m [illegible] was enlarged 1907. The build [illegible] with 4 Allis simple 500 to 625 tons [illegible] and 2 Nordberg compound heads 800 tons each [illegible] having been complet [illegible] about 1,000 tons daily. Stamp fo [illegible] mortars. [illegible] and Woodbury [illegible] the fine [illegible] and a Hunting [illegible] comes about

1907, carried 0.24% copper. The mill is heated by the
e system, air being delivered from 4 blowers, after pre-
ing over steam-coils, radiation in the coils being insured
. Power is furnished by a 500-h. p. 14x32″ Nordberg
e, and a 180-h. p. auxiliary engine.

the mill is about 25′ above mean water datum, and a drop
wasting many millions of tons of tailings by gravity, but
umulated largely in 10 years, and the management is
ion of a new system of dewatering, and carrying sands
t by a belt-conveyor, the water removed flowing ut by
in laying the sands at the point of deposit, clear water
uch smaller drop than sludge.

l is a 55x90′ boiler-house, of steel frame on stone founda-
-h. p. Stirling boilers and a Green fuel economizer. Draft
duplex fans, driven by the mill engine, with a concrete
and 8′ in diameter. Behind the boiler-house is a 25,000-
for the joint use of the Baltic and Atlantic mills, coal
boilers, through tunnels, by gravity.

ltic and Atlantic mills is furnished by a $150,000 gravity
h of Salmon Trout River. This structure is of steel,
weight, irrespective of the holding power of the rock.
ed by J. F. Jackson, of the Wisconsin Bridge & Iron Co.,
cted and approved by Foster Crowell. Material in the
,000,000 lbs. of steel and 8,000 cubic yards of concrete.
bout 1,250,000,000 gallons of water, and at the river's
h water to wash 5,000 tons of rock daily, 300 days yearly,
r pumping of about 2 cents per ton of rock stamped.
a cement foundation of great strength, is in 5 sections,
75′, the central or deepest section being 74′ high, with
est and 350′ on the east, in comparatively shallow water,
es built up from excavations in bed-rock, buttressed by
All 5 sections of the dam proper are of the same general
tion being highest, as it is bottomed in the bed of the
d heavier concrete base and stronger steel bracing. The
hout, anchored in a concrete base, with braces between
nd the extreme foot of the cement base. The following
tral section will give an idea of the general construction
crete base is 62′ wide, built up from rock excavations;
es gives a pressure of 2,626,000 lbs. for each steel sec-
74′ height. The upper 50′ of the dam in this central
ned from the water at 45°, throwing the point of over-
tral third of the concrete base, thus allowing an ample
e dam is made of plates of best boiler steel, concave on
in size and 3-8″ thick, riveted and caulked water-tight
allel inclined I-beams 24″ thick, for the full depth of 50′
e dam. On the lower section the steel plates are each
oncave, riveted and caulked, but resting directly against
he I-beams of the upper or main section are supported
frameworks of inclined steel columns and struts. The
s anchored to a 2″ steel base-plate, at the bottom of the
mber of 1½″, 2″ and 2½″ steel rods, of 15′ to 30′ length.
he dam about 20′ below the crest by three 38″ riveted
Atlantic and two on the Baltic side. There is a system
eirs, but the structure is of such a nature that it could
ater to flow continuously over its crest for an indefinite
; this structure is a trestle of the Copper Range rail-

road, built at the same time, but in nowise a portion of the dam. T
of the railroad track is 7′ above the crest of the dam, 10′ down-st
the central sections the foundations for the feet of the trestle are
concrete work, elsewhere the northern piers for the trestle are separa

Rock hoisted, 1909, was 851,208 tons, with a discard of 36,94
4.3%, the rock stamped, 814,260 tons, yielding 27,421,000 lbs. min
an average return of 21.88 lbs. fine copper per ton, comparing with
per ton in 1908 and 21.94 lbs. in 1907. Cost per ton, 1909, includ
was $1.55, and cost of copper, delivered, including taxes, was 7.98
pound, rendering the Baltic one of the cheapest copper producers,
of the district, but of the world.

Recent production has been as follows: 14,384,684 lbs. fine
1905; 14,397,557 lbs. in 1906; 16,708,868 lbs. in 1907; 17,724,854 lbs
17,817,836 lbs. in 1909.

The ultimate productive capacity of the mine cannot be predi
safety, but the present milling capacity is equal to making nearly 2
lbs. fine copper yearly, and ultimately this output, or even a greate
tion, should be reached. The management is of the best.

BALTIC MINING & SMELTING CO., LTD. M

Letter returned unclaimed from former office, Wallace, Idah
office: Thompson, Sanders Co., Mont. Fred Johnson, president;
Marlowe, secretary. Capitalization $150,000, shares 10 cents par
13 claims, developed by tunnels of 80′ and 100′, showing a vein o
estimated width, carrying auriferous and argentiferous copper ore, wit
ite gangue, giving assays of 7% copper and 3 to 4 oz. silver per to
trace of gold. Equipment includes several mine buildings. Idle.

BALTIMORE & ARIZONA COPPER CO. A

Dead. Formerly at Turkey, Yavapai Co., Ariz. Described V

BALTIMORE CONSOLIDATED MINING CO.

Mine office: Eureka, Juab Co., Utah. Robt. A. Brown,
C. C. Parker, vice-president; S. M. Simpson, secretary; John Enlund,
Organized December, 1908, under laws of Utah, with capitalization
shares 10 cents par. Lands, just north of Big Hill, in the eastern sect
Tintic district, are being developed by shaft. Presumably idle.

BALTIMORE COPPER CO. A

Letter returned unclaimed from former mine office, Prescott,
Co., Ariz. Organized 1907 as successor of Chronicle Mining Co.
claims, circa 4 miles east of Prescott, having several shallow shafts.
apparently moribund.

BALTIMORE COPPER MINING CO. MC

Office: Putte, Mont. Mine office: Boulder, Jefferson Co
David J. Charles, manager. Organized circa 1908, as successor of
Mining & Development Co. Capitalization issued, Jan. 1, 1909, wa
000, with liabilities of $10,000 on the same date.

Lands, 15 claims, known as the Baltimore group, at Comet, near
held under bond and lease, also 3 claims in the Boomerang district
west of Boulder, bought of Samuel Mackay and associates for $17,
to have a good showing of copper ore. The Baltimore mine, develo
shallow shaft and 5 tunnels, of circa 1,800′ aggregate length, carries
erous copper and lead ores, and is said to have considerable ore d
Preceding company shipped circa 30 carloads of ore, 1907, shutti
October, 1907. Idle.

BALTIMORE COPPER SMELTING & ROLLING CO. MAR

Office and works: Fourth Ave. and Sixth St., Canton, Baltim
Jos. Clendenin, president; Wm. H. Pierce and Edw. Brush, vice-p
H. A. Thorman, secretary; Chas. N. Sappington, treasurer. Comp

Cuba Smelting & Refining Co., which built the first
r, 1845, and is controlled, through stock ownership,
ecurities Co.
s, located on one of the best harbors of the Atlantic
l connections, being very advantageously located for
n business. The plant is large and modern, including
s, electrolytic plant, bullion refinery and sheet copper
lytic refinery, of 400 tons daily capacity, has anodes
lan. Material treated is entirely auriferous and ar-
d in the form of blister copper from various western
foreign countries. Works employ about 1,000 men.

& DEVELOPMENT CO. MONTANA.

ded by Baltimore Copper Mining Co. Property
r bond in the Boulder district, carrying argentiferous
ith about 1,800′ of workings. Mine shipped about
Formerly at Comet, Jefferson Co., Mont.

RA GOLD & COPPER CO. MÉXICO.

a Cananea, Arizpe, Sonora, Mex. Described Vol. VIII.

CO. MÉXICO.

Concheño, Rayón, Chihuahua, Mex. Described Vol. VIII.

MONTANA.

11 State Savings Bank Bldg., Butte, Mont. Dr. W.
H. Butler, vice-president; J. B. Frisbee, secretary;
r; preceding officers, J. L. Hannifin, Theo. Hennessy
rs. Organized July, 1909, and reorganized Sept. 24,
ntana, with capitalization $1,500,000, shares $1 par,
meeting, first Tuesday in June.
ea circa 230 acres, in the Summit Mountain district,
the foothills of Fleecer Mountain, 15 miles south-
being held under bond and lease, and 10 claims were
on Copper Mining Co. for 150,000 shares of Bamar
eral veins, of which one, of 50′ estimated average
00′, was mined circa 1890, by several shallow shafts,
untry rock is granite, markedly similar to that at
o 4′ of wash, with a mineralized zone of about one-
4 veins, with a diorite dyke to the northward. Shal-
ow continuity of the veins, which are leached at sur-
bonate ore below commercial tenor.
es several shallow old shafts, and the 180′ two-com-
so the 700′ Linda tunnel, with a total of about 1,000′
l shows a wide ledge, carrying a mineralized streak
ng mainly pyrite, with some argentiferous chalcopy-
nate stains, and a highly silicious gangue. Property
14 to 23% copper and 24 oz. silver per ton, with small
ssaying 11% lead, 24 oz. silver and $1 gold per ton.
a 40-h. p. boiler, 20-h. p. hoist good for 500′, 2-drill
al mine buildings. Company plans deepening shaft,
Property considered promising.

DEVELOPMENT CO. MÉXICO.

au St., New York, N. Y. Mine office: Zautla, San
la, Mex. Chas. Q. Davis, president; Lic. D. Manuel
V. L. Wilkins, general manager; H. L. Swaine, consult-
under laws of Arizona with capitalization $5,000,000,
ive 7% preferred stock, and $4,000,000 common stock.
apparently held under bonds and options, including
also silver claims near Pachuca, Hidalgo, Mex. The

copper property shows what Mr. Swaine calls dykes with intrusions
and lime, intrusive limestone presumably being a feature peculiar to th
with an innumerable quantity of veins, the important ones, near th
between granite and limestone, being said to carry malachite, azur
little native copper, with small quantities of silver bromides, sulphide
gold, in the oxidized zone, with chalcopyrite, bornite and chalcocite,
with hematite and limonite, having what is reported as a garnetifero
gangue, in the sulphide zone. Mr. Swaine is quoted as stating that o
mined opencast with pick and shovel at a cost not to exceed 35 cent
which figure remains to be demonstrated. The copper mines have ve
development, hence Mr. Swaine estimates how much ore might be d
in a year's work, the figure arrived at being 260,000 tons, averaging 2.5
25 grams silver and 0.5 grams gold per ton. Labor cost is estimated a
per day for miners, and 19 cents for surface workmen.

The company claims to have, in México, a power plant for the
smelters, consisting of two 400-h. p. Babcock & Wilcox water-tube
300-h. p. Allis-Corliss engine, a 200-h. p. Hughes-Philips Corliss eng
225-kw. Westinghouse generator.

The smelter, planned to be of 500 tons for the first unit, was s
1910, to include a 46x160" Traylor water-jacket blast-furnace, at Allen
paid for, with accessories under contract. Mr. Swaine estimates that
can smelt 250 tons daily, ore averaging about 4% copper, and carryi
ton in combined gold and silver values, and that, with copper at 10
pound, the company should be able to mine and smelt its ore at a c
exceed 2½ cents per pound, with an estimated cost for finished copper
3 cents per pound, after deducting included gold and silver values.
as no important copper mine in the world is making copper for anyw
these figures, Mr. Swaine estimates that the company can produce c
lower cost than any company now operating, which estimate shows
Swaine is a very clever estimator. Is not regarded favorably.

BANNACK CONSOLIDATED MINING CO. M

Office: 104 West Granite St., Butte, Silver Bow Co., Mon
returned unclaimed from former mine office, Bannack, Beaverhead C
Carlton H. Hand, president. Organized 1906, with capitalization $
shares $5 par. Lands, 312 acres, covered with alluvium of 25' to
opened by 2 shallow shafts, showing ores assaying up to 5% copper
gold per ton. Idle.

BANNER CONSOLIDATED MINES CO. CO

Dead. Was merged, 1909, in North American Smelter & Mines
merly at Idaho Springs, Clear Creek Co., Colo. Described Vol. IX.

BANNER COPPER CO. A

Letter returned unclaimed from former office, St. Louis, Mo. M
Globe, Gila Co., Ariz. Organized circa May, 1907, under laws of Ari
capitalization $1,000,000, by W. D. Connell, J. B. Aiken and Spen
practically as successor of the Arizona Banner Copper Co., which was
ization of the Pinal Copper Co.

Lands, 160 acres, known as the Black Copper group, 8 miles nor
Globe, having 10 shallow shafts and short tunnels claimed by form
to have 20,000 tons of 10 to 15% copper ore in sight, which was not
parently the company has sold part or all of its lands to the Inspirati
Co. Idle since circa 1901, except for annual assessment work.

BANNER GOLD & COPPER MINING CO. WASH

Dead. Formerly at Chelan, Chelan Co., Wash. Described V

BARABA MINING CO. WI

Office and mine: Melle[illegible] Ashland Co., Wis. Nelson Baraba
dent; Nelson Baraba, Jr., [illegible]. Organized 190[illegible] with

Has a shallow shaft showing ore assaying 2.8% cop-
nd silver. Idle.

INDIA.

nda, Hazaribagh, Bengal, India. Were operated, 1887
ut 1,000 tons of copper in five years. Ore occurs as
ly 1 to 3% copper, in a gangue of micaceous schist.
d 24 miles to the smelter, at Giridhi. These are per-
copper properties now known in India, despite the
l might be worked successfully, if given rail facilities,
d management. Idle since 1891.

ARTE. **CHILE.**

, Taltal, Antofagasta, Chile. Property includes the
p, and the Abundancia mine, 380′ deep, both opened
ine. Has steam power. Idle several years.

CO., LTD. **TRANSVAAL.**

Fox St., Johannesburg, Transvaal. Mine office: Bar-
nsvaal. T. F. Allen, chairman. Organized July 25,
vaal, as successor of Barberton Copper Syndicate, Ltd.
Noord Kaap. The manager stated, 1907, that he was
g and smelting proposition in South Africa, which was
ent, in view of the small amount of work done. Idle.

SYNDICATE, LTD. **TRANSVAAL.**

ized July 25, 1907, as Barberton Copper Co., Ltd. For-
delburg, Transvaal.

MARYLAND.

Van Antwerp, owner, Hornell, N. Y. Letter returned
mine office, Mt. Washington, Baltimore Co., Md. Is
oped mine, showing auriferous and argentiferous chal-
lle some years.

MÉXICO.

nt to raising chickens, and should have engaged in his
earlier. Formerly at Aguacaliente de Baca, Fuerte,
l Vol. VIII.

MONTANA.

St., Chicago, Ills. Mine office: Philipsburg, Gran-
arry, president; Herman O. Brumder, vice-president;
tary; preceding officers, Frank G. Wilson, Frank E.
e, directors. Organized under laws of Arizona, with
, shares $1 par. Lands, 5 claims, unpatented, on
Northern Pacific railway, said to show a vein of 4′
diorite and slate, carrying copper ore, and 2 veins, of
quartzite and sandstone, carrying silver-lead ores,
0′ tunnel and later by a 110′ shaft between the silver-

NING CO. **UTAH.**

laimed from former office, Salt Lake City, Utah, and
am Canyon, Salt Lake Co., Utah. Frank W. Klett,
ams, vice-president; H. Percy Bourne, secretary and
rs, Geo. Ewing and M. C. Godbe, directors; Chas.
Organized circa June, 1909, under laws of Utah, with
hares 10 cents par, assessable. Lands, 13 claims, in
Bingham district, having several opencuts, a short
lts, one said to show a vein of 40′ width, apparently
mineralized copper carbonates on the footwall, at depth of

BARNEY COPPER CO.

Office and mine: Globe, Gila Co., Ariz. Hon. J. D. Copler and general manager; J. B. Coplen, vice-president; W. J. Miller, secr Porter, treasurer; Fred F. Green, superintendent; D. A. McMillan engineer. Organized Aug. 27, 1910, under laws of Arizona, with ca $5,000,000, shares $5 par, nonassessable; fully paid and fully issu shares being given for property. Annual meeting, first Tuesday

Lands, 26 claims, partly fractional, unpatented, area 450 ac the Live Oak and Keystone mines, showing Pinal schist and quart capped by conglomerate. Property has a number of old pits and sha 240′, in Gila conglomerate showing copper stains. Is prospecting by drills, for disseminated sulphides in schist. Equipment includes gasoline hoist, and there are 7 camp buildings.

BAROTSE COPPER CO., LTD. R

Dead. Was merged, 1902, in Rhodesia Copper Co., Ltd. Bulawayo, Rhodesia.

BARRANCA COPPER CO.

Office: 170 Broadway, New York, N. Y. Mine office: Ba Cobre, San Andres del Rio, Chihuahua, Mex. H. T. R. Cowell, manager, resigned, 1908. Lands, in the Urique district, 25 miles eas railroad, include La Purisima mine, having argentiferous and aurife ores, developed by 750′ shaft and 2,100′ tunnel, said to show large low-grade copper ore. Equipment includes a 20-stamp mill with tw ington mills, a 100-ton concentrator and a 60-ton smelter. Produc is about 2,000 tons of high grade ore and concentrates, shipped to calientes smelter. Property was under lease, 1910, to Mendoza

BARSTOW MINING CO.

Office: 34 South First West St., Salt Lake City, Utah. Lett unclaimed from former mine office, Bingham Canyon, Salt Lake Henry Newell, president; W. L. Pickard, Sr., vice-president; Grace C secretary and treasurer. Organized February, 1910, under laws of capitalization $10,000, shares 2 cents par. Lands, 1 claim. No tra tions secured.

BARSTOW MINING & MILLING CO. CC

Dead. Formerly at Ironton, Ouray Co., Colo. Described Vol

GEWERKSCHAFT BARTHOLOMÄUS. G

Dead. Formerly at Wenden bei Olpe, Westfalen, Germany. Vol. VI.

BARTOLINI HERMANOS.

Mine office: Estación Izabal, Arizpe, Sonora, Mex. M. C manager. Ore carries copper, silver and gold, with values mainly in s times up to net returns of $2,000 to $4,000 per car. Was shipping, 4 carloads of ore monthly, employing about 40 men.

BASEL MINING CO.

Dead. Formerly at Tonopah, Nye Co., Nev. Described Vol.

BASIN & BAY STATE MINING CO. M

Dead. Property was sold July 30, 1907, for $302,865 to Basin Co. Formerly at Basin, Jefferson Co., Mont. Described Vol. V.

BASIN-COMSTOCK CO. M

Dead. Formerly at Cataract, Jefferson Co., Mont. Described

BASIN GOLD & COPPER MINING CO. M

Dead. Formerly at Basin, Jefferson Co., Mont. Described V

BASIN REDUCTION CO. M

Letter returned unclaimed from former office, 42 Broadway, N. Y. Works office: Basin, Jefferson Co., Mont. W. A. Kidne tendent, at last accounts. Company is controlled, through stock

r Co., which, in turn, is controlled by United Copper Co. he Basin & Bay State Mining Co., August, 1907, buying also the Katie mine, at sheriff's sale, for $302,865. Mill s daily capacity. Some trouble has been had with the ecause of pollution of streams by tailings, but large dams d the slimes. At last accounts property was in possession Bank of Butte, under a judgment for a debt of $145,000, Idle and apparently moribund.

& DEVELOPMENT CO. **CALIFORNIA.**

., Sacramento, Cal. Mine office: Lowry, Tehama Co., Lean, president; W. L. Rennie, secretary and treasurer; manager. Organized under laws of California, with capi- hares $1 par. Lands, 14 claims, partly patented, also a 20 acres miscellaneous lands, opened by a 1,200′ tunnel, ground workings, showing 3 ore bodies, one, of 2′ to 75′ assays of 2% copper, 2% lead, and $1 to $3 gold per ton, te and chalcopyrite. Presumably idle.

BOLIVIA.

Coro Coro, La Paz, Bolivia. Property is the Santo g native copper in conglomerate. Has steam power, and of barrillas de cobre at last accounts.

SMELTING CO. **MASSACHUSETTS.**

at Charlemont, Franklin Co., Mass. Described Vol. IV.

MINING CO. **WYOMING.**

eeded, circa 1907, by Portland Copper Mining Co. For- on Co., Wyo. Described Vol. VI.

ATTLE CREEK MINING CO. **WYOMING.**

ffice was Rice Lake, Wis. N. B. Noble was manager. haft, with a short crosscut showing a wide vein of graphite, at Battle Creek, Carbon Co., Wyo.

NNEL SITE MINING CO. **WYOMING.**

at Rudefeha, Carbon Co., Wyo. Described Vol. VIII.

N COPPER MINING CO. **WYOMING.**

at Encampment, Carbon Co., Wyo.

NG & MILLING CO. **NEW MEXICO.**

k Bldg., Denver, Colo. Letter returned unclaimed from rdsburg, Grant Co., N. M. Dr. O. L. Blachly, president; y and treasurer. Capitalization $100,000, shares $1 par. claims each, area 79 acres, in the Virginia district, three ordsburg, connected therewith by a good wagon road. e improvement, but is opened by 478′ of shafts, crosscuts g ores that are said to have given average returns, from El Paso, of 8 to 14% copper, 1 to 20% lead, 22 oz. silver, per ton. Idle several years and apparently moribund.

PER EXTENSION SYNDICATE, LTD. **MÉXICO.**

at Suaquide Batuc, Ures, Sonora, Mex. Described Vol. VIII.

R CO. **ARIZONA.**

ls, February, 1909, through forfeiture of bond and lease. eded by Baumann Mines Co. Formerly at Humboldt, Fully described Vol. VIII.

CO. **ARIZONA.**

Ariz. Mine office: Humboldt, Yavapai Co., Ariz. dent and general manager; E. S. Clark, vice president; y; Allen Hill, treasurer, preceding officers, and Robt. E. Organized March 18, 1910, under laws of Arizona, with 00, shares $10 par, nonassessable; issued, $650,000, with

$600,000 escrowed in bank of Arizona, Prescott, until March 21, 1912 meeting, first Monday in March. Practically was successor of Bauma Co., which forfeited bond and lease to Jules Baumann, February, roperty was bid in at sheriff's sale.

Lands, 25 claims, unpatented, area 500 acres, 2 miles east of I in the Agua Fria district, carrying 10 ore bodies, including fissur quartz and schist-porphyry, and a contact deposit between porp schist having a heavy gouge on the footwall. Ores are oxidized in workings, succeeded by chalcopyrite, ore being said to give assays u copper, from a trace to 300 oz. silver, and from nothing to $35.50 gol

The Swiss Girl mine, opened 1884, has 8 shafts, of 30′, 26′, 65′ 208′, 320′ and 900′, with a 250′ crosscut tunnel and a 305′ drift tunn assessment work is now being done on this group.

The Baby mine, circa 1,000′ northeast of the Swiss Girl, has a 1 showing azurite, malachite and chalcocite.

Equipment includes a 200-h. p. steam plant, with 2 hoists and a 2- van air-compressor. Buildings are a smithy, powerhouse, office, b boarding-house and several dwellings. Work was resumed, November, management plans deepening the Baby shaft and crosscutting at 100′

SOCIEDAD MINERA y FUNDICIÓN DE BAUSCH y TIANI. ARG

Office, mine and works: Chilecito, Rioja, Argentina. Property the Compañía and Mercedes mines. Has steam and water power, and known as the San Miguel, built 1876, for lead ores, at a cost of $120 altered, 1893, to treat copper ores of the Mexicana district. Presum

BAY HORSE COPPER MINING CO. WY

Dead. Formerly at Riverside, Carbon Co., Wyo. Described V

BEACON CONSOLIDATED MINES CO. COLORADO & I

Office: 609 Mack Bldg., Denver, Colo. Letter returned unclai former mine office, La Cananea, Arizpe, Sonora, Mex. Lloyd Keny secretary, treasurer and promoter. Has two gold claims, on Bea Cripple Creek, Teller county, Colorado, and in June, 1907, claim acquiring 40 to 50 hectares of copper ground at La Cananea. Is not favorably. Idle and apparently moribund.

BEAD LAKE GOLD-COPPER MINING & MILLING CO. WASHI

Dead. Was reorganized, September, 1910, as Bead Lake Mi Formerly at Newport, Stevens Co., Wash. Described Vol. VIII.

BEAD LAKE MINING CO. WASHI

Office: 600 Columbia Bldg., Spokane, Wash. Mine office: Stevens Co., Wash. B. F. Seeley, president; W. E. Allen, secretary, and general manager. Organized September, 1910, under laws of Wa with capitalization $2,000,000, shares $1 par, assessable, as a recor of Bead Lake Gold-Copper Mining & Milling Co.

Lands, 13 claims, area 267 acres, about 2 miles from Conquest on the Pend d'Oreille River, showing 3 veins outcropping on the ba which have been opened to some extent, carrying copper sulphides. ment is by a 2,462′ tunnel, planned to cut the third vein shortly, givi of circa 500′. Mine has a fair equipment, including steam power an compressor. Idle at last accounts, but planned resumption shortly.

BEAN AMALGAMATED COPPER CO. NEW I

Dead. Formerly at Lordsburg, Grant Co., N. M. Described V

BEAN COPPER CO. AI

Dead. C. C. Bean was manager. Mine, slightly developed showed auriferous copper ore, and equipment, 1902, included a sm plant. Formerly at Gila Bend, Maricopa Co., Ariz.

NG CO. **MONTANA.**
Twin Bridges, Madison Co., Mont. Alex. Johnson, xter, superintendent, at last accounts. Property is the , carrying auriferous and argentiferous copper ores, as steam power. Presumably idle.

IINING & DEVELOPMENT CO. **WASHINGTON.**
ville, Stevens Co., Wash. C. G. Carruthers, superin- ts. Has argentiferous and auriferous copper ore, opened y idle.

UNNEL & MINING CO. **COLORADO.**
stal, Gunnison Co., Colo. H. H. Williams, superin- nts. Lands, 26 claims, patented, having 300′ and 400′ tiferous and slightly auriferous copper ore. Has water and idle since 1907.

& COPPER MINES CO. **CALIFORNIA.**
Quimby, Trinity Co., Cal. Frank P. Burris, presi- ber, 1907, under laws of California, with capitalization laims, including 8 claims on the east side of New River, arallel veins from a few inches to several feet in width, vidth, being said to give average assays of 4% copper, ld per ton. Upper portions of the vein under develop- rrying copper carbonates and considerable chalcanthite ite, succeeded by chalcopyrite associated with arsenical , with quartz gangue. All ores are more or less auri- rable free gold. Vein opened has a gabbro foot and ser- velopment includes a shallow shaft and 3 tunnels, No. is about 300′ lower, of 125′, and No. 3, 100′ lower than ment includes an 8′ Huntington mill, which was treating t last accounts.

RBERGWERK BEATE. **GERMANY.**
re 170 hectares, traversed north and south by veins of 3 meters width, and in east and west direction by several ore, of one-half to 2 meters width, which, in turn, are by copper bearing veins of 10 to 30 meters width. Main t of a hill of 100 to 150 meters height. Development t 50 meters length, following the course of the spathic mall cost, could be made to serve as an outlet for ore ormerly at Erbach, Rheinprovinz, Prussia, Germany.

& MILLING CO. **MONTANA.**
eded, Jan. 14, 1907, by Jericho Mountain Copper Co. owell Co., Mont. Described Vol. VIII.

CO. **ALASKA.**
Broadway, New York, N. Y. Mine office: Latouche, a. Stephen Birch, president; W. H. Seagrave, manager. tock ownership, by the Guggenheim interests.
patented, area 340 acres, known as the Bonanza mine, northern end of Latouche Island, within one-half mile of is a good natural harbor. Country rock is slate, and rring in brecciated portions of the country rock, in regu- lly as impregnations or replacements of the country rock, siderably brecciated. Ore assays up to 30%, and, as to 8% copper, 2 oz. silver and 20 cents to $2 gold per , July 4, 1897, by Andrew K. Beatson, and began ship- nt is by a big quarry and tunnels of 320′ and 900′, with 1, 1910. There are 5 upraises, to surface, of 33′ to 43′ ins having steel gates, through which ore is milled down.

Owing to development by tunnel, mine has no machinery equipment; ... out mechanical power, ore has been mined and loaded on vessels at ... only $2.25 per ton. In addition to high grade ore shipped, the mine h... quantity of ore developed that is suitable for concentration.

A half-mile tramline, of 24" gauge, leads to a 300' wharf, with ore ... on the natural harbor. Freight to Tacoma, by water, is $2.75 per ton ... being desirable for flux, is smelted at an average cost of about $1.65 ... Buildings include an office and store. Employs about 30 men. The ... been a continuous and increasing shipper, since 1903, production be... 1,020,000 lbs. fine copper and 9,000 oz. silver in 1907, and 5,092 ton... yielding 1,264,053 lbs. fine copper and 8,820 oz. silver, in 1909. Mar... is said to plan producing about 4,000 tons of ore monthly, 1911, and i... consider building a smelter at the mine. Property considered valuable ... agement good.

BEAUPARC COPPER MINES CO., LTD. IR...

Office: College Green, Dublin, Ire. Mine office: Beaupark, ... Meath, Ire. Walter Hume, chairman; David Frame, manager; prece... cers and R. Stokes, directors; J. Carley, secretary. Organized Feb. ... under laws of Great Britain, with capitalization £1,000, increased later t... shares £1 par. Development work was in operation, leisurely, at last a...

BEAVER-BUTTE COPPER CO.

Office and mine: Beaver, Beaver Co., Utah. John M. Murdock, p... Albert F. Fillerup, vice-president and consulting engineer; John D. F... mine manager; O. F. McShane, secretary, preceding officers and ... Pritchett, directors. Organized May, 1906, under laws of Utah, with ... zation $50,000, shares 10 cents par, assessable.

Lands, 5 claims, unpatented, in the Newton district, 8 miles from a ... showing auriferous and argentiferous copper ore, developed by a 1... compartment shaft.

BEAVER CAÑON GOLD & COPPER MINING CO. WASHI...

Mine office: Loomis, Okanogan Co., Wash. E. P. Gaillac, ... Lands are over 8 miles south of Loomis. Presumably idle.

BEAVER CONSOLIDATED MINING CO.

Dead. Was merged 1904, in Beaver-Harrison Mining Co. For... Milford, Beaver Co., Utah. Described Vol. IV.

BEAVER COPPER CO.

Office: 222 D. F. Walker Bldg., Salt Lake City, Utah. Letter ... emblazoned from former mine office, Milford, Beaver Co., Utah. A. D. ... president; A. J. Bettles, vice-president; Chas. A. Weaver, secretary ... McMillen, treasurer; A. J. McMillen, general manager; preceding offi... J. Barrette and Jas. H. Patterson, directors. F. F. Richards, consulting e... Organized 1907, under laws of Utah, with capitalization $1,000,000, a... par, assessable; issued $...,000.

Lands, 14 claims, area 280 acres, in the Beaver Lake district, car... ore body ... about 6,000', with 2 veins, known as North and South, tha... strike ... dip. One vein developed by 4 pits and a 140' shaft, wit... workings ... stated to show $75.00 tons of ore, which is excessive, sh... ... and ... mine ... body of ... ... mined by management ... ago $..., average 14 oz. silver and $2.50 gold per ton, in a year estimated ... ... to be 1,000 tons. A carload of surface ore sent as a smaller test, ..., average $... oz. silver and $... gold per ton. Last some years ... ... assessment work.

BEAVER COPPER MINING CO. WY...

Dead. Was organized ... Formerly at Dorrington, Carbon Co... Description Vol. I.

INING CO. **UTAH.**
ck, Salt Lake City, Utah. Letter returned unclaimed
Milford, Beaver Co., Utah. J. J. Trenam, president
os, treasurer; B. L. Corum, secretary. Organized 1904,
00, shares 5 cents par, as a merger of Beaver Consol-
Ben Harrison Gold & Copper Mining & Milling Co.
35 acres, in the Beaver Lake district, one group being
he Majestic company, carrying sundry fissure veins,
0′ and 534′, with about 2,000′ of workings, showing a
50% copper, and up to 10 oz. silver and $7 gold per
nd an air-compressor, with necessary mine buildings.

R CO. **PENNSYLVANIA.**
sburg, Columbia Co., Pa. Has secured ores assaying
l years.

MINING CO. **ALASKA.**
Prince of Wales Island, Alaska. Henry Miller, pres-
anager. Lands are on the southern side of Beaver
Development is by tunnels, showing ore carrying cop-
dle several years.

C MINING CO. **UTAH.**
ond South St., Salt Lake City, Utah. Letter returned
ine office, Milford, Beaver Co., Utah. L. H. Goulet,
ice-president; Geo. D. Anson, secretary; W. F. Earls,
n. 12, 1910, under laws of Utah, with capitalization
par. No trace of operations secured.

NG & LAND CO. **COLORADO.**
Castor, secretary and treasurer, Boulder, Colo. Letter
former mine office, Rosemont, Teller Co., Colo. J. F.
Smith, consulting engineer. Lands include several
s and a damsite. Has 2 shallow shafts and a short tun-
giving fair assays in copper, silver and gold. Idle.

PER CO., LTD. **RHODESIA.**
ouse, London, E. C., Eng. Operating office: Bula-
office: Bushman Mine, Francistown, Rhodesia.
an; preceding officer, Thos. Joyce Seel and Geo. Wm.
Donald, secretary; E. Jorissen, consulting engineer.
, under laws of Great Britain, with capitalization
issued, 75,005 shares. Shares are listed on the Lon-
nual meeting, second Thursday in September.
echuanaland Exploration Co., Ltd., for £15,000 in fully
r license from the British South African Co., and is
o that company, as soon as profits are earned. Lands,
copper claims, circa 120 miles south of Bulawayo, these
of 60 claims, and the San Toy, Nondu, Kelly-Kenny
claims each. These properties show traces of ancient
cular fissure veins carrying chalcocite, in dolomite and
kes.
e Bushman group, which has shafts of 205′, 212′, 256′,
183′, with 2,557′ of crosscuts, four levels being opened.
20-h. p. steam plant, with 3 small hoists and 6 build-
npany plans prospecting along the copper belt, about
nking to the 300′ level.

N. **MÉXICO.**
os, Ocampo, Aguascalientes, Mex. Enrique Becker,
40 hectares, including El Tepozán, San Segundo and

El Triunfo mines, developed by a 40-meter incline shaft, producing and argentiferous copper ores. Planned installing gasoline hoists and about 20 men, at last accounts.

BECKMANN COPPER MINING & DEVELOPMENT CO., LTD. TRA

Dead. Formerly at Zoutpansberg, Zoutpansberg district, Transv scribed Vol. VIII.

BEDE METAL & CHEMICAL CO., LTD. NORWAY &

Office and works: Hebburn-on-Tyne, England. Spanish office: Manriques 9, Córdoba, Spain. Mine office: Puebla de Huelva, Spain. Sir Andrew Noble, Bart, K. C. B., chairman; precedi W. D. Cruddas, Sir Alfred M. Palmer, Bart., and Mason T. Scott, Wm. M. Brown, secretary; Richard Eshott Carr, general manager Chas. R. Sams, mine superintendent. Organized May 16, 1872, und Great Britain, as successor of Bede Metal Co., with capitalization shares £25 par, reduced, 1886, to £114,560, shares £10 par, and chan to shares of £1 par, fully paid. Debentures, formerly circa £125,000, fully paid. Dividends, 1879-1907, including payments of previous aggregated £108,464. Dividends were £14,320 in 1906, £20,048 £14,320 in 1908; £17,184 in 1909. Statement of Dec. 31, 1909, credit balance of £13,777. Company is primarily a manufacturer of chemical products, but also is a considerable producer of copper, fron and Norwegian cupriferous pyrite.

Spanish mining lands are 71 hectares, with about 50 acres misc lands, known as Las Herrerias mines, held under a small royalty, havin ings, in 2 groups. Property shows Devonian schists, with porphyry near the ore bodies, which are irregular lenses of massive cupriferou in schist, with dip from vertical to 40° N. There are 7 ore bodies, of under development, range from 1 to 40 meters in width, the main ore about 12 meters average width and 400 meters length, carrying ch and chalcocite, finely disseminated through pyrite, estimated by ma to average 1.4% copper and 45% sulphur, with very small quantiti and lead, of no commercial value. Development is by the Extractio 302', and the San Mateo shaft of 250', each having a 15x20" hoist, having about 150,000 tons of ore blocked out for stoping. The weste the mine is worked opencast, all ore being stoped, and openings filled wi The mine has about 150,000 long tons of ore blocked out for stopi property is served by the Guadiana railway.

Buildings include 4 engine-houses, a laboratory, warehouse, s dwellings for officials and 20 cottages for workmen.

The ore is piled in large flat-topped heaps, which are irrigated the resulting liquors passing over iron, for precipitation. There are water dams and 4 leaching dams, of masonry. Product is precipitat 80% copper tenor, which is shipped to the company's smelters, at on-Tyne, for reduction, and washed sulphur ore, which is shipped to pany's British works, and also to France, Germany and Russia. Ore heaps is charged to general production, the company's balance she ciating rather than padding actual assets.

Ore treated, 1909, was 51,000 long tons, carrying an average of 1. per, won at an average cost of 5s. per ton for mining, and the cost of fin f. o. b., in the form of precipitate of 73% copper tenor, was £42 per Forces are circa 300 men, at Las Herrerias. Production of Las Herrer to end of 1909, was circa 6;800 long tons of fine copper, and was 1,276 in 1907; 1,254,400 lbs. in 1909, and circa 1,150,000 lbs. in 1910.

The Killingdal mine, north of Rōros, Norway, is operating un from the Norwegian owners. Ore is cupriferous pyrite, averaging ab

ur, production being about 20,000 metric tons of ore
905, was 512,960 lbs. fine copper, and 1909 was circa
r from the Killingdal mine. Copper production of the
t 2,000,000 lbs. for 1909.

D MINING SYNDICATE. **AUSTRALIA.**

ar, Robinson Co., N. S. W., Australia. Lands, 6 miles
e mine, carry a promising gossan, containing gold, silver
ned by a 200′ shaft showing auriferous and argentiferous
Presumably idle.

ARIZONA.

Broadway, New York, N. Y. Mine office: Prescott,
. J. Beemer, general manager; J. E. Houlihan, superin-
laims, patented, 12 miles south of Prescott, on Mount
ampa district, known as the Stormcloud mine, opened
was said to have been bought for $58,000. The Storm-
of 2′ to 4′ width, one, of about 3′ average width, carrying
with combined values of $25 to $40 per ton. Mine is
, and it was planned connecting with the surface through
e winze into a working shaft. Shipped some ore, 1907.

MINING CO. **UTAH.**

ach Bldg., Salt Lake City, Utah. Letter returned un-
ine office, Ibapah, Tooele Co., Utah. Jos. P. McGrath,
ll, secretary and treasurer. Organized November, 1901,
h capitalization $30,000, shares 10 cents par, assessable;
en levied. Lands, 3 claims, patented, in the Dugway
a railroad, having a 200′ tunnel and 2 shallow shafts.

CO. **WASHINGTON.**

claimed from former office, Spokane, Wash. Mine office:
Vash. Jos. A. Anderson, president; Bruce White, man-
els, the 1,000′ No. 3 main tunnel showing a considerable
l argentiferous chalcopyrite, of fair average grade. A
ects the tunnels with ore-bins on the railroad. Water,
ambert Creek, through a steel pipe, generates electric
y a gasoline auxiliary plant. Equipment includes an
wer drills. Shipments of circa 6,000 tons of ore were
, on account of low price of copper. Property consid-

. **MÉXICO.**

outh Spring St., Los Angeles, Cal. Mine office: El
nora, Mex. J. J. Hardwick, president and general man-
vice-president; Harry R. Hay, secretary and treasurer;
L. Hardwick and G. A. Willcox, directors. Organized
ws of Arizona, with capitalization $5,000,000, shares $5
rotocolized, June, 1902, under laws of México.
es, circa 30 miles from Carbó, the nearest railroad sta-
th of the Copete mine and near the Sultana mine of the
Mine has shafts of 310′, 256′, 185′, 90′, and several tun-
mile of workings, on 2 large sulphide ore bodies, claimed
of 12% copper, 8 oz. silver and $10 gold per ton. Has
r. Idle since circa 1903, except for shipment, May 1907,
Paso smelter, which returned nearly $2,250.

MÉXICO.

claimed from former office, 12 Chamber of Commerce
nn. Mine office: Cumpas, Moctezuma, Sonora, Mex.

Chas. E. Wenzel, president; John E. Stair, vice-president; Ace P. Abell tary and treasurer; preceding officers, Chas. W. Sexton and Lyman W. I son, directors; Thos. L. Davenport, manager. Organized May 20, 1901 laws of South Dakota, with capitalization $1,200,000, shares $10 par.

Lands, 190 hectares, west of Cumpas, also 14,000 acres of ranch and lands. Mining lands, including the Belen, San Pablo and Lucero mine 8 ore bodies, of which 5 have been more or less developed by 5 shafts and nels, showing a vein of about 90′ width, with a 2′ paystreak of high gr averaging circa 8% copper, 20 to 30 oz. silver and 0.09 to 0.5 oz. gold p from chalcocite, bornite, chalcopyrite and tetrahedrite, ores being bismu ous.

Equipment includes a steam plant with two 60-h. p. boilers, a 12 dynamo, three 20-h. p. electric hoists, and electric lights, connected, b pipeline, with a pumping station 1 mile distant. There also is a Blake c and about 10 buildings, including a store. Transportation is by wago from Dos Cabezos to Cumpas, via the Transvaal mine.

Smelter has a rotary calciner and 30-ton Medbery revolving reverbe furnace, but this plant, blown in 1908, did not give satisfactory results, a closed down after a short run. Some copper ore was shipped to the Queen and El Paso smelters, and 8 carloads of bismutheriferous or shipped to England. Idle since 1908.

SOCIÉTÉ ANONYME BELGE POUR LA RECHERCHE ET L'EXPLORATION DES MINERAIS. I

Mine office: Massa Marittima, Grosseto, Tuscany, Italy. Org under laws of Belgium. Property is the Poggio al Guardione mine, c slightly cupriferous iron pyrites. Presumably idle.

COMPAGNIE DES CUIVRES DE BELGIQUE. BEL

Office: 17 Quay Napoleon, Antwerp, Belgium. Works office: Belgium. Marquis de St. Seine, chairman; Herman Thöfehrn, consultin neer; preceding officer, Baron D. Antroche, Viscomte Monteroux, Ec Jacobs, Baron Xaviere de Raveille, and L. Baziere, directors; H. de Mon metallurgical director. Organized Apr. 30, 1905, under laws of Belgium capitalization 500,000 francs, shares, f500 par. Annual meeting, second day in November. The smelter, at Duffel, a suburb of Antwerp, and con therewith by water, has a 250-ton blast furnace and five 100-ton reverbe furnaces.

BELLA COOLA COPPER CO. BRITISH COLU

Dead. Lands passed to North Coast Copper Co. Formerly at Coola, Cassiar district, B. C. Described Vol. VIII.

MINA BELLAVISTA. MÉ

Office: care of Henry L. Choistry, owner, Guadalajara, Jal., Mex. office: Etzatlán, Ahualulco, Jalisco, Mex. Lands, 14 hectares, just e Etzatlán, having 7 veins, two averaging 1 metre in width, slightly develo about 95 metres of workings, showing argentiferous and auriferous coppe Property is an antigua, formerly known as the Picachos. Idle several ye

BELL BOY GOLD & COPPER MINING CO. ID

Letter returned unclaimed from former office, Pocatello, Idaho. office: Caribou, Bingham Co., Idaho. Wm. Stephenson, president, accounts. Organized circa February, 1909, under laws of Idaho, with c ization 300,000 shares. Property was said to carry high grade copper o coarse gold. Presumably idle.

BELL-DOMINION COPPER MINING CO. ARIZ

Office and mine: Globe, Gila Co., Ariz. Organized August, 1904 capitalization $250,000. Lands, 10 claims, known as the Scotch group, Pinal Creek, having a 70′ shaft at last accounts. Idle and apparently mor

INE. MONTANA.
a Copper Mining Co., at Butte, Silver Bow Co., Mont.
MINING & SMELTING CO. NEVADA.
d, 1902, in the Nevada Bell Copper Mining & Reduction
ock, Humboldt Co., Nev.
MONTANA.
a Copper Mining Co., at Butte, Silver Bow Co., Mont.
MONTANA.
a Copper Mining Co., at Butte, Silver Bow Co., Mont.
MINING CO. IDAHO.
laimed from former office, Spokane, Wash. Mine office:
daho. I. Waldo Murphy, president; D. R. Glasgow,
on $1,000,000, shares $1 par. Lands, 3 claims, 1 frac-
ing a fissure vein, of 3′ to 4′ surface width, in quartzite,
d copper values. Mine has about 500′ of workings.
ribund.
G MINING CO. COLORADO.
k Hawk, Gilpin Co., Colo. Wm. Mitchell, superin-
ts. Mine, having auriferous and argentiferous copper
am power. Employed circa 15 men, 1903. Idle several
MONTANA.
a Copper Mining Co., at Butte, Silver Bow Co., Mont.
CO. COLORADO.
was manager and Jas. Buell, superintendent. Property
tiferous copper ore, slightly developed by tunnel. Com-
relocation, and was dissolved. Formerly at Winfield,
CO. IDAHO.
rn, Shoshone Co., Idaho. Par value of stock, formerly
1910, to $1. Option on majority of stock was given,
Lands, near the head of Two Mile Gulch, north of
and copper ores. Presumably idle.
CO. MONTANA.
as sold, 1906, to Butte Coalition Mining Co. Formerly
., Mont. Described Vol. V.
G & MILLING CO. UTAH.
d, 1903, in the Butler-Liberal Consolidated Mining Co.
Canyon, Salt Lake Co., Utah.
COPPER MINES, N. L. AUSTRALIA.
t Reefs, N. S. W., Australia. B. J. Harris, mine man-
a number of veins, of which No. 4, up to 6′ in width, is
says of 18 to 20 dwts. gold per long ton. Development
alues are in gold rather than copper.
NG CO. ARIZONA.
t Cedar, Mohave Co., Ariz. Described Vol. VIII.
D MINING CO. WASHINGTON.
urg, Stevens Co., Wash. A. A. Anderson, superintend-
Mine is slightly developed by shaft, showing auriferous
years and presumably moribund.
LD & COPPER MINING CO. WASHINGTON.
lle, Ind. Mine office: Chesaw, Okanogan Co., Wash.
ident; Basil Doerhoefer, vice-president; C. J. Weivel,
gton, treasurer and general manager; preceding officers,
ohn Sidler, directors; Jas. P. Blaine, superintendent.
nder laws of Washington, with capitalization $1,000,000,

shares $1 par. Lands, 6 claims, area 120 acres, in the Myers Cre opened by a 140′ shaft and 1,100′ tunnel, showing mainly auriferous ore. Has a 12-h. p. gasoline hoist, 25-ton concentrator and several r ings. Was developing with a small force at last accounts.

BEN HARRISON GOLD & COPPER MINING & MILLING CO.

Dead. Was merged, 1904, in Beaver-Harrison Mining Co. F Milford, Beaver Co., Utah. Described Vol. IV.

BEN HUR COPPER MINING CO. W

Office: 710-34 South Clark St., Chicago, Ills. Letter returned from former mine office, Encampment, Carbon Co., Wyo. Chas. president; Hon. R. B. Short, vice-president; Clifford M. Miller, sec treasurer; N. C. Bowen, superintendent, at last accounts. Organized 1902, under laws of Wyoming, with capitalization $1,000,000, shares said to be out of debt. Lands, 4 claims, 3 patented, area 80 acres, in Lake district, opened by a 350′ tunnel, planned to cut a sulphide or cropping on surface. Idle several years.

BEN HUR GOLD MINING CO. WASH

Dead. Was reorganized, 1906, to raise new capital, as Ben Hur Milling Co. Formerly at Republic, Ferry Co., Wash. Fully describe

BEN HUR MINING CO. M

Office and mine: Saltese, Missoula Co., Mont. Geo. H. Keep, Frank H. Bell, vice-president, secretary and general manager; preced W. J. Weaver and Geo. R. Trask, directors. Capitalization $1,500,($1 par.

Lands, 5 claims, adjoining the Last Chance mine, 3 miles from showing a fissure vein, in quartzite, of 10′ to 60′ width at surface. ment is by 2 crosscut tunnels, the lower, of 865′, cutting a vein carry lead and gray copper ores, giving assays up to 51% lead and 130 oz. ton. Property considered promising.

BEN HUR MINING & MILLING CO. WASH

Mine office: Republic, Ferry Co., Wash. S. P. Domer, manag accounts. Organized 1906, with capitalization $1,000,000, shares $1 reconstruction of the Ben Hur Gold Mining Co. Mine, opened by sh ore values mainly in gold and silver, with a little copper. Has ste Shipped some ore, 1905. Idle.

COMPAÑÍA MINERA BENITO JUÁREZ.

Mine office: Peñón Blanco, Cuencamé, Durango, Mex. Has ous and auriferous copper ores, employing about 40 men at last accou

BENNETT-STEPHENSON MINING & MILLING CO. NEW

Letter returned unclaimed from former office, 515 Keith & Pe Kansas City, Mo. Mine office: Organ, Donna Ana Co., N. M. S. president; O. Jolliff, vice-president; J. I. McCullough, secretary; C treasurer; M. J. Dailey, general manager. Organized circa February successor of Stephenson-Bennett Consolidated Mining Co.

Lands, 17 claims, 2 miles south of Organ, in the Organ Mountains from the Santa Fe railway, showing granite and limestone, with veins argentiferous and auriferous lead and copper ores. Development i 350′ two-compartment shaft, showing an ore body of 5′ to 40′ report with a 500′ shoot carrying argentiferous and auriferous copper ore. has a 2,000′ drainage tunnel.

Equipment includes a steam plant, with 3 boilers, 2 hoists goo each, and a 10-drill Ingersoll-Rand air-compressor. Buildings are store, boarding-house, changing-house, warehouse, engine-house, co house, smithy and 17 dwellings. The 50-ton concentrator was increa 1908, to 200 tons daily capacity. Idle, but plans resumption, early 1

CO. **SOUTH AUSTRALIA.**
eded by Benowrie Copper Mine, Ltd. Property was
miles northeast of Olary, described in this volume under
r Mine, Ltd. Formerly at Olary, South Australia.

MINE, LTD. **SOUTH AUSTRALIA.**
, South Australia. Company succeeded the Benowrie
0 miles northeast of Olary, known as the Mary mine,
ce circa 1890, have what apparently is a stratified bed,
slate, carrying bunchy ore, mainly azurite and malachite,
e, with silicious gangue, of low average grade, slightly
ing from colors to 3 dwts. gold per long ton. Develop-
ut, 50′ wide, 250′ long, and 5 to 30′ deep, with a number
05′ shaft, cutting an 18″ vein of sulphide ore at 65′, and
giving assays of 13.5% copper. Production was 241
eraging 12% copper, 1895-1898, and was 300 long tons,
% copper, with small gold and silver values, 1899-1901.
t last accounts.

PERÚ.

rochirí, Lima, Perú. Lands, 58 pertenencias, in the
uding the Aguas Calientes mine, developed mainly by
rying argentiferous lead, copper and zinc sulphides,
ilver, with considerable copper and lead as by-products.
ntrating grade. Mine is connected with the Casapalca
ter railway.

tes mill, of 30 metric tons daily capacity, includes a
ater power, developed by a Pelton wheel, employing
rty employs, all told, about 120 men. Production,
tons of ore, assaying about 2% copper, 8% lead and
430,337 lbs. fine copper, 208 metric tons lead and
nd production, 1908, was 8,871 metric tons of ore, yield-
209 metric tons lead and 13,815 kgs. fine silver.

NEW MEXICO.

rande, Otero Co., N. M. Lands, on Tularosa Creek,
lero Indian Reservation, have been worked some years
its to El Paso smelter. Equipment includes a small
o be enlarged. Property considered promising.

MILLING CO. **MONTANA.**
laimed from former office, Hirbour Bldg., Butte, Mont.
eaverhead Co., Mont. Harry A. Gallwey, president; J.
r. Organized 1908, with capitalization $100,000. Mine,
rict, is developed by the 150′ Argyle shaft, showing
ous copper ore, with values mainly in silver. Idle sev-
tly moribund.

R MINES, LTD. **IRELAND.**
ated voluntarily, 1908. Formerly at Allihes, County
ed Vol. VI.

RGFRIEDEN. **GERMANY.**
25, Hanover, Germany. Mine office: Friedrichs-
y. Graf M. von Bernstoff, Ernst Sollors and Th. Steeg-
ttee; Heinrich Burghardt, superintendent. Property
ls near Friedrichsroda, and oil fields near Steinförde.

MONTANA.

a Copper Mining Co., at Butte, Silver Bow Co., Mont.

MONTANA.

Butte Mining Co., at Butte, Silver Bow Co., Mont.

BERLIN MINING & DEVELOPMENT CO. M

Dead. Formerly at Butte, Silver Bow Co., Mont. Described

BERNICE & RED ROCK MINING CO. M

Dead. Formerly at Basin, Jefferson Co., Mont. Described

BERNOUDY MINING & MILLING CO. A

Dead. Was merged, circa 1909, in Bernoudy-Turkey Creek merly at Paradise, Cochise Co., Ariz. Fully described Vol. VIII.

BERNOUDY-TURKEY CREEK CO. A

Mine office: Paradise, Cochise Co., Ariz. Wm. P. Wright, and manager; R. D. Hall, vice-president; Norwood Oxford, secreta Musgrave, treasurer; preceding officers, Chas. W. Lowell, M. H. M J. W. McElroy, directors. Organized 1909, with capitalization $2,(a merger of the Bernoudy Mining & Milling Co., and the Turkey Cre & Development Co.

Lands, 20 claims, in one group, about 1 mile east of Paradise, ha cut tunnels of 95′ and 160′, showing a low grade ore body carrying a paystreak, with an 18″ vein in the north crosscut from the east dri ore assaying up to 40% copper, with good silver values. A smelter 1906, from the Bernoudy mines, gave returns of 4% copper, 151 oz. 1.92 oz. gold per ton. Management planned, 1908, a 50-ton mill. Sept. 1, 1909.

SUCESIÓN NOËL BERTHÍN.

Dead. Property was sold, Aug. 6, 1909, to Corocoro United Cop Ltd. Formerly at Coro Coro, La Paz, Bolivia. Described Vol. VII

BERTRAND COPPER CO. A

Dead. Formerly at Clifton, Graham Co., Ariz.

BESA y CA.

Dead. Property was sold, November, 1906, to Société des Mine de Cuivre de Chañaral. Formerly at Chañaral, Atacama, Chile. Vol. VI.

BESEMER COPPER MINES CO. NEW

Mine office: Fierro, Grant Co., N. M. Lands include the C Iron Head and Anson S. mines, latter said to produce ore of 7% cop opened by a 200′ shaft. Property was worked formerly for iron o been leased by the Bessemer Iron Association and Colorado Fuel & Extraction of copper by latter was stopped, by injunction, lease mining of iron ore only. Company was said, 1908, to plan a 100-to Idle.

BESSEMER IRON ASSOCIATION. NEW

Office: Hanover, Grant Co., N. M. Mine office: Fierro, (N. M. Copper properties were leased to Bessemer Copper Mines (accounts.

BESSHI MINE.

Owned by Sumitomo Copper Co.

BEST CHANCE MINING CO.

Letter returned unclaimed from former office, Spokane, Wa office: Wallace, Shoshone Co., Idaho. Chas. H. Bell, president; Edgeen, vice-president; Chas. Harr, secretary and treasurer; T. W manager. Lands, adjoining the H. E. M. on the west, are said to outcrop up to 75′ in width, developed by a 590′ crosscut tunnel, cutti stringers of argentiferous galena and copper ore.

BETTS COVE SULPHUR COPPER & IRON CO. NEWFOU

Dead. Was succeeded, 1906, by Pilley's Island Pyrites Co., a reorganization. Office was 1702-45 Exchange Place, New York, N. merly at Betts Cove, Newfoundland.

NORTH CAROLINA.

a Creek, Jackson Co., N. C. Winfield Scott Adams, cres, in the Blue Ridge Mountains, carrying two veins, ut 50′ width and prospected for about 1,500′ in length. disseminated chalcopyrite; lower vein mainly pyrrho- hese veins join at depth. Has 4 short tunnels, 2 shal- oles, with indications favoring possession of a large n grade ore. Assays average about 4.5% copper and chalcopyrite, the pyrrhotite showing nickel and traces al years.

MINING CO. BRITISH COLUMBIA.

led, circa 1903, by Hesperus Gold & Copper Mines Co. , Boundary district, B. C.

WYOMING.

as absorbed by United Exploration Co. Formerly at Described Vol. V.

MÉXICO.

harcas, Moctezuma, San Luis Potosí, Mex. Aurelio ager. Mine is a small producer of silver-copper ores, at last accounts.

MINES SYNDICATE, LTD. ENGLAND.

n, Edwards & Oldfield, 16 Eastcheap, London, E. C., erton, Cheshire, Eng. Organized Oct. 9, 1907, under h capitalization £750, shares £1 par, to acquire a lease r mines. No trace of operations, and presumably

ALASKA.

Copper Co., at Latouche, Latouche Island, Alaska.

PPER MINING CO. ARIZONA.

led, 1906, by Pocahontas Copper Queen Mining Co. apai Co., Ariz. Described Vol. VI.

CO. WYOMING.

ton St., Chicago, Ills. Letter returned unclaimed from , Carbon Co., Wyo. C. B. Bergquist, president; A. L. Pearson, secretary; J. A. Westerlund, treasurer; R. B. Organized circa November, 1907, with capitalization ims, about 1 mile east of the Itmay mine, and 4 miles 40′ shaft, showing a quartz streak, from which selected 0.5% oz. silver and $3 gold per ton. Presumably idle, ent, but apparently still selling stock.

CO. ARIZONA.

lg., Kansas City, Mo. Mine office: Wagoner, Yavapai e, president; J. B. Hamner, vice-president. Lands are rict. Idle.

CO. WYOMING.

Encampment, Carbon Co., Wyo. Described Vol. VIII.

NG & MILLING CO. COLORADO.

one, San Juan Co., Colo. C. W. Bloodgood, manager. arry gold, silver, copper and lead. Has electric and veral years.

CONSOLIDATED MINING CO. UTAH.

Bldg., Salt Lake City, Utah. Mine office: Brighton, Wm. L. Harwood, president and manager; E. O. Lee, Badger, secretary; preceding officers, B. L. Rich and Organized September, 1909, under laws of Utah, with hares 10 cents par. Lands, 4 claims, unpatented, near

the head of Big Cottonwood Cañon, carrying auriferous and argentife and copper ores, on which work was begun with a small force, July, 1

BIG COTTONWOOD COPPER & GOLD MINING CO.

Office: 521 Atlas Block, Salt Lake City, Utah. Mine office: Salt Lake Co., Utah. Col. Nicholas Treweek, president and general W. Mont Ferry, vice-president; J. Leonard Burch, secretary and treas ceding officers, J. E. Galligher and John S. Bransford, directors. under laws of Utah, with capitalization $1,500,000, increased, 1906, to $ shares $5 par, nonassessable. Is operated as a close corporation.

Lands, 140 acres, adjoining the Mountain Lake Consolidated Co., on the southeast, and carrying same ore zone, near the hea Cottonwood Cañon, and also in the Snake Creek district. Developm a 30′ shaft, showing ore assaying up to 8% copper, with small gold s values, and a 700′ tunnel with about 2,000′ of workings. Mine appar considerable bodies of sulphide ore, averaging about 5% copper and $ in combined gold and silver values, and has secured some ore assayi 32% copper.

BIG CREEK COPPER CO. WY

Dead. L. D. Godshall was superintendent, circa 1904, when a sma of development work was done. Formerly at Encampment, Carbon

BIG DIPPER MINING & MILLING CO., LTD. O

Office: Peterborough, Ont. Mine office: Cloyne, Addington J. A. Jamieson, superintendent. Lands show auriferous and argentife per ores. Equipment includes a steam plant, and property was under ment, with a force of about 20 men, 1908. Presumably idle.

BIG ELK MINING CO., LTD. MC

Office: Wallace, Idaho. Letter returned unclaimed from for office, Taft, Missoula Co., Mont. John H. Wourms, president; Geo. vice-president; A. H. Featherstone, secretary, treasurer and general preceding officers, Peter Peterson and J. E. Hood, directors. Organi 1909, under laws of Idaho, with capitalization $2,000,000, shares $1 p able; fully issued.

Lands, 21 claims, area 420 acres, including a millsite at Grand Bald Mountain, in the St. Joe district, showing 3 fissure veins in various trenches exposing streaks of chalcopyrite and spathic iron, in quartzite. A carload shipment, to Helena, from an 18′ prospect shaft 28.7% copper, 28.9% iron, 15% sulphur and 2 oz. silver per ton. A tunnel and a 200′ lower diagonal crosscut tunnel show chalcopyrite an carrying small gold values. The Puget Sound railway passes by the po lower tunnel. Former equipment, including air-compressor and mine was destroyed by the great forest fire of August, 1910. Management good and property promising.

BIGELOW GOLD & COPPER MINING CO. NEW

Dead. Former office was 49 Exchange Place, New York, N. Bowing was vice-president; Julia H. Bigelow, secretary; Wm. E treasurer. Was organized circa 1903, and possibly was succeeded by Chief Consolidated Copper Mining & Smelting Co., which was organi and took over lands formerly owned by Black Peak Gold & Copper M Mine was said to have 100′ shaft. Was promoted by those notorious "Col." Robt. H. Hopper and Julia H. Bigelow, who should be jaile one [illegible] swindles perpetrated on the public by their fake mining o [illegible] at Hillsboro, Sierra Co., N. M.

BIG FOUR GOLD & COPPER MINING CO. COL

Office: Freeport, Ill. Letter returned unclaimed from for [illegible] Lake Co., Colo. J. R. Cornwall; R. A. Sw [illegible], R. N. Bowell, secretary, J. F. Fa[illegible]

emick, directors. Capitalization $1,250,000. Lands, nted, area 11 acres, lying north of the Little Jonnie 1904, property was under lease to K. L. Fahnestock.

MINING & DEVELOPING CO. **WYOMING.**

, Wyo. Mine office: Depass, Frémont Co., Wyo. Walter Swanson, vice-president and general manager; y and treasurer; preceding officers, David Dickie, Wm. and Robt. Huston, directors. Organized 1909, under capitalization $1,500,000, shares $1 par, in $750,000 mmon stock; issued, $830,000. Annual meeting, third

npatented, area 193 acres, in the Copper Mountain illiams-Luman mine, having 2 fissure veins in diorite, ein under development, of 7′ estimated average width, ′ to 60′ depth, and 4 tunnels, of 40′, 75′, 300′ and 460′, hite, azurite, cuprite and native copper, with assays gold per ton. Mine has no power equipment. Man- electric air-compressor, and extending tunnel to 900′.

O. **ARIZONA.**

Wendendale, Yuma Co., Ariz. Described Vol. VIII.

O. **COLORADO.**

Larimer Co., Colo. Has a 50′ shaft, on the Copper n a 5′ vein claimed to assay 20% copper. Idle some ribund.

COPPER MINING CO. **WASHINGTON.**

Bldg., Seattle, Wash. Letter returned unclaimed Index, Snohomish Co., Wash. Wm. Frankfurt, pres- ecretary; Ed. E. Aegerter, superintendent. Organized hington, with capitalization $2,500,000, shares $1 par 00 acres, 4 miles from a railroad, in the Washington ′ tunnel, showing ores giving average assay values of d gold, principally latter. Idle some years and appar-

BRITISH COLUMBIA.

i, Vancouver Isld., B. C. Lands, 7 claims, area 350 at Central Lake, 12 miles from Alberni, at an eleva- -level. Property shows a brecciated zone with con- copper carbonates, low in grade, but with ore in im- to be available for concentration, if given transpor- cing very difficult to reach by present trail. Only nel. Idle several years.

SMELTING CO. **ARIZONA.**

, circa July, 1907, in Kelvin-Calumet Copper Mining , Pinal Co., Ariz. Described Vol. VI.

O. **UTAH.**

City, Utah. Mine office: Brighton, Salt Lake Co., an option on controlling interest in the stock was held Lands, near the mouth of Little Cottonwood Cañon, ′, with a 100′ winze cutting a 4″ to 6″ stringer of high- Management was said, 1909, to plan sinking a shaft.

COPPER MINING CO. **MONTANA.**

Bridges, Madison Co., Mont. Organized under laws ization $1,500,000, shares $1 par. Lands, 4 claims, rgentiferous copper ores. Idle several years.

BIG SPRINGS MINING CO.

Mine office: Paradise, Cochise Co., Ariz. C. W. McCoy, man
ganized 1906. Lands, variously reported as 7 or 11 claims, are kn
Claire group, near Wood Cabin. Vein has a 2' paystreak, carry
silver-lead ore, with a little argentiferous copper ore, all more or l
ore opened by a 165' tunnel. Property shipped a little silver-lead
Paso, and copper ore to Douglas. Idle.

BIG TEE COPPER MINING CO.

Office: Saratoga, Wyo. Letter returned unclaimed from fo
office, Rambler, Carbon Co., Wyo. Jos. Kermode, president; Geo.
vice-president, secretary and treasurer. Geo. Nelson, superintendent
ized March, 1909. Lands, 8 claims, adjoining the Tram group on
and west, on the edge of the Rambler basin, developed by a 70' tu
claims for annual assessment work.

BIG VEIN COPPER CO.

Office: 1 West 34th St., New York, N. Y. Letter returned uncl
former mine office, Tucson, Pima Co., Ariz. W. H. Sterling, presid
G. DeLisle, vice-president; Samuel G. Metteer, secretary and treasur
ing officers. Mortimer E. Newcomb, F. C. Watney, Leon Stern and
ors, directors; E. T. Jones, superintendent; Wm. A. Farish and Jol
ers, consulting engineers. Organized under laws of Arizona, with
ized $1,500,000 shares $1 par, fully issued. Security Registrar & Tr
New York, registrar; Empire Trust Co., New York, transfer agen
are listed on the New York curb.

Lands, 12 claims, area 240 acres, known as the Alamo group, a
acres patented, adjoining the Pantano, in the foothills of the Sant
Mountains, 7 miles north of Tucson. Mr. Farish says the property
on a great mineralized porphyry dyke, ore occurring in the contac
dyke and schist, which, from surface indications, is 300' to 800
The patented claims that each of its 12 claims show ore in place,
all carrying the same mineralized dyke. Transportation is by a g
road to Tucson. The property has shallow shafts and tunnels a
about 300' of workings, showing leached ore carrying stringers ass
[illegible] with gold and silver values, and a 3-compartment sha
March 31, 1909, was planned to be sunk 800', with crosscuts from bo

Company started in as prospecting mine as in the greate
belt in the world, being in a direct line north and south with such m
United Verde, Miami, Ray, Copper Queen and Shannon, which is a
and producing mines. Extensive developments of last. Some very clever
in which Big Vein have been conducted, 1908, with the aid of this st
was floated as high as $1.10 on the New York curb. On this purel
[illegible] were secured from sundry banks, by interest
[illegible] on Arizona, by th
[illegible] ores treating such values. It was a [illegible] bes told i
[illegible] and the many transactions on the New
[illegible] a swindle.

BIG YANK MINING & MILLING CO.

Office: 414 Oregonian Bldg., Portland, Ore. Mine office: Ga
[illegible] Ore. [illegible] superintendent, as last accounts.
[illegible] some years and apparently

COMPAÑIA MINERA MINERO ASTURIANO.

[illegible] Bilbao, Spain. M
Carbon Creek to Kern River. Was organized, through stock
by The Pacific Coast Coal Co., Ltd., which was wound up, 1910.
mines and mining [illegible] and 3 ore properties. Idle and presumably

CO. UTAH.
ka, Juab Co., Utah. Geo. A. Taylor, president; Walter
nt; Ralph A. Badger, secretary and treasurer; preced-
nce, Wilford Hays and D. W. Craig, directors. Organ-
aws of Utah, with capitalization $10,000, shares 1 cent
North Tintic district. Presumably idle.

ING & DEVELOPING CO. ARIZONA.
t, Yuma Co., Ariz. Lands include the Ely and M. & M.
ing the Blue Bell on the south, having a 4′ vein, said
id $5 gold per ton. The M. & M. group, of 14 claims,
h, carries a vein of 13′ reported width, with ore giving
er.

& COPPER MINING CO. WASHINGTON.
aw, Okanogan Co., Wash. Lands, 11 claims, 11 miles
2 tunnels, upper being a crosscut, expected to cut the
′. The 300′ lower tunnel has cut a promising vein of
ly idle.

MATED COPPER CO. UTAH.
cial Block, Salt Lake City, Utah. Letter returned un-
e office, Bingham Canyon, Salt Lake Co., Utah. B. F.
Marks, vice-president; F. R. Snow, secretary and treas-
general manager; preceding officers, W. P. Davis, R. E.
urtain, directors. Organized Jan. 7, 1907, under laws
ation $5,000,000, shares $5 par, nonassessable; issued,
listed on the Salt Lake City stock exchange.
tented, area 300 acres, known as the Illinois and Copper
; 7 mineralized veins. The Illinois has a 640′ shaft,
ying a 2′ paystreak of about 5% copper ore, with occa-
the average of 50 assays being 2.8% copper, 2 oz. silver
he Copper Glance group has a 1,400′ tunnel, in McGuire
l of 2,450′ of workings, and ore, including chalcopyrite,
cuprite, is estimated by management to average 3%
90 cents gold per ton.
a 25-h. p. electric hoist and 5 buildings. A little ore
roperty is considered promising. Idle since December,
anned for 1911.

NE COPPER CO. UTAH.
t Bingham Canyon, Salt Lake Co., Utah. Described

E COPPER CO. UTAH.
shire St., Boston, Mass. Letter returned unclaimed
, Bingham Canyon, Salt Lake Co., Utah. E. Harding
. G. Brown, secretary and treasurer; John E. Cotter,
Kauffman, director; Fredk. G. Tibbitts, financial agent.
f Utah, with capitalization $1,000,000, shares $1 par,
a 1909, to 500,000 shares.
ea 540 acres, also 160 acres miscellaneous lands, includ-
of 18 claims, adjoining the Last Chance mine, at the
n. Mine has 3 tunnels, No. 1 of 950′, No. 2 of 2,600′,
rrying ore assaying up to 15% lead, 3.4 oz. silver and
th occasional copper values. No. 1 tunnel has a Fair-
and an air-compressor. Company was said to plan
nation or reorganization, and possibly has lost lands to
r Mining Co. Idle since circa 1909.

ONSOLIDATED MINING CO. UTAH.
eded, June, 1910, by Montana-Bingham Consolidated

Mining Co. Former office was 66 West Third South St., Salt Lake C
Officers were W. E. Hubbard, president; Edwin Wright, vice-president
W. Parks, secretary. Organized 1907, under laws of Utah with capi
$1,000,000, shares $1 par, nonassessable. Was no relation to Bingh
Copper Co. Lands were 14 claims, 13 patented, including the old T
mine, opened by tunnel and shaft, with about a mile of workings, carryi
iferous and auriferous lead and copper ores, and mine was said to have
about $1,500,000 in the past. Equipment included steam power, with
air-compressor. Formerly at Bingham Canyon, Salt Lake Co., Utah.

BINGHAM-BUTTE COPPER CO.

Office: 419 D. F. Walker Bldg., Salt Lake City, Utah. M
Bingham Canyon, Salt Lake Co., Utah. John F. Cowan, presider
Hanauer, Jr., secretary; Geo. A Bellinger, superintendent. Organ
1907, with capitalization $5,000,000, shares $5 par, and apparently is
company for stocks of Copper Hill Mining Co. and Midland Mining
are inactive. Is no relation to Bingham Butte Consolidated Mining

Lands, 225 acres, patented, including the Copper Hill group, op
tunnels on the Caledonia fissure, upper tunnel giving ore assaying u
copper, 35% lead, 26 oz. silver and $9 gold per ton. Property als
vein, said to assay 5% lead, 54 oz. silver and $11 gold per ton. E
includes shipping bins at mouth of the lower tunnel, near railroad tr
several years.

BINGHAM CENTRAL MINING CO.

Mine office: Bingham Canyon, Salt Lake Co., Utah. Samuel N
president; H. P. Clark, treasurer; Col. D. C. Jackling, managing direct
italization $5,000,000, shares $5 par. Has a bond issue of $250,000, a
convertible into stock of the Bingham Central Standard Copper Co.
share, latter being controlled, through ownership of a great majority
issued by Utah Metal Mining Co., and this company is practically ou
ness. Fully described Vol. VIII.

BINGHAM CENTRAL-STANDARD COPPER CO.

Office: 66 West Third South St., Salt Lake City, Utah. For
office was Bingham Canyon, Salt Lake Co., Utah. Samuel A. Hall, p
E. W. Clark, vice-president; F. T. Hiatt, secretary; H. P. Clark, t
preceding officers, R. W. Sampson, W. E. Hubbard and T. H. Quillan,
Organized 1907, under laws of Wyoming, with capitalization $5,000,00
$5 par, nonassessable; issued, $4,500,000. Bonds, $375,000 at 6% au
$347,000 issued. Was organized as a holding company, controlling,
ownership of practically entire stock issues, the Bingham Central Mi
and Bingham Standard Copper Co., and sold these subsidiary stocks,
the Utah Metal Mining Co., for 300,000 shares of latter, which has been
and, on release of escrow, 1911, company will be wound up.

BINGHAM-COCHISE COPPER MINING CO.

Dead. Was a stockjobbing enterprise. Formerly at Bingham
Salt Lake Co., Utah. Described Vol. VIII.

BINGHAM-CONGER COPPER CO.

Office: 503 Auerbach Bldg., Salt Lake City, Utah. Letter retu
claimed from former mine office, Bingham Canyon, Salt Lake Co., Utah.
R. Bothwell, president; R. E. McConaughy, secretary and treasurer.
ized, 1907, under laws of Utah, with capitalization $1,000,000, shares
assessable; fully issued. Lands, 10 claims, showing gold, silver and
values. Idle several years.

BINGHAM CONSOLIDATED MINING & SMELTING CO.

Dead. Property was sold, 1908, by sheriff. Was practically reo
as the Bingham Mines Co. Formerly at Bingham Canyon, Salt L
Utah. Very fully described Vol. VI.

BOY MINING CO. **UTAH.**

First South St., Salt Lake City, Utah. Letter returned mine office, Bingham Canyon, Salt Lake Co., Utah. president; J. P. Spalding, vice-president; J. H. Hurd, treasurer; preceding officers and John Dern, directors; ident. Organized Feb. 19, 1901, under laws of Utah, 00,000, shares $1 par. Annual meeting, first Monday

11 patented, area 142 acres, on the Tooele side of the nillsite, in Carr Fork Cañon. Lands are in the western mp, somewhat out of the developed district, lying west ine of the Utah Consolidated, and apparently carrying Utah-Apex ore bodies. Property shows 3 veins, of 20′ giving estimated average assays of 6% copper, 20% lver and $2.50 gold per ton, these figures being in them- xaggeration. Ore on the dump shows 2 to 4.5% copper. cut tunnel and a 2,000′ lower tunnel, with circa 6,500′ company to put 1,500,000 tons of ore in sight, which Equipment includes an electric air-compressor. Out al years.

CO. **UTAH.**

bach Bldg., Salt Lake City, Utah. Letter returned mine office, Bingham Canyon, Salt Lake Co., Utah. Carl Brandt, secretary; preceding officers, Geo. E. Davis, r. A. L. Inglesby, directors; W. D. Bohm, manager. f Utah, with capitalization $800,000, shares $1 par. res, on the eastern slope of Carr Fork. Is in litigation r title to the Diamond claim. The mine has 2 tunnels, enice claim, at the head of Cottonwood Gulch, which rade ore many years ago, and the 1,250′ Diamond tun- led $150,000 worth of silver-lead ore to former owners. edded vein carrying silver-lead ore below commercial tober, 1908, to show, circa 300′ from portal, ore assay- d 15 to 30 oz. silver per ton.

GLANCE MINING CO. **UTAH.**

d, 1907, in Bingham Amalgamated Copper Co. For- yon, Salt Lake Co., Utah. Described Vol. VIII.

& GOLD MINING CO. **UTAH.**

ce was 60 State St., Boston, Mass. Was the parent gham Consolidated Mining & Smelting Co., and was , all its capital stock, property, assets and liabilities gham Consolidated Mining & Smelting Co., also dead, ed by Bingham Mines Co. Formerly at Bingham Utah.

HILL MINING CO. **UTAH.**

t Bingham Canyon, Salt Lake Co., Utah. Described

MINING CO. **UTAH.**

ded, circa 1906, by Bingham Mary Copper Co. For- on, Salt Lake Co., Utah.

N COPPER MINING CO. **UTAH.**

e was 42 Church St., New Haven, Conn. Officers were dent; Israel A. Kelsey, vice-president; W. S. Tucker, . Organized under laws of West Virginia. Charter , 1902, and company was reorganized, 1903, as Bing- o. Property was the Jersey Blue, I. X. L., Little Cot-

tonwood and adjoining claims, which were shippers, circa 1890, and we
ed by a 1,400′ tunnel. Formerly at Bingham Canyon, Salt Lake
BINGHAM & EASTERN MINES CO.

Dead. Formerly at Bingham Canyon, Salt Lake Co., Utah.
Vol. VI.

BINGHAM-ELY COPPER CO.

Dead. Lands laid between the Ely Calumet on the east and the
rection on the west and north, carrying the Cap Box vein, with north
strike, traceable circa 2,000′. Had a shaft on the May Day vein, sa
argentiferous copper and lead ores. Property was said, December
have been optioned to the Cole-Ryan interests, presumably in beh
Giroux Consolidated Mines Co. Formerly at Ely, White Pine Co.,

BINGHAM GREAT WESTERN MINING CO.

Dead. Was organized circa June, 1908, to operate in the West
district, but no trace of operations secured, and company apparently
born. Formerly at Bingham Canyon, Salt Lake Co., Utah.

BINGHAM GROUP MINING CO.

Dead. Former office was Salt Lake City, Utah. R. L. Boothe
intendent. Final judgment against this company, including sale of
was given, 1906, to Horace Greeley & Sacred Mining Co. Lands
the Crœsus claim and the Greeley-Sacred group, opened by tunnel.
at Bingham Canyon, Salt Lake Co., Utah.

BINGHAM MARY COPPER CO.

Office: 161 South Main St., Salt Lake City, Utah. Letter
unclaimed from former mine office, Bingham Canyon, Salt Lake C
Simon Bamberger, president; W. H. Dickson, vice-president; J. B. Be
tary; W. F. Adams, treasurer; Sidney Bamberger, manager; Jas. Sta
intendent. Organized 1905, under laws of Utah, with capitalization $
shares $5 par. Registrar & Transfer Co., Jersey City, transfer agent.

Lands, 2 claims, patented, area 40 acres, in Carr Fork, near the U
and company brought suit against the Utah Apex, claiming illegal o
tion. Development is by an 875′ shaft, with 2 levels opened, sho
grade ore, said to give assays of 4.7% copper, up to 12 oz. silver and
gold per ton. Equipment includes a 1,500′ electric hoist, several sm
buildings, and a tramway to the Rio Grande Western railway.

Annual report, issued circa September, 1908, showed expend
$63,300 on property, and a balance of $6,736 in the treasury. Was
tember, 1909, to have a $45,000 past-due mortgage, and same may h
foreclosed. Idle since 1908, and apparently in hopeless condition finan

BINGHAM MARY MINING CO.

Dead. Was succeeded, circa 1906, by Bingham Mary Copper C
merly at Bingham Canyon, Salt Lake Co., Utah.

BINGHAM METAL MINING CO.

Dead. Property was sold, circa 1909, to Utah Metal Mining Co.
at Bingham Canyon, Salt Lake Co., Utah. Fully described Vol. VII

BINGHAM METALS CO.

Dead. Was merged, 1909, in Utah Metal Mining Co. Formerly s
Tooele Co., Utah. Described Vol. VIII.

BINGHAM MIDWAY MINING CO.

Letter returned unclaimed from former office, Salt Lake City, Utah
office: Bingham Canyon, Salt Lake Co., Utah. O. E. Parsons, acti
dent; Jas. A. Smith, secretary and treasurer; preceding officers, He
Carlson, Frank J. Mallett and Wm. A. Dalton, directors; Carl B. Ferlin
manager. Capitalization $1,000,000.

Lands, formerly 15 claims, patented, area 593 acres, in the left-han
Fork of Settlement Cañon, Tooele Co., Utah, adjoining the Bingha

ngs said, September, 1909, to have been increased by claims. Lands show limestone and quartzite, with por- 3 fissure veins. Development is by 2 tunnels, No. 1 show- 30% lead, 36 oz. silver and $2.40 gold per ton. No. 2 an ore zone of 250′ width, and is planned to cut a second 00′, and a third vein with back of 1,800′.

CO. UTAH.

ngress St., Boston, Mass. Operating office: 403 Dooly Utah. Mine office: Bingham Canyon, Salt Lake Co., , president; Sydney S. Millett, secretary and treasurer; H. Williams, Alfred B. White, Thos. S. Woods, Arthur vis B. McCornick, directors; Imer Pett, general manager; Hilands, mine superintendents; Geo. E. Davis, auditor. 8, under laws of Maine, with capitalization $1,500,000, ssable; issued, $945,560. Bonds outstanding are $569,000 by Bingham Consolidated Mining & Smelting Co., and gage noncumulative bonds of the Bingham Mines Co., construction of the Bingham Consolidated Mining & xchanged one share of new stock for one of old, plus $3.50 0-cent installments. Controls, through stock ownership, Mining Co., of Eureka, Juab Co., Utah, and Yosemite n Canyon, Salt Lake Co., Utah, through ownership of 00 issued stock. Second-mortgage bonds were issued in gainst the old company. First National Bank, Boston, st Co., Boston, transfer agent. Stock is listed on the Bos- eeting, third Wednesday in April, at 57 Exchange St.,

cres, in 2 groups, in the West Mountain district, known and Commercial mines. These properties have a con- s, principally sulphides, carrying fair gold and silver-lead face, with increasing copper values at depth. Combined average about $2 gold per ton, and some of the ores are rable for fluxing the ores of the district, which are highly e Mascotte tunnel, formerly owned, was sold to F. Augus- 00.

k mines are 55 claims, patented, area 424 acres, with 306 ds. Property shows contact deposits between quartzite g mainly as replacements of lime at and near the contact. is S. 50° W., with average dip of 38° with horizon. The ncludes the Brooklyn mine, and produces both lead and g grade, copper being in the form of chalcopyrite. The 200′ in width, 8,000′ long and proven to depth of 2,000′; 80′ in width, with length of 6,200′ and proven depth of f 6′ average width, is proven for 6,200′ length and 1,400′ ow operated through the 3-mile Mascotte tunnel, and mine tunnel and 3,200′ Brooklyn tunnel, both of which following abandoned shafts: Dalton No. 1, of 600′; Dal- Sampson, of 1,100′; Revere, of 420′; Antelope, of 700′; 350′; Richmond, of 300′. Lead ores of the Dalton & 40% in tenor, and copper ores are 1.25 to 5% in tenor, res being more or less auriferous and argentiferous, with rying high grade precious metal values. Production, the 1,300′ and 2,000′ levels, is circa 100 tons daily, about f copper ore. A large amount of low to medium grade

Dalton & Lark includes a 250-h. p. steam plant, with 2

hoists and a 25-drill Ingersoll-Rand air-compressor. There are 1(including a 25x50′ machine shop, 25x30′ smithy, 20x30′ carpenter and dwellings. A private rail line, with electric locomotives, connec Denver & Rio Grande railway.

The Commercial mine, 5 claims, patented, area 62 acres, is t best mine of the company. The main ore body, of 120′ estimated ave 1,000′ length and proven depth of 1,150′, occurs as a contact betwee and limestone and replacement in latter, with a strike of S. 50° W. a dip of 38° with the horizon. Ore is exclusively chalcopyrite, shipme ing 2.5% copper, 2.5 oz. silver and $2 gold per ton. The 140′ Comm shaft and 350′ main incline shaft have been abandoned, as have the 1 Commercial tunnel and 2,000′ lower Commercial tunnel. Comme shaft has a depth of 330′ below the lower Commercial tunnel. Th and lower tunnels were abandoned, September, 1910, through a joint with the Utah Copper Co., Niagara Mining & Smelting Co., and S Mining Co., by which the Bingham Mines Co. abandons Copper Ca as dumping ground for the Utah Copper Co., and is allowed the use o ara Mining & Smelting Co. tunnel, which is being lengthened, to cu mercial ore bodies at a depth of about 1,325′ on the plane of the vei

Equipment of the Commercial mine is exclusively electric, i double-drum electric hoist with 52-h. p. induction motor, 75-h. p. motor, a 10-drill Ingersoll-Rand air-compressor, and three 50-k transformers. Buildings, removed, 1910, to a new site, near the m Niagara tunnel, include an office, warehouse, sawmill, smithy, barn a Mine is served by the Copper Belt line of the Denver & Rio Gran

The company also owns a smelter at Midvale, near Murray, Salt Utah, closed, 1907, by order of the Federal courts, on account of alleg by fumes, this proving a finishing blow to the old company. The sm coming antiquated, and apparently soon will be of small value.

Production, formerly shipped to Yampa smelter, is now divi lead ores going to the Murray smelter of the American Smelting & Re and copper ores to the Garfield smelter. Net earnings were $55,774 and $65,902.33 in 1910.

Production, by the old company, was 14,396,269 lbs. fine copp and 11,475,863 lbs. in 1906; production, by present company, was 1,0 copper, 3,411,499 lbs. lead, 169,974 oz. silver and 2,140 oz. gold in not including the considerable production of the Eagle & Blue Bell. ent management has made substantial progress in working out from great load of debt and difficulties left by its predecessor, and with secured, during a period of depressed metal prices, has better prospe future.

BINGHAM MINES CO.

Dead. Had no connection with present Bingham Mines Co. at Bingham Canyon, Salt Lake Co., Utah. Described Vol. VIII.

BINGHAM MONITOR MINING CO.

Dead. Formerly at Bingham Canyon, Salt Lake Co., Utah. Vol. VIII.

BINGHAM NEVADA MINING CO.

Office: Bingham Canyon, Utah. Mine office: Goodsprings, L Nev. R. D. Kennedy, secretary; W. T. Simons, treasurer; J. M. superintendent. Lands, 10 claims, including the Payday group o said to have a 2′ vein of 40% zinc ore, and the Paymaster group o showing values mainly in zinc, with some lead.

BINGHAM-NEW HAVEN COPPER & GOLD MINING CO.

Office: P. O. Box 84, New Haven, Conn. Operating office: 5 nick Bldg., Salt Lake City, Utah. Mine office: Bingham Canyon,

lard, president; E. B. Critchlow, vice-president; T. W. easurer; preceding officers, E. G. Stoddard and F. F. Doolittle, general manager; B. B. Lawrence, consult- nan, mine superintendent. Organized Oct. 12, 1902, apitalization $2,000,000, shares $5 par, nonassessable; ,000 bond issue was paid, 1909. Dividends have been n 1907, and 20 cents, December, 1910. Union Trust gistrar. Annual meeting, second Tuesday in October. ea 500 acres, including the Zelnora mine, near the the Highland Boy mine of the Utah Consolidated, fissures in porphyry, and a contact deposit between stone. The latter, of 3′ to 8′ width, carries 2 to 6% 7 to 12% zinc, 2 to 8 oz. silver and 40 to 80 cents halcopyrite, galena and sphalerite. Mine is opened aft starting 900′ from the portal of the lowest tunnel, nce of 1,200′ between the highest and lowest workings. its a wide fissure vein, giving assays of about 3% cop- 0 gold per ton. Terminal at the upper tunnel was el, and mine is operated through the latter. Mine ngs, with an aërial tram connecting with loading-bins ad. Equipment includes electric power and an air-

npleted, 1909 was closed, May, 1910, and treatment

MINING CO. UTAH.

al Bldg., Salt Lake City, Utah. Mine office: Bing- ., Utah. A. W. Mente, president and treasurer; D. H. ade Loofbourow, secretary; preceding officers, Henry in, directors. Organized Sept. 21, 1908, under laws St. Joe Mining Co., with capitalization $500,000, issued, $178,613.

patented, area 185 acres, showing a contact ore body rtzite, carrying sulphide ore estimated to average 2% , 12 oz. silver and $1 gold per ton. Development is , and by 10 tunnels, two longest 1,150′ and 3,250′, rkings. Equipment includes a 90-h. p. steam plant, 2-drill air-compressor.

E MINING CO. UTAH.

Bingham Canyon, Salt Lake Co., Utah.

COPPER CO. UTAH.

City, Utah. Mine office: Bingham Canyon, Salt zed 1906, with capitalization $5,000,000, shares $5 rd Copper Co., and was controlled through ownership k issued, by Bingham Central-Standard Copper Co., to Utah Metal Mining Co. Lands, 320 acres, partly he Saginaw tunnel. Mine is said to have produced er a former management, and shipped some ore circa s a number of buildings.

R QUEEN MINING CO. ARIZONA.

Yavapai Co., Ariz. Jas. Murphy, superintendent. ft, planned to be deepened to 800′, carries auriferous pparently mainly in gold. Has steam power. Man- be considering a 500-ton smelter. Presumably idle.

TUNNEL CO. UTAH.

adway, New York, N. Y. Operating office: 120 alt Lake City, Utah. Mine office: Tooele, Tooele

Co., Utah. Francis M. Lyman, president; Francis M. Lyman, Jr. ident; Milando Pratt, secretary; F. M. Bishop, treasurer. Orga under laws of Utah, with capitalization $2,500,000, shares $1 par, able. Lands, 30 claims, unpatented, area circa 520 acres, 5 miles fron said to show auriferous and argentiferous lead and copper ores. D is by tunnel of circa 2,000', planned to be driven 4 miles from the through the Oquirrh Mountain range, to drain the entire West Mo trict, develop mineral bodies, and provide water for irrigating lan ment includes gasoline power, air-compressors, ventilating fan buildings. Apparently the plan of this company, begun more th ago, is being carried out by the Utah Metal Mining Co. Is not reg ably. Idle.

BINGHAM WORLD MINING CO.

Dead. Former office was Salt Lake City, Utah. Officers A. Glynn, president; C. W. Howard, vice-president; E. E. Vander tary and treasurer; preceding officers, Gertrude Dougherty and I directors. Organized Nov. 27, 1909, under laws of Utah, with ca $100,000, shares 10 cents par. No trace of operations secured. Bingham Canyon, Salt Lake Co., Utah.

BIO-BIO (CHILI) COPPER SYNDICATE, LTD.

Office: Finsbury House, Blomfield St., London, E. C., Eng. Los Anjeles, Magallanes, Chile. Organized July 27, 1906, under la Britain, with capitalisation £30,000, shares £1 par; issued £20,50 fully paid shares, which were given for the lands, and £500 share Only exploratory work has been done. Mine shipped, 1909, to 13,401 kgs. of 17% copper ore, and 2,278 kgs. fine copper, secured f atory work.

SOCIETÀ MINIÈRE DI BIONAZ.

Mine office: Aosta, Torino, Piedmont, Italy. Property is mine, which was a small producer of copper ore at last accounts.

BISBEE-ARIZONA GOLD & COPPER MINING CO.

Office and mine: P. O. Box 966, Bisbee, Ariz. L. F. Lee, Dr. C. L. Covin, vice-president; M. R. Harlan, secretary and gener Jacob Schmidt, treasurer. Organized Dec. 27, 1902, under laws with capitalization $1,000,000, shares $1 par, nonassessable, incre to $2,000,000. Annual meeting, first Monday in March.

Lands, 13 claims, unpatented, area 250 acres, near the Modern 7 miles northwest of Bisbee, reported by company to carry fissu porphyry and contact deposits between limestone and porphyry, w averaging about 6' width, more or less developed. One vein is company to average 40' width and to carry chalcopyrite, bornite associated with pyrite, assaying 2% copper, 15% lead, 20 oz. sil cents gold per ton. Development is by a 40' tunnel, a 120' drift shafts of 30' and 45' and the 500' Lee shaft, with a total of abo workings.

Equipment includes a 125-h. p. steam plant, with horsts good f 1,200' and a 6-drill Ingersoll-Rand air-compressor, with 5 buildi many planned diamond drilling, 1909–1910, but apparently failed t Presumably idle.

BISBEE BELLE COPPER CO.

Dead. Formerly at Bisbee, Cochise Co., Ariz., and at Wickenb mile Co., Ariz. Described Vol. V.

BISBEE COALITION MINING CO.

Home office: Bisbee, Cochise Co., Ariz. E. H. Clark, pre general manager; V. M. Marshall, vice-president; R. J. Clark, sec treasurer; V. L. Davis, superintendent; preceding officers, Oscar

n, directors; L. A. Dunham, consulting engineer. Capital-ares $2 par. Company absorbed the North Bisbee De- 1909, paying for same in stock.
tiguous claims, in Tombstone Cañon, 3 to 7 miles north-ing the Eureka group of 13 claims, near the Modern mine, Eureka Mining Co., and the North Bisbee group of 23 om the North Bisbee Development Co. Some work is e on the property, by Mexicans, in early days. Develop-unnel and shafts of 50′ and 70′, said to show veins of 18″ 4 to 28% copper with $3 to $5 combined gold and silver gasoline power.

ATED COPPER CO. **ARIZONA.**
at Bisbee, Cochise Co., Ariz. Described Vol. VIII.

O. **ARIZONA.**
d egg. Formerly at Bisbee, Cochise Co., Ariz. Described

EVELOPMENT CO. **ARIZONA.**
at Bisbee, Cochise Co., Ariz. Described Vol. V.

INING CO. **ARIZONA.**
th Ave. North, Nashville, Tenn. Letter returned unclaimed ce, Bisbee, Cochise Co., Ariz. Ralph Ingraham, manager. apparently with capitalization $1,500,000, shares $5 par, sor of Bisbee Copper Co. Lands, 6 claims, including the hich a little work was done in the silver boom of early is by a 173′ crosscut tunnel, planned to be driven 2,800′, rs of auriferous and argentiferous copper ore, with values vein being claimed to be 5′ wide. Idle.

OPPER CO. **ARIZONA.**
rawer 1196, Bisbee, Ariz. Mine office: Warren, Cochise . Hicks, president; Harris W. Bennett, vice-president; y; Walter W. Carley, treasurer; Newton Trenham, man-ling officers are directors. Organized 1907, under laws talization $900,000, shares $10 par; paid in, $4. Annual y in August.
ere 27 claims, area 500 acres, but now are 5 claims, area aul, Little Chief, Big Chief, Little Squaw and Big Squaw Gulch, about 1 mile east of property of the Warren Realty A 70′ shaft, on the Little Squaw claim, shows auriferous and re. Company planned a deep 3-compartment shaft. Idle.

MINING & DEVELOPMENT CO. **ARIZONA.**
bee, Cochise Co., Ariz. Is controlled, through owner-issue, by Bisbee-Sonora Development Co.

N DEVELOPMENT CO. **ARIZONA.**
rganized, January, 1911, as Bisbee Extension Mining bee, Cochise Co., Ariz. Described Vol. VIII.

N MINING CO. **ARIZONA.**
obscot Bldg., Detroit, Mich. Mine office: Bisbee, . R. Poss, president; F. D. Craig, vice-president; J. M. treasurer; Wm. M. Clute, general manager; preceding ston, directors; Geo. W. Long, superintendent. Organ-ith capitalization $2,500,000, shares $10 par, as successor Development Co., giving 3 shares of new stock for 1 of 0.
laims, area 501 acres, increased, 1909, to 603 acres, in miles northwest of Bisbee, on the porphyry side of the ws upper Carboniferous limestone strata, with and ad-

jacent to the northwestern end of the main disseminated porphyry stock of t district. In Bisbee, to the southeast, ore is mined mainly from the lower C boniferous limestone. Property shows fissure veins in granite-porphyry, ca ing cuprite, azurite and malachite. Development is by 5 shafts, the 2-compa ment main shaft being more than 800' deep, and decidedly wet. Mine has ab 2,000' of drifts and crosscuts on the 400' level, passing through about 600 leached material, markedly similar to that overlying the large ore bodies of Bisb

Equipment includes a 10x12" steam hoist, good for 1,200', a 22-h. p. F banks & Morse gasoline hoist, good for 800', a 60-h. p. gasoline engine an 6-drill Sullivan air-compressor. Management hopes to develop bodies in the Escobrosa limestone, supposedly lying in the geological hori of the main ore bodies in Bisbee.

BISBEE GOLD & COPPER MINING CO. ARIZON

Dead. Was succeeded, Dec. 27, 1902, by Bisbee-Arizona Gold & Cop Mining Co. Formerly at Bisbee, Cochise Co., Ariz.

BISBEE MINING CO. ARIZON

Dead. Was dissolved, 1904, with all debts paid. Formerly at Bisb Cochise Co., Ariz.

BISBEE QUEEN DEVELOPING CO. ARIZON

Office: care of E. E. Dennis, president, Grand Rapids, Mich. Mine o Bisbee, Cochise Co., Ariz. Hoval A. Smith, managing director. Organi Apr. 20, 1903, under laws of Arizona, with capitalization $1,000,000, shares par. Lands, 27 claims, lying between the Portage Lake & Bisbee and Pi burg & Hecla. Was reorganized, 1905, through purchase, by Hoval A. Sm and associates, who are allowing the land to lie idle, pending developments adjacent properties.

BISBEE-QUINCY COPPER MINING CO. ARIZON

Dead. Formerly at Bisbee, Cochise Co., Ariz. Described Vol. VI.

BISBEE-SONORA DEVELOPMENT CO. ARIZONA & MEXIC

Office: Douglas, Ariz. Mine offices: Paradise, Cochise Co., Ariz.; Na Arispe, Sonora, Mex.; and La Cananea, Arispe, Sonora, Mex. C. I. Mi Reynolds, president; C. L. Jones, vice-president and manager; J. L. Carra secretary; J. B. Anderson, treasurer. Organized February, 1907, under laws Arizona, with capitalization $2,500,000, shares $2 par, as successor of Paradi Development Co. Is a holding company only, controlling, through ownersh of about 60% of stock issue of each, the Badger-Hall Mining Co. and Paradi Mining Co., near Paradise; Ohio Mining Co. and Bisbee & Duluth Mining Development Co., near Bisbee, and Dispatch Mining Co., at La Cananea. T relations between this company and its subsidiary corporations are so obscu that the properties of the latter are described as a unit, under the title of t company, instead of separately.

Principal holdings are in the Huachuaca Mountains, near Paradise, Ari including the townsite of Shamrock, 12 miles from Rodeo, the nearest rail poi in which some lots have been sold. The Paradise lands, lying mainly betwe the Manhattan and Sullivan properties, are developed by 3 tunnels, upper 340', intermediate and lower at 385', latter planned to be driven 1,20 to secure a back [illegible] The Badger-Hall property is 30 claims, area 540 acr claimed to show [illegible] surface and 50' wide at 200' dep where cut by tunn[illegible]g Co. near the Badger-Hall, has 245' crosscut, said [illegible] sulphide ore. The Morning Sta group of the Paradi[illegible] of the Cochise Development Co has a 90' tunnel, sh[illegible] ore carbonate an sulphide ore.

Lands of the Ob[illegible] 40 acres, abo 1 mile southwest of th[illegible] erly locate said to show 2 low-gr[illegible]

ides gold claims, bought of the Gold Treasure Gold Min-
é Mountains, just south of Naco.
, 1908, to plan a smelter, but should develop a mine first.

R DEVELOPMENT CO. **ARIZONA.**

lved, 1904, with all debts paid. Formerly at Bisbee,

PER MINING CO. **ARIZONA.**

at Bisbee, Cochise Co., Ariz. Described Vol. VI.

RKSCHAFT BISMARCK. **GERMANY.**

Hanover, Braunschweig, Germany. Alex. Eichwald,
fe, executive committee. Organized Nov. 20, 1899, under
perty is various copper and iron mines, former including
Brunswick, and the Rothbart, in Prussia, which carry
pper ores. The iron ore mines are near Ruhla, Saxe-
also has done a little exploratory work in Braunschweig-
l duchy of Gotha. Properties apparently are only in the

MINING CO. **MONTANA.**

fice was 423 Phœnix Block, Butte, Mont. Was organ-
ler laws of South Dakota, with capitalization $500,000,
cessor of Bismarck-Nugget Gulch Consolidated Mining
May 10, 1910, having transferred its lands, circa 1907,
pper Mining Co. Formerly at Brandon, Madison Co.,

GULCH CONSOLIDATED **MONTANA.**

nkrupt, and property was sold, 1905, by sheriff. Com-
ıcceeded, 1907, by Bismarck Copper Mining Co. For-
lison Co., Mont.

MINING CO. **MONTANA.**

eangle was manager. Property, known as the Monarch
and argentiferous copper and lead ores, and was equipped
oying, 1903, circa 10 men. Formerly at Elliston, Powell

ING CO. **BRITISH COLUMBIA.**

, B. C. Mine office: Stewart, Cassiar district, B. C.
J. S. Rankin, secretary and treasurer. Organized circa
laws of British Columbia, with capitalization $200,000.
circa 600 acres, in Brown's Gulch, Bitter Creek, in the
developed by a 35′ tunnel showing ore giving assays up
% lead, 39.56 oz. silver and 0.12 oz. gold per ton; also
per, 16.48 oz. silver and 0.12 oz. gold per ton.

PER MINING CO. **MONTANA.**

t Saltese, Missoula Co., Mont. Fully described Vol. IV.

CO. **ONTARIO.**

Minn. Mine office: Port Arthur, Thunder Bay dis-
wand, president; N. B. Carlson, secretary. Organized
s of Arizona, with capitalization $1,000,000. Lands, 3
area 266 acres, also 13 acres miscellaneous lands, all
ck Bay, in the Thunder Bay district of Ontario. Coun-
g 7 cupriferous amygdaloidal beds, claimed by company
pper, 1.25 oz. silver and $2 gold per ton, which estimates
. Idle several years and apparently moribund.

G CO. **COLORADO.**

ride, San Miguel Co., Colo. Oscar Manttila, superin-
s. Mine carries auriferous and argentiferous sulphides

of lead, copper and zinc. Equipment includes an electric plant, 2 and 75-ton concentrator. Idle.

BLACK BEAUTY COPPER CO. CA

Dead. Formerly at Cima, San Bernardino Co., Cal. Describ

BLACK BESS MINING CO.

Dead. F. H. Strickland was manager. Property was sold, ci 1909, to Utah Mines Co. Mine, in the Big Cottonwood district have been a producer, in a small way, of copper and lead ores, up t ing 1903. Formerly at Brighton, Salt Lake Co., Utah.

BLACKBIRD COPPER & GOLD MINING CO., LTD. IDAH

Office: 807 Newhouse Bldg., Salt Lake City, Utah. Mine o house, Beaver Co., Utah, and Salmon, Lemhi Co., Nev. John E. I ident; Chas. J. North, vice-president; F. O. Frick, secretary; B. treasurer and general manager; preceding officers and L. N. Morris Organized under laws of West Virginia, with capitalization $2,00 $1 par, non-assessable. Bonds, $500,000, at 6%. Annual me Tuesday in January. Is a close corporation.

Lands include 33 claims, patented, area 482 acres, in the Black of Idaho, carrying ore that has returned 17% copper and circa $8 from small smelter shipments; and 97 claims, 87 patented, in the S district of Utah, adjoining the Cactus mine of the South Utah on 3 cipal development is on the Utah property, having considerable wor diamond drilling was done thereon, 1909-1910. Property considere

BLACK BIRD MINING CO.

Dead. Formerly at Butte, Silver Bow Co., Mont. Describe

BLACK BUTTE MINING & REDUCTION CO.

Dead. Formerly at Hot Springs, Yavapai Co., Ariz. Ful Vol. VIII.

BLACK CANYON COPPER CO., LTD.

Dead. Was a bad outfit. Lands were sold to Copper Canyon Formerly at Mayer, Yavapai Co., Ariz. Fully described Vol. V.

BLACK CHIEF COPPER CO.

Mine office: Dewey, Yavapai Co., Ariz. Lands, 6 claims, k Uncle Sam group, having several short tunnels and shallow shafts, with considerable water in the bottom, all showing ore giving assay copper. Has a hoist. Presumably idle.

BLACK COPPER CO. NEV

Mine office: Elizabethtown, Colfax Co., N. M. Property ha

BLACK DIAMOND COPPER MINING CO.

Office: Warren, Ohio. Mine office: Pearce, Cochise Co., Hearne, president; H. C. Christie, vice-president; Dr. T. M. Sabi E. D. Kennedy, treasurer and general manager; W. G. Barney, sup F. H. Mitchell, smelter superintendent. Organized 1898, under Virginia, with capitalization $2,000,000, shares $5 par. Bonds, $4

Lands are 35 claims, area circa 500 acres, 6 miles from Pearce chise Mountains. Ores occur as contact deposits between limesto phyry, with parallel dykes of sandstone and quartzite, having a h capping in places 150' wide. Mine, originally opened for silver, ex exclusively sulphide ores, mainly chalcopyrite and bornite, with ir gangue, estimated to average better than 6% copper, 10 oz. silv gold per ton, with about 38% silica. Development is by a 115' sha nels, lowest 600' below crest of the hill, tunnel is being connected Mine and smelter are connected by a 1½-mile Leschen aërial tra drop of 800', with 600 tons daily capacity. There is a pumping p pipeline, installed at Pearce, this having capacity to raise 100,000 [illegible]' in 6 miles, with a 350,000-gallon storage res

a good steam equipment, including 2 air-compressors with roleum being used for fuel. Miscellaneous improvements tel, store, schoolhouse and a considerable number of dwell-

er, built 1902, has a 44x120″ Allis-Chalmers rectangular rnace, a 38″ auxiliary cupola and a 24x36′ circular roaster, ying about 65% copper, and 150 oz. to 300 oz. silver per values. Ores are self-fluxing, and easily smelted, and fur- ve shown slag losses of only 0.3% copper. Company came nd was practically reorganized and management changed. 905, and smelter was blown in, 1906, and blown out, 1907. ore bodies claimed cannot feed a smelter. Idle since 1907.

COPPER MINING CO. **NEVADA.**

: Yerington, Lyon Co., Nev. E. H. Walker, president ; John W. Owen, vice-president; Louis W. Trankle, secre- apson, treasurer; preceding officers, and Adam I. Wood, ammond, consulting engineer. Organized Apr. 9, 1907, a, with capitalization $1,000,000, shares $1 par, nonasses- 0.

3 patented, area 120 acres, 6 miles east of Yerington, show- limestone, carrying 4 contact deposits and fissure veins, of ch one, under development, has several shallow shafts and ncipal work is on Diamond No. 2 claim, with a tunnel run e body of sulphide and carbonate ore shown on surface, are about 3% copper.

TUNNEL CO. **BRITISH COLUMBIA.**

d Title Bldg., Philadelphia, Pa. Mine office: Ainsworth, . C. Maxwell Stevens, president; Henry M. Stevenson, hlander tunnel, having a total length of about 3,000′, has to 13′ width, giving fair assays in silver, lead, copper and officers of the company were claimed to stand well locally, here stockjobbing scheme. Long idle and moribund.

NING CO. **WASHINGTON.**

hewelah, Stevens Co., Wash. G. A. Mowatt, manager. iles west of Chewelah, having a 300′ tunnel showing cop- . Presumably idle.

NING & MILLING CO. **OREGON.**

: Gates, Marion Co., Ore. R. F. Shier, president and spach, vice-president; S. C. Sörensen, secretary, treasurer preceding officers, D. C. Smith and L. P. Larsen, directors; superintendent. Organized 1907, under laws of Oregon, 1,000,000, shares $1 par. Annual meeting, first Monday

, area 160 acres, also 40 acres miscellaneous lands, well d, 14 miles from Gates, in the Gold Creek district, on Horn f the Little North Fork River, which is a tributary of the pertyshowsa contact vein between greenstone and dolomite, width at surface, traceable circa 1 mile, opened by a 100′ l short tunnels, longest 750′, with back of 500′, showing malachite, claimed to average about 10% copper and 6 to Has a hoist and 4 mine buildings. Company planned

PER CO. **MONTANA.**

cceeded, 1901, by Imperial Montana Copper Mining, wer Co. Apparently should have been called the Blackleg oot. Formerly at Blackfoot, Teton Co., Mont.

BLACKFOOT MINING & MILLING CO. WY

Dead. Formerly at Battle, Carbon Co., Wyo.

BLACK FOREST MINING & SMELTING CO.

Mine office: Wells, Elko Co., Nev. C. M. Spence, general Mine has a 400′ shaft, showing argentiferous and auriferous copper and mainly silver-lead in upper workings, but at depth of 350′ the vein carri sulphides giving assays of 25 to 30% copper, which it is planned de Equipment includes water power, and a small smelter with a lead stac has been, for some years, a small but fairly steady producer of silver-le

BLACK FRIDAY GOLD MINING CO. MO

Mine office: Radersburg, Broadwater Co., Mont. Lands, 320 joining the Keating and Ohio-Keating mines. Development is by cline shaft, with levels at 100′ intervals, values, as developed, being gold, with some copper, the vein apparently increasing in both size values with depth. Mine has a productive capacity of 30 to 50 tons of

BLACK HAWK MINE. AI

Owned by Arizona Commercial Copper Co., at Globe, Gila Co., Ar

BLACK HILLS CONSOLIDATED COPPER CO. SOUTH D

Dead. Lands, in the Pactola district, had a 118′ two-compartme said, 1907, to be bottomed in a promising body of copper ore. For Keystone, Pennington Co., S. D.

BLACK HILLS COPPER CO. SOUTH D

Office: Benton Harbor, Mich. Letter returned unclaimed fro mine office, Rochford, Pennington Co., S. D. E. A. Hoffman, president M. Thresher, secretary; John H. Kerr, treasurer. Organized June under laws of South Dakota, with capitalization $2,000,000, shares Lands, 27 claims, area 510 acres, in the Hornblende district, showin veins in slate, with heavy gossan capping, carrying carbonate and ox Ore body under development is said by company to average 20′ width be more than a mile in length, opened by incline shafts of 800′, 40′ and crosscut tunnels of 65′ and 300′, giving a total of about 1,200′ of und openings. Ores average 1.5 to 3% copper, with small values in gold, s nickel, and a carload shipment of carbonate ore gave smelter returns o copper. Has steam power, with 60-h. p. hoist, good for 1,500′, and drills. Idle some years and presumably moribund.

BLACK HILLS COPPER CO., LTD. AR

Office: 812 Columbia Bank Bldg., Pittsburg, Pa. Letter retu claimed from former mine office, Jerome, Yavapai Co., Ariz. John G. president; Alfred A. Lappe, secretary and treasurer. Organized Jul and reorganized May 20, 1901, under laws of Arizona, with capit $3,000,000, shares $1 par. Union Trust Co., Pittsburg, registrar. Trust Co., Pittsburg, transfer agent.

Lands, 15 claims, 6 patented, area 280 acres, in the Verde district, the United Verde and Equator mines, opened by shafts of 212′ and tunnels of 60′ and 90′, with about 2,500′ of openings. Main shaft, at a stringer of ore assaying up to 13% copper and 3 oz. silver. Has a steam plant, with 125-h. p. tubular high-pressure boiler, duplex pum and power drills. Did some work, 1905-1907; since idle, owing to lack

BLACK HILLS & DULUTH COPPER MINING CO. SOUTH D

Mine office: Custer, Custer Co., S. D. F. A. Towner, presiden Bailey, secretary; W. F. Hanley, treasurer; W. A. Nelson, superin Capitalization $3,000,000, shares $1 par. Lands, 340 acres, 8 miles n of Custer, adjoining the Central Black Hills Copper Co., showing p outcrops of argentiferous and auriferous copper ores assaying up to 2 per, slightly developed by 2 shafts. Has water power. Idle some y apparently moribund.

& COPPER MINING CO. **ARIZONA.**

Prescott, Yavapai Co., Ariz. R. H. Burmister, general
e Black Hills district, are but slightly developed. Long
oribund.

OLIDATED MINING CO. **UTAH.**

ah. Mine office: Mammoth, Juab Co., Utah. Jesse
G. McMillan, vice-president; W. Lester Mangum, secre-
receding officers, J. Wm. Knight and S D. Kimball,
907, under laws of Utah, with capitalization $100,000,
essable, as a merger of Black Jack Mining Co. and Star
o. Is controlled by the Knight Investment Co. Shares
ake stock exchange.

a 2,000′ tunnel and a 1,400′ two-compartment shaft,
eventually to 2,000′. The 1,000′ level shows auriferous
in broken ground, and the bottom level, at 1,400′, shows
to 20% lead and 20 oz. silver per ton. Mine also has
in iron, available for fluxing use. Production, 1907,
om the Black Jack and 7 from the Star, or circa 900 tons.
909.

ER MINING CO. **MONTANA.**

claimed from former office, Helena, Mont. Mine office:
Mont. H. M. Brooks, superintendent, at last accounts.
1907, with capitalization $400,000. Lands, near the
e a 225′ shaft, with about 450′ of workings, showing aurif-
s copper ore, from which several small shipments have
n power.

G CO. **UTAH.**

structed, 1907, as the Black Jack Consolidated Mining
s $1,000,000, shares $1 par. Formerly at Eureka, Juab

PPER CO. **TEXAS.**

claimed from former office, Baltimore, Md. Mine office:
Co., Tex. Lands are in the Quitman Mountains, south
oratory work was begun, circa September, 1909. Pre-

COPPER CO. **ARIZONA.**

tion, Yavapai Co., Ariz. F. A. Reisling, superintendent,
erty has but slight development, and presumably is idle.

& COPPER MINING CO. **NEW MEXICO.**

e 6 claims, said to have about 2,000′ of workings, claimed,
s of shipping ore. Lands passed to Victoria Chief Cop-
Co., a swindle promoted by "Col." Robt. H. Hopper
low. Formerly at Engel, Sierra Co., N. M.

PPER CO. **ARIZONA.**

s Bldg., Denver, Colo. Mine office: Johnson, Cochise
. Bell, president; Dr. John C. Thompson, vice-president;
ary and treasurer; preceding officers, Robt. Temple and
ctors; N. E. Boggs, superintendent. Organized May 10,
ona, with capitalization $1,500,000, shares $1 par; issued,
eeting, last Wednesday in May.

tented, area 147 acres, showing contact deposits in lime-
Mine has an 860′ two-compartment shaft, showing
onates, bornite and chalcopyrite. Small smelter ship-
rned 12% copper and 20 to 30 oz. silver per ton, and
d 20 to 27% copper, with silver values. Equipment in-
nd 3 mine buildings.

BLACK PRINCE COPPER MINING CO. I

Dead. Was succeeded, circa 1909, by Copper Prince Consolidated & Milling Co. of Idaho. Office was at Fairmont, West Va. Daniel Da manager. Capitalization was $3,000,000. Lands were 8 claims, circa 2 above the head of navigation on the St. Joe River, showing auriferous ore. Formerly at Cœur d'Alene, Kootenai Co., Idaho.

BLACK RANGE COPPER MINING CO. NEW MI

Office and mine: Fairview, Sierra Co., N. M. B. S. Phillips, gener ager; preceding officer, F. E. Green, L. H. Armstrong, E. D. Thayer and Allen, directors. Organized January, 1906, with capitalization $1,2 shares $1 par. Idle, apparently has done no work, and presumably mo

BLACK RIVER COPPER CO. ARI

Letter returned unclaimed from former mine office, Cherry, Yavap Ariz. G. M. Batty, manager, at last accounts. The Pearl claim was show high grade gold ore, at depth of 70'. Idle since circa 1909.

BLACK ROCK COPPER CO.

Dead. Was reorganized as Black Rock Copper Mining & Milli Formerly at Frisco, Beaver Co., Utah. Described Vol. VIII.

BLACK ROCK COPPER MINING & MILLING CO.

Letter returned unclaimed from former office, Salt Lake City, Utah. office: Frisco, Beaver Co., Utah. Walter James, general manager. ized as successor of Black Rock Copper Co. Mine, in the Beaver Lake on which work was begun 1904, has shown ore assaying up to 36% copp small gold and silver values, and the 170 level is said to show a 5' vein a 7% copper, 16 oz. silver and $1.40 gold per ton. Presumably idle.

BLACK ROCK GOLD & COPPER MINING CO. ARI

Dead. Formerly at Jerome, Yavapai Co., Ariz. Fully described V

BLACK ROCK MINE. MON

Owned by Butte & Superior Copper Co., at Butte, Silver Bow Co.,

BLACK ROCK MINE. NE

Office: 524 Main St., Racine, Wis. Mine office: Yerington, Ly Nev. E. H. Walker, general manager; preceding officer and Wm. D. Tho owners: T. M. Hammond, engineer. Lands, 5 claims, area 52 acres, s 4 parallel fissure veins in quartz-monzonite, of which 2, of 5' to 10' average traceable 2,500', have shafts of 80 and 150', showing chrysocolla and pyrite, bottomed in ore estimated to average about 4% copper and 4 to $5 silver per ton. Management plans deepening shaft to 500', addin boss, patenting ground, and incorporating after securing patents, if d ments are favorable.

BLACK ROCK MINING CO. ARI

Office, Superior, Ariz. Mine office: Wickenburg, Maricopa Co R. C. Vincent, president and manager. Lands, 9 claims, area 180 a the Bradshaw Mountains, 17 miles from rail connection at Wickenburg. ity rocks are granite and syenite, showing 4 fissure veins, averaging ab width, carrying copper, lead, gold and silver with quartz gangue, a showing porphyritic dykes carrying low-grade ores. Development is by shallow shafts and short tunnels. Has gasoline power. Idle some ye apparently morbund.

BLACK ROCK MINING CO. MON

Dead. Was worked up circa January 1907. Property was a 3 to lease on the Black Rock mine, which was sold more to Butte & Superior Co. Formerly at Butte, Silver Bow Co., Mont.

BLACK TIGER COPPER MINING CO. WYO

Dead. Last heard from 1906. Formerly at Encampment, Carbon Co

BLACK TRAVELER COPPER MINING CO. MON

Office, Victor, Idaho. Letter returned unclaimed from forme

Co., Mont. Albert Roof, president and general man-
president; Thos. G. Kennedy, secretary and treasurer;
an, Wm. Poorman and H. S. Harris, directors. Lands,
theast of Saltese, near the Saltese Consolidated Copper
owing 2 parallel veins, one, of about 6′ width, having a
ment is by 2 crosscut tunnels, the upper cutting a vein
arrying copper ore, mainly chalcopyrite, giving assays
streaks assaying up to 32.4% copper and 15.8 oz. silver,
e 1,200′ lower tunnel is planned to be driven 1,800′ to
er tunnel will be driven circa 1,400′ on Black Traveler
he property of the Marie Mining Co., Ltd. Presumably

PPER COMPANY, AMALGAMATED. ARIZONA.
ized, 1905, as Warrior Copper Co. Formerly at Black
Fully described Vol. V.

NE. ARIZONA.
lease by Warrior Development Co., at Black Warrior,

MINING CO., LTD. IDAHO.
Murray, Shoshone Co., Idaho. Amos Watkins, presi-
ary and treasurer; R. J. Houghtaling, superintendent.
, shares $1 par. Lands, 4 claims, heavily timbered,
op proven circa 2,000′, by trenching. Development is
ack of 125′. Mine shows ore assaying well in copper,

LING & INVESTMENT CO. NEW MEXICO.
s Vegas, San Miguel Co., N. M. Mill office: Chapelle,
H. E. Blake, president and general manager; S. B.
B. C. Pittenger, secretary; C. P. Hammond, treasurer;
L. Matt, directors. Capitalization, $200,000. Lands,
Hill district, circa 12 miles from Las Vegas, slightly
tunnels. A 14-ton sample ore shipment yielded 2.1%
plant, 7 miles from the mine, doing a general custom
and 50-ton Gardiner process leaching plant. Idle.

NING CO. NEW MEXICO.
le. Formerly at Silver City, Grant Co., N. M. Fully

BLANCA TORRE DE COLLAHUASI. CHILE.
Chile. Mine office: Collahuasi, Tarapacá, Chile.
, under laws of Chile, with capitalization £120,000,
ly idle.

INING CO. WYOMING.
National Bank Bldg., Omaha, Neb. Letter returned
ine office, Encampment, Carbon Co., Wyo. H. E.
Kyner, secretary; Arthur H. Crow, general manager.
nder laws of Wyoming, with capitalization $1,000,000,
claims, near the New Rambler, showing 2 veins, one of
imed to show auriferous oxide, carbonate and sulphide
in a bad shape financially, idle some years and bank-

ARIZONA.
Mo. Mine office: Patagonia, Santa Cruz Co., Ariz.
r. Mine, in the Harshaw district, has a 500′ tunnel,
ings, showing a main vein and 2 blind ledges, carry-
th some silver-lead.

BLANTON COPPER MINING SYNDICATE. **HAYTI & SANTO D**

Office: The Bourse, Philadelphia, Pa. Mine office: Bucaro, bal, Santo Domingo. E. A. Blanton, Jr., president and general mar Herbert Sickels, vice-president; Henry C. Martin, secretary; A. M treasurer; preceding officers and Ralph C. Lupton, directors; Otto A superintendent. Organized Feb. 16, 1910, under laws of Delaware, w ization $200,000, shares $25 par, nonassessable, in $25,000 of 7% pref and $175,000 common stock. Annual meeting, first Monday in Janu

Lands, circa 700 acres, in a tract 5,000x6,000′, held under gover cession, including the Bucaro mine, on the Rio Nigua, 27 miles west mingo, bought of San Cristobal Mining Co. Property shows ore bod stone, near a porphyry contact, one ore body in the Bucaro mine ca copyrite, bornite and chalcocite, all auriferous and argentiferous, gi of 3 to 24% copper, and estimated to carry $3 per ton in combined gol values. Development is by tunnel, including a 250′ crosscut tunne tunnels of 75′, 80′, 160′ and 100′, also by an opencut, estimated to s tons of ore. Property has no power plant, but has several small min A water power, 7,000′ from the mine, is said to be capable of deve furnishing power for a mine yielding 1,000 tons of ore daily. Com building a 100-ton concentrator, 1911, as first unit of a larger plant ping concentrates to the Norfolk smelter. Company also hopes t 50-kilometer railway, from San Domingo to San Cristobal.

BLAYNEY COPPER MINES & SMELTERS, LTD. **AU**

Dead. Was reconstructed, circa 1906, as New South Wales Smelters, Ltd., which was reorganized, Jan. 31, 1907, as Blayney Co & Smelting Co., N. L. Formerly at Blayney, Bathurst Co., N. S. W., Described Vol. VIII.

BLAYNEY COPPER MINES & SMELTING CO., N. L. **AU**

Office: 375 Collins St., Melbourne, Australia. British office: ton House, London, E. C., Eng. Mine and works office: Blayney Co., N. S. W., Australia. E. A. Weinberg, chairman and consultin E. H. Shackell, secretary; Edwin Habben, London secretary; F. L. P general manager. Organized Jan. 31, 1907, under laws of Victoria, italization £75,000, shares 10s. par, increased, by doubling par valu March, 1908, to £150,000, shares £1 par; issued, £100,000, 14s. paid a reconstruction of New South Wales Mines & Smelters Co., Ltd., w reconstruction of Blayney Copper Mines & Smelters, Ltd. Comp options on properties of the Mount Hope Mines, N. L., and Bogan Riv Mining Co., N. L. A property at Wellington, N. S. W., formerly h option, was abandoned, 1909.

Lands, freehold, are the mine formerly known as the Blayney, G ney and Annandale, discovered 1881, and first opened 1882 by the Gre Copper Mining Co. Mine took the name of Annandale, 1889, when t by another company, and a third company holding the property 1 did no work, while a fourth company secured a small production, 190 was resumed by present company, after two false starts by the two corporations.

Property shows a strong ore body, 40′ wide at depth of 100′, in near the junction of augite and Silurian sedimentaries, with considera ing and shearing. Ore is chalcopyrite, with andesitic gangue. Mine to depth of 337′, and for a horizontal length of 680′.

Equipment includes steam and electric power, and the mine has railway siding. A small precipitation plant is said to have recovered lbs. copper per 1,000 gallons of water, and is said to have received 90 copper contents of the mine-water.

nt, doing a general custom business, was built circa 1882, enovated, 1907. Equipment includes a small sampling orage-bins for ore, fluxes and fuel. The smelter has two -furnaces, a small blast-furnace for matte smelting, a urnace and an Edwards calcining furnace. Converter the Leghorn type, and a 6′ Chilian mill for linings. Pro- ,666 long tons of ore smelted, yielding 936,320 lbs. fine

& SMELTING CO. **AUSTRALIA.**
eeded, 1906, by Blayney Copper Mines & Smelters, Ltd. Bathurst Co., N. S. W., Australia. Described Vol. VI.

INING & LEACHING CO. **COLORADO.**
at Kokomo, Summit Co., Colo.

R CO. **CALIFORNIA.**
St., New York, N. Y. Letter returned unclaimed from lton, Riverside Co., Cal. Andrew F. Burleigh, president lewett, vice-president; M. E. Milles, secretary; Ralph E. ager. Organized October, 1906, under laws of Arizona, ,000,000, shares $100 par.
, area 2,400 acres, in the Ironwood district of Riverside McCoy and Palen Mountains, circa 65 miles north of ims to have about 45 different veins on its lands, of which 00′ in width, opened by 4 shafts of 30′ to 52′ depth, carry- alachite, chalcocite and chalcopyrite, estimated by com- copper, 7 oz. silver and $18 gold per ton. Company esti- f ore in sight, which is entirely too high. Transportation sample carload of selected ore, weighing 29,000 lbs., so, netted $1,382. Idle and presumably moribund.

MINING CO. **AUSTRALIA.**
was sold, 1902, to Tasmanian Copper Co., Ltd. For- nton Co., South Australia. Described Vol. V.

PPER CO. **ARIZONA.**
at Tucson, Pima Co., Ariz. Described Vol. VIII.

R CO. **UTAH.**
Blk., Salt Lake City, Utah. Letter returned unclaimed , Milford, Beaver Co., Utah. Henry M. Crowther, presi- nager; Wallace W. Wait, vice-president, secretary and ion $600,000, shares $1 par. Lands, 17 claims, area 320 ke district, showing 5 contact and fissure veins, of which width, are being developed, these carrying values esti- at 6% copper, 5 oz. silver and $4 gold per ton, from oxide, e ores, opened by 4 shallow shafts. Idle several years.

ER MINING CO. **WASHINGTON.**
at Republic, Ferry Co., Wash. Described Vol. VIII.

R MINING SYNDICATE, LTD. **AUSTRALIA.**
dated 1908. Formerly at Gympie, March Co., Queens- ribed Vol. VIII.

ARIZONA.
lidated Arizona Smelting Co., at Humboldt, Yavapai

G CO. **CALIFORNIA.**
Quincy, Plumas Co., Cal. J. J. Sullivan, superintendent. s's, show heavy outcrops at the apex of a hill, in which a erent copper bearing veins. Idle some years and appar-

BLUE BELL MINING & REDUCTION CO.

Office: Yucca, Ariz. Mine office: Swansea, Yuma Co., A Martin, president; E. T. Miner, vice-president and superintendent; comb, secretary. Lands, 23 claims, circa 5 miles from Swansea, ju Bill William's Fork River from the Swansea pumping plant. Min two-compartment shaft, with 2 levels opened, and several hundred nels, showing ore carrying up to 10% copper, with fair gold and silv

BLUE BELL MINING & SMELTING CO.

Dead. Was reorganized, 1910, as Blue Bell Mining & Reductio merly at Swansea, Yuma Co., Ariz. Described Vol. VIII.

BLUE BIRD CO., LTD.

Dead. Formerly at Butte, Silver Bow Co., Mont. Describe

BLUE BIRD COPPER-GOLD MINING CO.

Dead. Was succeeded, circa 1907, by New York & Utah Gol Mining & Milling Co. Formerly at Milford, Beaver Co., Utah. Vol. VI.

BLUE BIRD MINE.

Office: 30 Church St., New York, N. Y. Mine office: Wick Co., Mont. Wm. Q. Ranft, owner and manager. Lands, 5 claim held under bond and lease from Michigan & Montana Development erty, about 1 mile south of the Alta mine, and operated in connect Penn Yan mine, has a 2,100′ tunnel, with a 200′ winze, opening the m of 600′. Property has 2 veins, of 4′ to 14′ width, known as the Nort veins, carrying shoots of ore averaging 5% copper, 5% lead, 25 o $1.50 gold per ton. Has electric power.

BLUE BIRD MINING & SMELTING CO. WAS

Dead. Office was Everett, Wash. O. C. Wright was president manager; Thos. Parks, superintendent. Property was the Copper said to show a wide vein of gray copper and chalcocite carrying sm silver values. Development was by a tunnel and 2 shafts, one verti ment included a 25-h. p. gasoline hoist, and the foundation for a 100 trator was built, 1903. Formerly at Darrington, Snohomish Co., W

BLUE CAP MINING & MILLING CO.

Office and mine: Casper, Natrona Co., Wyo. Theo. Becke Donald Mitchie, vice-president; E. Percy Palmer, secretary and tre S. Cook, superintendent, at last accounts. Capitalization $5,000.0 par. Lands in the Casper Mountains, are opened by a shaft, fro copper specimens have been secured. Idle several years.

BLUE CREEK COPPER MINING CO. WAS

Dead. Formerly at Blue Creek, Stevens Co., Wash. Describ

BLUE CREEK MINE. A

Mine office: Yarrangobilly, Buccleuch Co., N. S. W., Austra about 8 miles from the Limestone Caves, in a very rugged country, of about 12 width, having a 2 paystreak of rich ore. Mine is opene nel having a back of about 25 Was developing with a small forc

BLUE JACKET CONSOLIDATED COPPER CO.

Dead Lands reverted to owner, American Mining Co., Ltd. at Deerlodge, Washington Co., Idaho. Described Vol. VIII.

BLUE JAY EXTENSION MINING CO.

Office 845 Templeton Bldg., Salt Lake City, Utah. Letter r claimed near former mine of the Blue Bird Co., Utah. R. E. F ment, L. H. Gray, secretary and treasurer. Capitalization $500,00 par. Lands in the Washington district of Beaver county, Utah, are reported idle and abandoned.

BLUE JAY MINE.

Owned by Arizona Copper Mining Co., at Burro, Silver Bow

NEVADA.

gton, Lyon Co., Nev. A. Pugh, superintendent, at last veloped by shaft and tunnel. Has steam power. Idle

O. **CALIFORNIA.**

er, Fresno Co., Cal. N. Philips, manager, circa 1904, yed in exploratory work. Idle some years and appar-

O. **WASHINGTON.**

sh. Mine office: Ione, Stevens Co., Wash. C. S. Clute, ized July 1, 1908, under laws of Washington. Lands, d'Oreille River, and about 1 mile from Ione, and 1 mile said to have a fair surface showing of copper, with a s 4′ to 12′ in width at surface. Development includes shaft and a 215′ crosscut tunnel, with a lower tunnel ving fair copper assays, with a little silver and gold. nall hydro-electric power plant, an air-compressor and

COPPER MINING, WASHINGTON.
WER CO.

egg. Formerly at Conconully, Okanogan Co., Wash.

CO. **CALIFORNIA.**

ed, circa 1907, by Blue Ledge Mining Co. Formerly Cal.

CO. **CALIFORNIA.**

t, New York, N. Y. Mine office: Hutton, Siskiyou , general manager; Frank H. Carnahan, general super- ims, area circa 440 acres, well timbered, at the head of Elliot Creek, which is an affluent of the East Fork of les south of the Oregon line, also a large smeltersite, at gate River. Property was located 1889, and desultory fore coming under present ownership.

of N. 10° E., and almost vertical dip, slightly inclined 00′ by prominent outcrops of 50′ to 250′ width, lies y to black, slightly micaceous schist, and a hanging- hist, the walls not always being clearly defined, and ding into the hanging-wall. Ore bodies are lenticular said, by several authorities, to be in huge laminations t ore apparently is persistent to depth. Ore is mainly ith a little sphalerite and occasional native copper. with upwards of one-half mile of workings, blocking circa 7,000′ of diamond drilling showed several ore ge assays of 5% copper, 2.5 oz. silver and $2.50 gold

a hydro-electric power plant, taking water from Elliot out 150′, at pressure of 85 lbs. Buildings include an ng house, dwellings and sawmill. The company has th waterworks, sewers and a schoolhouse, and has Hutton and Yreka. A 40-mile railway to connect with Medford, Oregon, has been projected. Company was ter. Property is in strong hands, and is considered

CO. **NEVADA.**

Bldg., Indianapolis, Ind. Mine office: Mina, Geo. J. Cook, president; Henry L. Dollman, vice-

president; Carl L. Rost, secretary; Wm. C. Osborne, treasurer; preceding
Chas. N. Van Cleave, Chas. E. Test, and Richard Stegemeier, directors;
Chalmers, general manager; F. M. Baker, superintendent. Organized
1907, under laws of Nevada, with capitalization $2,500,000, shares $1 p
assessable, as successor of Blue Light Mining Co.

Lands, 24 claims, area 480 acres, about 12 miles from Mina, in t
Mountain district, also 3 lots in Mina. Mine has shafts of 60′, 70′ a
developing an 8′ vein of auriferous and argentiferous sulphide ore
about 5% copper, with 4,406′ of workings, estimated by management
100,000 tons of ore blocked out for stoping. Equipment includes 30-
100-h. p. gasoline hoists, latter said to be good for 3,000′ depth. Five
of ore shipped, circa 1907, returned 15 to 23.2% copper, with small
silver values.

BLUE LIGHT MINING CO. N

Dead. Was succeeded, October, 1907, by Blue Light Copper C
merly at Mina, Esmeralda Co., Nev. Described Vol. VIII.

BLUE MOUNTAIN COPPER MINING CO. COL

Dead. Lands were sold, circa 1906, to Michigan & Colorado M
Milling Co. Formerly at Florissant, Teller Co., Colo.

BLUE POINT COPPER MINING & MILLING CO.

Dead. Formerly at Frisco, Beaver Co., Utah. Described Vol. V

BLUE RIDGE COPPER CO., INC. VI

Office: 613-145 La Salle St., Chicago, Ills. Mine office: Stanley
son Co., Va. Jacob Lauth, president; Frank L. Race, secretary and t
Geo. F. Brigham, Jr., general manager. Organized Apr. 2, 1904, unde
Virginia, with capitalization $500,000, shares $5 par. Lands, circa 1
on the eastern slope of the Blue Ridge Mountains, in one of the dee
most inaccessible ravines of the range, about 8 miles from a railway, o
old pits and a 200′ shaft, with about 500′ of workings. Ore is variously
as a contact vein between granite and metamorphosed slate, and as a
of greenstone, carrying native copper, cuprite, malachite and azurite.
Pelton wheel, using water under a head of 500′, generating circa 350 h.
necessary mine buildings, and a 50-ton Nissen mill. Idle since August

BLUE RIDGE COPPER MINING CO. NORTH CA

Dead. Formerly at Gap Creek, Ashe Co., N. C. Described Vol.

BLUE STAR MINING CO. WASHI

Office: Chewelah, Wash. Mark Mitchell, president and general
W. W. Dickson, vice-president and treasurer; S. F. Doran, secretary;
assistant secretary; P. T. Peterson, business agent. Lands, 9 claims,
northeast of Chewelah, including the Eagle group of 4 claims, formerl
by Eagle Consolidated Gold Mining & Milling Co. Mine has an 800
showing a 4′ vein of silver-lead ore, said to parallel the copper vein of th
Copper Co. at a distance of circa 400′, also a 215′ two-compartment sha
ing silver-lead ores. Equipment includes machinery and buildings.
last accounts, but planned resumption shortly.

BLUESTONE EXTENSION GOLD & COPPER MINING CO. N

Office: Reno, Nev. Mine office: Yerington, Lyon Co., Nev.
Hinckley, president. Organized 1906. Lands, 180 acres, adjoining t
stone mine on the north, having a 65′ shaft, planned to be sunk to 50
crosscutting. Has a hoist. Idle at last accounts, but planned resumpt

BLUESTONE MINING & SMELTING CO. N

Office: 43 Exchange Place, New York, N. Y. Mine office: Y
Lyon Co., Nev. Capt. J. R. DeLamar, owner; W. O. Fletcher, secretar
A. Weck, superintendent. Is not incorporated.

Lands, 20 claims, 3 miles southwest of Yerington, being the olde
erty in the district, claims having been patented previous to 1890.

ngs, including a 1,200′ main haulage tunnel, cutting an ide and 500′ long at a point 300′ below the apex. This n 80′ paystreak of high grade ore, ranging up to 20% in ore carrying circa 2.5% copper. Management estimates n sight, averaging 2.6% copper. Ore is mainly chalco- considerable epidote, in a limestone gangue, there being l ores, even at the outcrop. Ore is garnetiferous, and nd adapted to magnetic separation, the epidote gangue, y as chalcopyrite, causing difficulty in ordinary wet con-

es a 50-h. p. hoist and a 35-drill electric air-compressor. es the ore, in rolls, to pass an 8-mesh screen, after which in a tower-roaster, to magnetize the pyrite. Roasted ugh a Wetherill magnetic separator, which takes up the the waste, giving a concentrate of about 15% estimated ic separation is claimed to have given a 95% extraction, rking conditions, should be satisfactory.
1901, has a 150-ton water-jacket blast-furnace, but is nall value. When working the mine employs about 30 experienced and property considered valuable. Idle.

R MINING CO. **MONTANA.**

17 Owsley Blk., Butte, Silver Bow Co., Mont. F. L. ewis A. Smith, secretary; W. F. Noyes, treasurer. Or- under laws of Montana, with capitalization $1,000,000, 9 claims, patented, being the Little Boulder, Valentine, n, Blue Vein No. 1, Myrahl and North Star No. 1 lode er claim, and a half interest in the Columbia lode claim, the Butte district. Idle, apparently since organization.

R CO. **NORTH CAROLINA.**

eeded by Boston & Carolina Copper Mining Co. For- Granville Co., N. C.

G CO. **NORTH CAROLINA.**

ess St., Boston, Mass. Operating office: Virgilina, Va. ity, Granville Co., N. C. F. E. Wood, president; T. M. . M. Hill, secretary; J. P. Sylvester, treasurer; Robt. G. ger. Organized 1907, under laws of West Virginia, with , shares $1 par, nonassessable. Property was held, circa pper Co., succeeded, 1897, by Boston & Carolina Copper was successful, owing to bad management.
, showing a 4′ fissure vein in schist, with north and south and proven to depth of 350′, estimated by management 3% copper, 1 oz. silver and 10 to 20 cents gold per ton. and difficult of treatment without admixture of basic are unobtainable in the district. Development is by with 4 levels, opened, showing bornite and chalcopyrite, onal calcite gangue.
s a 40-h. p. hoist, good for 500′, one 5-drill straight-line air- er drills. Buildings include engine-house, boiler-house, rpenter-shop. Production, 1909, was 2,900 tons of ore, ne copper. Mine was worked very poorly in the past, velopment and good management might make a good 909.

COPPER MINING & **WASHINGTON.**

saw, Okanogan Co., Wash. Lands, at Bolster, 4 miles o show ore assaying $18 per ton in combined copper and

gold values. Has a 218′ tunnel, planned to be driven 1,200′, and several sha[illegible] shafts. Presumably idle.

GEWERKSCHAFT BOBERTHALER ERZBERGWERK. **GERMA[illegible]**

Office: Eisenacher str. 10, Berlin, Germany. Mine office: Kupfer[illegible] Schlesien, Germany. Max Arendt, chairman; Dr. Bernhard Kossman, ge[illegible] manager; J. W. Arendt, agent, Herr Grimm, superintendent. Organized [illegible] 20, 1902, under laws of Prussia, with capitalization 1,000 shares, of no [illegible] value. Mine is operated by Konsolidierte Kupferberger Erzbergwerke. La[illegible] 437 hectares, showing country rock of Archæan schists, with about 30 ore bod[illegible] including fissure veins in amphibolite and diorite, and contact deposits betw[illegible] dolomite and porphyritic rocks. Fourteen ore bodies under development ra[illegible] 0.6 to 1.8 meters in width, and are traceable circa 1,200 meters, showing a g[illegible] variety of ores, including the principal oxides and carbonates, chalcopyrite a[illegible] tetrahedrite in connection with sphalerite. Has shafts of 84 and 135 me[illegible] depth, with about 3,000 meters of workings, estimated to show 120,000 me[illegible] tons of ore, with about 60,000 tons blocked out for stoping. Mine was [illegible] covered A. D. 1270, and, after various vicissitudes, was reopened, 1898, by [illegible] ent management. Has steam power and employs about 20 men. Comp[illegible] plans a central electric plant and concentrator with magnetic separation. P[illegible] duction, 1902, was 176,368 lbs. fine copper, and was practically the same in 19[illegible]

BOB'S MOUNT MINE. **AUSTRAL[illegible]**

Mine office: Springfield, Bathurst Co., N. S. W., Australia. W. Pater[illegible] secretary. Organized 1906. Lands are about 8 miles from Orange, and [illegible] 9 miles south of the Mount Bulga. Mine, on which about £3,000 has [illegible] expended, has a 79′ vertical main shaft, planned to be deepened to 100′, [illegible] necting with a 170′ tunnel, showing a vein of about 4′ average and 9′ maxim[illegible] width, carrying an ore shoot 92′ long, and smaller shoots of 10′ and 50′ length.

BOBTAIL MINES CO. **ARIZON[illegible]**

Dead. Lands passed to Big Lead Mining & Smelting Co. Formerly [illegible] Kelvin, Pinal Co., Ariz. Described Vol. V.

COMPAÑÍA EXPLORADORA y EXPLOTADORA DE LAS MINAS DE LA BOCA. **MÉXIC[illegible]**

Mine office: Ciudad La Victoria, Rio Grande, Coahuila, Mex. Ant[illegible] Quintana, president and general manager; C. Guerra Espinosa, secretary. O[illegible] ganized 1905, under laws of México, with capitalization 30,000 pesos; [illegible] 18,750 pesos. Lands, 101 hectares, including the Bornita, Asturiana, Esp[illegible] anza and Oviedo mines. Development is by a 44-meter shaft, and by tun[illegible] of 26, 44, 58 and 100 meters, showing considerable ore, of which a portion is h[illegible] grade. Mines produce about one carload bi-monthly of ore assaying circa 2[illegible] copper, 800 grams silver and 3 grams gold per metric ton. Property ha[illegible] water power available, and management planned installing a concentrat[illegible] Presumably idle.

BOCA DEL COBRE MINING CO. **MÉXICO**

Office: 306-308 South Spring St., Los Angeles, Cal. Letter return[illegible] unclaimed from former mine office, San Luis del Cordero, Nazas, Durango, Me[illegible] Capt. C. Henry Thompson, president; J. D. Thompson, vice-president; Lane [illegible] Gilliam, general manager; A. G. Alexander, manager; Nelson Nyberg, sup[illegible] intendent; Pasadena National Bank, treasurer. Organized 1906.

Lands, 788 hectares, 25 miles from Nazas and 45 from Pedricena, [illegible] to have been bought for $300,000, including El Rosario group of 12 hectar[illegible] San Nicolás, San Francisco, and Santa Rita mines, all with considerable de[illegible] velopment, ore reserves being valued at 12,000,000 pesos. The Santa Ri[illegible] mine, 900′ deep, has a 70-h. p. hoist. El Rosario mine gave average [illegible] from ore shipped from fourth and 20-ft levels, of 7.3% copper and 100 oz. silv[illegible] per ton, with small gold values.

Equipment includes electric motor, 2 hoists and a 12-drill air-compres[illegible]

raction engines from the mines to Bermejillo station. 1907-1909, and is said to have earned good profits. e and management good. Presumably idle.

NE. **ITALY.**

nonima delle Minière di Montecatini.

CIA. **CHILE.**

n de Los Anjeles, Cabildo, Aconcagua, Chile. Propvn as Los Anjeles and Fundiciones Unidas, formerly añola de Fundición de Los Anjeles. The Los Anjeles m Cabildo, with 8 pesos per metric ton carriage charges, blast-furnaces, blower, 60-h. p. boiler, 40-h. p. Robey ps for water-jackets. The Fundiciones Unidas have water-jacket blast-furnaces. About 60 men are em-Coke costs 86 pesos per metric ton. Production, 1907, per, of which Los Anjeles smelter produced 370,372 lbs., idas smelted 3,433 metric tons of ore averaging 4.79% kgs. of 50% matte, carrying 326,278 lbs. fine copper.

UND HÜTTENAMT BODENMAIS. **GERMANY.**

odenmais, Bavaria, Germany. Bergmeister A. Maurer, ws gneiss and granite, carrying 2 contact ore bodies of 30° to 50°. Ore is very lean, being slightly cuprifut 0.3% average copper tenor. Mine, one mile from . D. 1463, has circa 2,000 meters of workings. Equip-. electric power plant, and a 40-metric ton mill, having ûlhe type, 5 Humboldt jigs, 4 Humboldt tables and 1 duction is circa 2,000 tons of iron oxide, 150 metric tons quantity of bluestone.

ER MINING CO., N. L. **AUSTRALIA.**

St., Sydney, N. S. W., Australia. Mine office: Dan-N. S. W., Australia. Geo. Eason, chairman; preceding allace and A. H. Mellick, directors; H. Ernest A. Miller, anager; Peter Neville, mine manager. Organized Jan-New South Wales, with capitalization £6,250, shares 2s. full-paid and 25,000 contributing shares, latter 9d. paid. sehold from the crown, at annual rental of 5s. per acre, known as the Royal Sweep mine, opened February, r, about 20 miles from Dandaloo, in the Orange Plains miles west of Trangie, the nearest railway station on but a railway line has been surveyed within 8 miles. f 8′ to 20′ width, in mica-schist, outcropping for about us carbonate ore near surface, and sulphides at depth, topes showing high grade ore. The sulphide ore is too verberatory practice, though adapted to blast-furnace be used, owing to present lack of transportation facilire coal or coke at a living price. Returns from upwards he Waratah smelter, were 35% copper, 2.5 oz. silver and n, and 560 long tons smelted yielded 28 tons of blister Development is by shafts of 65′, 100′ and 150′, in a nd a winze was said, 1909, to show 12′ of good sulphides. veloped circa 25,000 long tons of 5% ore. Equipment rage tanks of 1,000 and 5,000 square yards area. There n the main shaft to the smelter.

in February, 1908, has 2 reverberatory furnaces, one . Sulphide ores are heap-roasted, rendering them pracel is wood, found in abundance near-by, costing 4s. 3d. s being required to make 1 ton of blister copper. Freight

charges, by wagon and rail, to Sydney, are about £4 per ton for copper. Cost, first half of 1909, was estimated at £43 per long ton for finished copper, delivered in Sydney. Production, 1906, was 124,440 lbs. fine copper, and 1909 was circa 500,000 lbs. fine copper. Property considered promising.

SOCIÉTÉ MINIÈRE DE BOGOSLOVSK. RUSSIA.

Office: Teatralnaya 18, St. Petersburg, Russia. Mine and works office: Bogoslovsk, Verkhotsorsky, Perm, Russia. A. Hitrovo, chairman; N. I. Vladkin, general manager. Becoming embarrassed, the corporation was placed in the hands of trustees, Nov. 3, 1905, since which time the finances have been greatly improved. Company had a deficit of 2,309,820 rubles, Dec. 1, 1905, and made a profit, 1906, of 226,980 rubles.

The property is one of the largest estates in the world, having an area of 3,600 square miles, with an extreme length of 144 miles north and south, and an extreme width of 63 miles east and west, the town of Bogoslovsk lying near the center. There also are a few hundred thousand acres of scattering lands outside of the main estate, which has a population of about 35,000. The property includes immense forests. Mineral values include gold, platinum, copper, manganese, iron, chromium and some lignite. Placer gold deposits are worked by dredges and hand, the output, formerly 10,000 to 12,000 oz. of gold yearly, having decreased latterly.

The principal business of the company is the manufacture of iron, the output being about 75,000 tons of finished products yearly. The iron mines carry mainly magnetite, with some hematite near surface, and extraction is principally from open pits and surface cuts, at average cost of about $1 per metric ton of ore. The property includes iron furnaces, iron and steel foundries, a steel rolling mill, coke-ovens, quarries, chemical works and a flouring mill.

Copper mining is merely an adjunct of the extensive business of the company, the copper mines lying in the lower rolling foothills on the Siberian slope of the Urals, the copper deposits apparently running parallel with the axis of the mountain range. The copper mines are in 4 groups, within a radius of 3 miles, the principal properties being the Bogolovsky, Frolovsky, Vasilevsky, Nikitinsky and Bashmakovsky mines, producers of importance in order named, also the Bashurakovsky, and smaller mines. Country rock is limestone, of lower Devonian age, with eruptive granite and porphyry, mingled with tufis, these being overlaid by tentaculite slate, followed by an eruption of augite-garnet rock, the copper ores, occurring along the contact of augite-garnet with other formations, being in lenticular shoots, mainly between diorite and wollastonite and limestone. There are some oxidixed ores, but values are mainly in chalcopyrite and occasional chalcocite, associated with ferruginous material, mainly pyrrhotite with calcite, quartz and wollastonite gangue. The rock in the mines is extremely hard. The 4 principal copper mines have been worked for upwards of a century.

The Bogoslovsky mine, employing, 1908, an average of 841 hands, has a main lens about 650′ long, with another lens of about 15x50x180′, the main lens yielding ore averaging 2.5% to 3% copper, which is hand-sorted to an average copper tenor of about 4.5%. The mine is 630′ deep, with 1 main shaft. Equipment includes a 455-h. p. steam plant, with 9 engines. Production of this mine, 1909, was 2,455,000 poods of copper ore, or 44,328 tons.

The Frolovsky mine has 3 shafts, deepest 750′, and employed, 1908, an average of 825 hands. Equipment includes a 369-h. p. steam plant, with 9 engines. Production, 1908, was 19,320 tons of ore.

The Vasilevsky mine has a 600′ main shaft, and a 190-h. p. steam plant, with 2 engines. Production, 1908, secured with an average force of 458 hands, was 7,272 tons.

The [illegible] shafts and 3 steam hoists, and production, 1908, with an [illegible] tons of copper ore.

ky mine has 2 shafts, deepest 450′, and a 100-h. p. steam
Production, 1908, with an average force of 271 hands,

mine has a sorting plant, with hand work, ore being as-
ontaining 5 to 6% copper, second grade, carrying 2.5 to 3%
s ore, of 1 to 1.5% copper tenor, which is discarded. The
steam-heated and electric-lighted concentrator, with a
nd labor. Wash-water passes through precipitation vats,
ontaining 3 to 4% copper, and ore is taken from the lower
e roast-yards.

heaps and stalls, latter having 3 walls and a capacity of
roasting requiring 20 to 60 days, according to nature of
ng required occasionally. Formerly a third and even a
ecessary, at times. Semi-pyritic smelting was tried, but
ove successful.

the mine, has four 48″ Pilz furnaces, of 28 tons capacity
44″ Raschette furnace, and two 18-ton 41x65″ Raschette
being of brick, with water-jackets. Fuel is inferior char-
and fir, and product is a matte of 22 to 35% copper tenor,
. Matte is converted to blister copper of 98% copper
99.7% copper tenor, in brick reverberatories.

e an acid plant, with a daily capacity of about 6,500 kgs.
50° Beaumé. There also is a plant turning out about
potassium and sodium bichromate.

a large number of dwellings, with good structures for the
uses at a number of the mines, and mainly log houses for
s. The management spends money liberally, in a variety
y purposes other than of a purely business nature, main-
a mining college, geological museum and an old people's
free medicines, medical attendance and a hospital service

ns 130 versts, of about 100 miles, of narrow gauge railway,
of 10 steamers, of 21,000 tons capacity, and 54 barges and
te capacity of 41,000 tons.

done mainly by Tartars, from the province of Kazan, on
or is good, though poorly trained and somewhat erratic,
ing a few months only. No women work underground,
orting ore, driving carts and working in the placer mines.
ent of 43 cents per day for shaftmen; 38 cents for miners,
pers, 35 cents per 12-hour day for day laborers, and 15
en day laborers.

er short ton averaged as follows: Mining, $8.09; hand-
sting, 17 cents; matte smelting, $2.12; bessemerizing, 89
ts; management, 35 cents; administration and miscellane-
f $12.08 per ton of ore, equivalent to a cost of 13.78 cents
er.

tion of ore from the various mines was as follows: Circa
ging 5.2% copper, from the Bogoslovsky; 741,000 poods of
Frolovsky; 407,000 poods of 11.1% copper ore from the
000 poods of 9% ore from the Bashmakovsky. Present
ines is circa 75,000 metric tons of ore yearly. Production
e copper in 1903; 3,163,190 lbs. in 1905; 7,699,291 lbs. in
n 1908; 8,636,098 lbs. in 1909.

CO. MICHIGAN.

onshire St., Boston, Mass. Mine office: Lake Mine,
Operating office: Dee Bldg., Houghton, Mich. Wm.

A. Paine, president; Chas. A. Snow, vice-president; Robt. H. Gross, and treasurer; Richard M. Edwards, superintendent; preceding offic H. Rice, Thos. S. Dee and Stephen R. Dow, directors. Organized 1910, with capitalization $2,500,000, shares $25 par, assessable; pai issued, $1,875,000. Of the 75,000 shares issued, 30,000 were given f and 45,000 were sold to the public, at $8. Boston Safe Deposit & Tr pany, transfer agent. Stock is listed on the Boston curb. Annual third Wednesday in April.

Lands, 960 acres, originally known as the Piscataqua, in very ea and later as the Henwood. It is hoped that the property is traverse cupriferous amygdaloidal bed of the Lake Copper Co. Diamond dri done, 1910, with 2 drills working at the end of the year. Drill holes hav a number of cores, from various amygdaloidal beds, more or less cu some with copper in fair quantities, but with nothing remarkably p or that justify sinking a shaft. Suspended operations March, 1911.

BOHEMIAN RANGE COPPER CO. MIC

Dead. Formerly at Mohawk, Keweenaw Co., Mich. Described

BOLAÑOS MINING CO. M

Dead. Property was sold, July, 1910, to Mexican Mines Co. at Bolaños, Colotlán, Jalisco, Mex. Described Vol. VIII.

BOLAÑOS MINING & MILLING CO. M

Dead. Was reorganized, circa 1904, as Bolaños Mining Co. For Bolaños, Colatlán, Jalisco, Mex.

COMPAGNIE DU BOLEO. M

Office: 56 Rue de Provence, Paris, France. American office: some St., San Francisco, Cal. Mine and works office: Santa Rosalia, S California, Mex. Albert Mirabaud, chairman; Chas. Laforgue, man rector; preceding officers, Marquis de Montaign, Jules Aron, Wm. d' Henri Puerari, Chas. Wendel and Ernest Z. Amboir, directors; Ernest director general; M. Démarest, secretary; A. Santallier, purchasing agen

Organized May 16, 1885, under laws of France, with capit f12,000,000, shares f100 par. Debentures have been fully paid. Is c jointly by the French house of Rothschild and the Banque Mirabaud, a considerable share interest in the Compagnie d'Inguaran. Is exem Dec. 17, 1925, from all federal and local taxes, except stamp taxes; is until 1935, from export and import duties on fuel consumed; is exem 1942, from custom duties and local duties, and employés are exempt f tary and civil service.

Dividends have been as follows: f62.5 in 1901; f62.5 in 1902; f 1903; f135.41 in 1904; f200 in 1905; f312.5 in 1906; f200 in 1907.

Lands, 20,000 hectares, granted by the Mexican government, in 1 also 11,920 hectares of grazing lands south of the mines. Principal g the Soledad, Providencia and Purgatorio. Lands include 5 known co posits of importance, the copper-bearing formation covering 3,000 hects possibilities of further extensions.

The ore occurs in a formation of Tertiary conglomerates, sandst tuffs, traversed at certain points by trachyte, the cupriferous tuffs conglomerates of eruptive rock pebbles, and being surmounted by ar tuffs, all traversed by fissures. The ores, of great variety, include melaconite, azurite, malachite, crednerite, chrysocolla, atacamite, cov chalcocite, with chalcocite and covellite predominating. There are 3 cu beds, the upper averaging about 3′ in thickness, the middle 2′ to 3′, bottom 2′ to 10′. The middle bed carries oxide and carbonate ores i concretions, known locally as boleos, hence the name of the mine. T bed, partly below the water-line, carries sulphide ores, as well as ox carbonates. The ore is disseminated through the tuffs in thin, irregul

clay gouge, and has a marked concentration toward the bottom of each where the ore forms compact layers of 6″ to 12″. The main workings are ıetres to 200 metres above sea-level, the mine being opened by numerous ıels, and by 7 shafts of the following depths: Sombrero, 98 metres; Carmen, .; Purgatorio, 55m.; Central, 156m.; Amelia, 48m.; Santa Rita, 86m.; San ı, 86m. The mine is extensively developed, having about 125 kilometres orkings in 1906.

Owing to the peculiar nature of the mine, all drilling is done by hand, and ore, not being fitted for mechanical concentration, is hand-sorted, and about is machine-briquetted at a cost of only about f1 per ton, the argillaceous gue serving as a natural binder. Average net returns from ore smelted have ged from 4.29% copper in 1900, to 3.36% in 1906, when the high price of per caused the smelting of ore of lower than average grade.

The mine has complete steam and electric plants, generating upwards of 0 h. p. from steam engines, of which 2,000 h. p. is transformed by two 500- 3-phase current generators and two 250-kw. 3-phase generators. The elec- plant, at Santa Rosalia, furnishes power for hoisting, traction engines and ghting system having 50 arc lights and a number of incandescent lamps. ı company is courageous in installing new machinery, and has a "boneyard" taining much old machinery that has been scrapped. The climate is trop-, and the country extremely arid. Potable water is brought from a reser- r on the Yaqui plateau, through a 16,074-meter pipeline, having pumps at ita Agueda and Santa Rita. The mines and works are connected by a 30- meter private railway, equipped with 9 locomotives and 250 cars.

The smelter, rebuilt 1901 and 1906, has 13 water-jacket blast-furnaces, of a 200 to 250 tons daily capacity each, six with 12 and six with 15 tuyeres each. ere are 6 large Connersville blowers, driven by three 175-h. p. compound en- es. Sea-water for jackets is supplied by a duplex pump of 2,400 cubic metres rly capacity, operated by a 250-h. p. engine. Electric locomotives on the g-line dump molten slags into moulds in rough holes in the ground, and, er cooling, the masses of slag are dumped over the end of the breakwater, ving a useful purpose in its extension. Fuel for smelting is German coke and glish coal, and patented coal briquettes are used for general fuel. The first sion product is a matte of 60 to 65% copper tenor, blown up to black copper 93 to 94% average tenor, production being about two-thirds matte, and one- ird black copper. Matte and bars are shipped to England and France for fining, the management believing this preferable to adding a converter plant.

The works at Santa Rosalia include a 2-story power building, of steel, ncrete and brick, and extensive machine-shops, capable of handling all classes mining work, the company occupying a singularly isolated position.

The harbor of Santa Rosalia has breakwaters of 650′ and 2,500′, with a 0-meter jetty and 2 new wharves, the dock having an area of 15 hectares, ith breakwaters composed of large blocks of slag. The harbor works in- ude a dredge and three 200-ton lighters used therewith. The port handles nnually about 125,000 tons of freight, in addition to about 7,000,000′ of lum- er. The company owns a steamer, plying between Santa Rosalia and the east- rn coast of México. Copper is shipped to Europe on the steamers of the Com- agnie Chargeurs Reunis.

The town of Santa Rosalia has a population of 9,500, of whom 200 are Europeans, dependent solely upon the mines and works, and is controlled abso- utely by the company. The town is well laid out, and has 4 general stores, arehouses, sawmill, church, 4 schoolhouses, theatre, amphitheatre and market. The company gives free medical and surgical attendance, medicines and an excellent hospital service to employés.

The labor question has given considerable difficulty, owing to the scant population of Lower California, necessitating the importation of workmen.

Wages are fairly high, for México, averaging 2 pesos daily for mine employés are given the benefit of free medical and surgical attenda cines and an excellent hospital service. The importation of 500 workmen, 1904, proved unprofitable, only 40 men remaining at the m end of the year, and tropical labor from Tepic also proved a failure number of Chinese coolies were hired, 1903-1904, but of the force of now employed, only about 300 are Chinese.

Recent production has been as follows: 304,940 metric tons of ing 22,817,610 lbs. fine copper in 1906; 319,854 metric tons of or 24,530,000 lbs. fine copper in 1907; 342,334 metric tons of ore 22,619,196 lbs. copper in 1908; 328,100 metric tons of ore, yielding lbs. fine copper in 1909; production, first half of 1910, was 14,753,0 copper, and for year was circa 27,500,000 lbs. The property is one of g and has been ably managed, under rather trying circumstances.

BOLINAS COPPER MINING CO. CAL

Office: 253 Spear St., San Francisco, Cal. Letter returned uncl former mine office, Bolinas, Marin Co., Cal. T. P. H. Whitelaw, and manager, at last accounts. Lands, 4 miles east of Bolinas, show 6″ to 2′ width in serpentine, on which some development work was d past, including a 180′ shaft, on the western vein, having levels at 100 with about 2 miles of workings, and formerly had several short tunn caved. Ore on dumps is said to carry 5 to 10% copper, which seem estimate. The property has a good equipment, including a mill. years.

BOMPA SYNDICATE. AU

Mine office: Glassford Creek, Curtis Co., Queensland, Australi in the Gladstone district, are but slightly developed. Idle some yea parently moribund.

BONANZA BELT COPPER CO. A

Office: 31 Nassau St., New York, N. Y. Mine office: Johnso Co., Ariz. Robt. Huntley, president; A. T. Wells, vice-president; Ehrich, superintendent; Gustav N. Gouyard, consulting engineer; Lewis, manager. Organized Oct. 29, 1906, under laws of Arizona, wi ization $3,500,000, shares $10 par. Trust Co. of America, New York Directors authorized, circa January, 1910, a $250,000 issue of 10-yea mortgage bonds, to provide funds for liquidating a floating debt $175,000, and furnish working capital.

Lands, 12 claims, area 230 acres, bought of Dragoon Mining Co., the Peabody mine, located 1879, which has a 6′ vein carrying ore giv up to 9% copper and 4 oz. silver, and is claimed to have 16,950′ of The mine was claimed to have produced, under former owners $1,000,000 worth of ore.

Judgments against company were secured, August, 1907, by Alb for $40,623.20, for advertising, and April, 1908, by Geo. C. Dessar, f retary and treasurer, for $27,155.55, also for advertising, the advertisi way, being of a most misleading nature. Production, 1907, was 22 fine copper and 7,126 oz. silver. Idle several years. Is not regarded

BONANZA COPPER CO.

Mine office: Manhattan, Nye Co., Nev. Lands, in East M have a 131′ shaft showing stringers of ore assaying about 4% copper, values. Idle and apparently moribund.

BONANZA COPPER CO. NEW

Mine office: Las Vegas, San Miguel Co., N. M. Chas. N. Pett dent and manager; Geo. H. Hunter, secretary. Has steam power, a centrator and a 25-ton leaching plant. Presumably idle.

)NANZA COPPER MINING CO. **MONTANA.**

Office: 12 Howard St., Spokane, Wash. Mine office: Florence, Ravalli ., Mont. Jos. Felton, president; A. J. Reise, vice-president; J. H. Tilsley, retary; W. J. Doust, treasurer; H. C. Topping, general manager. Organized arch 30, 1907, under laws of Washington, with capitalization $1,500,000, ares $1 par, nonassessable; issued, $957,750. Annual meeting, second Mon- y in January.

Lands, 6 claims, unpatented, area 100 acres, adjoining the Bonanza Moun- in Copper Co., in the Woodchuck district, circa 20 miles south of Missoula. nds show quartz-porphyry, slate and granite, said to carry 3 bedded veins quartz-porphyry, one, of 3′ estimated average width, opened by three 10′ ts and a 70′ shaft, and by tunnels of 90′ and 137′, carrying melaconite, mala- ite, chrysocolla, enargite and chalcopyrite, estimated by company to average % copper and $3.50 gold, which is considered an overestimate. Management ans extending tunnel 400′, to cut other veins.

ONANZA DE COBRE MINING CO. **MÉXICO.**

Dead. Was succeeded, circa 1907, by Elenita Development Co. For- erly at La Cananea, Arizpe, Sonora, Mex.

ONANZA DEVELOPMENT CO. **NEW MEXICO.**

Dead. Sold lands, 1899, to Santa Rita Mining Co. Formerly at Santa ita, Grant Co., N. M.

ONANZA GREENWATER COPPER CO. **CALIFORNIA.**

Dead. Formerly at Greenwater, Inyo Co., Cal. Fully described Vol. VIII.

ONANZA MINE. **ALASKA.**

The Bonanza mine in the Copper River district of Alaska is owned by the ennecott Mines Co.

ONANZA MINE. **ALASKA.**

The Bonanza mine on Latouche Island, Alaska, is owned by the Beatson opper Co.

BONANZA MINING CO. **BRITISH COLUMBIA.**

Dead. Formerly at Stewart, Cassiar district, B. C.

BONANZA MINING CO. **IDAHO.**

Office and mine: Montpelier, Bear Lake Co., Idaho. Col. E. J. Parrish, resident; E. M. Stewart, vice-president; A. D. Young, secretary; H. H. Hoff, reasurer; preceding officers, Chas. Sweet, M. F. Whitman and Ira Chaffin, irectors; R. C. Eckloff, general manager. Organized November, 1905, under aws of Idaho, with capitalization $5,000,000, shares $1 par, as successor of Montpelier Copper Mining & Smelting Co.

Lands, 25 claims, unpatented, area 500 acres, circa 9 miles southwest of Montpelier, including the Duke, Emerald and other claims. The Duke claim has a vein of circa 30′ width, with paystreak of about 5′, carrying auriferous and argentiferous copper ore, developed by a 400′ shaft. Presumably idle.

BONANZA MINING CO. **MÉXICO.**

Office: Sunbury, Pa. Mine office: Ameca, Jalisco, Mex. Geo. B. M. Metzger, president; Chas. A. Sidlar, secretary and treasurer; E. J. Callahan, general manager. Organized, 1905, by shareholders of Amparo Mining Co., to take over the Barranca mine, bought for $30,000. Idle since November, 1907.

BONANZA MINING & DEVELOPMENT CO. **CALIFORNIA.**

Office: 223 Sheldon Bldg., Los Angeles, Cal. Mine office: Vontrigger, San Bernardino Co., Cal. A. Wm. Grant, director; B. E. Webster, manager. Organized October, 1909, under laws of California, with capitalization $500,000. Mine, developed by shaft, shows auriferous and argentiferous copper ores, and tungsten ore. Has gasoline power.

BONANZA MINING & SMELTING CO. **WASHINGTON.**

Dead. Formerly at Index, Snohomish Co., Wash. Described Vol. VIII.

BONANZA MOUNTAIN COPPER CO. MO

Office: Wallace, Idaho. Mine office: Florence, Ravalli Co., Amos Buck, president; G. W. Dougherty, vice-president; H. C. Toppin tary; Thos. McCabe, treasurer; preceding officers and D. J. Whaley, d Organized May 20, 1909, under laws of Idaho, with capitalization $1, shares $1 par. Annual meeting, May 20th, yearly.

Lands, 6 claims, unpatented, area 120 acres, in the Woodchuck about 3 miles from the Northern Pacific Railway, carrying 4 fissure quartzite and slate, of which one vein, dipping to the northeast, of 4′ e average width and traceable 3,000′, carries cuprite, melaconite, m azurite, bornite, chalcopyrite and enargite, developed by a 300′ tunnel. shipment of 2 carloads of ore returned 32% copper, 3 oz. silver and $3 per ton.

BONANZA MOUNTAIN GOLD MINING CO., LTD. BRITISH COL

Dead. F. H. Knight was superintendent. Property, slightly de by shaft, employing, 1903, circa 10 men, showed low grade auriferous an tiferous copper ore. Formerly at Grand Forks, Boundary district, B. C

BONANZA QUEEN MINING CO., LTD. WASHIN

Office: 2931 Portland Ave., Minneapolis, Minn. Letter retur claimed from former mine office, Silverton, Snohomish Co., Wash. Shepard, president; W. R. Edwards, vice-president; C. F. Gordon, secret treasurer; Angus Sutherland, general manager; preceding officers, P. D. H. F. Warner and Mrs. S. L. Webb, directors. Organized 1906, under Washington, with capitalization $2,000,000, shares $1 par, nonassessab issued. Bonds, $250,000 authorized, $190,000 issued, at 7%.

Lands, 10 claims, showing 4 veins, said to be proven by gorges fo 4,000′, the main vein being claimed to average about 60′ width. Devel is by a 1,500′ crosscut tunnel. Company also has 12 placer claims, co a 30′ bed of clay, said to be suitable for Portland cement, also fire-clay. ments of 26 carloads of ore, to the Tacoma smelter, gave returns of $1 ton. Idle.

MARCELLO BÓ e NIPOTE.

Office: Sestri Levante, Italy. Mine office: Bonassola, Genova, Italy. Property is the Rossora mine, a small producer of copper ore, operation. Presumably idle.

BONITO COPPER CO. AR

Dead. The property showed low grade copper ores, apparently very slight development, and the management planned the installati lixiviation plant. Formerly at Safford, Graham Co., Ariz.

BONMAHON COPPER MINES DEVELOPMENT SYNDICATE, LTD. IRE

Office: Broad Street House, London, E. C., Eng. Mine office: ford, County Waterford, Ireland. Sir Jas. Aloysius Power, chairma Dixon, secretary; Arthur Llewellyn Pearce, consulting engineer; Her Marks, mine manager. Organized Nov. 16, 1905, under laws of Great with capitalization £30,000, shares £1 par.

Lands, 190 acres, on Bonmahon Bay, 17 miles from Waterford, in the Knockmahon and Tankardstown mines, which, 1827-1865, under the ship of the Mining Company of Ireland, made an authenticated produc £1,339,232, with claimed profits of £534,011. Ore extracted during thi is said to have averaged 10%, but must have been secured by very hand-selection. After 1875, under a different management, mines are have produced about £900,000 worth of ore. The Bonmahon mines a ancient, having been worked as early as the Sixteenth Century. Last work preceding present ownership was done 1878.

The Knockmahon ore body, said to be traceable 5 miles, to Kilmackthomas, curs in clay-slates. Annual production was about 1,000 tons fine copper, circa 40. The Tankardstown mine, running under the sea for some distance, is id to show considerable bodies of ore of concentrating grade. The Bonivy ine, 300′ deep, has been unwatered. Property as a whole shows large reserves low to medium grade ores, and is considered decidedly promising, but to be ofitable must be operated on a good scale. At last accounts, circa 1908, com- any planned reorganization, on a basis of about £200,000 capitalization. Idle veral years and apparently moribund.

ONNEY MINING CO. **NEW MEXICO.**

Dead. Formerly at Lordsburg, Grant Co., N. M. Described Vol. VI.

ONNIE BELLE MINING & MILLING CO. **WYOMING.**

Dead. Formerly at Rudefeha, Carbon Co., Wyo.

ONNIE DUNDEE MINING CO., N. L. **AUSTRALIA.**

Office: Cobar, N. S. W., Australia. Mine office: Hermidale, Canbelego o., N. S. W., Australia. M. J. Corbett, chairman; preceding officer, J. A. Draper, A. J. L. Flashman, E. B. Treatt and R. A. Sorensen, directors. Mine, pened to depth of 400′, carries auriferous copper ore, in considerable quantities, ssaying up to 45% copper, with varying gold values.

BON SOLDAT MINING CO. **UTAH.**

Office: 647 West Forty-first Place, Los Angeles, Cal. Letter returned unclaimed from former mine office, Frisco, Beaver Co., Utah. Edith Maida Cook, president; Col. J. Lee Burton, vice-president; Dr. J. H. Dennison Cook, secretary; Farmers & Merchants Bank, Los Angeles, treasurer. Organized June 4, 1907, under laws of Arizona, with capitalization $1,000,000, shares $1 par, nonassessable. Lands, 7 claims, 3 fractional, 5 miles from a railroad, showing argentiferous lead, copper and zinc ores, developed by shafts of 100′ and 112′. Idle.

BOODLE MINING SYNDICATE, LTD. **COLORADO.**

Office: 46 St. Mary Axe, London, E. C., Eng. Letters returned unclaimed from former mine office, Central City, Gilpin Co., Colo. John Peter Reid, chairman; Chas. Pearson, secretary. Organized June 28, 1901, under laws of Great Britain, with capitalization £15,000, shares £1 par; issued, 7,500 shares, 15s. paid in. Property carries auriferous and argentiferous copper ore. Idle some years and presumably moribund.

BOOLBOONDA COPPER SYNDICATE, LTD. **AUSTRALIA.**

Office: 13 Frederick St., Edinburgh, Scotland. Mine office: Boolboonda, Bowen Co., Queensland, Australia. A. J. H. Kenney, manager. Organized July 19, 1909, under laws of Great Britain, with capitalization £12,000, shares £1 par. Lands, 360 acres, known as the Madeleine mine, 1 mile from Boolboonda, also the Pansy mine, acquired July, 1909, and a 25-acre smeltersite, 2 miles from the mine. Property, divided by a creek into 2 sections, carries 5 veins. The mine has tunnels of 100′, 100′, 300′ and 300′, with air shafts for ventilation, and tunnels can be driven to secure an 800′ back. Ore is low grade, but selected samples have given assays of 20 to 30% copper, 10 oz. silver and several dwts. gold per ton. Employed 28 men, May, 1910.

BOPPY BROKEN HILL COPPER MINE, N. L. **AUSTRALIA.**

Mine office: Cobar, Robinson Co., N. S. W., Australia. Organized circa December, 1907, under laws of New South Wales, with capitalization £22,500, shares £5 par. Mine has a 200′ shaft, showing, at bottom, ore estimated to average 30% copper. Presumably idle.

BOPPY MOUNTAIN CO. **AUSTRALIA.**

Mine office: Cobar, Robinson Co., N. S. W., Australia. Organized 1906, with capitalization £3,000, shares £5 par. Lands, 28 claims, 2 miles north of Mount Boppy gold mine, adjoining the Boppy Blocks mine on the north, showing a strong gossan capping. Idle several years.

COMPAGNIE FRANÇAISE DES MINES DE BOR. S

Office: 60 Rue de la Victoire, Paris, France. Mine and works offi Zayetchar, Timok, Servia. P. Mirabaud, president; L. Molineau president; preceding officers, A. Mirabaud and G. Mirabaud, direct Laurens, manager. Organized June 24, 1904, under laws of France, wi talization f5,500,000, increased, 1908, to f7,000,000, shares f500 par.

Lands are a 50-year concession, with privilege of renewal, known St George, covering 2,400 hectares, and a lease of 6,500 hectares ad lands, in the communes of Bor, Krivelj and Ostrelj, lying circa 13 mil of Majdenpek. Property shows prominent gossans carrying considerabl ite, ores occurring in a belt of 1 to 2 miles width by about 10 miles le fissure veins up to 50′ and even 100′ width, traversing andesite and tuffs and breccias. Ores include chalcocite, covellite, bornite, chalc enargite and chalcanthite, latter in considerable quantities, associat galena, sphalerite and pyrite, all slightly auriferous and argentifero Krivelj, a vein of about 40′ width gives average ores of 5.5% copper. A Dulkan, a vein of 27 meters extreme width has given average assays copper. At Crveno-Brdo there are 3 irregular chimneys, averaging 80′ i giving average returns of 7% copper. Property is served by a branch Budapest & Constantinople railway. Mine is the principal copper p of the Balkans. Some labor troubles were had, 1908.

The smelter has 2 water-jacket blast-furnaces, and a converter dep with 1 stand and 4 shells. The steam plant has 360-h. p. Babcock & boilers.

Production was 2,689,612 lbs. fine copper in 1907, and 4,188,740 1908. Property, already a considerable producer, apparently has poss of considerable growth.

BOREN GULCH MINING CO. COLO

Office: care of Henry C. Deeming, general manager, Harrisbu Mine office: La Plata, La Plata Co., Colo. G. C. Cornell, superint Ores are complex auriferous and argentiferous copper, lead and zinc sul Has steam power.

BORNITE COPPER CO. MON

Dead. Formerly at Blackfoot, Teton Co., N. M. Described Vo

BORNITE COPPER & GOLD MINING CO. ARI

Dead. Formerly at Wickenburg, Maricopa Co., Ariz. Fully de Vol. VI.

BORNITE COPPER & GOLD MINING CO. WASHIN

Office: Bangor, Me. Mine office: Darrington, Snohomish Co., C. W. Coffin, president; Wilbur E. Frank, secretary; Hon. C. G. Austin, manager; Wm. Hancock, superintendent. Organized under laws of W ton, with capitalization $2,500,000, shares $1 par. Lands, 11 claims, Stillaguamish district, showing strong outcrops of auriferous and argent bornite and chalcopyrite. Development is by a 2,689′ tunnel, cutting 3 Has water power, and is said to have an aërial tram. Idle several year

BORNITE MINING & SMELTING CO. WASHIN

Office: Spokane, Wash. Mine office: Newport, Stevens Co., Was Honeck, president; J. A. Noble, vice-president; preceding officers, Henr and Fred Schilling, directors. Capitalization, originally $1,000,000, v creased, 1908, to $2,000,000, shares $1 par.

Lands, 180 acres, patented, 6 miles below Newport, on the north b the Pend d'Oreille River. Development includes a 30′ shaft, showing 12′ of high grade copper ore, and a 430′ tunnel, cutting an 18′ vein carryi grade copper ore, with quartz gangue. A quarter-mile flume from the h Coyote Creek would develop water power.

RTLE COPPER-GOLD CO. **WASHINGTON.**

Office: 822 Penobscot Bldg., Detroit, Mich. Letter returned unclaimed n former mine office, Republic, Ferry Co., Wash. C. Eugene Bortle, pres- it; Chas. E. Murphy, vice-president; Chas. Kohn, secretary and treasurer; ceding officers, Ralston MacCaig and Chas. Storch, directors; E. J. Delbridge, eral manager. Organized June 22, 1906, under laws of Washington, with italization $1,200,000, shares $1 par.

Lands, 4 claims, area 80 acres, held under bond and lease, also an 80-acre lsite and 160 acres miscellaneous lands, in the Lambert Creek district, adjoin- the Belcher mine on the south. Mine has a 357′ tunnel and a 52′ incline shaft, the northern extension of the Belcher vein, showing auriferous sulphide ore ing average assays of about 3% copper. Company is said to have expended ut $65,000 on the property. There is a sawmill at the smeltersite, on Curlew te, where a matting furnace was planned. Idle several years and apparently ribund.

SCASWELL UNITED TIN & COPPER MINES, LTD. **ENGLAND.**

Office: 8 Old Jewry, London, E. C., Eng. Mine office: St. Just, Corn- ll, Eng. A. H. Walter, secretary; Douglas S. S. Stuart, manager. Organized ne 4, 1907, under laws of Great Britain, with capitalization £200,000, shares par, in half preferred ordinary and half deferred shares, latter allotted to ndor as purchase consideration. Lands, 660 acres, being 7 setts, including the rth Boscaswell Downs, Calartha Common and Bortherras mines, adjoining e Levant and near the Botallack, about 2 miles from St. Just. Some of these nes were worked profitably in olden days, but no work was done thereon for ny years, until taken over, 1906, by Mr. Stuart. On the Pendeen Consols lt, the 135′ level shows a vein carrying a 2′ hanging-wall paystreak of massive ay copper and chalcopyrite, the footwall showing native copper, and assay of e entire vein, 1910, gave 14.3% copper and 40.9 lbs. of tin oxide per long ton.

OSS MINING CO. **WYOMING.**

Dead. Was organized circa 1908, as successor of Encampment Boss Mining Milling Co. Lands, adjoining the Itmay, were but slightly developed, and pparently no work was done by this company. Formerly at Rambler, Carbon o., Wyo.

OCIÉTÉ ANONYME PYRITES DE BOSSMO. **NORWAY.**

Office: 1 Rue d'Arenberg, Antwerp, Belgium. Mine office: Baasmoen, anen, Tromsö, Norway. G. Martens, O. Bendert, Ch. Scheid and H. Fasting, irectors; Ch. A. Münster, manager. Organized July 1, 1907, under laws of elgium, with capitalization f1,500,000; issued, f1,200,000. Has a bond issue f 1150,000.

Property is a mine of slightly cupriferous pyrite, assaying 0.5% and upwards n copper, and about 50% sulphur, latter element furnishing the principal ore alues. In 1909 employed an average force of 220 men. Production, 1907, was 3,412 metric tons of cupriferous pyrite, and was practically unchanged for 1909.

BOSTON & ALTA COPPER CO. **MONTANA.**

Office: 53 State St., Boston, Mass. Mine office: Corbin, Jefferson Co., Mont. John Joyce, president; Marcus L. Hewett, vice-president and general manager; Chas. H. Innes, secretary and treasurer; preceding officers, Walter Callender, Warren Curtis, Sr., Jas. G. Gregg, Archibald S. Spriggs, Wm. Tatham, and Chas. B. Van Nostrand, directors; Richard M. Atwater, Jr., consulting engineer; C. E. Titus, superintendent. Organized circa November, 1909, under laws of West Virginia, with capitalization $3,000,000, shares $10 par, as succes- sor of Alta-Montana Copper Co.

The Alta mine was worked circa 1873-1893, and is claimed to have pro- duced about 1,250,000 tons of ore, carrying metallic values of about $32,000,000. The Alta mine, passing from the original owners to the Helena Mining & Re- duction Co., was shut down, 1903, and thereafter was worked occasionally, by

tributers, until recently. The Alta Montana Co. succeeded to the o and was succeeded in turn by the Kelly Mining & Reduction Co., v succeeded by the Alta-Montana Copper Co., which was succeeded by ton & Alta Copper Co. The New Mexican holdings of the Kelly S Refining Co. were segregated, holdings of present company being c in Montana.

Lands, 640 acres, including the Alta group of 8 claims, carryi 7,000′ of the Alta or mother lode of the Corbin camp, property inclu placer ground near Corbin, and a townsite. The Alta vein series are granite, with dip to the north, the main, or Alta vein, of about 20′ aver being developed for about a mile horizontally. Values in developed are mainly in silver and lead, with a little copper and gold, and occasio erite, the lead and zinc decreasing and copper increasing with depth. ore is mainly chalcopyrite, carrying silver and a little gold, apparen average grade, and somewhat refractory, though it can be mined Mine assay records, during 1903, the last year of work by the old own an average of 1.75% copper, 4% lead, 9 oz. silver and $1.40 gold per to

The old Alta mine had about 17 miles of workings, developed n tunnels, No. 8 being the main tunnel, and was dry, even to the great attained.

New development is by a 700′ three-compartment shaft, with a of laterals, and management planned reopening old workings of the 500′ below, and deepening the shaft to 1,000′. A crosscut at 665′ depth the Alta vein to be about 30′ wide, 560′ from the shaft, said to give a fa showing.

Company is said to have a hydro-electric power plant, estimated a of developing 1,400 h. p., on Prickly Pear Creek, and there also is a s iliary steam plant. Equipment includes an electric hoist good for 1,; a 10-drill air-compressor. There is a 30x70′ boarding-house, and an ol little present value, but having a good site.

The Alta was a large and profitable producer for two decades, bu came low in grade and refractory, hence suspension in 1893, when s fered marketwise. The property was reported upon favorably by Kingston & Browne, who stated that it was "not so much a mining v a manufacturing proposition on a large scale," and also stated that risks are practically nil" in this venture. The correctness of this pred the part of Messrs. Pearse, Kingston & Browne will be verified or disp the outcome. Company is not regarded favorably, on account of the reorganizations, and its promotion by Marcus L. Hewett, whose rec promoter includes a number of unsuccessful ventures. Idle.

BOSTON-ARIZONA COPPER CO. AI

Office: 1012-60 State St., Boston, Mass. Letters returned u from former mine office, Globe, Gila Co., Ariz. Hon. Chas. M. Bru dent. Lands, 21 claims, near the McMillen, in the Richmond Basin, from Globe. Idle several years and apparently moribund.

BOSTON-ARIZONA MINING CO. AI

Dead. Formerly at Wickenburg, Maricopa Co., Ariz. Describe

BOSTON & ARIZONA SMELTING CO. AI

Office: Worcester, Mass. Letter returned unclaimed from form office, Benson, Cochise Co., Ariz. W. H. Beaumont, president; C. secretary; Riley A. Boggess, general manager; Doane Merrill, agent. ized 1907, under laws of Nevada, with capitalization $2,500,000, sha par, as successor of Southwestern Smelting & Refining Co., which s the Empire Smelting Co. Has a $50,000 bond issue, at 6%, due 1913, has authorized a Series B bond issue of $100,000.

Lands, 60 acres on the main line of the Southern Pacific. The sm

250-ton water-jacket blast-furnace, a 75-ton Kirk reverberatory furnace, nned to burn petroleum, No. 7 Connersville blower, Vezin automatic sampler, ck dust-chamber, ore and coke bins, steam power and artesian water. The elter, built circa 1905, never has been in blast. An old slag-dump, remain- ; from a previous smelter, contains circa 100,000 tons of slag, of about $5 per a assay values, which possibly could be resmelted.

OSTON-BISBEE MINING CO. **ARIZONA.**

Office: 91 City National Bank Bldg., Utica, N. Y. Mine office: Bisbee, chise Co., Ariz. Wm. J. Thistlethwaite, president and general manager; Milton Harlan, superintendent; Daniel F. Strobel, secretary; J. C. Breen, treasurer. ganized March, 1908, under laws of Arizona, with capitalization $5,000,000, ares $10 par; issued, $700,000. Utica Trust & Deposit Co., registrar. Com- any absorbed the Modern Copper Mining Co. Dec. 25, 1908, giving therefor ,000,000 in stock, escrowed until Nov. 1, 1912, and assumed all indebtedness the Modern.

Lands, 29 claims, 3 fractional, unpatented, area circa 550 acres, at the north- estern end of Tombstone Cañon, in the Warren district, showing 5 fissure eins, carrying carbonate and sulphide ores, of which one vein, slightly devel- ped, is claimed to give ore with average assay values of 7% copper, 10% lead, 4 oz. silver and 1 oz. gold per ton. Development includes shafts of 30′ and 100′ nd a short tunnel, latter planned to strike a vein showing a gossan outcrop. roperty is considered poorly located. Equipment includes a hoist and 6-drill ir-compressor. Idle several years.

OSTON & BRITISH COLUMBIA MINING CO. **BRITISH COLUMBIA.**

Office: 39 Cortlandt St., New York. Mine office: Granite Creek, Yale district, B. C. Idle some years and moribund.

OSTON & CAROLINA COPPER MINING CO. **NORTH CAROLINA.**

Dead. Formerly at Baker City, Granville Co., N. C.

BOSTON CLIMAX GOLD-COPPER MINING & INVESTMENT CO. **WASHINGTON.**

Office: Union Trust Bldg., Providence, R. I. Letter returned unclaimed from former mine office, Orient, Ferry Co., Wash. Benj. F. Harrington, presi- dent. Organized December, 1899, with capitalization $2,500,000, shares $5 par. Lands, circa 240 acres, on which it is claimed about $25,000 has been spent on development. Idle several years and apparently moribund.

BOSTON-COLBY COPPER MINING CO. **MONTANA.**

Letters returned unclaimed from former office, Colby, Wis., and former mine office, Saltese, Missoula Co., Mont. John Bauer, president; Hon. Andrew Flaig, secretary and general manager; Ole H. Linn, superintendent. Organized Sept. 16, 1903, under laws of Montana, with capitalization $1,000,000, shares $1 par.

Lands, 7 claims, area 140 acres, and a 5-acre millsite, lying next east of the Butte-Cœur d'Alene Copper Mining Co., immediately south of Saltese, in the St. Regis district. Lands have 2 copper-bearing veins, No. 1 of about 40′ width, and No. 2, to the south, of about 3′ width, carrying mainly chalcopyrite, with some bornite, of good average grade. Development is by 2 crosscut tunnels, upper, of 400′, giving a back of about 200′, and management was said to plan a 500′ two-compartment shaft. Idle.

BOSTON-COLORADO COPPER CO. **COLORADO.**

Dead. Was a swindle. Formerly at Salida, Chaffee Co., Colo. Fully described Vol. VIII.

BOSTON-COLORADO COPPER MINING CO. **COLORADO.**

Dead. Formerly at Ft. Collins, Larimer Co., Colo. Fully described Vol. VIII.

BOSTON & COLORADO SMELTING CO. **COLORADO.**

Dead. Was liquidated 1910. Formerly at Argo, Denver Co., Colo. Described Vol. VIII.

BOSTON CONSOLIDATED COPPER & GOLD MINING CO., LTD.

Dead. Was practically absorbed by Utah Copper Co., and w dated, voluntarily, and disincorporated Feb. 23, 1910. Formerly at Canyon, Salt Lake Co., Utah. Fully described Vol. VIII.

BOSTON CONSOLIDATED MINING CO.

Dead. Was merged, Jan. 26, 1910, in Utah Copper Co., on the b share of Utah for 2½ shares of Boston Consolidated, plus payment o mission of 25 cents per share. Production, for fiscal year ending Sept. was 6,148,510 lbs. fine copper, 49,130 oz. silver and 7,446 oz. gold, and f dar year 1909, production was circa 12,000,000 lbs. fine copper. For Bingham Canyon, Salt Lake Co., Utah. Very fully described Vol. VI

BOSTON & CORBIN COPPER & SILVER MINING CO. MO

Office: 82 Devonshire St., Boston, Mass. Mine office: Corbi son Co., Mont. Nathan L. Amster, president; A. B. Clough, vice-p C. R. Jeffrey, secretary and treasurer; preceding officers, David E. Ellis A. Houston, directors; Homer E. Emerson, general manager; Jas. W. M sulting engineer; F. W. Tuck, engineer. Organized Aug. 27, 1906, un of Maine, with capitalization $500,000, shares $5 par, nonassessable $450,000. Federal Trust Co., Boston, registrar; Boston Safe Deposit Co., transfer agent. Stock is listed on the Boston stock exchange. meeting, fourth Monday in August. Company sold 10,000 shares of stock, 1908, at $25. Balance sheet of July 31, 1910, gave $87,960 in call loans, with current accounts payable, the only debit item, of $6,539.

Lands, 12 claims, patented, area 157 acres, in the Colorado district mile west of Corbin, including the Bertha mine, having about 4,500′ of t of the Bertha vein. Country rock is granite, with intrusive porphyr carrying a vein system consisting of a number of parallel fissures. The ical conditions are markedly similar to those of Butte, though ore is chalcopyrite, instead of chalcocite, as in Butte, with some enargite and bornite of good grade, all argentiferous and slightly auriferous. Lands ore bodies, of which 3 are under development, the Bertha having 6 veins, of about 2′ average width, in addition to the main vein, which defined fissure in granite, of 6′ to 18′ width, carrying an 18″ to 2′ pa Management estimates the 3 veins under development as of 5′ averag Silver values increase with depth, ranging 6 to 9 oz. per ton in upper w and 12 to 22 oz. per ton in the lower workings, from ore shipped, first- averaging about 7.8% copper and second-class ore 4.6% copper, avera ore shipped, to Apr. 1, 1908, being 4.64% copper and 7.7 oz. silver Property adjoins the old Alta mine, claimed to have produced $32, worth of silver, and the Bertha vein supposedly is a continuation of the Al

The mine had about 3,500′ of workings when taken over by prese pany, development including two 900′ tunnels, 7 shallow discovery p shafts, and a 200′ shaft. Present development is by the 55′ Corbin sha Bertha shaft and 900′ Main shaft, with 4 short discovery tunnels, t Boston Fraction crosscut tunnel, 1,500′ Corbin crosscut tunnel and 880′ drift tunnel. The 700′ level shows a vein of 2′ to 10′ width, carrying chalcopyrite, and a 300′ drift, on the bottom level, at 900′, shows cop phides. Workings aggregate 11,000′, and management estimated, at 1910, that 300,000 tons of ore were blocked out, down to and includi 700′ level. The mine has an electric pump.

Equipment includes an electric hoist, capable of raising 5-ton from a depth of 2,000′, at the rate of 900′ per minute, and a 15-drill Ing Rand air-compressor, direct-connected to a 150-h. p. motor. Power i mercial current, taken from the Missouri Power Co., at a considerable over steam. There are 19 buildings, including a boiler-house, engine-

ıpressor-house, bunkhouse, boarding-house, changing-house, warehouse, ·e, laboratory, smithy and dwellings. Cost of wagon freight to railway $2 per ton on ore. The building of an aërial tram has been considered. duction, 1907, from test shipments of ore secured from development, was ,000 lbs. fine copper. Company plans continuing underground develop- nt by sinking, crosscutting and drifting, and is giving tentative considera- ı to building a 300-ton mill.

STON-COURTLAND COPPER CO. **ARIZONA.**

Office: Boston, Mass. Mine office: Courtland, Cochise Co., Ariz. R. Tolfree, president; W. H. Davis, vice-president; G. H. Hall, secretary; Allen, treasurer; Weldon C. Humphries, manager; preceding officers and ank S. Price, directors. Lands, 30 acres, including the Geronimo mine. operty was tested with a calyx drill, and later with a Cyclone churn drill, evious to starting the 50′ Geronimo shaft. Equipment includes a power nt. Presumably idle.

)STON DOMINION COPPER CO. **MANITOBA.**

Office: 60 Arch St., Boston, Mass. Letter returned unclaimed from rmer mine office: Ingolf, Selkirk Co., Man. R. B. Nickerson, superin- ndent. Organized, circa 1910, under laws of Massachusetts, with capital- ation $1,000,000, shares $1 par, nonassessable. Lands, 51 acres, known as ıe Mineral King mine, claimed to carry a 20′ fissure vein, nearly vertical, aceable 1,500′ on this property, and for 2 miles all told, carrying auriferous)pper ore, said by company to be developed by 2 shafts, which presumably re mere pits. Lands are on the shore of Hawk Lake, 95 miles east of Winni- eg, and this constitutes the first attempt at a copper mine in Manitoba, the roperty belonging geologically to the extreme western part of the Rainy ake-Rat Portage field.

The company in its propsectus omits the names of all of its officers, which ooks badly, and claims that this mine is located in the most prolific mineral egion in the world, which, unfortunately, is not true, stating that the bulk f the copper production of the United States comes from that vicinity, which s a rather remarkable claim, considering that this mine is located in Canada. The company credits its district with the entire copper and iron production of Lake Superior, the nickel and copper production of the Sudbury district, and the silver production of Cobalt. Company was endeavoring, February, 1911, to sell its shares at par, and for a raw prospect, having 50 acres of lands, with 2 pits, a selling price of $1,000,000 is absolutely unjustified. Letter was returned from the alleged mine office at the same time the company was en- deavoring to peddle its stock. Apparently, merely a stockjobbing enter- prise, and is regarded with much suspicion.

BOSTON-ELY DEVELOPMENT CO. **NEVADA.**

Dead. Was succeeded by Boston-Ely Mining Co. Formerly at Ely, White Pine Co., Nev. Described Vol. VIII.

BOSTON-ELY MINING CO. **NEVADA.**

Office: 84 State St., Boston, Mass. Mine office: Ely, White Pine Co., Nev. Arthur L. Robinson, president; Chas. H. Farnsworth, vice-president; Jerome C. Smith, secretary and treasurer; preceding officers, Geo. E. Keith and Wm. D. Elwell, directors; E. C. Chase, consulting engineer; Edw. W. Ralph, superintendent. Organized November, 1907, under laws of Maine, with capitalization $2,000,000, shares $10 par, assessable; paid in, $4; issued, $1,700,000. Was a reconstruction of Boston-Ely Development Co., and owns a two-thirds stock interest in the Ely Western Copper Co. Ended 1910 with nearly $40,000 cash on hand, with monthly expenses of about $4,000.

Lands, 22 claims, patented, area 300 acres, adjoining the Giroux on the west. Development is by the 1,160′ Emma shaft, one of the deepest in the district, proving the existence of disseminated ores, in porphyry, below the

limestone, at depth of 800′, but the question is as to average value erty also has 2 fissure veins, said to carry high grade ore, from whi shipments were made. Equipment includes a 40-h. p. hoist, and t several camp buildings.

BOSTON EXPLORATION CO. WASHIN

Office: Old South Bldg., Boston, Mass. Letter returned u from former mine office, Conconully, Okanogan Co., Wash. F. E. Hc fiscal agent. Organized 1906, with capitalization $5,000,000, shares Is a holding company, organized to control the Mineral Hill Tunnel Co. and Mineral Hill Mining Co., both of Ferry county, Washing Triune Gold Mining Co. in the Wannicut Lake district of Okanogan Washington, and the Providence Mining Co. in the Cedar Cañon di Stevens county, Washington.

BOSTON GOLD-COPPER MINING CO. AR

Dead. Was reorganized as Growler Copper Co. Formerly Pima Co., Ariz. Described Vol. III.

BOSTON GOLD-COPPER SMELTING CO. COLO

Dead. Was succeeded by Republic Smelting Co. Formerly a ville, Lake Co., Colo. Described Vol. III.

BOSTON-GREENWATER COPPER CO. CALIF

Dead. Career was marked by scandals. Formerly at Greenwat Co., Cal. Fully described Vol. VIII.

BOSTON-IDAHO MINING CO. I

Dead. Office was 6 First National Bank Bldg., Ogden, Utah. were R. P. Hunter, president; Frank H. Clayton, vice-president; E Waugh, secretary; O. A. Kennedy, superintendent. Organized Fe 1902, under laws of Utah, with capitalization $500,000, shares $1 par.

Lands were 8 claims, area 160 acres, on the western slope of the River Mountains, 12 miles west of Nicholia, nearest railway being at M 32 miles. Mine had about 1,500′ of workings, 1903, and had had a li on the dump, including some high grade copper and silver-lead ore scription of this company was badly mixed, in Vol. VIII, with descrip a company of precisely the same title, also in Idaho. Formerly at N Lemhi Co., Idaho.

BOSTON-IDAHO MINING CO. I

Office: 1137 Old South Bldg., Boston, Mass. Mine office: Ke Blaine Co., Idaho. A. Mayo, Jr., president; Frank M. Johnson, vic dent; Geo. E. Burnham, secretary; W. M. Pierce, assistant treasurer a manager; Fred W. Smith, superintendent. Organized May 28, 1907, laws of Maine, with capitalization $200,000; nonassessable; capitalizati given, May, 1909, by fiscal agents, at $500,000; present capitalization un

The description of this company was badly mixed in Vol. VIII w description of another company of precisely the same name, also loc Idaho.

Lands apparently were 11 claims in 1907, and August, 1909, were to be 24 claims, partly fractional, area 435 acres, and were stated by Diamond Co., fiscal agents of this company, April, 1910, to be 460 a Boyle Mountain. Property includes the Ontario and Sunday mines, ing slightly auriferous silver-lead ores, and the Lucky Boy mine, clai have ore averaging 35% zinc. In May, 1909, mines were claimed t 6,400′ of workings, with a productive capacity of more than 100 tons Mines apparently have 7 tunnels, and manager reported, officially, 190 more than 2 years' supply of ore had been blocked out for stoping. Mi claimed, 1907, to have 15,000 tons of low grade ore on the dumps, a tons of tailings. The L. Diamond Co. stated, May 28, 1909, that the co had 3 producing mines, and that the annual production from one mi

ore than 3½ times the necessary tonnage of ore for dividend requirements f 20 cents per annum, and that the other 2 mines were equal in production, ith ore of high value, but there was no annual production when these statements were made. It was claimed in advertisements, 1907, that company's mines were already credited with a production of more than $1,000,000.

Buildings include an office, laboratory, 2 warehouses, boarding-house, unkhouse, 2 smithies, 2 stables, 2 powder-houses, 2 ore-houses and 8 dwellings. There also is a 5,000′ sawmill. Company was claimed, 1908, to plan hydro-electric power plant.

An old 30-ton mill was in commission, 1907, for a short time, and a carload shipment of ore or concentrates was made, circa October, 1907. The old mill was dismantled in the summer of 1908, and a new mill projected on the same site.

The official progress of the new mill is best shown by the following statements from letters and advertisements of the L. Diamond Co.: In December, 1908, the 100-ton mill was completed; In December, 1908, the company had completed a 2-unit mill, the lead unit being 51x131′, in 5 units, rated at 100 tons daily capacity, and a zinc unit of 40x60′; in May, 1909, contract had been closed with the Traylor Engineering Co. for a 100-ton concentrator; on May 28, 1909, contracts had been placed for new machinery and electric power, with money on hand to pay for them, and, barring unforeseen delays, the mill should be ready to run on or before Sept. 29, 1909; July 21, 1909, the first carload of machinery for the new mill had been shipped, and final shipments would follow immediately; Aug. 2, 1909, the first carload had been received, and every effort would be made to get the machinery installed and the mill in operation by September, 1909; Oct. 2, 1909, the mill machinery and electric machinery were on the ground, and herculean efforts being put forth to install them as rapidly as possible; November, 1909, the L. Diamond Co. advertised another small allotment of stock at $1 per share, par value, proceeds to pay expenses of installing machinery and completing the electric plant; Nov. 16, 1909, machinery for the mills and electric plant was on the ground, and paid for; Feb. 12, 1910, the mill machinery was on hand, and installation would be under way the latter part of March, and the plant should be in operation not later than July 1, 1910; May 31, 1910, mill machinery and electric power plant would be installed and mill in operation not later than Aug. 1, 1910; July 16, 1910, the Traylor Engineering Co. had mechanics at the mill, installing the machinery; Feb. 11, 1911, the company reported a test run, resulting in the magnificent concentration of 1.3 tons into 1 ton, and the even more magnificent concentration of 1.1 tons into 1 ton. The remarkable progress made by this mill, backward as well as forward, not to mention sidewise and up and down, presumably was responsible for the remarkable ratio of concentration secured. With a little further practice the mill should be able to put 1 ton into 2.

The dividend and production record of this remarkable property, for the past 4 years, cannot be shown to better advantage than by similar summaries from the letters and advertisements of the L. Diamond Co., fiscal agents of this corporation since its organization. It should be premised that the L. Diamond Co. stated, 1907, that there was not a share of promotion stock in the company; that every officer and director paid cash for his holdings; that agents got no stock bonuses for selling stock, and the commission for selling was so small on each hundred shares sold that it would not buy a good dinner. In view of this, the L. Diamond Co. is entitled to great credit for its philanthropic efforts to sell stock, at a cost of thousands of dollars for advertising.

The following statements regarding production, earnings and dividends are summarized direct from advertisements and letters of the L. Diamond Co., fiscal agents for the Boston & Idaho Mining Co.:

June 15, 1907, the Boston & Idaho Mining Co. pays 25% on stock sold at

80 cents per share, but there is no record of any dividends ever having be
July, 1907, the millruns from second-class ore will net the company $
month, after charging off all expenses of operating the mine, mill and
and charging off $5,000 monthly for shrinkage, and allowing only two-
the mill capacity, to operate only three-fourths of the time, this earni
millruns alone equaling 5% of the capitalization, and being indepe
profits from shipping ore.

July 28, 1907, the fiscal agents stated positively that "your inc
this investment will not stop at 5% quarterly, and that extra divide
later will be disbursed, after the reserve fund is created, will exceed
the assured dividends of 20%." There is no record of any dividends e
ing been paid.

Sept. 7, 1907, the fiscal agents advertised that the investment was p
against loss.

September, 1907, the fiscal agents advertised this stock as "unques
the safest, soundest and most profitable investment security offered the i
public," though there is no record of dividend disbursements.

October, 1907, the fiscal agents advertised that after the completio
protective reserve fund of $200,000, the earnings that will be disburse
form of extra dividends would treble the assured dividends of 20% a
Perhaps the protective reserve fund is not yet completed.

Oct. 5, 1907, the L. Diamond Co. advertised dividends assured at
of 5% quarterly, beginning November, 1907. There is no record that
these "assured" dividends ever were paid.

Oct. 5, 1907, the L. Diamond Co. gave three reasons why this st
"safer than a bank deposit, and practically as convenient," the first bei
the Boston & Idaho Mining Co. stock "will pay, in assured dividends, a
five times as much as banks pay in interest"; secondly, the investment "
safer by the protection reserve fund, and impossible to lose"; thirdly, th
protection reserve fund completed, your holdings can be converted into
quickly as money can be withdrawn from the bank."

Aug. 22, 1908, the L. Diamond Co. offered a little more stock, at
share.

Apr. 5, 1909, the statement of F. O. Libbey, treasurer, gave liabili
capital stock, of $336,939, though nothing was noted in the company's
tising about the increase in capitalization.

Apr. 7, 1909, the fiscal agents stated that the Boston-Idaho Mini
had made good, had all it represented, had done and was doing all it claim
stated confidently that dividends were expected, not later than October,
regular quarterly dividends of 5%. These have not been paid, being of th
"promising" class as the 1907 and 1908 "dividends" preceding and th
"dividends" following.

Apr. 27, 1909, W. N. Pierce stated to stockholders that he desired t
record with the statement that "the new mill would earn, by operating on
thirds of its then daily capacity, a net profit, annually, of 50%, on the ou
ing stock of the corporation," but he intended "to run the mill to its full ca
which would increase earnings to at least one-third more, and the result
be that the investment would earn an enormous profit in excess of the div
promised." The excess profits were of the same material as the div
promised.

May 28, 1909, the fiscal agents stated that "the necessary daily t
of ore for dividend requirements, at the rate of 20% per annum, was le
10% on the production of the 3 mines," which apparently would be less t
tons daily. There is no record of production of even 10 tons daily. The
duction" was of the same character as the "dividends."

May 28, 1909, the L. Diamond Co. stated that hundreds of thousands of llars had been expended in development and equipment, which statement uld be open to doubt, had it come from a less immaculate source.

May 28, 1909, the fiscal agents stated that stock at $1 par share unquestionly "is the best, safest and will ultimately be the most profitable investment er offered to investors." The "profits" are of the same material as the "proction" and "dividends."

July 21, 1909, the fiscal agents offered stock "at $1 per share, up to 5 p. m. igust 6, 1909, after which an advance would be made, probably to $2.50 per are." The selling price was increased March 15, 1910, seven months, eight ys and fourteen hours in arrears of the scheduled date.

Aug. 2, 1909, the fiscal agents stated that the mill would run on zinc, the nc product being sold under a 5-year contract. It was stated that the mill uld treat 100 tons of crude ore daily, yielding 64 tons of shipping concentrates 56% zinc, for which the company would receive, on price of zinc then ruling, 3.35 per ton, or $2,134.40 per day, with a net profit estimated at $1,302.40, ving net annual earnings of $416,768. The annual net "earnings" are made om the same material as the "production," "profits" and "dividends" of this mpany.

Oct. 2, 1909, the fiscal agents advertised that the financing of the company as "about complete," and only a little stock remained for sale.

March 15, 1910, the "directors" voted to increase the selling price of shares rom $1 to $2, taking effect March 31, 1910. It is always a great comfort for hareholders to know that their interests are being safeguarded, days, nights and undays, by an efficient, vigilant and scrupulously honest board of directors. The increase in selling price, to $2, was ordered by the "directors," to take effect March 31, 1910, but Apr. 5, 1910, the fiscal agents advertised stock for sale at $1 per share. The orders evidently came out of the same cold-storage compartment as the "production," earnings," "net profits" and "dividends."

Apr. 16, 1910, the fiscal agents stated that "the mines had many thousands of tons of silver-lead milling ore, and many thousands of tons of zinc ore ready for milling, with an average value of 23.5% lead and 26.5 oz. silver per ton for galena, as determined by sampling from top to bottom," (120 feet), "with zinc ore averaging 36.7%."

Apr. 23, 1910, the L. Diamond Co. advertised that subscriptions to the final and last allotment of treasury stock at $2 per share would be received at their office "for a few days only." May 28, 1910, the L. Diamond Co. offered stock, in advertisements, at $2 per share, recommending same as "a sure-to-be certainty of 20% annually."

July 16, 1910, the L. Diamond Co. advertised stock at $2.50 per share, stating that it had advanced from par value of $1 to the then price of $2.50 "solely on its intrinsic value." The "intrinsic value" was of the same character as the "production," "net earnings" and "dividends."

Feb. 11, 1911, the L. Diamond Co. was still advertising, and presumably the army of "shrewd investors," of whom one is said to be born every minute, was "investing" real money in the "sure-to-be certainty" offered by the Boston-Idaho Mining Co., through the medium of those estimable philanthropists, the L. Diamond Co., whose efforts in behalf of the public scarcely have been equalled since the days of Dodson & Fogg.

BOSTON-JARILLA COPPER CO. **NEW MEXICO.**

Office: 64-92 State St., Boston, Mass. Mine office: Orogrande, Otero Co., N. M. J. J. Murray, general manager. Is controlled, through ownership of a large block of stock, with option on outstanding stock sufficient to give a majority interest, by Eureka Mines Co., Consolidated. Lands, 17 claims, adjoining the Molly Gibson mine, leased to Wauchusett Mining Co. Presumably idle.

BOSTON & JEROME COPPER CO. AI

Office and mine: Jerome, Yavapai Co., Ariz. J. C. Scott, preside Nikell, vice-president; A. A. Macpherson, secretary and treasurer. C 1908, under laws of Arizona, with capitalization $1,500,000, shares $1 creased, May, 1908, to $2,500,000, shares $5 par. Lands, 12 claims, i the Juniper group of 9 claims, area 146 acres, circa 2 miles south of Development includes 2 tunnels, of 266′ aggregate length, and a 130′ sh on a large porphyry and schist dyke carrying carbonate copper stai since February, 1908.

BOSTON & LAKE SUPERIOR COPPER MINING CO. ON

Dead. Formerly at West Superior, Douglas Co., Wis.

BOSTON & LAKE SUPERIOR MINERAL LAND CO. MIC

Office: Leopold Bldg., Houghton, Mich. Fred W. Nichols, reside Property is mineral land in the Lake Superior copper district. No min ever done.

BOSTON-MEXICAN MINES CO. ARIZONA & M

Dead. Formerly at Twin Buttes, Pima Co., Ariz., and Hermosillo, Mex. Fully described Vol. VIII.

BOSTON & MÉXICO GOLD & COPPER MINING CO. M

Dead. Formerly at Ameca, Jalisco, Mex. Described Vol. VI.

BOSTON-MIAMI COPPER CO. AR

Office: 70 State St., Boston, Mass. Mine office: Miami, Gila C Harry F. Fay, president; C. J. Morrisey, secretary and treasurer; p officers, Geo. G. Endicott, Walter L. Frost and Jas. Gardner, director L. Dickerman, consulting engineer; Fred W. Hoar, manager. Organize 9, 1910, under laws of Maine, with capitalization $5,000,000, shares $ successor of Boston-Miami Development Co. American Trust Co., transfer agent; State Street Trust Co., Boston, registrar. Apparently trolled through stock ownership by Arizona-Cananea Mines Corporatio

Lands, 42 claims, held under a $400,000 bond and lease, for 3 ye October, 1909. Lands are next south of the Live Oak and Keystone pr and about one-half mile west of the townsite of Miami, including the zuma group, bought for $90,000. Property shows a considerable area o granite and porphyry, similar to that of neighboring properties carrying p ores, the mineralized zone apparently extending in a southwesterly d through the Miami, Inspiration, Keystone, Live Oak and Boston-Mia erties. Mineralization is along the contact of schist and granite-po extending into both, and lands show conglomerate underlaid by schist. opment has been exclusively by churn drilling, with 2 Star drills, borin up to 900′ in depth. Management gives no estimates of average percen ore. Buildings include an office, laboratory, warehouse and 13 dwelling

BOSTON-MIAMI DEVELOPMENT CO. ARI

Dead. Was reorganized, March 9, 1910, as Boston-Miami Cop Formerly at Miami, Gila Co., Ariz. Described Vol. VIII.

BOSTON & MONROE MINING CO. NE

Dead. Former office was 418 Clay Peters Bldg., Reno, Nev. were Daniel F. Yost, president and general manager; Jos. E. Peters, vi ident; M. B. Moore, secretary; G. A. McPherson, treasurer; preceding and John O. Roe, directors. Lands were near Walker Lake, in the Walk Indian Reservation, and a little work was done thereon, 1907. Form Schurz, Esmeralda Co., Nev.

BOSTON & MONTANA CONSOLIDATED COPPER & SILVER MINING CO. MON

Dead. Was dissolved, circa February, 1911, and company sold all it erty, 1910, to the Anaconda Copper Mining Co., receiving in return 1,2 shares of Anaconda stock, which was distributed to stockholders of the

Montana, practically the entire stock issue of which was held by the Amalgamated Copper Co. A dividend of $4, circa July, 1910, brought total dividend disbursements of the company up to $421 per share, aggregating $63,150,000. Formerly at Butte, Silver Bow Co., Mont. Exhaustively described Vol. VIII.

BOSTON & NEVADA COPPER CO. NEVADA.

Dead. Office formerly was at Salt Lake City, Utah. Organized Aug. 15, 1904, under laws of Maine, and was merged, Nov. 17, 1904, in Nevada Consolidated Copper Co. Formerly at Ely, White Pine Co., Nev.

BOSTON & NEVADA MINING CO. NEVADA.

Dead. Property was sold, 1906, to Nevada Copper Co. Formerly at Yerington, Lyon Co., Nev.

BOSTON & NEW MEXICO COPPER CO. NEW MEXICO.

Dead. Was a stockjobbing scheme. Formerly at Estey, Socorro Co., N. M. Described Vol. VIII.

BOSTON-PARRY SOUND COPPER CO. ONTARIO.

Mine office: Parry Sound, Parry Sound district, Ont. Organized June, 1908, under laws of Maine, with capitalization $1,000,000, shares, $1 par. Lands 160 acres, in the vicinity of the Willcox and McGowan mines. Idle several years and apparently moribund.

BOSTON & PIOCHE MINING & DEVELOPMENT CO. NEVADA.

Office: Boston, Mass. Mine office: Pioche, Lincoln Co., Nev. C. S. Miller, general manager, at last accounts. Lands, 10 claims, lying to the eastward of the Nevada-Utah property, including the Fannie and Peavine mines, both small producers, in the past. Development is by shaft. Idle.

BOSTON-ST. PAUL CONSOLIDATED COPPER MINING CO. WASHINGTON.

Office: 712 St. Peter St., St. Paul, Minn. Letter returned unclaimed from former mine office, Index, Snohomish Co., Wash. Wm. M. Baker, president; O. S. Derringer, secretary. Capitalization $2,000,000, shares, $1 par. Lands, 8 claims, adjoining the Ethel. Idle some years and apparently moribund.

BOSTON & SEATTLE MINING CO. MONTANA.

Dead. Formerly at Elliston, Powell Co., Mont. Described Vol. VIII.

BOSTON & SEVEN DEVILS COPPER CO. IDAHO.

Dead. Formerly at Cuprum, Washington Co., Idaho. Described Vol. III.

BOSTON-SIERRA MADRE MINE INDUSTRY CO. WYOMING.

Office: 430 Railway Exchange Bldg., Denver, Colo. Mine office: Slater, Routt Co., Colo. Amos Pettibone, president; Dr. Daniel Pease, vice-president; Lewis A. Pease, secretary, treasurer and general manager. Organized December, 1900, under laws of Wyoming, with capitalization $1,000,000, shares $1 par, nonassessable; fully issued. Annual meeting, second Wednesday in January.

Lands, 2 claims, patented, area 40 acres, in the Three Forks district, carrying 2 fissure veins in andesite, one of about 14′ average width, opened by several pits of 10′ to 25′, and a 165′ shaft and 470′ tunnel, with about 1,200′ of workings, showing cuprite, chalcopyrite and argentiferous galena, estimated by company to carry a small percentage in copper, 15% lead, 60% zinc, 10 to 600 oz. silver, with an average of about 50 oz., and from a trace to $1,400 gold per ton, with an average of about $4. Equipment includes several mine buildings. Idle since 1907, owing to lack of funds.

BOSTON & SILVERTON MINING & REDUCTION CO. COLORADO.

Dead. Property was sold, circa November, 1909, to W. B. Lowe Mining Co. Formerly at Silverton, San Juan Co., Colo. Described Vol. VIII.

BOSTON TERRACE COPPER MINING CO. UTAH.

Dead. Formerly at Lucin, Box Elder Co., Utah. Described Vol. VIII.

BOSTON & TEXAS COPPER CO. TEXAS.

Office: 405 Tremont Bldg., Boston, Mass. Letter returned unclaimed from former mine office, Spalding, Archer Co., Tex. E. M. Low, president;

Jas. M. Wheaton, secretary and treasurer. Organized 1898, under Arizona, with capitalization $2,500,000, shares $10 par. Is mortg $25,000 and desirous of selling lands. Long idle and apparently mori

BOSTON & TEXAS COPPER MINING CO.

Dead. Formerly at Spalding, Archer Co., Tex. Was promoted, Chas. Denison, of the Hartford Trust Bldg., Hartford, Conn., who adve as another Calumet & Hecla.

BOSTON & TINTIC MINING CO.

Office: Provo, Utah. Mine office: Mammoth, Juab Co., Utah Knight, president; Wm. H. Tibbals, vice-president; W. Lester Mang retary and treasurer. Organized 1899, under laws of Utah, with capit $1,000,000, shares $1 par, assessable; issued, $747,000. Lands, 3 clai ented, area 46 acres, near the Black Jack mine, carrying 2 fissure porphyry, of which 1, of 3′ to 5′ average width, traceable circa 2,000′, opened by tunnels of 40′, 70′ and 120′, and by a 103′ shaft that enco bunches of good ore giving assays of 1 to 3% copper, 20 to 55% le 45 oz. silver and 80 cents gold per ton. Mine is said to have shipped ric early days. Idle since 1905, except for a little work, 1909.

BOSTON & UTAH COPPER CO.

Office: 508 Tremont Bldg., Boston, Mass. Mine office: Basin, Co., Utah. L. Auerbach, president; Geo. H. Heath, manager; John Chrystal, consulting engineer. Was organized as a merger of the tional Gold & Copper Mining Co. and Dirigo-La Sal Mining Co. L claims, in 2 groups, one of 23 claims and a millsite, on Deep Creek, from Castleton, having been taken over from the Dirigo-La Sal, and group, of 2 claims and a millsite, on Beaver Creek, was taken over f International Gold & Copper Mining Co. Property shows a vein, in one press description to be 700′ wide, and traceable more than 1 mi a 200′ hanging-wall paystreak averaging 6 to 10% copper, with workabl in the balance of the lode. These figures were made by a lunatic. has been claimed, in another press description, that the property has up to 100′ in width, carrying 5% copper, with sufficient gold and silver all mining and milling expenses, which statements were made by lunatic. It cannot be found that the company made these claims. ently the ore carries about 3% copper, and 40 cents to $1.40 gold Development includes a number of shallow pits and short tunnels, one to be driven circa 3,000′, to cut a number of veins at depths of 1,200′ t Equipment includes necessary mine buildings. Presumably idle.

BOSTON-UTAH MINING CO.

Office: 1012 Boston Bldg., Salt Lake City, Utah. Letter retur claimed from former mine office, Ibapah, Tooele Co., Utah. Wilmar president; Jas. Langton, vice-president; T. R. Larson, secretary and tr Organized February, 1907, under laws of Utah, with capitalization $1 shares 10 cents par, assessable. Lands, 9 claims, 3 patented, 45 miles railroad, having shafts of 50′ and 85′, showing argentiferous and au lead and copper ores of medium grade. Idle.

BOSTON & WYOMING COPPER-GOLD CO. WYO

Letter returned unclaimed from former office, Custer, S. D. Mine Wheatland, Laramie Co., Wyo. W. A. Nelson, president; John I. Hig vice-president and general manager; W. E. Benedict, secretary. Or October, 1903, under laws of South Dakota, with capitalization $2,0 shares $1 par. Lands, 6 claims, area 120 acres, known as the Seldo group, having 3 fissure veins in granite-porphyry, giving assays of 5 copper, 6 oz. silver and $3 gold per ton, from cuprite, chalcocite, borni chalcopyrite, with sulphide ores predominating. Idle and apparently bund.

BOSTON & WYOMING COPPER MINING CO. **WYOMING.**

Office: care of Col. Jas. A. Shinn, Leadville, Colo. Mine office: Esterbrook, Albany Co., Wyo. Organized January, 1903, with capitalization $500,000. Property, which is the oldest in the district, includes 120 acres mineral lands and 120 acres miscellaneous lands, taken over from Esterbrook Mining Co. The Esterbrook mine has a 4′ fissure vein, traversing diorite, schist and granite, carrying cuprite, chalcopyrite, cerussite and galena, estimated by former owner to average 2 to 4% copper, 25 to 30% lead, 2 oz. to 4 oz. silver and $1 to $2 gold per ton, developed by 2 short tunnels and 5 shafts, deepest 335′. Presumably idle.

BOULDER COPPER MINING CO. **SOUTH DAKOTA.**

Dead. Formerly at Custer, Custer Co., S. D. Described Vol. VII.

BOULDER CREEK MINING CO. **IDAHO.**

Office: 512 Mohawk Blk., Spokane, Wash. Mine office: Mullan, Shoshone Co., Idaho. Wilbur D. Greenough, president; J. B. Greenough, vice-president; O. T. Underwood, secretary and treasurer. Capitalization $1,500,000, shares $1 par. Is said to control the Idaho Giant and Bitter Root companies, through 15-year leases, and apparently is controlled by Cœur d'Alene Development Co. Lands, 5 claims, known as the Central group, about 2 miles south of Mullan, which, with leases on the Idaho Giant and Bitter Root properties, give a tract of about 900x7,500′. Development is by tunnels of 140′, 400′ and 1,000′, showing ore giving assays of 10 to 15% lead, with small copper and silver values. Property considered promising.

BOULDER-MICHIGAN MINING & DEVELOPMENT CO. **MONTANA.**

Letter returned unclaimed from former office, Cassopolis, Mich. Mine office: Boulder, Jefferson Co., Mont. Organized circa November, 1910, with capitalization $1,000,000, by J. Henry Miller, David S. Tallerday, C. E. Trescott, L. E. Skelton, M. B. Taylor, Samuel Myhre and J. H. Robinson. No trace of operations secured.

BOUNDARY FALLS SMELTER. **BRITISH COLUMBIA.**

Owned by New Dominion Copper Co., at Boundary Falls, Boundary district, B. C.

BOUNTIFUL GOLD & COPPER MINING CO. **UTAH.**

Dead. Former office was Bountiful, Utah. Officers were Henry W. Hooton, president; Henry Southworth, superintendent. Was organized October, 1909, under laws of Utah. Lands were 7 claims, unpatented, showing auriferous and argentiferous copper ore. Formerly at Farmington, Davis Co., Utah.

BOUSE GOLD & COPPER CO. **ARIZONA.**

Letter returned unclaimed from former office, Los Angeles, Cal. Mine office: Bouse, Yuma Co., Ariz. Lands, about one-half mile west of the Little Butte mine, show a gossan, said to be 120′ wide and to carry $3 gold per ton, on which is sunk a 50′ shaft, showing ore said to assay 9 to 16% copper, and up to $26 gold per ton.

BOUSE-PIOCHE GOLD & COPPER MINING CO. **ARIZONA.**

Mine office: Bouse, Yuma Co., Ariz. Property is the Old Maid mine, west of Bouse, from which first shipment, March, 1909, assayed about $150 per ton in gold, in addition to fair copper values. Idle.

SOCIÉTÉ DES MINES DU BOU-THALEB. **ALGERIA.**

Office: 27 Rue Lafitte, Paris, France. Mine office: Rovigo, Alger, Algeria. Jules de Catelin, manager. Lands, 394 hectares, carrying copper, lead and zinc sulphides.

BOWEN COPPER CO. **ARIZONA.**

Dead. Formerly at Wendendale, Yuma Co., Ariz. Described Vol VIII.

BOWYER GOLD & COPPER CO. **ARIZONA.**

Office: Quartzite, Ariz. Mine office: Bouse, Yuma Co., Ariz. W. L. McPeak, president; David L. Watson, vice-president; Jos. Bowyer, secretary and

general manager; preceding officers, J. Delmar Bowyer and E. N. directors; Phœnix National Bank, treasurer. Organized July 15, 190 laws of Arizona, with capitalization $5,000,000, shares $5 par, nonas Annual meeting, first Monday after first Tuesday in July.

Lands, 7 claims, known as the Swastika group, also 160 acres misc lands, in the Plomosa district, on the western slope of the Dome Roc tains, circa 10 miles south of Bouse. Property has 3 contact deposits, schist hanging and limestone foot, showing 50′ to 200′ gossans and malachite and chalcocite, estimated to average 2 to 10% copper and $ gold per ton. Company plans sinking a 300′ incline shaft on the f crosscutting at that depth, also installing a 25-h. p. gasoline hoist.

BOX CANYON MINING CO. AR

Dead. Formerly at Bisbee, Cochise Co., Ariz. Described Vol. V

BOYER-NEVADA COPPER CO. N

Office: 508 Equitable Bldg., Denver, Colo. Mine office: Boyer, ill Co., Nev. Wm. H. Swift, vice-president; Arthur Howe Carpenter, s and treasurer; Cranston Howe Carpenter, superintendent. Organize laws of Arizona, with capitalization $10,000,000, shares $1 par, nonas Lands, 24 claims, area 400 acres, also a 10-acre millsite and 160 acres lands, having a 230′ tunnel, with about 600′ of workings, held under b lease from Messrs. Uniacke, Boyer and Gunnell. Property shows an e area of porphyritic rock, carrying disseminated ore in the original Considerable diamond drilling has been done. Property shows a leach of circa 300′ to 1,000′ width, between walls of rhyolite and trachyte, streaks of oxidized ores said to give a general assay of 12.68% copper, ba leached ore material assaying 1.45 to 1.7% copper. The leached zon ceeded by chalcopyrite, disseminated in grains through porphyry, a tered ores are claimed to average 3.5 to 5% copper, and were reported, ber, 1909, by the late Dr. Franklin R. Carpenter, to average about 1.8% and 80 cents gold per ton. Idle.

BOZEMAN COPPER CO. MO

Office and mine: Bozeman, Gallatin Co., Mont. Organized Augu with capitalization $100,000. No trace of operations secured, and c apparently still-born.

BRADEN COPPER CO.

Office: 165 Broadway, New York, N. Y. Mine office: La Jun cagua, O'Higgins, Chile. Works and operating office: Rancagua, O' Chile. Barton Sewell, president; Edgar J. Meyer, vice-president; C. K. treasurer; preceding officers, Murry Guggenheim, Wm. Braden, Edgar Jr., Messmore Kendall and J. E. Bamberger, directors; Geo. F. Hilto tary; Frank L. Langford, general manager; Pope Yeatman, consulting e W. G. Locke, mine superintendent; Fredk. Kett, mill superintendent Colley, smelter superintendent. Organized June 18, 1904, under Maine, and name changed to present title, Aug. 9, 1904, with capita $2,332,030, shares $10 par, nonassessable; fully issued. Company is p ized in Chile. Is controlled, through ownership of entire stock issue, by Copper Mines Co. Has a $4,000,000 issue of 6% first-mortgage con bonds. Annual meeting, fourth Tuesday in July.

Lands, 15 mineral claims, area 264 acres, and a 204-acre millsite, wi holdings of circa 1,200 acres. Mine is at La Junta, about 40 miles fro cagua, nearest seaport being Valparaiso, 200 miles distant by rail. includes El Teniente mine, an antigua, La Fortuna and La Capitana m the Cordillera de Graneras.

The ore body is unique, a volcanic vent of about 3 miles circumferen filled with tuff, and surrounded by highly fractured and brecciate dio fracture being mineralized around the circumference. While the miner

s an extreme width of nearly 1,000′, around the 8-mile circle, the commercial e bodies lie in diorite, with a hanging-wall of brecciated tuff, with an average dth of about 150′, but with frequent width of 200′, and even up to 400′ of mmercial ore. The dioritic zone has been further fractured by porphyry kes, which occasionally cut into the tuff. The zone of oxidation is shallow, nging from a few feet to 150′ in depth, and as the property carries mainly dis-minated primary ore, the management holds to the belief, with strong reason, at values will carry to great depth. The fractures in the rock range from a ere film of sulphide ore up to 3″ to 4″ of mixed bornite and chalcopyrite, mainly e latter. Both porphyry and tuff are slightly mineralized for a considerable stance from the point of contact, and beyond the limits of commercial ore. Ore illed, December, 1910, gave average returns of 2.87% copper. The ore stands ell without timbering, in stopes up to 10 meters in width. Mine is equipped ith an electric haulage system, taking a 3-phase current at 220 volts, with -ton ore cars. The general plan of mining adopted calls for opencast work own to the tunnel level.

The Fortuna mine, which is the principal property in point of development aving, according to Mr. Yeatman's report, of March, 1910, fully developed serves of 7,000,000 tons of ore averaging 2.7% copper, in tunnels No. 12 and , is opened by 5 tunnels, No. 4, the deepest, being 730′ below No. 3, the former owest working, and shows copper ore of good grade at this depth. Tunnels No. 2 and 3 are breasted in ore at 2,000′ from the portals. The Fortuna was opphered extensively, by former owners, for high grade ore, which was followed nd extracted wherever found. Average grade of Fortuna ore is lower than in El Teniente mine. Workings show copper sulphides and occasional metallic copper throughout the brecciated material for a depth of circa 2,000′.

El Teniente mine, adjoining La Fortuna, is the oldest property, having been worked by the Spaniards before the independence of Chile, and is said to have produced about 50,000 tons of ore, of 30 to 50% average copper tenor. This property carries native copper, cuprites, azurite, malachite and tetrahedrite, latter predominating. The breccia of porphyry and tuff has been compared with the Calumet conglomerate of the Calumet & Hecla, which it resembles somewhat. This mine, developed by tunnel, shows considerable quantities of high grade chalcocite, of 30 to 40% tenor.

La Capitana mine, in the Cañon Diablo, on the opposite side of the mountain from the Fortuna, is to be developed through the Fortuna tunnels, at considerable depth, and is practically a part of La Fortuna mine. La Capitana shows 15% ore in surface workings. El Soldado mine, practically undeveloped, shows promising outcrops of ore.

Owing to the plan of development by tunnels, no heavy hoists are required. Mines are supplied with adequate buildings and necessary machinery.

The Norte América mine, near Putaendo, Chile, said to be owned by this company, has a vein carrying about 3% copper and 12 dm. silver, used for fluxing. Production, 1907, with a force of 18 men, was 550 metric tons of ore.

Electric power is used throughout. The present hydro-electric plant, near El Teniente mine, 72 kilometers from Rancagua, takes water from 2 small cordilleran rivers, La Coya and El Teniente, through a 20x36″ wooden flume, of 2 kilometers length, leading to a powerhouse having 3 turbines, 2 developing about 1,000 h. p., and the third actuating a 175-kw. 3-phase General Electric dynamo. There is now under construction a larger hydro-electric plant, to take water through a ditch from the same rivers, the first unit of which will develop 6,000 kw., with an ultimate capacity estimated at 12,000 to 15,000 kw. Cost of hydro-electric power, for first year of operation, was under $2 per h. p. year, not including interest and depreciation.

Ore is transported from mines to mill by three Riblet aërial trams, of 2,630 meters length, with 550 meters drop. The main line, of circa 2,000 meters, runs

from the mill to the central transfer station, where connection is had 1,000-meter line to El Teniente mine, and a 500-meter line to La Fortu Capacity of the aërial tram system is 1,000 tons daily, but electric t are being built, to replace the ropeways, and these will have practically u transportation capacity.

The company owns a 43-mile railway of 30" gauge, connecting the m mill at La Junta with the smelter at Rancagua. A 40-mile wagon-ro Rancagua to the mines, costing about $175,000, was completed Novemb and over this road about 4,000 tons of machinery and supplies were ha many as 2,500 draft oxen being used.

The mill, completed June, 1906, was of 250 tons capacity, planne first unit of a 500-ton mill, and was remodeled and capacity increased, 450 tons daily. Equipment includes Hartz jigs, Overstrom and Wilfle Frue vanners, Wilfley slimers and the Sherman slime-settling syste mill yields concentrates of about 25% average copper tenor. Work way on further units, the first expected to be in operation circa April, 19 all units completed by end of 1911. The designed capacity of the c milling plant is 1,600 tons, but it is expected to have an actual capacity tons, and, the old and new mills and the smelter are expected to have a c capacity of circa 3,000 tons daily, by the end of 1911.

A 50-ton leaching plant, at the mine, is of an experimental natur successful, leaching will be employed more extensively that at any othe property outside of Spain.

Labor is tractable, fairly efficient, and in adequate supply, about 2,2 being employed.

A smelter is under construction at Rancagua, with foundations l steel on the ground at the end of 1910. This plant, to be thoroughly with blast-furnaces, converters and refinery, should be completed the latter half of 1911. The complete works, including the concen leaching plant and smelter, are planned to treat circa 3,000 tons of or estimated to average 2.7% and to yield 40,000,000 lbs. fine copper ye a cost, estimated by the management, of 7½ cents per pound, laid New York, with the possibility of reducing the cost to 6½ cents per if the leaching process proves adapted to treating the bulk of ore pr Production is estimated at 3,000,000 lbs. fine copper in 1908; 7,500, in 1909, and circa 9,000,000 lbs. in 1910. It remains to be proven t Braden can lay down copper in New York for 7½ cents per pound, b seems little question of its ability to secure a large production at a c cents per pound, or even less. The property is one of exceptional and is being developed and equipped with the aid of the best technical

BRADEN COPPER MINES CO.

Office: 165 Broadway, New York, N. Y. Barton Sewell, pr Edgar J. Meyer, vice-president; Geo. F. Hilton, second vice-presid secretary; C. K. Lipman, treasurer; preceding officers, Eugene Mey Murry Guggenheim, S. R. Guggenheim, Wm. Braden, Messmore L. F. Crofoot and J. E. Bamberger, directors. Organized May 2 under laws of Delaware, with capitalization $10,000,000, shares $5 creased, November, 1910, to $12,000,000, shares $5 par, nonassessable $6,000,000. Bonds, $6,000,000 authorized, $5,000,000 issued, in a $4, issue of 10-year 6% first-mortgage convertible bonds, and an issue of $2, second-mortgage 7% convertible bonds. Upon the retirement of all ible bonds, the full capitalization of $12,000,000 will be issued.

Property consists solely of the entire capital stock and entire $4, bond issue of the Braden Copper Co., the Braden Copper Mines Co. being a holding company, controlled by the Guggenheim interests. Farme & Trust Co., New York, registrar. Annual meeting, fourth Monday i

BRADFORD COPPER MINING CO. **ARIZONA.**

Mine office: Patagonia, Santa Cruz Co., Ariz. Idle several years.

BRADFORD DEVELOPMENT CO. **ARIZONA.**

Dead. Formerly at Vail, Pima Co., Ariz. Fully described Vol. V.

BRADLEY MINING & MILLING CO. **WYOMING.**

Mine office: Centennial, Albany Co., Wyo. Lands are claims on Michigan Hill, near Centennial, developed by a tunnel being driven to reach a vein of auriferous copper ore, claimed to carry average values of $35 per ton. Presumably idle.

BRADSHAW MINING CO. **ARIZONA.**

Dead. Was a bad egg. Formerly at Briggs, Yavapai Co., Ariz. Fully described Vol. VIII.

BRADSHAW MINING CO. **CALIFORNIA.**

Dead. Property was the Blue Ledge mine. Formerly at Hutton, Siskiyou Co., Cal.

BRADSHAW MOUNTAIN COPPER MINING & SMELTING CO. **ARIZONA.**

Dead. Lands passed to De Soto Mining Co. Formerly at Humboldt, Yavapai Co., Ariz. Fully described Vol. V.

BRAGANZA GOLD MINING CO. **ARIZONA.**

Office: 708–140 Dearborn St., Chicago, Ills. Mine office: Big Bug, Yavapai Co., Ariz. Wm. Kelly, superintendent. Property is the Henrietta mine, carrying auriferous copper ore. Company was promoted by J. C. Rankin, and at one time paid 1% monthly dividends, which apparently were not earned. The old dump, of about 20,000 tons of ore, said to average about $4 per ton in gold, is being shipped to the United Verde smelter, for converter linings.

NEGOCIACIÓN MINERA DE O. y T. BRANIFF y CA., S. A. **MÉXICO.**

Office: Rosales 1, México, D. F. Mine office: Caracuaro de Morelos, Tacámbaro, Michoacán, Mex. Mine and works office: Cadereyta de Montes, Cadereyta, Queretaro, Mex. Thos. D. Murphy, general manager. Organized Feb. 3, 1905, under laws of México, with capitalization 250,000 pesos.

Lands include El Doctor and La Negra mines, carrying mainly silver-lead ores, with considerable zinc and small copper values. Equipment includes electric power and an auxiliary steam plant.

Works include a mill and smelter, former having 5 stamps, Huntington mills, and a 125-ton cyanide plant. The smelter, at Maconi, 50 miles from Bernal, on the main line of the Mexican National railway, is connected therewith, for greater part of distance, by good wagon-roads, with 15 miles of indifferent mountain roads. The smelter has two 36x36″ Colorado Iron Works water-jacket blast-furnaces, and an octagonal cupola furnace taking 35-ton charges of lead bullion for refining, with a Connersville blower. Employs 250 men, and is a considerable producer of lead and silver, with a small output of copper.

BRANT INDEPENDENT MINING CO. **COLORADO.**

Office: Pitkin, Colo. Mine office: Bowerman, Gunnison Co., Colo. A. P. Nelson, president; J. F. Anderson, vice-president; L. H. Becker, secretary; R. L. McKnight, treasurer and manager; preceding officers, Chas. Rabbidge, J. E. Hickman, R. B. Anderson, A. W. Lindquist and J. E. Sawtell, directors; A. L. Whitehorn, consulting engineer; J. J. Curley, foreman. Capitalization $5,000,000, shares $1 par. Lands are in the Box Cañon and Quail Creek districts. Mine carries ore assaying well in copper and gold. The mill, below Bowerman, has 10 stamps. Started work August, 1910.

BREADALBANE MINING & SMELTING CO. **AUSTRALIA.**

Mine and works office: Goulburn, Argyle Co., N. S. W., Australia. Reginald F. Barker, managing director; preceding officer, Chas. Taylor and Robt. Gregory, directors. Lands, 63 acres, in 4 mineral leases, dated Jan. 6,

1908, also an ironstone quarry for fluxing ore, developed by tunnel. opened to depth of 240′, shows, on the bottom level, a 4′ to 6′ vein, a 2.5 to 7% copper, and has a considerable tonnage of auriferous and cup hematite, peculiarly adapted for fluxing silicious ores. A sample sent to was estimated to average 10% copper.

The smelter, connected with the Southern Railway by a private was blown in circa October, 1910. Equipment includes a 42x132" jacket blast-furnace, A No. 7 Connersville blower, return tube boiler, p plant and water system. Limestone for flux costs 7s. 6d. per long t livered. The smelter does a general custom business, treating ores fr Kangiara and Kootra mines.

BREBO COPPER, SILVER & LEAD MINING CO., N. L. AUST

Office: Goulburn, N. S. W., Australia. Mine office: Brebo, Co., N. S. W., Australia. W. H. Bladwell, chairman; J. N. Hay, legal m Lands, sundry claims 4 miles from Brebo, the nearest railway station, by a 60′ shaft. Was developing, with a small force, 1908. Presumab

BREWER GOLD & COPPER MINING CO.

Office: 202 Utah Savings & Trust Bldg., Salt Lake City, Utah. office: Ibapah, Tooele Co., Utah. S. W. Morrison, vice-president; Windsor, secretary and treasurer; V. S. Anderson, assistant secretar ganized Feb. 16, 1907, under laws of Utah, with capitalization $50,000, 10 cents par, assessable; 4 assessments have been levied. Lands, 11 6 patented, on Dutch Mountain, in the Clifton district, 50 miles from road, having a limited amount of development work, showing argentifero per ore. Idle, awaiting better transportation facilities.

GEWERKSCHAFT GRUBE BRICCIUS-STOLLN. GER

Letter returned unclaimed from former mine office, Annaberg, Saxon many. E. R. Poller, manager, at last accounts. Capitalization 128 sh no assigned value. Mine carries argentiferous chalcopyrite and sphalerit some years.

BRIDGE CREEK MINING CO. WASHIN

Mine office: Keller, Ferry Co., Wash. E. H. Arthur, president; Braley, secretary and treasurer; B. H. Wells, superintendent. Lan acres, on Bridge Creek, near the Congress mine, 14 miles north of Keller, by a 246′ tunnel, said to show ore assaying $80 per ton in combined gold and silver values. Presumably idle.

BRIGGS-OLIVER DEVELOPMENT CO. NEW ME

Dead. Formerly at Lordsburg, Grant Co., N. M. Described Vol

BRIGHAM COPPER CO.

Office and mine: Brigham, Box Elder Co., Utah. C. M. Peterson dent; J. F. Peterson, vice-president; Chas. A. Anderson, secretary and tre preceding officers, Peter A. Madsen and Edw. H. Morris, directors. N of operations secured.

GEWERKSCHAFT BRIGITTA ERZBERGWERK. GER

Dead. Formerly at Sennheim, Elsass, Germany. Described Vol.

BRINDLE PUP MINING CO. ARI

Dead. Formerly at Dewey, Yavapai Co., Ariz.

FÉLIX BRIONES. MÉ

Mine office: Topia, Tamazula, Durango, Mex. Property has silv copper ores, employing about 30 men at last accounts.

BRISTOL AVON MINING CO. NE

Office: 325 Brooks Arcade, Salt Lake City, Utah. Mine office: Lincoln Co., Nev. Jackson C. McCrystal, president; Wm. R. Wallace president; Jas. E. Berkley, secretary and treasurer. Organized under Utah, with capitalization $250,000, shares 25 cents par, nonassessable. 13 claims, area circa 200 acres, in process of patenting, about 10 miles nor

Pioche. Property includes several mines that have been considerable producers in the past, from shallow shafts, less than 100′ in depth. Property shows some giving assays up to 23.5% copper, 16.5 oz. silver and $2 gold per ton.

BRISTOL CONSOLIDATED MINES & SMELTING CO. **NEVADA.**

Letter returned unclaimed from former office, 31 Nassau St., New York, N. Y. Mine office: Pioche, Lincoln Co., Nev. F. L. Underwood, president; B. Van Norden, secretary and treasurer; preceding officers, W. A. Smith, Wm. Selder and E. F. Freudenthal, directors; Walter C. Brace, manager. Organized June 4, 1906, under laws of Arizona, with capitalization $4,000,000, shares $1 par, as a merger of Bristol Copper Mining Co. and Hillside Copper Mining Co. Is controlled through stock ownership, by California-Nevada Copper Co.

Lands, 20 claims, patented, area 400 acres, and an 80-acre millsite. Property includes several mines, opened circa 1880, said to have produced about $500,000 worth of ore, with values mainly in silver ores, changing at depth to argentiferous copper. Property has the 300′ Iron shaft, 700′ Gypsy shaft and 300′ May Day shaft, with 7 or 8 old shafts. Lower workings show oxidized argentiferous copper ores, occurring in fairly regular and persistent channels, in veins. Mines have about 2 miles of workings. Test shipments returned 12% copper and 12 oz. silver per ton, and mines have large quantities of second grade ore that apparently might be concentrated.

Equipment includes a 50-h. p. steam plant, with 12-h. p. and 20-h. p. hoists, 2-drill Durkee air-compressor, and an electric light plant. Idle.

BRISTOL COPPER MINING CO. **NEVADA.**

Dead. Was merged June 4, 1906, in Bristol Consolidated Mines & Smelting Co. Formerly at Pioche, Lincoln Co., Nev. Described Vol. VI.

BRISTOL-PIOCHE MINES CO. **NEVADA.**

Office and mine: Pioche, Lincoln Co., Nev. J. F. Marshall, president; Louis Scheisinger, secretary and treasurer. Organized July, 1907, with capitalization $1,000,000, shares $1 par, nonassessable. Lands, 7 claims, unpatented, 12 miles from a railroad, having an 85′ tunnel and 38′ shaft, said to show argentiferous lead and copper ores. Presumably idle.

BRISTOL VALLEY MINING CO. **NEVADA.**

Office: 511 Tribune Bldg., Salt Lake City, Utah. Mine office: Pioche, Lincoln Co., Nev. A. C. Ellis, president; W. H. Dickson, vice-president; C. B. Felt, secretary; Walker Brothers Bank, treasurer. Organized June, 1907, under laws of Utah, with capitalization $250,000, shares 50 cents par, nonassessable. Lands, 11 claims, 2 patented, circa 2 miles from Pioche, having 3 incline shafts, deepest 80′, with a little surface trenching. Presumably idle.

BRITANNIA COPPER MINE, LTD. **WALES.**

Office: 16 Tokenhouse Yard, London, E. C., Eng. Mine office: Pen-y-Pas, Carnarvonshire, Wales. George C. Howard and Sydney C. Hunt, directors. Organized March 29, 1898, with capitalization £90,000, shares £1 par; issued, at last accounts, £7, fully paid. Property is near Llanberis. Idle, and apparently moribund.

BRITANNIA COPPER SYNDICATE, LTD. **BRITISH COLUMBIA.**

Dead. Was merged, 1908, in Britannia Smelting Co., Ltd. Formerly at Howe Sound, New Westminster district, B. C. Fully described Vol. VII.

BRITANNIA MINING CO. **MONTANA.**

Office: 274 Fifth St., Milwaukee, Wis. Letter returned unclaimed from former mine office, Butte, Silver Bow Co., Mont. F. C. Sieling, president; G. R. Best, vice-president; Chas. F. Brussat, secretary and treasurer. Organized Sept. 25, 1892, under laws of Wisconsin, and capitalization increased, March 2, 1898, to $350,000, shares $1 par, nonassessable. Has $15,000 bonds issued, at 6%. Has paid dividends of $42,000. Annual meeting, last Friday in September.

Lands, 1 fractional claim, patented, area 13 acres, in the silver belt. Property shows 6 veins, of which 3 parallel veins, of 3′ to 30′ width, have shafts of

100′, 150′, 230′ and 400′, with circa 4,000′ of workings, developing ore averaged about $35 per ton, mainly in silver, with $250,000 smelter Equipment includes a hoist good for 400′. Property is under lease, u 1, 1911, to Wm. Semmens, on a 25% gross royalty.

BRITANNIA MINING & SMELTING CO., LTD. BRITISH COL

Office: 747 Fifth Ave., New York, N. Y. Operating office: 3 Chambers, Vancouver, B. C. Mine office: Britannia Beach, New W ster district, B. C. Works office: Crofton, Vancouver Island, B. C Edgar Dewdney, president; R. H. Leach, vice-president and general m G. M. White, secretary and treasurer; preceding officers, D. G. Mars C. B. McNeill, directors; S. S. Raymond, smelter superintendent; H. C ger, consulting engineer; L. E. Gooding, metallurgist; W. H. Yost, mechanic.

Organized 1908, under laws of British Columbia, with capit $2,500,000, shares $25 par; issued, $1,625,000; was a reconstruction of B Smelting Co., Ltd. Annual meeting, first Monday in March.

Lands, 7 claims, crown-granted, area 297 acres, also a 49-acre sm and 3 townsites.

The Britannia mine lies on Britannia Mountain, 4 miles from an 3,500′ above the sea, carrying approximately 8,500′ of the strike of a m mineral zone, ore-body consisting of mineralized schist in lenses a irregular bodies, ranging 300′ to 600′ in width, the schistose silicious being impregnated with copper and iron pyrites. Considerable diamon was done, 1907. There are 8 known ore bodies, of which 3, more or le oped, carry an average of about 2.5% copper, 0.04 oz. silver and 50 to gold per ton. Climate is favorable, and, owing to the immense width o body, mine can be worked opencast for many years. Development is glory-holes, and by tunnels of 300′, 300′, 200′, 1,000′, 1,500′ and 300′, wi 8,000′ of workings, estimated to show 2,000,000 tons of ore, with about tons blocked out for stoping. Principal tunnels are the Big Bluff and Jan which is the main operating tunnel, having a 600′ trestle with 10-ton sel ing cars and an automatic incline tramline. The Big Bluff tunnel ha trestle with 10-ton self-dumping cars, and a gasoline locomotive. At t are Blake crushers that pass crushed ore to a sorting-belt, thence to a 1 receiving bin, whence ore is taken by a 16,900′aërial tram in 2 sections, t of 5,800′ and the lower of 11,100′, with an intermediate transfer statio tram is rated at about 300 tons daily capacity, but has given some tr operation. The upper section has a drop of 1,400′ and the lower a 1,800′.

Equipment includes 300 h. p. steam, 400 h. p. water and 500 h. p. power. A 35-drill Rand air-compressor, at the beach, sends air to t through an 18″ pipeline. There is a 3-mile transmission line, with two 6,600-volt generators, driving the machinery plant at the mine, actua Pelton water-wheel, located at the beach, which receives water from under an effective head of about 1,900′. At the beach there is a 25 with a 90′ wing for receipt of mine supplies and shipment of concentra

The 300-ton concentrator, 125x133′ in size, of wood, has 2 Blake c 3 Chilean mills, 4 rolls, 34 Hartz jigs, 1 Hancock jig, 2 Cammett concentr Wilfley tables, 11 Overstrom tables, 10 Johnson vanners and 22 Frue Mill was remodeled, 1907, changing its method from fine to coarse c trouble having been experienced in concentration under the fine crushing A Wetherill magnetic separator was installed, 1909, for separation of i copper sulphides from zinc sulphides, and experiments have been co for about 2 years.

Buildings include a 40x80′ wooden machine-shop, sawmill, school an with about 50 dwellings and miscellaneous buildings.

The Crofton smelter, built 1902, by the Southwestern Smelting & Refining is located on the eastern coast of Vancouver Island, about 50 miles from Vic-a, with which there is rail and water connection, and receives ore by water n the Britannia mine, 60 miles distant, the works being well located for the ipt and treatment of coast and Alaskan ores. Ore is received from the annia in railway cars, loaded on barges, at a 750′ wharf having 21′ of clear er, and cars are hauled up incline trestles to six 300-ton receiving bins re also are eight 300-ton storage-bins, with room for additional bins, all having automatic discharge gates.

The sampling mill, 26x32′ on the ground and 84′ high, has two 10x20″ ke crushers, 1 pair of Davis 12x13″ crushing rolls, Constand automatic pler and a Coolidge sampler, with a 45-h. p. engine.

The furnace building, 45x75′, has two 250-ton water-jacket blast-furnaces. dust-flue is 10x12x200′, with a 24x40′ dust-chamber, connecting with a ular brick stack 12′ in diameter and 120′ high, on a concrete base. Slag is nulated and dumped by bucket elevator.

The converter building, 65x73′, has 1 hydraulic stand and four 84x126″ lls, of trough type. Molten matte runs from settlers to converters in a nder, and converter fumes pass through a steel flue into a dust-chamber ring water sprays. The converter department has a silica mill, with pneu-tic tamper run by a small air-compressor. Product, when operating, is a ster copper of 99.5% tenor, carrying 12 oz. silver and 2 oz. gold per ton, it to the United States refinery, at Chrome, N. J., for electrolytic treatment.

The briquetting plant is housed in a 35x73′ building with 78x104′ dry-shed. quipment includes a No. 7 Chambers briquetting machine and 2 Scott ele-ting brick-cars, with steam coils in the loft of the dry-shed. Briquettes are sted with raw ore.

The power building is 50x60′, with blower-room 40x50′, and boiler-house x48′, housing three 140-h. p. boilers. The power plant has a 110-kw. West-ghouse current generator, electric light plant, air-compressor for converter ast, and Nos. 5 and 8 Connersville blowers, connected with a 54″ blast-pipe, ading to the furnace, blowers having a united capacity of 9,000 cubic feet of ee air per minute.

Miscellaneous buildings at the smelter include a well constructed office, ssay office and a small but complete machine-shop.

Production was suspended, October, 1907, and no ore production, except om test runs, has been secured since, though exploratory work has been con-nued at the mine, and experimental work in the mills. Production was ,409,650 lbs. fine copper, 38,265 oz. silver and 5,261 oz. gold in 1906, and 5,922 tons of ore, yielding 3,011,410 lbs. fine copper, of which the Britannia nine furnished 1,706,734 lbs. in 1907. The mine has been very thoroughly leveloped, and equipment is good, but ores are refractory, hence the extensive xperiments conducted in milling. Management plans resuming production t the mine, concentrating ore and shipping concentrates to a custom smelter.

BRITANNIA SMELTING CO., LTD. **BRITISH COLUMBIA.**

Dead. Was merged, circa 1908, in Britannia Mining & Smelting Co., Ltd. Formerly at Howe Sound, New Westminster district, B. C. Very fully described Vol. VIII.

BRITANNIA WEST COPPER CO., LTD. **BRITISH COLUMBIA.**

Dead. Formerly at Howe Sound, New Westminster district, B. C. De-scribed Vol. VIII.

BRITISH AMERICAN COPPER MINES & SMELTER CO. **BRITISH COLUMBIA.**

Office: Williamson Bldg., Cleveland, Ohio. Mine office: Golden Koote-nay district, B. C. Chas. H. Tucker, president; J. C. Kernohan, vice-president; C. H. Taylor, treasurer; Thos. G. Selleck, secretary; Francis J. Peck, consult-

ing engineer. Organized Aug. 15, 1906, with capitalization $5,000,0
$1 par. Lands, 10 claims, area circa 500 acres held by location, on Warr
a tributary of Wells Creek, which is a tributary of the Similkameen Riv
is a tributary of the Columbia River. Lands are 43 miles from Golde
miles from Wells Landing, and instead of neighboring the Granby, as a
are distant about 300 miles, in an air-line, from the Granby. Lands, wel
and timbered, are in a very rugged country, showing strong outcrop
pany claimed, in its advertisements, to have a 16′ vein, and to have "e
for" 1,000′ of tunnel, which would "block out ready for mining," $1
worth of high grade copper ore, which, of course, was a downright lie.
claimed to have a practically inexhaustible body of ore assaying 7% co
a conservative figure," which happens to be an exceedingly reckless fig
Kernohan, the promoter, stated, 1907, that he had examined this prop
reported that "2 tunnels, one 750′ and one 250′, with shaft connecting,
$10,000,000 worth of ore, if half the values continue in the 16′ vein.
being no evidence of either tunnels or shaft, this statement carries its
tation. The company's advertising and literature state that a 10-m
road will give an outlet to the Kootenai Central Railroad, but unfo
the Kootenai Central has not yet materialized beyond the point of 1
grading, and there is no railroad within 100 miles of the company
neither is there a wagon-road or river transportation, and the total co
duction of the entire district was valued at $1,654 in 1905. Stateme
company in its advertising that this is the richest copper district in t
and that the mine would begin shipping ore at once, were deliberate a
tional lies. Idle and the company must be regarded as a swindle.

BRITISH AMERICAN DEVELOPMENT CO.

Office: 135 West North Temple St., Salt Lake City, Utah. Mi
Alta, Salt Lake Co., Utah. H. Z. Lund, president; G. T. Halladay, v
dent; O. R. Lund, secretary and treasurer. Organized May, 1909, u
of Utah, with capitalization $500,000, shares 50 cents par; assessable.
30 claims, unpatented, said to show argentiferous and auriferous lead a
ores. Presumably idle.

BRITISH AMERICAN GOLD & COPPER MINING CO. SOUTH D

Dead. Former office was 70 Grand River Ave., Detroit, Mich.
ently was merely a stockjobbing scheme. Did a little work, 1902, in t
placing stock and 6% gold bonds, latter in denominations of $50 a
giving 2 shares of capital stock free with $1 "worth" of bonds. No
mining work secured. Formerly at Hornblende, Pennington Co., S. D

BRITISH COLUMBIA AGENCY, LTD. BRITISH COL

Dead. Formerly at Alberni, Vancouver Island, B. C. Describe

BRITISH COLUMBIA CHARTERED CO. BRITISH COL

Dead. Formerly at Summit, Boundary district, B. C. Described

BRITISH COLUMBIA COPPER CO., LTD. WASHINGTON & BRITISH COL

Office: 814-31 Nassau St., New York, N. Y. Mine and wor
Greenwood, Boundary district, B. C. Newman Erb, president; F. L.
vice-president; R. H. Eggleston, secretary and treasurer; preceding
Anthony N. Brady, Harry Bronner, C. H. Burke, Colgate Hoyt, Edwin
Frederick Lewisohn, C. B. Mears, Col. Josiah C. Reiff and C. A. Star
rectors; J. E. McAllister, general manager; W. C. H. Wilson, E. Hibbe
Lover, H. Johns, F. J. Longworth and A. Burnett, mine superintenden
Warren, smelter superintendent.

Organized March, 1898, under laws of West Virginia, with capit
$2,000,000, increased, 1907, to $3,000,000, shares $5 par; issued, $2
Paid a 40-cent dividend July 18, 1907, and a 12½-cent dividend Marc

ntrols the New Dominion Copper Co., Ltd., through ownership of 155,000 res, or 64% of the stock issue. Has about 2,000 shareholders, and ended al year, Nov. 30, 1910, with favorable profit and loss balance of $256,561.58, d cash $107,095.11. New York Trust Co., transfer agent. Empire Trust Co., w York, registrar. Annual meeting, second Tuesday in February.

Lands are extensive, including various groups in the Boundary district of itish Columbia and in the adjoining state of Washington, also a 60-acre mill-e. The principal mines are the Motherlode and adjoining properties, in the adwood camp, having large and strong ore bodies, which are slightly lower average grade than those of the Granby. Ores average about $1 per ton in mbined gold and silver values.

The Motherlode group, area 180 acres, has 5 ore bodies, of which 3 are veloped, occurring as contact deposits between limestone and eruptive dykes. e is exclusively auriferous and argentiferous chalcopyrite, occurring with icious and calcareous gangue, or in magnetite. The ore bodies are irregular occurrence, the main vein ranging 80′ to 150′ in width, and proven, by face trenching and natural exposure, for a length of 1,800′. Ore assays out 1.5% copper, 0.2 to 0.5 oz. silver and $1 to $2 gold per ton. Under-ound workings are about 3 miles, disclosing about 3,000,000 tons of ore, ith circa 1,000,000 tons blocked out for stoping. Development is by a 475′ ur-compartment shaft, with 3 tunnels, latter connected with surface by 6 praises, of 200′ average height, these reaching quarries on surface, ore being illed through the upraises to tram-cars in the tunnels, mine having electric aulage on the 300′ and 400′ levels. Main tunnel has double tracks, equipped ith 3-ton tram-cars. At the portal of the tunnel there are 24x36″ and 36x42″ arrel crushers.

Equipment at the Motherlode formerly included a 500-h. p. steam plant, ut this has been done away with, and electric power is used exclusively, in-tallation generating about 1,800 h. p. Machinery includes two 35-drill Cana-lian-Rand Corliss duplex tandem air-compressors, driven by 500-h. p. and 25-h. p. induction motors. Buildings at the Motherlode include a 30x50′ arpenter shop, 30x70′ machine shop, about 20 other mine buildings, and 20 wellings.

The Oro Denoro mine, 4 claims, area 180 acres, bought June, 1906, adjoins he Emma and British Columbia mines, showing 3 ore bodies, of 20′ to 120′ width, carrying auriferous and argentiferous chalcopyrite, associated with pyrite, with silicious and calcareous gangue, being valuable for fluxing, owing to excess of both iron and lime. New ore bodies were proven, 1907, by diamond drill borings. Mine has a 190′ shaft, and 3 tunnels, but is worked mainly open-cast. Equipment includes an ore crushing and conveying plant.

The British Columbia mine, about a mile from the Emma, held formerly by the British Columbia Chartered Co., consists of 11 claims, 3 fractional, developed by about 2 miles of workings, showing argentiferous and slightly auriferous chalcopyrite, similar to the ore of the Oro Denoro and Emma. Equip-ment includes a 225-h. p. steam plant, with 4-drill Rand and 5-drill Ingersoll-Sergeant air-compressors.

The Napoleon mine, 46 claims, at Boyds, Ferry Co., Wash., in the Pierre Lake district, on the Colville Reserve, 4 miles from Marcus, has a large ore body carrying unaltered auriferous copper sulphides, of low average tenor, used mainly for fluxing, overlaid by a large body of oxidized ore carrying values mainly in gold. Production has been intermittent. Buildings, destroyed circa August, 1910, by forest fires, have been replaced. Machinery includes 3-drill and 7-drill air-compressors, and the mine has a 4,100′ tram. The mill, built 1910, has 10 stamps and a 100-ton cyanide plant, treating oxidized ores, sulphides being shipped to the smelter for fluxing.

The Lone Star mine, about 4 miles from Greenwood, B. C., but a
international boundary line in Washington, has been explored by diamo
which are estimated by management to have developed 300,000 tons
higher average copper tenor than the other mines, but more refractory.
rations have covered only about 6% of the area. The Lone Star was c
with the Canadian Pacific Railway, 1910-1911, by a 28,560′ aërial tram
72 towers, of 15′ to 67′ height, with 3 tension and 2 anchor stations.

The smelter at Greenwood, 5 miles from the Motherlode mine,
ore over the Canadian Pacific railway, does a general custom business al
reduction works take commercial electric current from Bonnington Falls
ing about 1,600 h. p. All buildings are of steel, and the plant was re
1907, with increase to about 2,000 tons daily capacity, and enlarged
2,500 tons capacity.

A 600-ton sampling mill, 65x79′ and 3 stories high, has a custom
connected with the sampler ore-bins by a belt-conveyor. The bins at t
have capacity for 12,000 tons of ore and 4,000 tons of coke.

The cupola building has 3 blast-furnaces, formerly each 48x240
tuyeres, of 700 tons daily capacity each, but Nos. 1 and 3 furnaces were
1909, to 48x360′. No. 2 being left unchanged, giving the larger furn
tons daily capacity each. The smelter was treating about 650 tons
Dominion ore daily, at end of 1910. A 12x14x620′ dust-flue leads t
stack. There are five 15-ton Baldwin-Westinghouse electric locomotiv
charging and miscellaneous use, and 2 for the slag-line, which has 25-
dumping ladle-cars, each with an electric motor and worm-gear, for ti
dumping, operated from the locomotive.

The converter building, 45x80′, of steel, adjoining the blast-furna
ing, has 2 stands, with 84x126′ horizontal shells, taking matte of 15 to 5
per tenor, and producing blister copper of 99.3 % tenor, carrying 20
silver and 10 to 25 oz. gold per ton, sent to the United States Metals
Co., at Chrome, N. J., for refining. Stands are tilted by hydraulic a
tors, and shells are handled by a 40-ton 4-motor traveling crane. T
72″ slica-mill for linings.

The 4[illegible]81′ power-house has three 1[illegible]-h. p. boilers and a 150-h.
Reliance-Corliss engine, held in reserve for emergencies, electric power b
throughout the works. Equipment includes three 300′ Connersville
each belted to a [illegible]-h. p. induction motor, and a Nordberg air-co
operated by a 300-h. p. induction motor.

The works have a briquetting plant handling flue-dust. Smeltin
coke, costing under $5 per ton, consumption being circa 90,000 tons y

The w[illegible] a machine-shop and several other buildings. T
is protected by a complete water system, having hydrants at frequent i

About 600 men are employed at the mines and works. The comp
had trouble and a strike with the Western Federation of Miners, which h
several months and other stoppages.

Returns from ore treated were [illegible] copper and 98.5 cents in
[illegible] copper and $1.[illegible] in gold and silver for 1909
[illegible] In 1910 the per ton of ore treat
$[illegible] [illegible] $[illegible] in 1911. The mining included
[illegible] 1,[illegible]56 cents
[illegible]

[illegible] 39,[illegible] lbs. fine copper
[illegible] 3,820
[illegible] 8,643
[illegible] 5,567
[illegible] 64,264

18,244 oz. gold for fiscal year 1909; 7,143,456 lbs. copper, 84,180 oz. silver 24,962 oz. gold for fiscal year 1910. Output, November, 1910, was largest he history of the property, being 917,994 lbs. blister copper, 10,794 oz. silver 2,845 oz. gold.

The British Columbia has an immense tonnage of assured ore, very low in rage tenor, with extremely low recovery of copper, comparing in this respect h the low-grade mines of Lake Superior, but with considerable gold and sil- values to serve as a sweetener. Property is considered valuable and well naged.

ITISH COLUMBIA EXPLORATION, LTD. **BRITISH COLUMBIA.**

Dead. Was succeeded, Jan. 15, 1904, by Kamloops Mines, Ltd. For- rly at Kamloops, Yale district, B. C. Fully described Vol. V.

ITISH COLUMBIA & LAKE SHORE COPPER CO., LTD. **BRITISH COLUMBIA.**

Dead. Formerly at Summit, Yale district, B. C.

ITISH GOLD MINES OF MÉXICO, LTD. **MÉXICO.**

Dead. Formerly at Torres, Hermosillo, Sonora, Mex. Described Vol. VI.

ITISH MEXICAN COPPER SYNDICATE, LTD. **MÉXICO.**

Dead. Formerly at Suaqui de Batuc, Ures, Sonora, Mex. Described l. VIII.

ITISH-YUKON COPPER & SILVER MINING CO. **BRITISH COLUMBIA.**

Dead. Ralph C. Gill was receiver. Property was sold, December, 1908, E. B. Palmer, for $50. Property was the Copper King, Dundee, and Sham- ck claims, on Taku Inlet. Formerly at Atlin, Atlin district, B. C.

RITT COPPER CO. **ARIZONA.**

Letter returned unclaimed from former mine office, Ft. Thomas, Graham o., Ariz. Organized Feb. 11, 1907, under laws of Arizona, with capitalization ,250,000, shares $10 par. Lands, in the Aravaipa district, circa 25 miles from t. Thomas, are said to have an encouraging surface showing of copper ore. Idle veral years.

K. BERG- UND HÜTTENVERWALTUNG BRIXLEGG. **AUSTRIA.**

Mine and works office: Brixlegg, Tyrol, Austria. Gustav Kroupa, gen- al manager; Vincens Svoboda, superintendent and mining engineer; Cayetan lummel, smelter superintendent; Josef Link, purchasing agent. Mining lands re circa 22.5 hectares, carrying argentiferous and slightly auriferous chalcopy- ite and sphalerite, with occasional tetrahedrite. The smelter has blast and everberatory furnaces, argentiferous tetrahedrite and sphalerite being smelted eparately. Raw ore is brought up to about 30% copper tenor, in Pilzscher urnaces, there roasted in 2.1x9-meter reverberatories, in charges of 10 tons of oasted ore, 2 tons of roasted fines, 1 ton of raw fines and 1.9 tons quartz. Cop- er bottoms are leached with sulphuric acid, and works include a small bluestone lant. Smelter also has a refining furnace for casting anodes.

The electrolytic refinery, built 1885, was one of the earliest in existence. This has 60 tanks arranged in 6 series, electrolyte circulating in terraces, and being pumped back for recirculation. Electrodes have multiple arrangement, and current density is 240 amperes, or 20 amperes per square meter. The anode sludge carries about 10% copper, 10% silver, 15% zinc and 25% antimony. Product is electrolytic copper of 99.7% assay tenor.

Production, 1909, was about 130 metric tons blister copper, 70 metric tons electrolytic copper, and 125 tons bluestone, containing about 600,000 lbs. fine copper, 100 kgs. silver and 5 kgs. gold.

BROADWATER COUNTY MINING CO. **MONTANA.**

Office and mine: Townsend, Broadwater Co., Mont. J. J. Fisher, presi- dent; Jas. Marks, vice-president; Len Jobb, secretary; John A. Matthews, treas- urer; preceding officers and Albert Fisher, directors; Chas. V. Huxley, consulting

engineer. Organized circa 1910, with capitalization $225,000, shares
Lands, 7 claims, about 5 miles west of Townsend, on the Radersburg roa
ing strong outcrops, and developed by pits and shafts of 18′ to 60′, c
vein of 4′ to 12′ estimated width, carrying chalcocite assaying up to 60%
and 6 oz. silver per ton.

BROMIDE COPPER CO. **NEW M**

Dead. Formerly at Tusas, Rio Arriba Co., N. M.

BROMIDE COPPER & GOLD MINING CO. **NEW M**

Dead. Lost lands circa 1904. Formerly at Tusas, Rio Arriba Co

BROMIDE COPPER MINING CO. **NEW M**

Office: Bloomsburg, Pa. Mine office: Tusas, Rio Arriba Co.,
Lands, 42 claims, including the Pay Roll mine, opened to depth of 250′,
auriferous copper sulphides of good average tenor. Presumably idle.

COMPAÑÍA ESPLOTADORA LOS BRONCES.

Mine office: Los Condes, Santiago, Chile. Has a long tunnel, d
connection with Francisco de P. Perez. Ore is shipped to the Maitenes
for reduction. Production, 1903, was circa 400,000 pounds fine copper.

SOCIEDAD MINERA DE LOS BRONCES.

Office and mine: La Serena, Coquimbo, Chile. Organized Apr. 1
under laws of Chile, with capitalization 60,000 pesos, shares 250 pesos pa
is about 14 kilometers from La Compañía, with ore carriage charges of
per metric ton, and is opened to depth of 630 meters, on dip of vein,
550 meters vertical depth, and for length of about 550 meters.

BRONZE MONARCH MINING CO., LTD. **WASHIN**

Dead. Was merged in Mount St. Helens Consolidated Mining Co.
near the Sweden group, on Mount St. Helens, had a 300′ tunnel, and p
about 1,000 tons of auriferous and argentiferous copper sulphides. For
St. Helens, Skamania Co., Wash.

BROOKLYN-ARIZONA MINING CO. **AR**

Office: 75 State St., Boston, Mass. Mine office: Mayer, Yava
Ariz. Frederick E. Small, president and general manager; Jas. A. Ger
vice-president; Irging G. Miller, second vice-president; Benj. G. Tuttl
vice-president; Percy B. Spofford, secretary; A. Calvin Cruchet, treasurer
H. Knight, superintendent; John Crosby, foreman. Organized March 2
under laws of Maine, with capitalization $2,000,000, shares $10 par, no
able; fully issued. Was promoted by the American Securities Co. of wh
Small is also treasurer. Company reports having no indebtedness.
meeting, first Wednesday in April.

Lands, 82 claims, area circa 1,600 acres, including the Brooklyn g
14 claims, in the Squaw Creek district, about 20 miles southeast of
Property carries auriferous and argentiferous copper sulphides, app
with gold values predominating.

The official statements of the company claim a 15′ outcrop averagi
copper, $1.20 silver and $10 gold per ton, which is not believed. Co
also claims to have 24 large quartz veins carrying heavy values in copp
and silver, with 11 under development, and Mr. Small is authority for th
ment that massive dykes and veins converge and run into the Brooklyn-
mine from every point of the compass, which reminds the reader of E
celebrated "umbrella" apex theory, in Butte. Mr. Small also states tha
indication points to the fact that underlying the Brooklyn-Arizona min
vast ore body, anywhere between 1,500′ and 2,500′ in width, Mr. Small pr
bly being gifted with second-sight to have determined this "fact." In
pectus, of November, 1908, Mr. Small claimed that the shaft, then 225
was bottomed in ore averaging 9.5% copper, 15 oz. silver and 2 oz. gold p
The company's prospectus contains a considerable number of misstatem
fact, signed by Frederick E. Small, M. E. The company's prospectus,

r. 5, 1908, states that some of the leading mining engineers and experts of country and Europe had visited the property, and each and every one ed in a general statement that the Brooklyn-Arizona would prove to be the est and greatest gold and copper producer of the world. It would be insting to learn the names of some of these great experts, who joined in this arkable statement, and verify this statement, if possible, direct from them.

The 3-compartment Jasper shaft was reported by the company, April 1, 0. to be over 400′ deep, opening a 26′ body of high grade ore, and a report he stockholders, by Mr. Small, on that date, stated that the Jasper shaft ld be 1,000′ deep by Oct. 1, 1910, but it was reported by the company to be ′ deep, on Dec. 14, 1910. The Oak claim is said to have a 100′ shaft with 100′ crosscuts, and an 85′ shaft with 2 crosscuts, said to show good ore ues. The Ella group is said to have a 40′ shaft. The Trinity group is said have some work showing an ore body. Company reports workings, Dec. 1910, to include shafts of 700′, 125′, 150′, 100′, 85′, 50′, 40′, 35′, 30′ and 25′, h tunnels of 1,500′, 300′, 300′, 450′, 350′ and 100′, estimated to show 00,000 tons of ore, averaging 9% copper, 40 oz. silver and $15 gold per ton. ese figures are entirely too good to be true.

A prospectus by the company explains the geology and ore situation in h remarkably lucid, not to say lambent, language, that the following expts are extracted from the company's prospectus, with due acknowledgment: he Squaw Creek mining district is of volcanic formation, belonging to the rcerean geological age. * * * The copper ores bearing gold have been ecipitated by static pressure from below into heavy ore veins. * * * here the basalt has been seared away by erosion shows the formation of the ystalline rocks, etc. * * * Numerous dykes of trachyte and diarite averse this formation diagonally. * * * In them various forms of copr ore exist, appearing at and above the surface from 3′ to 20′. * * * he ore in the numerous veins in the Brooklyn-Arizona mine consists of icates and lime dyarites, carrying copper in oxides, native chrysacolla, malaite, azurite, chalcopyrite, redruthite and sulphide." It is obvious from the mpany's own statements that the Brooklyn-Arizona is a very remarkable ine, geologically and mineralogically. The opportunity of inspecting veins rojecting 3′ to 20′ above surface is one that any conscientious geologist would eatly appreciate, and precipitation upward would be considered remarkable, ere it not accounted for by static pressure. It should be borne in mind, howver, that unusual geological conditions necessarily would pertain to anything nnected with the Tercerean geological age. "Native chrysacolla" also is great interest, occurring in this mine only, and if the property has large uantities of redruthite, which is a varietal form of chalcocite, the deposit will e valuable, as dealers in mineralogical specimens charge high prices for small rystals of this mineral.

Equipment includes boilers of 278-h. p., a 100-h. p. double-drum hoist, ood for 1,000′, a 25-h. p. single drum hoist, a 15-drill Sullivan air-compressor, nd an electric light plant, reported by the company to be housed in a 50x150′ ower-house. Buildings include also a 20x36′ smithy, office, store, cookhouse, bunkhouses and 12 dwellings. Mr. Small reported to stockholders, April 1, 1910, that it was expected that the Prescott & Eastern railway would be built o the camp before the end of the year, but this was not done, also that it was o have a 500-ton matting furnace in operation during 1910, but latter failed o materialize. On this same date Mr. Small stated to his shareholders that he knew, as matters stood, every stockholder could feel that every share of stock in the Brooklyn-Arizona was equal to any gold bond ever issued by any corporation. Verbum sap.

BROOKLYN BRIDGE MINING & MILLING CO. **MONTANA.**

Dead. Formerly at Clancey, Jefferson Co., Mont. Described Vol. VIII.

BROOKLYN COPPER & GOLD MINING CO. WASHI
Dead. Formerly at Keller, Ferry Co., Wash.

BROOKLYN MINING CO. CALIF
Mine office: Dale, San Bernardino Co., Cal. Ores carry gold and
Has gasoline power and a 3-stamp mill. Idle and apparently moribun

BROOKLYN MINING CO. COL
Mine office: Silverton, San Juan Co., Colo. Ores carry gold, si
copper. Has steam power and a 10-stamp mill. Idle.

BROOKLYN MINING CO. N
Mine office: Contact, Elko Co., Nev. Has gasoline power. Long
apparently moribund.

BROOKS CONSOLIDATED COPPER CO. M
Dead. Was succeeded, January 1909, by Cerrito Mining Co. I
scribed Vol. VIII.

BROOKSHIRE MINING CO. AR
Mine office: Mayer, Yavapai Co., Ariz. Organized January, 190
laws of West Virginia, with capitalization $100,000. Was controlled
accounts, through ownership of 80% of stock, by the George A. T
Mining Co., a notorious swindle. Mine, 4 miles south of Jerome, has
since 1905.

BROUGHTON COPPER CO., LTD. EN
Works office: Widnes, Lancashire, Eng. Property is a copper r
plant.

BROWHEAD COPPER MINES. IR
Dead. Formerly at Crookhaven, County Cork, Ireland. I
Vol. VIII.

BROWN-ALASKA COPPER CO. A
Office: 1201 Alaska Bldg., Seattle, Wash. Mine office: Hadley
of Wales Island, Alaska. Maurice D. Leehey, secretary. Capital
$1,000,000, shares $1 par. Became bankrupt, 1907, but assets not
liquidated. Property is the Mamie mine, having an ore body of a
width, formerly claimed to give average assays of 6% copper and $1 p
combined gold and silver values. Ore is slightly auriferous and arge
chalcopyrite, associated with pyrite, pyrrhotite and magnetite, with
gangue, occurring in lenticular bodies, connected by seams. Was a p
1907; since idle.

BROWN-ALASKA SMELTER. A
Owned by Alaska Smelting & Refining Co.

BROWNELL-ARIZONA MINING & SMELTING CO. AR
Mine office: Casa Grande, Pinal Co., Ariz. Lands, formerly
Producer Mining & Smelting Co., supposedly are the Jack Rabbit gro
acres, in Pinal county, and the Producer and Century-Chief group of 3
and Index group of 220 acres, in Pima county, all in the Quijotoa Mo
Mine has a 200′ main shaft, with about one-half mile of workings, clai
former owners, to show 52,000 tons of auriferous and argentiferous co
Company was selling stock, 1910, on the strength of a brochure wr
Alfred Henry Lewis, a talented writer, who knows absolutely nothi
copper mining, and should stay out of the business of writing prospect

BRUCE & CHESSOR MINING CO. B
Mine office: Oruro, Bolivia. Has steam power and employs ab
men when working, producing native copper from conglomerate strat
sumably idle.

BRUCE COPPER MINES, LTD. ON
Dead. Was liquidated, voluntarily, May, 1902, lands going to
Mining & Smelting Co., of Ontario, Ltd. Formerly at Bruce Mine
ma, Ont. Fully described Vol. IV.

UCE MINES, LTD. **ONTARIO.**

Office: St. Catharines, Ont. Mine office: Bruce Mines, Algoma, Ont. W. Leonard, president; Alex. Longwell, vice-president and general manager; . Mackay, secretary; A. B. Willmott, consulting engineer. Organized 1908, uccessor of Copper Mining & Smelting Co. of Ontario, Ltd,

Lands are 65 acres of surface rights, and mineral rights to 12,800 acres, or square miles, on Georgian Bay, granted, 1854, from the crown. Property he old Bruce mines, freehold, discovered 1843, and worked extensively, 6–1876, producing copper to the value of about $3,500,000. The mine 6 known veins, practically parallel, of which 2, of 4′ to 18′, have been re or less developed, the principal vein, traceable 8,000′, having a strike of 23° W., and of 18′ maximum width, traversing diabase, carrying mainly lcopyrite, with some chalcocite, and quartz gangue, estimated by former nagement to average 5% copper, but run-of-mine ore ranges 2.5 to 5% per. Development is by the No. 1 or Palmer shaft of 360′, No. 2 of 450′, . 3 of 240′, No. 4 of 244′, No. 5 of 340′, No. 6 of 270′, No. 7 of 75′, No. 8 of ′, No. 9 of 200′, and No. 10 of 210′. Practically everything above the 360′ el is stoped out. The waste burrows carry about 117,000 tons of discarded , estimated to average 1.5% copper, which perhaps is too high.

The power-house, burned February, 1909, had a 400-h. p. steam plant, th 4 hoists, of 25 to 150 h. p., a 16-drill Rand air-compressor and 35-kw. namo. There are 14 mine buildings, including a 25x60′ machine-shop, ithy, warehouse, office, etc.

The Bruce Mines & Algoma Railway, formerly under the same manage- ent as the mine, is a standard gauge line, with a locomotive and 8-ton side- umping cars.

A 200-ton concentrator, 75x192′ in size, 1½ miles from the mine, has an ustin crusher, 5 sets of rolls, 12 Hartz jigs, 18 Frue vanners, 2 double-deck ime-tables and 18 sizers.

Miscellaneous improvements include a coal wharf, merchandise wharf, lectric light plant and telephone system.

Production of old mine, 1846–1875, was 47,593 tons of ore and concen- rates, yielding 19,125,920 lbs. fine copper. Property has changed hands epeatedly, but has secured no production since suspension, 1876, of the old ompany.

RUCE MINING CO. **IDAHO.**

Mine office: Junction, Lemhi Co., Idaho. A. T. Bruce, general manager, t last accounts. Has copper-gold ores, opened by tunnel. Idle.

RUGER y CA. **BOLIVIA.**

Office and mine: Toledo, La Paz, Bolivia. Mine has steam power and he firm was a small copper producer at last accounts.

RUNDOLME MINING SYNDICATE, LTD. **ENGLAND.**

Office and mine: The Thorn, Threlkeld, Cumberland, Eng. W. H. Bor- , secretary; preceding officer, J. W. Pattinson, J. S. Quirk, and Dr. R. J. tchinson, J. P., directors. Organized Sept. 17, 1907, under laws of Great tain, with capitalization £3,000, shares £1 par, in £[illegible] preference and 000 ordinary shares; issued, £812 preference and £[illegible] ordinary shares y paid. Property is lands carrying lead, zinc and copper. Idle several rs and apparently moribund.

RUNSWICK CONSOLIDATED MINING CO. **NEVADA.**

Office: 13 St. John St., Montreal, Que. Mine office: Carson City, msby Co., Nev. J. A. Yerington, president; Hon. R. K. Colvord, vice- sident; E. B. Yerington, secretary and treasurer; [illegible] Mills and A. M. Ardery, directors; J. L. [illegible] yle, consulting engineer. Organized, [illegible] pitalization increased, 1906, to $[illegible], shares $1 par [illegible]

Lands, 7 claims, 1 fractional, area 130 acres, in the Delaware distri
miles east of Carson City. Mine, opened to depth of about 200',
tact deposit between diorite and porphyry, of 5' to 6' estimated aver
carrying auriferous and slightly argentiferous oxidized and sulphi
ores, associated with hematite, with limestone gangue. Average as
were said to have exceeded 6% copper. Equipment includes neces
buildings.

BRUNSWICK MINING & MILLING CO. CO

Mine office: Tin Cup, Gunnison Co., Colo. A. Lejune, super
Property is the Jimmy Mack mine, carrying gold, silver and copper
steam power and a 100-ton concentrator.

BRUSTAD MINES, LTD.

Office: 62 London Wall, London, E. C., Eng. Mine office:
Hedemarken, Trondhjem, Norway. G. T. Broadbridge, secretary.
Feb. 11, 1905, under laws of Guernsey, as a second reconstruction
Mint Mines, Ltd., with capitalization £120,000, shares £1 par. Mi
east of Lake Mjösen and 50 miles north of Christiania, was first wo
early in the Nineteenth Century. Development is by tunnel, show
of 30' width, carrying copper and gold values. Has a mill with 15
Frue vanners, Wilfley tables and an Elmore concentrating plant.
dently has made some considerable production in the past, as evi
large slag-piles. Idle several years and apparently moribund.

BRYAN MINING CO. M

Office: Wallace, Idaho. Mine office; Saltese, Missoula C
Hon. Harry T. Day, manager; Chas. Burns, superintendent.
under laws of Delaware, with capitalization $1,000,000, shares $1 pa
in the Packer Creek district, show auriferous and argentiferous c
developed by 2 tunnels, lower of 900', with circa 3,500' of workin
carries values mainly in silver-lead ores, including galena and lead c
with some tetrahedrite, and has considerable ore developed, of promi

BUCHANAN COPPER MINES, LTD. AU

Mine office: Mungana, Lynd Co., Queensland, Australia.
Welcome Creek, circa 15 miles west of Mungana, have but slight dev
Idle and apparently moribund.

BUCHANAN MINE. CAL

Office and mine: Daulton, Madera Co., Cal. G. A. Phersc
Lands, shortly south of the Green Mountain mine, and about 5 m
east of Daulton, show diabase and amphibolite schists, both mineral
4 veins, of 4' to 9' width, carrying oxidized ores near surface and ch
at depth. Development is by 5 tunnels, of 30', 60', 100', 120' and 50
two 200' shafts, one equipped with hoist and air-compressor. Old t
partly caved, and in bad shape. Mine has produced considerable ore,
covery, circa 1865, and shipments made by lessees are reported to hav
about 15% copper, 12 oz. silver and $3 to $4 gold per ton. Idle s

BUCKENBAR COPPER MINING SYNDICATE. AU

Dead. Formerly at Yeoval, Gordon Co., N. S. W., Australia.
Vol. VIII.

BUCKEYE & CALUMET ARIZONA-MINING CO. A

Mine office: Red Rock, Pinal Co., Ariz. Organized circa April
operate in the Owl Head district. Idle.

BUCKEYE CONSOLIDATED GOLD & COPPER MINING CO. NEW

Dead. Former office was 414 Atlas Blk., Salt Lake City, Utah
Jermaine was secretary; H. G. May, superintendent. Mine had
and argentiferous copper ore, and was equipped with steam power.
at Socorro, Socorro Co., N. M.

JCKEYE COPPER CO. **WASHINGTON.**
Dead. Formerly at Index, Snohomish Co., Wash. Described Vol. VIII.

JCKEYE COPPER MINING CO. **IDAHO.**
Dead. Former office was Wallace, Idaho. S. P. Fairweather was manager. Organized circa July, 1907, with capitalization $375,000, shares $25 par. Lands were 9 claims, adjoining the Bullion mine, near the Montana line. Formerly at Mullan, Shoshone Co., Idaho.

JCKEYE MINING & SMELTING CO. **OREGON.**
Dead. Formerly at Galice, Josephine Co., Ore. Described Vol. VIII.

JCKHORN GOLD & COPPER MINING CO. **BRITISH COLUMBIA.**
Dead. Formerly at Greenwood, Boundary district, B. C.

JCKLAND MINING & DEVELOPMENT CO. **UTAH.**
Office and mine: Farmington, Davis Co., Utah. A. L. Buckland, president; Frank Jardine, vice-president; R. C. Buckland, secretary; David Moss, treasurer. Organized February, 1909, under laws of Utah, with capitalization $100,000, shares 10 cents par, assessable. Lands, 14 claims, unpatented, miles from a railroad, slightly developed, showing auriferous and argentiferous lead and copper ores.

JCKSKIN MOUNTAIN COPPER CO. **MONTANA.**
Dead. Formerly at Ryan, Coconino Co., Ariz. Described Vol. VIII.

JDGERYGAR MINING CO., N. L. **AUSTRALIA.**
Office: Nyngan, N. S. W., Australia. Mine office: Hermidale, Canbelego Co., N. S. W., Australia. Organized 1907, under laws of New South Wales, with capitalization £5,000, shares 2s. par. For 1909 revenue was £2,066 1s. 4d., and expenditures were £2,055 18s. 11d., showing, according to Mi-wber, that the company must be prospering. Lands, on Wilga Downs, show a vein of 9′ to 47′ width, low-grade where widest, with kaolin gouge, carrying disseminated chalcocite, assaying 2 to 22% copper, with small gold values. Development is by 2 shafts, 200′ apart, of 271′ and 353′.

JDGERY KING COPPER MINING CO., N. L. **AUSTRALIA.**
Mine office: Hermidale, Canbelego Co., N. S. W., Australia. Organized circa November, 1907, under laws of New South Wales, with capitalization £6,000, shares £5 par. Presumably idle.

JDGERY MINES, N. L. **AUSTRALIA.**
Office: 23 Equitable Bldgs., George St., Sydney, N. S. W., Australia. Mine office: Cobar, Robinson Co., N. S. W., Australia. M. J. Corbett, chairman; L. A. Sorensen, manager. Organized 1906, under laws of New South Wales, with capitalization £80,000, shares 10s. par.

Lands, leasehold, 3 miles from Hermidale, carry 6 volcanic vents, one, under development, filled with tuff near surface, carrying, to depth of 200′, cuprite in particles from pin-head to man-head size, succeeded by a large body of covellite, up to 86′ width, with 45° pitch to the south, which in turn is succeeded, on the bottom level, at 400′, by chalcopyrite, carrying about 1.5 dwts. gold per ton, in a broken formation. Company claimed, circa 1907, ore reserves of 40,000 tons on the 164′ level. Ore produced, to end of 1906, shipped to Great Cobar works, averaged 11.5% copper. For 1907 production was 1,920 long tons of ore raised, 797 tons of dressed ore, sold for £3,695, yielding circa 200,000 lbs. fine copper. Property considered promising.

COMPAÑÍA MINERA EXPLOTADORA DE BUENA ESPERANZA. **CHILE.**
Dead. Formerly at Santa Rosa, Tarapacá, Chile. Described Vol. VIII.

BUENA VISTA COPPER MINES, LTD. **MÉXICO.**
Dead. Was dissolved Nov. 29, 1907. Formerly at Santa Rosalía, Sur, Baja California, Mex. Described Vol. VI.

BUENA VISTA COPPER MINING CO. **CALIFORNIA.**
Dead. Property was the Russell and Bull Run mines, carrying silicious

copper ores, in schistose diabase. The Bull Run mine had a 400′ sha considerable dump of low grade sulphides, discarded when mine wa shipper, previous to 1870. Equipment included a steam plant. Fo Valley Springs, Amador Co., Cal.

BUENA VISTA COPPER MINING CO. A

Mine office: Solomonville, Graham Co., Ariz. Has a 100′ shaft ore, and sent a sample shipment of 25% ore to El Paso smelter, 19 several years and apparently moribund.

BUENAVISTA MINING CO.

Letter returned unclaimed from former office, Pittsburg, Pa. M San Francisco del Mezquital, Durango, Mex. F. A. Ruttman, gen ager, at last accounts. Property is La Buenavista copper mine and ciño silver-lead mine, developed mainly by tunnel. Presumably idle

BUENA VISTA MINING & MILLING CO. A

Dead. Formerly at Washington, Santa Cruz Co., Ariz.

BUENA VISTA SMELTING & REFINING CO. COL

Dead. Formerly at Buena Vista, Chaffee Co., Colo. Described

BUENOS AIRES MINING CO.

Dead. Was a swindle, perpetrated by the notorious Dr. R. C "Assets" were inherited by the Pan-American Mining & Smelting merly at Cusihuiriáchic, Iturbide, Chihuahua, Mex. Described Vol.

COMPAÑÍA MINERA BUERRERO DE VALLE HERMOSO. ARG

Office: Santiago de Chile. Mine office: Mendoza, Argentina. Feb. 16, 1907, under laws of Chile, with capitalization 230,010 pesos, pesos par. Presumably idle.

BUFA MINING, MILLING & SMELTING CO.

Mine office: 709 Lankershim Bldg., Los Angeles, Cal. Letter unclaimed from former mine office, La Bufa, Sahuaripa, Sonora, Me Richardson, president; Wm. E. Richardson, vice-president and gen ager; Baron W. Riley, secretary; Louis R. Richardson, treasurer. 1902, under laws of Arizona, with capitalization $1,500,000, shares $1 paid 5 dividends, last being $60,000, July, 1905.

Lands, 123 acres, also a 10-acre millsite, and 5,000 acres mis lands, showing 6 fissure veins, of which 2 under development average opened by a 600′ incline, giving average assays of 10% copper, 10% zinc, 150 oz. silver and $2.50 gold per ton, from argentiferous tetrahe copper sulphides. Has shafts of 300′ and 600′, and a 225′ tunnel, w of workings and about 20,000 tons of high-grade ore blocked out, wi siderable amount of low grade ore on the dump, for eventual treatme

Machinery includes a 120-h. p. plant at the mine, with 2 hoist air-compressors and 7 power drills. Mine buildings include seve shops, a store, sawmill and about 20 dwellings.

The 35-ton concentrator has a small sampling mill attached. T is a 20-ton leaching plant.

The smelter, at the mine, receives ore by gravity tram. E includes 10-ton and 25-ton reverberatory furnaces, built of silica bri on the ground. Fuel is inferior wood, cut on the premises. Product i carrying 50% copper, 600 to 800 oz. silver and 1.5 oz. gold per ton, sh burro, to Aguascalientes, via Guaymas, for refining, some rich ore bein also. Production, 1906, was about 750,000 lbs. fine copper. Idle si and date of resumption unknown.

BUFFALO-ARIZONA GOLD MINES CO. A

Office: 42 Westminster St., Providence, R. I. Mine office Yavapai Co., Ariz. Arthur E. Brown, secretary and treasurer. I claims, area 360 acres, known as the Parker group, 2½ miles from

producer, shows copper values at depth of 50′, in a vein Has a 5-stamp mill and planned adding a cyanide plant.
ier clerk, took judgment, Dec. 19, 1908, for $538.86 and pped a little ore to the Humboldt smelter. Idle several noribund.

IA MINING CO. ARIZONA.
claimed from former mine office, Morristown, Maricopa andall, treasurer; J. Harry Bennett, general manager; erintendent. Lands, in Bennett Gulch, on lower Turkey town and Hot Springs, have a 319′ shaft, bottomed in about 3% copper, 2 oz. silver and $2 gold per ton. about 800′ of workings. Has steam and gas power, a 5,000-gallon storage tank, and 13 buildings. Shipped a a June, 1908. Idle and presumably moribund.

CO. MONTANA.
se, Missoula Co., Mont. P. J. Conroy, president; Ole H. nd manager; S. H. Linn, secretary; Paul Gerber, treas-, Michael H. Linn, J. Fleming, Geo. Dunham and Geo. Organized May 15, 1903, with capitalization $1,000,000, 500,000, shares $1 par.

3 to 7 miles east of the Monitor mine, on Big Creek, near oot Mountains, between Saltese and Deborgia. Property, ension of the Monitor vein, shows 2 copper veins, with ed by a 600′ upper tunnel, showing a little silver-lead and nd by a 1,075′ lower crosscut tunnel, with 25′ of drifting ng chalcopyrite of 6 to 7% estimated copper tenor. Prop-ing.

G WORKS. NEW YORK.
t & Hecla Mining Co., at Buffalo, Erie Co., N. Y.

RROCARRIL y MINAS DEL BUITRON. SPAIN.
mea la Real, Huelva, Spain. Property is operated by under lease, and is described under title of that company.

ARIZONA.
le, Yuma Co., Ariz. Lands, 5 claims, in Cunningham tains, are said to show considerable ore assaying 7 to r ton in gold and silver. Presumably idle.

G CO. WYOMING.
Wyo. Mine office: Hazelton, Johnson Co., Wyo. F. A. reasurer and manager; W. J. Davis, vice-president and ficers and Geo. Smith, directors. Organized 1903, under h capitalization $500,000, shares $1 par, nonassessable; al meeting, December 1st, each year. Lands, 5 claims, g mica-schist and felsitic granite, carrying several veins, 2′ width, developed by 5 pits of 10′ to 15′ and shafts of s cuprite and chalcocite, giving assays of 25% copper and Equipment includes a 45-h. p. hoist and 3 mine buildings.

INING CO. WYOMING.
eded, 1907, by New Bull Domingo Mining & Milling Co. Hecla, carried auriferous copper ore, and was but slightly at Hecla, Laramie Co., Wyo.

CHAMPION MINING CO. UTAH.
ouse Bldg., Salt Lake City, Utah. Mine office: Eureka, M. Bradley, president; Jos. F. Smith, vice-president and , general superintendent; preceding officers, Frederick Philo T. Farnsworth and Jas. A. Cunningham, directors. 00, shares $10 par. Dividends, to end of 1909, were

$2,738,400, last dividend being 10 cents, July 11, 1908. Is control stock ownership, secured 1908, by United States Smelting, Refining &

Lands, 3 claims, adjoining the Centennial-Eureka, which is un control, and with which sideline agreements estopping litigation w 1908. Mine was discovered 1876, and has been a producer since 1

Development is by a 1,300′ shaft, with a 200′ winze below the l the 1,300′ level being wet. All levels from 100′ to 1,200′ inclusi unstoped. Production is mainly auriferous lead carbonates and silv carrying small copper values, used mainly for fluxing, and the mine h reserve of high grade ore, with considerable quantities of low grade o for later extraction.

Equipment includes a 200-ton mill, with steam and electric p duction, 1907, was 248 carloads of ore, or circa 12,000 tons, secured pa work of lessees.

BULLION CANYON MINING & MILLING CO.

Mine office: Cedar City, Iron Co., Utah. J. R. Richard Property, west of Cedar City, and about 15 miles from the Salt Lake a 240′ crosscut tunnel, with a winze showing ore giving good ass lead, copper, silver and gold.

BULLION CITY BORNITE COPPER MINING & MILLING CO. C

Dead. Formerly at Aspen, Pitkin Co., Colo. Described Vol.

BULLION GOLD & COPPER CO.

Dead. Formerly at Reno, Washoe Co., Nev. Described Vol.

BULLION KING GOLD MINING CO. C

Office: 19 Wabash Ave., Chicago, Ills. Mine office: Silverto Co., Colo. Frank E. French, superintendent, at last accounts. auriferous and argentiferous sulphides of lead, zinc and copper. includes an electric plant. Became bankrupt, circa April, 1910

BULLION MINING CO., LTD.

Office: Wallace, Idaho. Mine office: Mullan, Shoshone Co., Id O'Neil, president; Jas. H. Taylor, secretary, treasurer and manag ized 1902, under laws of Idaho, with capitalization $1,500,000, shar

Lands, 8 claims, 3 patented, area 160 acres, near Lookout, 2 mi Puget Sound railway and 4 miles from Borax station, on the Nort line, on the Idaho slope of the Bitter Root divide, with a good wa Borax. Property has a vein of 4′ to 20′ width, with average of 6′ nearly vertical dip, carrying shoots of copper ore, mainly chalco some bornite, associated with siderite, having a limestone gangue, or mated to average 3.2% copper, and 0.4% oz. silver per ton, with a t with some ore of better grade. Mine is opened by a 60′ shaft, a 1 tunnel and 186′ drift tunnel, with 1,899′ of workings, well timbere hemlock, tamarack and fir. Equipment includes steam power, a 1 and a 5-drill Ingersoll-Rand air-compressor. Management plans be shipments, 1911.

BULLION MOUNTAINS COPPER CO. CA

Office: 1221-52 Broadway, New York, N. Y. Mine office: Bernardino Co., Cal. Organized under laws of Arizona, with ca $1,500,000, shares $1 par. Was promoted by H. R. Leighton & Co., rupt. Company claims to have mines and reduction works at Lavic sumably succeeded to property of the Peacock Copper Co., which h concentrator, but ran out of ore. Is regarded with suspicion. Idle ently moribund.

BULLWHACKER COPPER CO. M

Office: Spokane, Wash. Mine office Butte, Silver Bow Patrick Clark, president; J. J. Stewart, vice-president; W. C. Moyer

ohn Bresnehan, superintendent. Organized March 20,
ona, with capitalization $1,000,000, shares $1 par. Is
Clark, who is supposed to own about 80% of the stock.
of 1 cent per share, early 1907.
g east of the Pittsburg & Montana, having a 400′ shaft
paystreak of 15′ to 20′ width, carrying workable values
and chrysocolla, averaging about 3.5% copper, both
gold or silver values, and also has a little chalcocite, up
Ore is silicious and does not concentrate well, hence
ade with a leaching process. In 1906 lessees produced
re, averaging 4.97% copper, extracted from depth of
pany itself produced nearly an equal amount of ore,
ated as equal to 850,000 lbs. fine copper. Shipments
7. Property considered promising, though located on
t. Idle since 1907.

D & COPPER CO. **ARIZONA.**

in Great Belcher of Arizona Co. Formerly at Prescott,

& CO. **CALIFORNIA.**

y, Shasta Co., Cal. E. J. McLaggan, superintendent.
1910. Property is known as the Michigan group.
been done by the present company.

MINING & SMELTING CO. **CALIFORNIA.**

ay, New York, N. Y. Mine office: Winthrop, Shasta
an, president; Anson W. Burchard, vice-president; M.
John B. Keating, manager; Herbert R. Hanley, assist-
d 1900, under laws of New Jersey, with capitalization
par, reduced, 1905, to $1,000,000. Bonds, $400,000,
Sacramento Valley & Eastern Railway, stock of which
Hill. Is controlled, through practically entire stock
l Electric Co.
8 patented, area 213 acres, in the Pittsburg district,
of the Iron Mountain, Balaklala and Mammoth mines,
me general geological horizon. Property includes the
and Copper City groups, connected properties, except
miles southwest of the Bully Hill, with an unworked
per City and Rising Star groups.
erty was opened as a gold mine, paying well as placer
working the gossan with rather indifferent results, until
ed, at slight depth. Bully Hill has a diameter of about
e the stream levels of the surrounding country, and is
cks, mainly basalt and rhyolite, with 3 mineral zones,
ximately north and south, ore occurring in shear-zones
abase dykes, all of superficially slaty structure, lenses
to 30′ on one or both walls. Main lenses have stringers
a few inches to 30′ in width, the principal lenses being
o 40′ wide, with average width of about 30′, opened to
arrying ore of 2 to 30% copper tenor. The zone of
ows about 10′ of bonanza ore, the main ore bodies below
ssociated with pyrite, also a little bornite and chalco-
lized ores and native copper. The best ore body gives
15% copper, 6 oz. silver and $8 gold per ton, and shows
e silver in considerable quantities, on the 670′ level,
r of the mine being about 5% with combined gold and
er ton.

The Bully Hill group is opened above tunnel No. 3 by crosscut 600′, 800′, 1,000′ and 1,200′, giving a back of about 300′. No. 3, the r ing tunnel, 1,000′ long, has double tracks and a 100x100′ undergrou containing powerful pumps and double-drum electric hoist for the ment 970′ blind shaft starting from this point.

The equipment includes steam and electric power aggregating 3 the mine, and 350 h. p. at the smelter, the mine having four 100-h. p. h for 1,000′ depth each, and 3 Rand air-compressors, of 14 drills agg pacity. Buildings, about 20 in number, include a 40x50′ iron-sheathe shop.

The Rising Star group of 5 claims, also known as the Anchor, Ex Northern Light mine, has an 800′ three-compartment shaft, with do electric hoist, and works the sixth and seventh levels, which show co good ore.

The Copper City group, 4 claims, area 70 acres, is opened by an nel of 150′ and a lower tunnel of circa 1,000′, started, circa 1863, by C DeLamar, and is said to show a 20′ body of solid sulphide ore, stro iferous. The Winthrop mine, of the Copper City group, has a 16′ v of fair copper tenor. Principal developments, 1910, were on the Co group.

The smelter, about one-half mile from the mine, receives ore the the Bully Hill railroad, a 4-mile standard-gauge private line having Baldwin locomotive. The smelter, remodeled 1907-1908, has about daily capacity, fuel being mainly coke, supplemented by petroleum f verberatory. The furnace building is 39x310′, with a 90′ stack, and i throughout, handling all material by gravity. The calcining depar roast-stalls, in series, with 2 McDougal circular calcining furnaces are two 42x120″ rectangular water-jacket blast-furnaces, and a 50-t beratory for treating fines and flue-dust. First-fusion product is a m to 50% copper tenor, taken in ladles, by electric traveling crane, t verter department, which has 2 stands, with 68x96″ shells of barrel t ing out blister copper of 99% tenor, shipped to the DeLamar works a N. J., for electrolytic refining. Limestone and iron ore for fluxing ar from quarries on the McLeod River, 6 miles distant, but there is a s suitable ferruginous copper ores for fluxing the high grade sulphid Bully Hill mine.

Smelter was closed down, July 1, 1910, and forces at the mine owing to trouble over fumes, the federal forest service alleging damag Ore production is shipped, under contract, to the Balaklala smelter, t City group being the principal producer, and shipping about 100 during the latter half of 1910.

The Sacramento Valley & Eastern Railway, 17 miles long, con the company, completed, 1907, at a cost of circa $500,000, runs from to a connection with the Southern Pacific, at Pitt, 3 miles from Ken ning through Heroult and Copper City.

Annual production, formerly about 5,000,000 lbs. fine copper, v 3,250,000 lbs. in 1908, and circa 4,000,000 lbs. in 1910. The Bully H haps the highest grade copper mine in California, with an experie capable management.

BUNDARRA MINE. AUS

Mine office: Bundarra, Hardinge Co., N. S. W., Australia. M owner; A. C. Julius, manager. Lands, in the Tingha division of th Uralla mining district, show a 4′ to 8′ vein of sulphide ore, deepest being 350′. Has a smelter with a small reverberatory furnace, mak matte. Production, 1907, estimated at 250,000 lbs. fine copper. about 50 men at last accounts.

ARIZONA.

l. Emil Rautman, Prescott, Ariz. Mine office: Big Lands, 10 claims, in the Big Bug and Walker districts, of Prescott, opened by a 1,600′ tunnel. Presumably

NG & SMELTING CO. WASHINGTON.

dison Ave., New York, N. Y. Mine office: Index, Works office: Reiter, Snohomish Co., Wash. Chas. wis H. Nash, vice-president; John D. Campbell, secre- asurer; V. V. Clark, general manager; Chas. A. McClain, V. Collins, smelter superintendent. Organized Oct. 24, ine, with capitalization $3,000,000, shares $1 par, re- to $1,500,000, and afterward increased to $2,000,000, ,000 common stock and $500,000 cumulative 8% pre- ovide for payment of bonds, second mortgage notes and uccessor of Bunker Hill-Sullivan Copper Mining Co.

area circa 300 acres, known as the Copper Bell group, niles west of Index, on May Creek, below Lake Isabelle, n granite, and a contact deposit between granite and ng was done, 1907-1909. Development is by shafts of t 1 mile of workings, showing 2 ore bodies, one of 2′ to lcopyrite averaging about 1% copper, 0.5 oz. silver and

s a 110-h. p. hydro-electric plant, taking water from a 10-drill Ingersoll-Sergeant duplex air-compressor, and There are a number of mine buildings.

1907, to 100 tons, has Blake and Austin crushers, rolls, les, buddles and a magnetic separator.

building has a furnace, variously rated at 50 to 75 tons July, 1908, for a short period only. Some concentrates resumably idle.

NG CO. NEVADA.

11 claims, 7 freehold, well timbered and fairly watered, n, near the Delmas Copper Co. Ores were cuprite and hanging, at slight depth, to bornite and chalcopyrite. 10 tons of ore, said to give fair returns in copper, 2.8% er per ton. Formerly at Lee, Elko Co., Nev.

MILLING CO. UTAH.

h. Mine office: Silver City, Juab Co., Utah. B. H. r; preceding officer, W. F. Giles, Jos. I. Bullock, A. O. Dixon, directors. Has 600,000 shares. Mine has 2 rous copper sulphides, known as the Railroad and As- owing a 3′ ore shoot assaying up to 20% copper, 10% er ton. Mine is developed by a 2-compartment shaft.

VAN COPPER MINING CO. WASHINGTON.

zed March 20, 1900, and reorganized Oct. 24, 1902, as melting Co. Formerly at Index, Snohomish Co., Wash.

VAN MINING CO. NEVADA.

Jr., was manager. Lands, about 6 miles northwest of he Steptoe Valley, circa 9 miles from a railroad, carried with small gold values. Property was bid in, circa 1910, s, holder of a judgment for $6,311.20, he being the only cGill, White Pine Co., Nev.

to show more than 3,000,000 tons of ore, with approximately 2,500 blocked out, assaying 3.4% copper, ore being mainly chalcocite, witho ciable precious metal values. The 500′ Newsboy vertical shaft, star is east of the former main workings. The mine has about 5 miles of wo the 2 veins, the Sampson ore body being 100′ to 200′ in width, about proven length, and of 300′ proven depth. Mine is worked largely on t system, obviating excessive timber requirements. Equipment include hoists and pumps, and a steam hoist at the Sampson shaft.

Lands include a townsite, improved with water-works, electric li substantial buildings, including a hotel and numerous dwellings.

The concentrator, built circa 1905, has been twice remodeled, an to the present capacity of 300 tons daily, putting about 9½ into 1, extraction of assay values. Equipment includes electric power, with and 300-light electric generator. The mill may be increased to 1,500 t capacity. Concentrates are shipped to the Shannon smelter.

A 10-ton smelter, of antiquated design, left by former owners, is worthless.

Survey has been made for a 14-mile spur from the main line of Fé railway to the mine and mill. Labor is almost exclusively Mexi the bosses being Americans.

Production, to end of 1907, was about 15,000,000 lbs. fine copper 1910, is estimated at 2,500,000 lbs. Property considered decidedly p and management is of the best.

BURTON CONSOLIDATED COPPER CO. WY

Dead. Formerly at Encampment, Carbon Co., Wyo.

BUSTER BROWN CO. A

Office and mine: Tucson, Pima Co., Ariz. Chas. F. Hoff, presi general manager. Capitalization $3,000,000, shares $1 par. Lands, area 100 acres, in the Amole district, 16 miles northwest of Tucson, sli veloped, showing ores carrying fair assay values in copper and silver.

BUSTER MINES SYNDICATE, LTD. A

Dead. Formerly at Prescott, Yavapai Co., Ariz. Described Vol

BUTCHER BOY MINING CO. WASHI

Letter returned from former office, Greenwood, B. C. Mine offic saw, Okanogan Co., Wash. Lands, in the Myers Creek district, sli veloped, carry auriferous copper ore of fair assay tenor. Equipment a small steam plant. Presumably idle.

BUTLER-LIBERAL CONSOLIDATED MINING CO.

Dead. Was succeeded, 1908, by North Utah Mining Co. For Bingham Canyon, Salt Lake Co., Utah. Fully described Vol. VIII.

BUTLER MINING & MILLING CO.

Dead. Was merged, 1904, in Butler-Liberal Consolidated Mi Formerly at Bingham Canyon, Salt Lake Co., Utah. Described Vol. I

BUTTE-ALEX SCOTT COPPER CO. MO

Office: Palladio Bldg., Duluth, Minn. Mine office: Butte, Sil Co., Mont. J. G. Bennett, president; N. F. Hugo, vice-president an manager; Thos. Furniss, secretary and treasurer; preceding officers, Clough, Capt. W. J. Dawson, Thos. A. Merritt, W. D. McMullin, W. man and J. B. Chapman, directors; Chas. J. Stone, superintendent. C Feb. 6, 1909, under laws of Delaware, with capitalization $1,250,000, sh par; issued, $1,000,000, $500,000 in full-paid and $500,000 stock $4 pai a reconstruction of Butte Montana Mining Co., giving 50,000 shares of stock to the Butte Montana for its property and is said to have begun with $100,000 cash. A $1 assessment was levied July 1, 1910. Prop taken [redacted] delity Title & Trust Company, Pittsbu trar [redacted] ittsburg, transfer agent. Stock is liste

Duluth stock exchanges. Annual meeting, second Tues-

1 fractional, area 25 acres, known as the Little Annie and The Little Annie, area 20 acres, lying between the Gold-rgia claims, northwest of Walkerville, is a silver property sunk many years ago, that include a 200′ incline shaft, Property is supposed to carry the northern branch of the lits in going west, the Little Annie having the northern west of the Alice company's westernmost claims. The filled with water, and idle some years.

y is the Alex. Scott, a fracticnal claim of 4.52 acres area, in g the West Colusa mine on the north. Title to the Alex. ere is likelihood of litigation over apexes. The Alex. Scott 00′ of the strike of 4 veins, and is developed by a 1,600′ partments to depth of 900′ and 3 compartments below, o show a vein 28′ wide, carrying 3 seams of ore, one, of 2′ ade. The 600′ level has a vein carrying an 18″ paystreak inly chalcopyrite. The 1,000′ level shows a vein carrying blocked out on the 1,200′, 1,500′ and 1,600′ levels. Some vel, shipped, 1908, by leasers, to the Pittsmont smelter, 20% copper, with good gold and silver values. A little he beginning and end of 1910, to the Pittsmont smelter, pper.

des a Nordberg hoist, capable of raising 4-ton loads from an air-compressor. Buildings include a boiler-house, com-0-ton ore-bins.

is of problematical value, but the Alex. Scott, though small, eing located in the heart of the district, and surrounded on nines. The stock-market was unmercifully rigged, with he company and speculators, in April, 1909.

DA COPPER CO. **MONTANA.**

ceeded, 1902, by Carlisle Copper Co., also dead. For-Bow Co., Mont.

DA COPPER MINING CO. **MONTANA.**

unclaimed from former office and mine, Butte, Silver Bow Goodwin, president; Wm. Metting, vice-president; John and treasurer; preceding officers, F. Tomek, Geo. P. Porter directors. Organized June 6, 1906, under laws of Mon-ion $1,000,000, shares $1 par. Lands, 20 claims, north of howing mineralized ledges. Idle several years and appar-

COPPER CO. **MONTANA.**

ohn Bldg., Butte, Mont. Letter returned unclaimed from genta, Beaverhead Co., Mont. J. P. Oppenheimer, presi-, manager; J. H. Tonkin, superintendent. Organized Feb. f Montana, with capitalization $3,000,000, shares $10 par. nt of Jan. 1, 1909, liabilities were $40,000.

es west of Dillon, known as the Iron Mountain mine, has , opened to a depth of 200′ on a wide vein of argentiferous ore, having streaks assaying up to 16.5% copper and 30 oz. levels were worked, years ago, for silver-lead, which changed lepth. Equipment includes a 125-h. p. hydro-pneumatic lton wheel, and an 8-drill Ingersoll-Rand air-compressor.

A COPPER CO. **ARIZONA & MONTANA.**

ceeded by Arizona Blue Bell Copper Co., also dead. For-apai Co., Ariz. Described Vol. VI.

BUTTE & ARIZONA COPPER MINING CO. A

Office: Butte, Mont. Letter returned unclaimed from former m
Hereford, Cochise Co., Ariz. A. P. Pohndorff, president; B. H. Duns
president; John E. Corette, secretary; John C. Adams, treasurer;
officers, L. O. Evans, Chas. S. Shoemaker and D. M. Watts, direct
Hoatson, general manager; Caspar Schultz, mine superintendent. C
tion $1,250,000, shares $1 par.

Lands, 14 claims, 11 patented, costing circa $60,000, for which
took $450,000 stock, well watered and partially wooded, in the Huachuc
ains, circa 35 miles west of Bisbee, and about the same distance no
Cananea.

Property shows an ochrous gossan of 10′ to 300′ width, covering
vein between syenite and limestone carrying occasional copper oxides, ca
pyrite and argentiferous gray copper, and chalcocite of fair tenor, thou
large quantities. Development is by a 2,300′ tunnel cutting several sm
giving assays up to 18% copper with an average of 4.5% tenor, mine h
wards of 3,000′ of workings. Main vein 350′ from mouth of tunnel i
to show 39′ of 6% chalcopyrite, which is an overestimate. Nearest
is 15 miles, with a fair wagon-road. Has steam power and an air-co
Idle since end of 1908, and out of cash, with poor prospects.

BUTTE & ARIZONA COPPER MINING CO. A

Office: 710 Fay Bldg., Los Angeles, Cal. Mine office: Mayer,
Co., Ariz. Ernest A. Haggott, president; Emil J. Baxter, vice-preside
C. Job, secretary; M. B. Hazeltine, treasurer; preceding officers and B.
dall, directors; Warren G. Davis, superintendent. Organized June
under laws of Arizona, with capitalization $5,000,000, shares $1 par
sessable; issued, $2,200,000. Annual meeting, first Monday in May
pany bought, circa January, 1909, former holdings of Ironwood & Ari
velopment Co., and sold same, March, 1909, to Yuma Copper Co., fo
full-paid shares of latter.

Lands, 9 claims, unpatented, area 180 acres, also 160 acres in the
district, showing Algonkian schist, quartzite and pyrite, carrying 3 or
2 partly developed, occurring as replacements in chloritic schist, and as
deposits between hornblende-schist and quartzite. The main vein,
estimated width, traceable 4,800′, is developed by shafts of 75′, 120′,
300′ and a 400′ tunnel, with about 1,900′ of workings, showing cha
estimated to average 2.5% copper, 2 oz. silver and $2 gold per ton.
contemplates deepening the 75′ shaft, and churn drilling, 1911.

BUTTE & BACORN MINING CO. MO

Office and mine: 49 Silver Bow Block, Butte, Silver Bow Co., M
W. Bacorn, president and manager; Geo. I. Whitney, treasurer; H. L. W
secretary; Ed. Renouard, superintendent. Organized Feb. 12, 1906, un
of Maine, with capitalization $5,000,000, shares $1 par.

Lands were 21 claims, partly fractional, area circa 230 acres, in th
eastern part of the Butte camp, about 1 mile north of the Pittsburg & M
and same distance from any producing mine. Options on the Calu
Moonlight claims were allowed to lapse. Litigation with the federal
ment, over 2 claims, was decided, 1910, favorably to the company, the
ment, with its usual vacuity, advancing the fatuous assertion that thes
were in a forest reserve. Mine is developed by the Colleen Bawn shaft
400′, and the Belinda shaft of 840′. Idle since circa 1907, owing to f
fiscal agents caused by the 1907 panic. Property is entirely outsid
proven zone, though not devoid of promise, and payable ore, if foun
ably will occur at great depth.

BUTTE-BALLAKLAVA COPPER CO. MO

Office: 315 Sellwood Bldg., Duluth, Minn. Mine office: Butt

Henry Nelson, president; John A. Percival, secretary; er; preceding officers, John Panton, I. Freimuth, Gus arner, directors; Dr. Walter Harvey Weed, consulting wton, superintendent.

2, 1907, under laws of Arizona, with capitalization par, nonassessable; fully issued. A former voting trust 1909, to permit listing of stock on the unlisted depart- ock exchange. Paid a 50-cent dividend, Aug. 1, 1910. Trust Company, transfer agent; Federal Trust Company, s upwards of 1,200 shareholders.

l claims, known as the Burke and Ballaklava, area circa as tied up by litigation for many years, but a settlement, ve title to the Catholic Bishop of Helena, who sold the for $400,000, cash.

heastern slope of Butte Hill, are entirely surrounded by nda Copper Mining Co. Owing to the peculiar shape of 60′ long on the strike of the vein system, it carries the an aggregate of about 3,600′ of their strike. By reason on, the property is, for all practical purposes, materially area, by reason of the law permitting the following of ins, formerly called the Speculator, Edith May, Old Joe, oux Chief, are now numbered 1 to 5, and include 3 veins minor veins, with dip varying from level to level. The by wash, the underlying formation has been exposed by ad cut.

ava line is 640′ from the North Butte mine. The Moun- Anaconda, immediately to the north, was a small pro- gement of F. A. Heinze. The Modoc and Modoc Exten- onda, immediately to the south, carry one of the largest t this is of low grade to depth developed, which is only llaklava lies immediately west of the Leonard and north e about 1,000′ distant each, these being the principal mines na group of the Anaconda. The location is one of the

afts, the 250′ three-compartment West shaft being idle, he 1,600′ three-compartment main shaft. The mine has 12th level, for ventilation and safety, with the Modoc and makes a comparatively small amount of water. The w ore carrying 5 to 8.5% copper and 45 to 60 oz. silver, mall shipments have been made. The 500′ level shows grade silver ore, which probably will not hold to depth, s stringers of massive chalcopyrite, with frequent bornite, rincipal ore values are shown on the 800′ to 1,400′ levels, inly chalcocite and bornite, carrying good silver values. p to 34′ in width, carrying rich ore on the 800′ level; the vein up to 20′ in width, with ore averaging 4 to 4.5% level carries 9′ of chalcocite and bornite, of about 7.5% The main shaft has a 98′ steel headgear and a 500-ton

rted, 1908, by the Butte, Anaconda & Pacific Railway, algamated Copper Co., which had secured a right-of-way klava property, and claimed title to the ore underneath, was discovered, and the railway company dropped suit, n the right-of-way. The Anaconda Copper Mining Co. junction, Aug. 22, 1910, from Judge McClernan, at Butte, nade permanent Jan. 24, 1911, restraining the Butte-Bal-

laklava from extracting ore from the vein formerly called the Edith
the Butte-Ballaklava, and which is claimed, by the Anaconda, to be th
tain Chief vein, apexing on the Mountain Chief claim of the Anaconda
northward, the Anaconda company claiming that ore was extracted
from both the Mountain Chief and Right Bower claims, and filing
$1,800,000 damages against the Butte-Ballaklava therefor. No defe
made by the Butte-Ballaklava, at the hearing Jan. 24, 1911, when the
rary injunction was made permanent, but the matter is to be fought ou
courts, the Butte-Ballaklava having brought a counter suit, for $8
damages, for ore alleged to have been extracted illegally from veins of th
Ballaklava by the Anaconda Copper Mining Co. The damages clai
both litigants can be considered only as legal fictions, as the total pr
of the Butte-Ballaklava was only about $205,000, partly from undispu
while it is scarcely possible that the Anaconda could have extracted $8
worth of ore from the Butte-Ballaklava veins. It is the contention of th
Ballaklava that the Anaconda has extracted considerable ore from its
through the Old Joe, Modoc and Mountain Chief workings, from veins
on Butte-Ballaklava ground. The Butte-Ballaklava ground has be
pletely crosscut, at several points, by the Anaconda, and presumably
drilled also. The disputed vein has been followed, by upraises, conti
from the bottom or 1,400′ level to surface, on Butte-Ballaklava grou
clean walls, only a few stringers coming in, and with no important vei
in that by any possibility could be the Mountain Chief, hence the con
of the Anaconda are not considered valid. Surface trenchings also s
outcrops of the 5 ore bodies opened underground. The Butte-Ballakl
4 veins not in dispute, and development work on these is now in prog
the disputed vein is very much the best of the 5 ore bodies, and is e
valuable. Litigation always is costly and tedious, and the outcome u
but the Butte-Ballaklava is believed to have a just case.

Transportation facilities are unusually good, 4 railroad lines cros
property.

Electric power is used throughout, an auxiliary steam plant being
reserve for emergencies. Equipment includes a double-drum Lake Sho
operated in counterbalance, driven by a 300-h. p. General Electric m
signed to hoist an unbalanced load of 5 tons, at a speed of 800′ per minu
a depth of 3,000′. There also are a 165-h. p. auxiliary double-drum ho
for 1,500′ and a 10x12″ auxiliary steam hoist, 2 Ingersoll-Rand air-com
with cross-compound air cylinders, each driven by a 100-h. p. General
motor, and an electric station pump. The auxiliary steam plant in
cooling tower for water.

Buildings include an engine-house, office with warehouse on the
floor, carpenter-shop, smithy, and a 30x50′ steam-heated changing-hou

Production was begun April, 1910, and when stopped by the inj
August, 1910, shipments to the Pittsmont smelter were about 125 tons
ore assaying about 8% copper and 12 oz. silver per ton, this being the
average grade of ore produced by any Butte mine. Production, Jul
was 662,838 lbs. fine copper and 44,072 oz. silver, and for the second qu
1910 was 1,561,953 lbs. fine copper and 105,608 oz. silver. Total pr
was 2,428,346 lbs. copper, 164,811 oz. silver and 42 oz. gold, giving net
returns of $205,000, in 1910. The property, though small, is very rich,
management good.

BUTTE & BASIN MINING CO. MO

Letters returned unclaimed from former office, Butte, Mont., and
mine office, Basin, Jefferson Co., Mont. J. W. Kemper, president. A
to statement of Jan. 1, 1909, issued capitalization was $207,001, with li
of $1,165. Idle and apparently moribund.

IEAD COPPER CO. **MONTANA.**
at Argenta, Beaverhead Co., Mont. Described Vol. VIII.

M COPPER CO. **UTAH.**
ffice was Butte, Mont. W. H. Nichols was president.
ad apparently little or no work was done thereon, as com-
straits early in its career. Formerly at Bingham Canyon,

I COPPER MINING & DEVELOPMENT CO. **UTAH.**
ffice was 35 Congress St., Boston, Mass., and former
lt Lake City, Utah. Lands supposedly were in the West
trict, but no trace of operations thereon ever secured.
Canyon, Salt Lake Co., Utah.

CONSOLIDATED MINING CO. **MONTANA.**
way, New York, N. Y. Former mine office, Butte, Silver
Philips, Jr., president; Adolph Lewisohn, vice-president;
ecretary and treasurer; A. H. Melin, assistant secretary
ng officers, A. B. Grafius, W. J. Riley and John D. Ryan,
1896, under laws of New York, with capitalization
0 par. Original bond issue of $1,500,000, at 6%, was
of sinking fund. Paid dividends, to Dec. 31, 1910, of
nd, $1 per share, having been paid February, 1904. Net
ing June 1, 1909, were $446,198, and for year ending June
70. Recent production has been as follows: 9,209,650
07; 10,349,640 lbs. in 1908; 14,010,500 lbs. in 1909. For
ne 1, 1910, production was 20,955,910 lbs. fine copper,
d 7,377 oz. gold.
f company was sold Apr. 1, 1910, to the Anaconda Copper
00 shares of Anaconda stock. The Anaconda stock is to
shareholders, and the company wound up, 1911. Very
III.

R MINING CO. **MONTANA.**
Iont. Letter returned unclaimed from former mine office,
., Mont. Lands, 2 claims, held under bond and lease,
expected to cut, at depth of circa 500', a vein carrying
iferous copper and lead ores. Idle and apparently mori-

N COPPER MINING CO. **MONTANA.**
at Butte, Silver Bow Co., Mont. Described Vol. VIII.

Y COPPER MINING CO. **MONTANA.**
at Butte, Silver Bow Co., Mont. Described Vol. VIII.

COPPER MINING CO. **MONTANA.**
s, 1909, to Bamar Copper Co., for 130,000 shares of stock
t Butte, Silver Bow Co., Mont. Fully described Vol. VIII.

PPER & GOLD MINING CO. **MONTANA.**
nclaimed from former office, Lewisohn Bldg., Butte, Mont.
Deer Lodge Co., Mont. Louis Feldman, president; D. J.
; J. Chauvin, secretary and treasurer; preceding officers,
as. McMasters, Wm. Henthorne and John Strasser, direct-
21, 1906, under laws of Montana, with capitalization
par. Lands, 6 claims, 4 patented, circa 15 miles west of
Consolidated Mining Co., showing a 3' to 4' vein carrying
al ore, giving assays of 11.9% copper, 156 oz. silver and
Presumably idle.

COPPER CO. **MONTANA.**
hattan Bldg., Duluth, Minn. Letter returned unclaimed
e, Butte, Silver Bow Co., Mont. M. A. Ryan, president;

Chas. Bergson, vice-president; Henry Kimpel, secretary; Edw. Lync preceding officers and Fred C. Harris, directors. Organized 1908, w zation $1,100,000, shares $1 par. Lands are the Carlisle and Protec in the North Butte district, near the Butte & Superior and Elm Orl north of the Berlin claim of the North Butte. Property is said to distinct veins. October, 1908, company planned installing a surface intention of sinking 2,500′, but failed to do so. Idle and presumabl

BUTTE-CAROLINA MINING & MILLING CO.

Dead. Was a stockjobbing enterprise. Formerly at Butte, Silv Mont. Described Vol. VIII.

BUTTE CENTRAL & BOSTON COPPER CORPORATION.

Dead. Became bankrupt, and property was sold, 1908, for withstanding the capitalization of $15,000,000. Was practically rec Butte Central Copper Mining Co. Formerly at Butte, Silver Bow Very fully described Vol. VIII.

BUTTE CENTRAL COPPER CO.

Office: 27 State St., Boston, Mass. Mine office: Butte, Co., Mont. Sir Frederick W. Borden, chairman of the board; Wm president; Mark Workman, vice-president; Freeman I. Davison, dent and general manager; Willard E. Robinson, treasurer; preced Henry M. Pellatt, Francis A. Cave, Hon. Rodolphe Forget, Wm. hast, Chas. A. Henderson, W. Harry Thompson, John A. Cond Cragin and Harry W. Davis, directors; W. L. Creden, consultin Samuel McConnell, superintendent. Organized December, 19 laws of Delaware, with capitalization $2,500,000, shares $10 par, no fully issued. Was practically a reconstruction of the Butte Cent Mining Co., which was affiliated with the Butte Central Copper Central Copper Mining & Smelting Co., and Butte Central & Bost Corporation. Stock is listed on the Boston curb. First Natic Boston, registrar; International Trust Co., Boston, transfer agen meeting, second Wednesday in February.

Lands, 1 claim, patented, area 20 acres, known as the Ophir to have been bought by predecessor of present company for $50,00 a stock consideration. Mine is in the southwestern portion of the trict, a few hundred feet east of the Travona. Property, having 2 ve as the North and South, and a cross fissure, known as the Blue V veloped by a 540′ three-compartment shaft, planned to be deepened with laterals on the 100′, 200′, 300′ and 500′ levels, the mine ha 8,000′ of workings, estimated by management to show 1,000,000 t with 100,000 tons blocked out for stoping, which figures seem hig are mainly in silver, with copper increasing at depth, and only sl of zinc on the 500′ level. Company reports veins as of 17′ to 90′ wi ing sulphide ores assaying from a trace to 1% copper, 8% lead, fr to 8% zinc, 20 oz. silver and $1 to $10 gold per ton. Assays have be up to 102 oz. silver and $5 gold per ton, and management hopes to copper ore at depth of anywhere from 1,000′ to 1,400′. The Ophir siderable producer, 1880–1883, of silver ore, but was poorly opened.

Equipment includes a 330-h. p. steam plant, with hoist good depth, and a 7-drill Rand air-compressor. There are 7 buildings, an engine-house, 18x24′ carpenter-shop, 18x36′ smithy, and an off silver ore was produced, by leasers, before suspension, December, 19 pany plans a 100-ton concentrator.

BUTTE CENTRAL COPPER MINING CO.

Dead. Was reorganized, December, 1908, as Butte Central C Formerly at Butte, Silver Bow Co., Mont. Described Vol. VIII.

OPPER MINING & SMELTING CO. MONTANA.

te, Silver Bow Co., Mont. Organized February, 1906, , with capitalization $2,500,000, shares $5 par. Appar- company of the Butte Central & Boston Copper Cor- ractically succeeded by the Butte Central Copper Co., this corporation is a conundrum.

MINING CO. MONTANA.

way, New York, N. Y. Former mine office, Butte, . Thos. F. Cole, president; John D. Ryan, vice-presi- etary and treasurer; preceding officers, Benj. B. Thayer, Baker and Urban H. Broughton, directors.

, 1906, under laws of New Jersey, with capitalization 5 par. Retired, 1906–1907, bonds at 6% to amount of ; $2,500,000 bonds of Nipper Consolidated Copper Co., of Montana Ore Purchasing Co. Paid first dividend ends were passed 1908, and resumed Dec. 1, 1909, after ividends of 25 cents were paid to end of 1910. Ameri- , transfer agents; Old Colony Trust Co., Boston, regis- on the Boston Stock Exchange. Company began busi- ash. Dividends, to end of 1910, aggregated $3,700,000. he company is the entire stock issue of Red Metal Min- ng share interest in the Alice Gold & Silver Mining Co., s held any other property, but because the Red Metal g company only, principal data pertaining to the prop- as been given under this title, by which the property is he Red Metal Mining Co. sold its mines, Feb. 6, 1910, per Mining Co., receiving therefor 500,000 shares of he Red Metal Mining Co. is to be liquidated, early 1911, now purely perfunctory, and stocks now held by Red to be transferred to the treasury of the Butte Coalition. the Butte Coalition Mining Co. consists of the entire ed Metal Mining Co., the property of which consists of stock of the Anaconda Copper Mining Co. and 3,000 ernational Smelting & Refining Co.; also an equity in Gold & Silver Mining Co., whose only property consists conda stock, of which Butte Coalition will receive about e liquidation of the Alice. In addition to these stock ended 1909 with a cash balance of $3,922,138, from ken, 1910, to purchase 3,000 shares of International o. stock, and the Butte Coalition should have ended e of approximately $3,750,000, drawing interest; interest $105,064. Dividends, 1910, were 25 cents quarterly,

en as follows: 24,995,112 lbs. fine copper, 730,226 oz. d in 1906; 19,416,377 lbs. copper, 444,810 oz. silver and 18,521,282 lbs. copper, 300,192 oz. silver and 1,831 oz. 71 lbs. copper, 641,256 oz. silver and 4,145 oz. gold in

lk, late 1910, by dissatisfied stockholders, of bringing he property was illegal, and made for much less than ough the Butte Coalition apparently got the worst of its properties, there apparently is small likelihood of tion looking toward invalidation of the sale, which is ed. The mines formerly owned by the company were . VIII.

BUTTE & CŒUR D'ALENE COPPER MINING CO.

Letters returned unclaimed from former office, Missoula, former mine office, Saltese, Missoula Co., Mont. Operating offic Idaho. David C. Smith, president; Geo. M. Dunham, vice-pr treasurer; John Uttling, secretary; Geo. Brousak, manager; prece Peter Peterson and Richard Daxon, directors; John Quinlan, sup Organized circa July, 1907, under laws of Washington, with c $1,000,000, shares $1 par.

Lands, 9 claims, adjoining the Boston-Colby on the west, extension of the veins of that mine. A vein of 75′ estimated width between shale and quartzite, carries slightly auriferous and copper carbonates, with gangue of spathic iron. A 375′ crosscut a vein carrying oxidized copper ores of low average tenor, and silver-lead ore assaying up to 10% lead and 100 oz. silver per ton. mine buildings, and was developing, with a small force, late 1910.

BUTTE-CŒUR D'ALENE MINING CO.

Letter returned unclaimed from former office, Spokane, W Lens, president; W. P. Edris, secretary and treasurer; Jas. E. Quir manager; Col. L. E. Linsley, consulting engineer; Jas. E. Short, sup Capitalization $1,500,000, shares $1 par. Lands, 7 claims, 1 f Gentle Annie Gulch, about 4 miles east of Mullan, within one-h railroad. Development is by a tunnel, cutting 2 veins, the Le 75′ from portal, being considerably broken, though showing some tion for 30′, one stringer of 1″ to 30″ width giving ore assaying 6 128 oz. silver per ton. A 330′ blind shaft starts from the tunnel the portal. Property also has a third vein, known as the Kir opened only by surface work, carrying argentiferous tetrahedrite A test carload, shipped, circa 1908, to the Panhandle smelter, gave of $41 per ton. Mine has a power plant and several buildings.

BUTTE COMMERCIAL COPPER MINING & DEVELOPMENT CO.

Dead. Formerly at Butte, Silver Bow Co., Mont. Describe

BUTTE CONSOLIDATED COPPER CO.

Office and mine: 63 Hibbour Bldg., Butte, Silver Bow Co., O. Gerrall, president; Robt. J. Buckley, vice-president; Frank M secretary and treasurer; preceding officers, Dr. W. R. Lincoln and son, directors. Organized Jan. 12, 1906, under laws of Montana, ization $6,000,000, shares $1 par. Statement of Jan. 1, 1909, g liabilities. Lands, 34 claims, area circa 500 acres, including claims, known as the Susie group, adjoining the Butte & Bacorn opened by a 225′ tunnel, and a 150′ two-compartment shaft, latte Idle several years.

BUTTE CONSOLIDATED COPPER MINING CO.

Letter returned unclaimed from former office, Butte, Silve Mont. Mine office: Corbin, Jefferson Co., Mont. D. D. Twohy Martin Mahoney, vice-president; preceding officers, C. D. McC Walsh and C. R. Grewell, directors. Organized June 30, 1906, u Montana, with capitalization $500,000, shares $1 par. Lands, the Corbin-Wickes have a 300′ shaft, with a crosscut, seeking the which has developed a [illegible] ore giving assays of 30 oz. steam power. [illegible] maintained.

BUTTE CONSOLIDATED MINING CO.

Dead. Was a [illegible] promoted by Jas. B. Goode. Former Silver Bow Co., Mont. Described Vol. VIII.

BUTTE CONTINENTAL COPPER MINING CO.

Office and mine: 36 New Owsley Bldg., Butte, Silver Bow

ident; Fred De Pauli, secretary. Organized January, ion $1,000,000, and statement of Jan. 1, 1909, gave lia- ands, 8 claims, area 160 acres, partly patented, on the bout 5 miles east of Butte, hoped to carry the eastern te ore system, and having 1 large and several small veins. has shafts of 50′ and 150′, latter showing about 4′ of ore 8% copper. Idle several years, except for occasional urts.

ELT MINING CO. **MONTANA.**

at Butte, Silver Bow Co., Mont. Described Vol. VI.

O. **MONTANA.**

vin of the Butte Copper Mining Co., and some relation ntana. Formerly at Butte, Silver Bow Co., Mont. De-

O. **MONTANA.**

relation to present Butte Copper Co. Lands, held under 1902, in the eastern part of the Butte district, included laims, which have since become an important part of the lso the Amazon and several other claims. Formerly at ., Mont.

O. **MONTANA.**

Butte, Silver Bow Co., Mont. Geo. H. Casey, A. H. , Chas. Mattison, Patrick Mullins, W. F. Cobban, Frank Love and Chas. S. Warren, directors. Organized Oct. 2, Montana, with capitalization $2,500,000, shares $5 par. two other companies of same title listed in this volume, d. Lands were the Amazon, Altona and Gaynor claims, a and Bullwhacker, on which apparently no work was , and its properties seem to have passed to other hands. moribund.

XPLORATION CO. **MONTANA.**

at Butte, Silver Bow Co., Mont. Fully described Vol. VI.

ING MINING CO. **MONTANA.**

unclaimed from former office and mine, Butte, Silver E. Beebe, president. Organized Apr. 19, 1906, under ith capitalization $1,500,000, shares $1.50 par. Lands, ea 28 acres, known as the Frenchman No. 2, Rare Steak st of the Jennie Dell mine. Company planned sinking Missouri Girl, but no work was done. Idle since organ- ly moribund.

INING CO. **MONTANA.**

olding company for Butte Copper Montana, and a twin Co. Formerly at Butte, Silver Bow Co., Mont. De-

INING & SMELTING CO. **MONTANA.**

at Butte, Silver Bow Co., Mont. Described Vol. V.

ONTANA. **MONTANA.**

lway, New York, N. Y. Letter returned unclaimed from utte, Silver Bow Co., Mont. C. E. Burrelle, president; e-president; John MacGinnis, general manager; W. L. ceding officers and W. L. Moyer, directors; Robt. Haus- . Organized Dec. 1, 1906, under laws of Maine, with 000, shares $1 par. Trust Company of America, New

lly a reorganization of the Butte Copper Mining Co., but d without the knowledge of the Butte owners of the old

company's lands, and without notice to shareholders, plan of pron decidedly devious. Controlled, through stock ownership, the Co. and Butte Copper Mining Co., both of which are dead. La claimed to be owned, apparently are the Trifle, Anselmo 1 and interest in Robert Emmet 1 and 2. Lands lie just west of M there being a total of 5 patented claims, area circa 35 acres, Copper Mining Co. apparently claimed to own these lands out are supposed to carry the Gagnon and Stewart veins, the North supposedly being an extension of the Gagnon. Properties h about $700,000 in gold and silver, mainly the latter, some b the past running up to 9,000 oz. silver per ton. Principal deve the Trifle claim, which has a 700′ shaft, planned to be sunk to which cut a large vein at depth of 375′, this giving assays of abo from selected ores. Machinery plant is good for 1,000′ depth. claims have a 300′ shaft, said to show 7% copper in the bottom operators were driven out by water and lack of cash.

This concern was supposed to be a holding company, bu the Butte Copper Mining Co. or the Butte Copper Co. is unde corporate relations between these companies being both intrica iar. The promoters represented that the company owned th Anselmo claims, and had an abundance of funds, but the facts otherwise. It seems doubtful whether this is a holding compan company. Idle since 1907, and moribund.

BUTTE COPPER & ZINC CO.

Dead. Formerly at Butte, Silver Bow Co., Mont. Describ

BUTTE & CORBIN CONSOLIDATED COPPER MINING CO.

Office: care of Thornton Hotel, Butte, Mont. J. L. Temp dent; Lee Williams, vice-president; J. B. Fitzpatrick, secretary Organized May 1, 1907, under laws of Montana, with capitaliza shares $1 par, nonassessable; issued, $469,000. Annual meeti each year.

Lands, 5 claims, area 82 acres, also 10 acres of timber lands, in district, on the eastern side of Valparaiso Mountain, showing reported by company to average 8′ 4″ in width, and to carry cha galena averaging 4% copper, 6% lead, 2% zinc, 8 oz. silver an ton, developed by the 500′ Rarus tunnel, which is said to hav assaying 2.5% copper, with a 4′ paystreak, carrying mainly co aging 6% copper, 8 oz. silver and $6 gold per ton. A new shaft October, 1909, at the mouth of the Rarus tunnel.

BUTTE-CORBIN COPPER CO.

Letters returned unclaimed from former office, Butte, Mont mine office, Corbin, Jefferson Co., Mont. J. B. Slemmens, presid ized Dec. 1, 1906, under laws of Montana, with capitalization $5 $1 par; fully issued. Lands, in the Corbin district, are said to sh grade ore. Idle and presumably moribund.

BUTTE-CURTIS & MAJORS COPPER MINING CO.

Office and mine: 35 West Granite St., Butte, Mont. Jas dent; Geo. D. Curtis, manager. Organized Sept. 20, 1906, u Montana, with capitalization $1,000,000, shares $2 par; issu Company reported, Jan. 1, 1909, indebtedness of [illegible]. I southern part of the Butte camp, have a shaft of circa 200′. Idle

BUTTE & DULUTH COPPER C

Dead. Former office was [illegible] J. D. Welcome, Otto Stroh [illegible] under laws of Montana, with [illegible]

a director and treasurer, without his knowledge or tion of such election, had an examination made of the option on sundry lands in the Butte district, and, the ory, resigned immediately. Formerly at Butte, Silver

GOLD & COPPER MINING CO. MONTANA.
r Bldg., Butte, Mont. Letter returned unclaimed , Elliston, Powell Co., Mont. Was said, 1907, to be nds of 1½ cents per share. Lands, 6 miles from Ellis- k mine, having a 300′ shaft, showing ore reported to r, 17 oz. silver and $10 gold per ton. Made a small ores going to the Panhandle smelter, and carbonate noe smelter. Presumably idle.

ER CO. NEVADA.
ix Bldg., Butte, Mont. Mine office: Ely, White Thornton, president; John C. Adams, vice-president; ; Edw. J. Maney, treasurer; preceding officers and L. Organized July 27, 1905, under laws of Montana, with shares $1 par; stock was made assessable, 1907. Is nership of 250,005 shares, by Giroux Consolidated 1, had $242,037.95 in the treasury. Stock is listed on hange. Annual meeting, third Tuesday in January. atented, area 210 acres, in the Robinson district, lying onsolidated and Giroux. Property includes a valuable stant, said to be capable of supplying 2,000,000 gallons

ts of 200′, 200′, and 310′, latter with a steam hoist, all ore, of low tenor, but of some promise. The Nevada pit near the eastern end-line, and ground to the west churn drilling of the Giroux. Mining was suspended, urn drilling was done, 1909, and further churn drilling

COPPER CO. MONTANA.
Butte, Silver Bow Co., Mont. Fully described Vol. VIII.

CREEK COPPER MINING CO. CALIFORNIA.
t Greenwater, Inyo Co., Cal.

NGE COPPER CO. CALIFORNIA.
nt. Letter returned unclaimed from former mine office, Cal. Dr. H. J. McDonald, president; A. H. Mueller, Organized June 15, 1906, under laws of Montana, 000,000, shares $1 par. Lands, 4 claims, next east of per Co., having a 120′ shaft. Idle and presumably mori- water district having gone to pot.

ER & COPPER CO. WASHINGTON.
Wash. Mine office: Stehekin, Chelan Co., Wash. Lands out 25 miles from the head of Lake Chelan, Washington, ′ wide, opened by tunnels. Long idle and apparently

PER CO. MONTANA.
at Butte, Silver Bow Co., Mont. Described Vol. VIII.

TER COPPER CO. CALIFORNIA.
Greenwater, Inyo Co., Cal. Described Vol. VIII.

COPPER CO. MONTANA.
office and mine, Butte, Silver D. J. Charles, vice-president; preceding officers, Emil H.

Renisch and C. S. Passmore, directors. Organized 1906, with c
$2,500,000. Lands, 10 claims, near the old Trenton concentr
southwestern portion of the Butte district, slightly prospected by
cut tunnel, said to show a 35′ vein with an 18″ paystreak carrying m
values in copper, lead, silver and gold, and a 100′ shaft. Idle sin
1907, and apparently moribund.

BUTTE HILL COPPER MINING CO.

Office: 1538–42 Broadway, New York, N. Y. Mine office:
Bldg., Butte, Silver Bow Co., Mont. Jas. Higgins, president; Ma
berg, vice-president; preceding officers, H. A. Frank, J. W. Murp
MacRae, W. P. Cary, W. H. Hall, Thos. Driscoll and John S. Da
ors. Organized Apr. 18, 1906, under laws of Montana, with c
$5,000,000, shares $5 par. Annual meeting, fourth Saturday in J

Lands, 11 claims, area 173 acres, in an undeveloped distri
Walkerville, about 1 mile from previous mining attempts. Has
cutting a vein of 40′ estimated width, showing a few stringers an
ore assaying up to 3% copper and 20 oz. silver per ton. Idle s
except for occasional appearance in the courts.

BUTTE-HOMESTAKE COPPER MINING CO.

Letter returned unclaimed from former office, Butte, Mont.
Homestake, Jefferson Co., Mont. Daniel Agoa, superintendent
claims, patented, area 98 acres, well wooded and watered, 2 mil
Northern Pacific railway, formerly held by Homestake Mining
has a 185′ two-compartment shaft, on the Last Chance claim,
with a 270′ tunnel, showing a 5′ to 7′ vein carrying ore of medium
quartz gangue, assaying up to 6% copper and 38 oz. silver per
also has an 85′ shaft, and a small vein on the Mammoth claim h
assaying 20% copper, 125 oz. silver and $6 gold per ton. Proper
have, on the dumps, 1,700 tons of low grade ore, worth about $6 per t
ment includes two 80-h. p. boilers, and there are 5 buildings. Idle s

BUTTE & IDAHO GOLD & COPPER MINING CO.

Letter returned unclaimed from former office, Butte, Mont.
Salmon, Lemhi Co., Idaho. Wallace Corbett, president; A. L.
vice-president; Dr. W. H. Haviland, secretary and treasurer; T.
assistant secretary and treasurer. Lands, 6 claims, a millsite, a
right, on the northern fork of Carmen Creek, near Salmon, having a
cutting a 6′ vein carrying medium grade auriferous and argentife
ore, with other tunnels of 75′ and 150′ showing other ore bodies,
a total of 600′ of workings. Idle and apparently moribund.

BUTTE & IOWA MINING CO.

Dead. John Hewitt was superintendent. Company former
trolled, through stock ownership, by Davis-Daly Copper Co., and
was merged in same, as lands were said to have been sold to Dav
tates Copper Co. for $55,000. Property included the Colorado
is the principal property of the Davis-Daly Copper Co. Former
Silver Bow Co., Mont.

BUTTE-KNICKERBOCKER MINING CO.

Dead. Formerly at Butte, Silver Bow Co., Mont. Fully describe

BUTTE LODE EXTENSION MINING CO.

Office and mine: Butte, Silver Bow Co., Mont. John
president; Chas. S. Warren, vice-president; John M. Murphy, secr
Kelly, treasurer; preceding officers and Jos. Russell, directors.
Apr. 28, 1906, under laws of Montana, with capitalization $500,
$1 par. Lands, 4 claims, known as the St. Angus group, 12 miles
Butte, having a 150′ shaft with a crosscut showing 2 veins. Presu

COPPER CO. MONTANA.
ized 1906, and name changed, 1906, to Butte & London
Co. Formerly at Butte, Silver Bow Co., Mont.

COPPER DEVELOPMENT CO. MONTANA.
46 East Broadway, Butte, Silver Bow Co., Mont. E.
Jas. H. Lynch, vice-president; W. E. Reynolds, secre-
treasurer; T. H. Emery, general manager; preceding
Baker, Fred Whiteside, W. W. McDowell, Guy W.
ott and Chas. J. Kelley, directors. Organized January,
zona, with capitalization $5,000,000, shares $5 par, non-
London Copper Co., and changed name to present title,
meeting, third Tuesday in January. Gave a $10,000
), to Miners Savings Bank, Butte, to provide funds to
sufficiently to pay a judgment of $16,853.31, for the
iner.
known as the Greendale placer claims, lying immedi-
sburg & Montana, and formerly claimed by the man-
astern extension of the veins of the North Butte, which
rth Butte veins turn at right angles, which remains to
ty acres of the property is said to be valuable for town-

,130′ three-compartment shaft, 2 crosscuts on the 1,100′
none carrying ore of commercial value, except a streak
copper, 50 oz. silver and $2 gold per ton.
s four 125-h. p. boilers, a Corliss double-conical-drum
-compressor. Idle since April, 1908, and in poor shape
while not devoid of speculative promise, is entirely
zone of Butte.

MINING CO. MONTANA.
ester, Madison Co., Mont. Mine has a 150′ two-compart-
ly idle.

I MINING CO. MONTANA.
at Butte, Silver Bow Co., Mont. Described Vol. VIII.

COPPER CO. MONTANA.
Owsley Blk., Butte, Silver Bow Co., Mont. Letter
m former mine office, Argenta, Beaverhead Co., Mont.
ent; B. E. Calkins, vice-president; C. H. Smith, secre-
Organized March 28, 1906, under laws of Montana,
000,000, shares $2 par. Is controlled, through owner-
the issued stock, by Butte & New York Copper Co.,
Butte & Superior Copper Co., through stock ownership.
ge, at 8%, dated March, 1909. Statement of Jan. 1,
$2,000.
cluded 6 claims near the Butte & Argenta, at Argenta,
parently no work was done, and which presumably have

y is 5 adjoining claims, known as the Pollock, Colonel
nce, which are patented, and the Stonewall claim, un-
the gulch from the Butte & Superior, and about a mile
tte.
has 4 veins, 2 more or less developed by a short tunnel
artment shaft. A silver vein has been opened on the
ne is said to have produced, years ago, about $400,000
es mainly in silver and gold, from above the 200′ level,
g 2% copper and 15 oz. silver per ton, with small gold

values, was produced, 1906, by present company. Equipme
5-ton Nordberg first-motion hoist, good for 2,000′ depth.

The Colonel Sellers mine, said to have a promising surface s
600′ shaft, and a 250-gallon electric pump. The Butte & Supe
a crosscut to the Colonel Sellers mine, on the 1,600′ level of th
mine, and plans opening the Colonel Sellers at depth. The F
has a shallow shaft. Idle since 1908.

BUTTE MINE EXPLORATION CO.

Office and mine: 408 West Granite St., Butte, Silver Bo
Clinton C. Clark, president; C. P. Connolly, secretary. Organiz
with capitalization $250,000, shares $1 par. Is no relation to th
same title formerly holding the Six O'Clock property, in Butte, o
Mines Exploration Co. formerly having property at Tecoma, B
Utah. Property is the Pacific Lode claim, on which a little wo
1901–1902; since idle.

BUTTE MINE & EXPLORATION CO.

Dead. Formerly at Butte, Silver Bow Co., Mont. Describ

BUTTE MINES EXPLORATION CO.

Dead. Formerly at Lucin, Box Elder Co., Utah. Describ

BUTTE MINING & DEVELOPMENT CO.

Dead. Formerly at Butte, Silver Bow Co., Mont. Describ

BUTTE MONITOR TUNNEL MINING CO.

Office: care of C. W. Pomeroy, vice-president, 145 La Salle
Ills. Letter returned unclaimed from former mine office, Butt
Co., Mont. Wm. S. Switzer, president, secretary and treasur
officers and J. H. Morong, directors. Capitalization $3,750,000,

Lands, 7 claims, area 102 acres, near the eastern portal of
tunnel, on the Great Northern Railway, in the northeastern part
camp. Development is by shafts of 40′ and 80′, and a 1,412′
cutting a number of veins, some of considerable width, one,
management to be the Anaconda vein, being claimed to be 280′
also is a 300′ crosscut tunnel on the Burner claim, cutting a str
posed by management to be a continuation of the Homestake vei
conda. The Sunlight claim has 3 veins, of 10′ to 20′ width. M
said to show chalcopyrite averaging about 2% copper and 2 oz.
with small gold values.

The mine was shut down, 1889, by litigation. Mr. Switzer
man, and a guardian was appointed for him, 1910, after litigat
loan of circa $30,000 to Switzer from Jas. A. Murray, secured by
the company's stock in pledge, which stock was sold by the sheri
ber, 1910, for $725, to a representative of Mr. Murray. Proper
worthy of further test.

BUTTE-MONTANA MINING CO.

Dead. Practically was reorganized, Apr. 10, 1909, as Butt
Copper Co., when property was sold for 50,000 shares of Butte-Ale
and Butte-Montana Mining Co. liquidated. Formerly at Butte
Co., Mont. Fully described Vol. VIII.

BUTTE-NEW YORK COPPER CO.

Dead. New Jersey charter was forfeited, 1903, because of
Formerly at Butte, Silver Bow Co., Mont.

BUTTE & NEW YORK COPPER CO.

Office: Duluth, Minn. Letter returned unclaimed from
office, Butte, Silver Bow Co., Mont. Augustus B. Wolvin, preside
officer, Theo. Hollister, John G. Williams, I. Freimuth, J. B. Bec
Kirk and John F. Killorin, directors; John G. Allen, secretary.
circa October, 1906, under laws of South Dakota, with capitalizatio

holding company only, controlling the Butte-Milwaukee ownership of only about 80% of its stock issue, and is said otal stock ownership, the Montana Consolidated Copper ement had no connection with the promoters. Property iary of the Butte & Superior Copper Co., Ltd.

N COPPER CO. **MONTANA.**

ere sold, 1906, to Butte Central & Boston Corporation. ilver Bow Co., Mont. Described Vol. VI.

INING CO. **MONTANA.**

ny, Madison Co., Mont. Organized Dec. 1, 1906, under th capitalization $1,000,000, shares $1 par. Has a 740' gers of argentiferous copper sulphides assaying up to 25% er per ton, with traces of gold. Idle several years.

GLE COPPER CO. **MONTANA.**

unclaimed from former office and mine, Butte, Silver Bow Harrington, president. Organized circa May, 1907, under ith capitalization $5,000,000, shares $5 par. Lands, 6 e Butte & Bacorn, the Red Eagle claim having a 400' tun- no ore. Idle since circa 1907, and apparently moribund.

N WORKS. **MONTANA.**

onda Copper Mining Co., at Butte, Silver Bow Co., Mont.

D & COPPER MINING CO. **ARIZONA.**

y at Humboldt, Yavapai Co., Ariz. Described Vol. V.

IS MINING CO. **MONTANA.**

y at Butte, Silver Bow Co., Mont. Fully described Vol. VI.

NE MINING CO. **MONTANA.**

llich was president. Capitalization was $1,000,000. Prop- with a crosscut from the bottom, on which a little work was rmerly at Butte, Silver Bow Co., Mont.

E MINING CO. **MONTANA.**

office was Spokane, Wash. Organized 1905, to take over te. Patrick Clark, whose name was connected with the he never heard of it, and that this company was not suc- hacker Copper Co. Formerly at Butte, Silver Bow Co.,

COPPER MINING CO. **MONTANA.**

y at Butte, Silver Bow Co., Mont. Described Vol. VIII.

VALLEY COPPER MINING CO. **MONTANA.**

unclaimed from former office and mine, Butte, Silver Bow Joslin, vice-president; Jas. A. Talbott, treasurer; J. W. . H. Taft, superintendent. Organized Apr. 9, 1906, under ith capitalization $3,000,000, shares $5 par. Lands, 5 in Saratoga Gulch, southeast of Butte, near the Ida-Mon- s, deepest 500'. Did some diamond drilling early 1908; ntly moribund.

OR COPPER CO., LTD. **MONTANA.**

worth Bldg., Duluth, Minn. Mine office: Butte, Silver ugustus B. Wolvin, president and treasurer; I. Freimuth, J. B. Becher, second vice-president; preceding officers, J. White, H. S. Clark, Theo. Hollister, J. F. Killorin and John s; Walter S. Horr, secretary; J. A. P. Neal, assistant secre- ater, Jr., general manager and consulting engineer; M. W. ntendent; D. F. Haley, mill superintendent. Organized laws of Arizona, with capitalization $6,000,000, shares $5 pany, Dec. 3, 1910, to have been changed to $2,500,000, ssessable; issued, $1,127,390. Bonds, $1,000,000, author-

lized, secured by a trust mortgage in favor of Northwestern Trust Co
issued, $275,500. Bonds, dated Sept. 20, 1910, running 10 years,
convertible, at option of holder, for 5 years from date, into stock, at
trols the North Butte Extension Development Co. through ownership
shares. Borrowed $250,000 from the American Metal Co., Ltd. to b
but has built nothing but the foundation. Company has been h
for funds, and ended 1910 with indebtedness of $673,886, but earn
net during latter half of 1910, and earned $14,465.31 operating profit
ary, 1911. Annual meeting, second Tuesday in January.

Lands, 6 claims, including the Black Rock, Niagara, Raymon
Silver mines, about three-fourths mile north of the North Butte.
property is the Black Rock mine, having a 1,630′ three-compartment
company started as a copper mine, but has become a zinc mine, havi
a large amount of zinc ore that is practically free from iron, renderin
amenable to concentration. The Black Rock carries an exception
vein, of 50′ to 100′ width, showing, on the 300′ level, mainly silver
with ore up to 3% in copper tenor, succeeded at greater depth b
slightly argentiferous and cupriferous. It was hoped, formerly, by t
ment, that the zinc would be replaced, at considerable depth, by a la
copper ore of commercial grade, but this does not seem likely to oc
agement plans a new shaft, 1911, for the development of the Butte-
company's ground. The Black Rock has a 60′ headgear. The Nia
worked by lessees, 1907, produced a little ore carrying up to 200 oz. sil

The plant at the Black Rock mine includes 7 boilers, a 7-drill air-
and a small electric plant. The 500-h. p. double-drum hoist, wre
was replaced, and company is said to have ordered an additional 2
compressor. Buildings include a combination engine and boiler-hou
and brick, a good carpenter-shop, and other necessary mine stru
1,200′ gravity tram connects the mine with the Great Northern rail

Foundations were laid, 1909-1910, for a mill, but construction
pound, and zinc output is sold, under contract, to the American Meta
Production, November, 1910, was 11,200 tons of ore milled, averaging
zinc and 8 oz. silver per ton, yielding 3,815 tons of zinc concentrate
34.5% zinc and 17 oz. silver per ton. Production was increased, Decem
to about 500 tons daily, at the Basin concentrator, the company mak
contract with the Basin Reduction Co. for ore treatment.

There has been considerable dissatisfaction among shareholder
by assessments, outbreaks and lawsuits. The Butte & Superior has
[illegible] as a copper mine, but apparently has very fair prospects of
[illegible] and the company now claims to be the largest
[illegible] of Stock.

BUTTE & VERDE GOLD & COPPER CO. A

Organized under Arizona laws, Oct. 9, 1911. Organized circa
with [illegible] shares $1.00 par. Issued, 10 claims,
[illegible] shares sold at 4 cents per share; [illegible] copper

BUTTE & VERONICA COPPER MINING CO. M

[illegible] office and mine office, Bu
[illegible] Incorporated. M. H. McNul
[illegible] Organized Nov. 20, 1906,
[illegible] shares $1.00 par.
[illegible] and south of the Belmont
[illegible] claims. The Veronica
[illegible] and south
[illegible] the Nort
[illegible] from the fed
[illegible]

vein, which dips about 35° to the south, showing stringers % copper. The Southern vein has an 85′ vertical shaft, . Shipped a little ore, 1906, of 5 to 10% copper tenor.

LAKE MINING CO. **NEVADA.**

claimed from former office, Butte, Silver Bow Co., Mont. Esmeralda Co., Nev. Carroll E. Dolan, secretary and rr, superintendent. Lands, 3 miles south of Loma, are oth, a 50′ vein in granite, carrying melaconite, malachite ng 4.5% copper and $1 gold per ton. Idle and apparently

OPPER & SILVER MINING CO. **IDAHO.**

ranite St., Butte, Mont. Mine office: Wallace, Sho- s 2 tunnels on a vein said to be 15′ to 35′ wide, with a 2- ft sunk from the lower level, showing ore giving assay lver. Idle.

ET MINING CO. **MONTANA.**

Boulder, Jefferson Co., Mont. Louis A. Massic, presi- vice-president; F. H. Benjamin, secretary; L. Q. Skelton, circa May, 1907, under laws of Montana, with capitali- es $1 par. Lands, 12 claims, adjoining the Baltimore lch, 3 miles north of Boulder, developed by a 400′ tunnel showing an 8′ vein carrying argentiferous and auriferous so a shallow shaft, giving ore assaying up to 26% copper, old values. Mine was a small producer, 1886. Idle.

TON MINING CO. **WASHINGTON.**

m former mine office, Orient, Stevens Co., Wash. Fleet- at last accounts. Lands, at Hall Bridge, east of Kettle e 2 tunnels, the lower, of 500′, planned to cut the vein at l. The upper tunnel shows bornite, argentiferous chal- halerite. An opencut shows lead carbonates. Idle.

ON COPPER CO. **NEVADA.**

ix Bldg., Butte, Mont. Mine office: Yerington, Lyon erfin, president; B. E. Calkins, vice-president; W. E. treasurer; preceding officers, John C. Adams, John N. Dr. Thos. B. Moore, directors. Organized Jan. 29, 1907, a, with capitalization $1,000,000, shares $1 par; issued, ting, second Wednesday in January.

area 350 acres, in 2 groups, one of 14 claims, patented, er Mountain mine, circa 4 miles east of Yerington, with djoining the Mason Valley Mining Co. Presumably idle.

ING CO. **ARIZONA.**

at Minnehaha, Yavapai Co., Ariz. Described Vol. IV.

COPPER MINING CO., LTD. **RHODESIA.**

House, London, E. C., Eng. Mine office: Bwana Col. C. H. Villiers, chairman; preceding officer, H. L. , directors. Organized March 16, 1910, under laws of apitalization £600,000, shares 10s. par. Is controlled, £146,250 of fully paid stock, by Rhodesia Copper Co. to have been provided with an initial working capital

, known as the Bwana M'Kubwa mine; 6 farms in ie, with a total area of 36,000 acres; 120 mining claims the right to peg 200 mining claims in northern Rhodesia. from the Rhodesia Copper Co., Ltd., which floated this ngs, near the Belgian Congo, circa 90 miles north of Hill mine, and about 150 miles southeast of the Kansan-

shi mine, show extensive remains of ancient workings, extending o mile. Country rock is quartzite-schist and sandstone, carrying 2 par about 15′ apart, traced circa one-half mile, main vein being 30″ to 5′ in v a claimed average of 4′, having copper impregnations for some distan to be 40′, in either sandstone wall, and such impregnations are claimed 4 to 5% copper, with 1,200,000 long tons of this class of ore develc 1908, the main vein, of 4′ estimated average width, being claimed to es carbonates of about 15% average tenor, with silicious gangue, workin ing 80,000 tons of this class of ore. These figures seem high. Min show considerable ore assaying 25 to 30% in copper tenor. Develop 3 shafts, deepest, No. 3, being 310′. Mine has proven wet, requi pumps. Property is served by the Cape to Cairo railway.

There is plenty of timber available for charcoal, if labor can be burn it. Test shipments of 500 long tons were made, 1910, to Britis Mine, which is considered promising, has been developing leisurely years.

BYRNE MINING & SMELTING CO. WASH

Mine office: Keller, Ferry-Co., Wash. Mine, apparently dev slightly, carries argentiferous copper ores, and is equipped with ste Presumably idle.

BY-CHANCE COPPER CO. NEW

Office: El Paso, Tex. Mine office: Orogrande, Otero Co., N. J. Greene, president and treasurer; T. G. Travis, vice-president; C. secretary; Jas. J. Murray, general manager. Organized March 29, 1 laws of New Mexico, with capitalization $2,000,000, shares $10 p sessable. Management is affiliated with the Orogrande Smelting Co meeting, first Thursday after first Tuesday in March.

Lands, 4 claims, area 80 acres, 3 miles from Orogrande, in the district, having contact ore bodies between granite and limestone chalcocite and chalcopyrite, estimated to average 3% copper and per ton, associated with pyrite, in a vein of 25′ estimated average wid by shaft of 25′, 30′ and 90′, with a total of 235′ of workings, estimat 50,000 tons of ore blocked out, which is considered an impossibilit 250′ of diamond drilling has been done. Equipment includes a 35-h plant and 3 buildings.

CABABI MINING CO. A

Letter returned unclaimed from former mine office, Morristown, Co., Ariz. S. G. McWade, general manager; preceding officer, C. N. W. H. Kirschner, directors. Lands, formerly held by Picacho Blan Co., are 31 claims, in the Cababi Mountains, Maricopa and Yavapa Mine has several shallow shafts, deepest circa 300′, with about 1,90 ings, and, years ago, was a small producer. Auriferous and argentifer and lead ores assay up to 40.5% copper and several thousand ounces silv with copper and silver values predominating, and mine also is said to milling gold ores. Old workings have chicken-ladders. Equipmen steam power, a 15-stamp mill and a 25-ton cyanide plant. Buildin an adobe store and several frame dwellings. White and Indian employed. Presumably idle.

MINA EL CABALLO.

Mine office: Indé, Durango, Mex. Wm. Benton, owner. Ha ous silver ores and steam power. Idle.

MINAS CABEZAS DEL PASTO.

Owned by Sociedad Colectiva C. y J. Sundheim, but leased to Un Co., Ltd., and described under title of latter.

FUNDICIÓN DE CABILDO.

Owned by Sucesión de Cerveró.

NING CO. **IDAHO.**
ded by Fern Cliff Mining Co. Formerly at Coolin, escribed Vol. VIII.

ED MINING CO. **MONTANA.**
Bow Block, Butte, Mont. Mine office: Cable, Deer . Bacorn, superintendent. Lands, circa 20 miles west of Cable gold mine, in vicinity of the Southern Cross mine, on the same ore body. The Cable mine, worked since ess, has produced about $4,000,000 worth of ore, with out has auriferous copper ore on the tunnel level, and e averaging 3.84% copper, 1906-1907, to the Washoe ncludes steam power, air-compressor and a 30-stamp out 25 men.

SYNDICATE, LTD. **SPAIN.**
ated, voluntarily, 1906. Formerly at Cabrales, Ovideo, bed Vol. VI.

A. **MÉXICO.**
uachinango, Mascota, Jalisco, Mex. Lands, 30 hectares, , carrying values in copper, silver and gold. There are limited development of a recent date. Idle several years.

O. **MÉXICO.**
was superintendent. Mine, opened by shaft, carried l lead ores, employing, 1904, circa 25 men. Formerly , Durango, Mex.

PMENT CO. **MÉXICO.**
t Fronteras, Arizpe, Sonora, Mex. Fully described

CHILE.
o Hundido, Antofagasta, Chile. Property is El Manto erly a considerable producer, and employing circa 100 king a small production only, secured by a selection of s. The mine, now idle, shows large bodies of low to night become an important producer, if given adequate Has steam power.

SMELTING CO. **MÉXICO.**
er rather disgraceful circumstances, property reverting ormerly at Autlán, Jalisco, Mex. Fully described Vol.

ARIZONA.
le Bldg., Duluth, Minn. Mine office: Crowley, Gila ton, president; H. B. Fryberger, vice-president; H. L. esident; A. O. Rabideau, secretary; Geo. H. Mance, tt, consulting engineer. Organized circa August, 1909, , with capitalization $5,000,000, shares $5 par; issued, onstruction of the Cactus Development Co. Is con- Co., through ownership of 227,150 shares, or about 40% ion. Company owns 70,000 shares of Summit Copper tation price of 60 cents per share, and a 51% stock eek Copper Mining Co. The company supposedly he- 45,000 cash in its treasury. Annual meeting, second Trust Co., Boston, transfer agent, American Trust

re 33 claims, in 2 principal groups, held under bonds 415,000, including 9 claims held under bond from the ning Co.; 14 claims, a 15-acre millsite and 100 acres of he Arizona National Copper Co., and 42 claims, known

as the Upper group, added 1910, giving total holdings of about 1,400 acres consideration of sinking the Hamilton shaft to depth of 500', the Cactus Co Co. was given a 51% stock interest in the Pinto Creek Copper Mining Co.

The Cactus mine was fully described in Vol. VIII. Extensive develop work was done, 1909-1910, shafts sunk to depth of 530' and 541', and abou mile of lateral openings made, with considerable churn drilling. The ore indications justified development, but, though ore of commercial tenor was f in occasional patches, not enough payable ore was found to make a mine, work was abandoned and bonds on the properties surrendered, circa Oct 1910. Former mining operations were very fully described Vol. IX.

CACTUS DEVELOPMENT CO. ARIZO

Dead. Was reorganized, circa August, 1909, as Cactus Copper Co. merly at Globe, Gila Co., Ariz. Fully described Vol. VIII.

CACTUS MINE. UT

Owned by South Utah Mines & Smelters, at Newhouse, Beaver Co., U

CACTUS SMELTING & COPPER CO. UT

Dead. Was absorbed by Royal Copper Mining Co. Formerly at N house, Beaver Co., Utah.

CADENA DE COBRE MINING CO. MÉX

Office: Bisbee, Ariz. Mine office: Sahuaripa, Sonora, Mex. Marks, president; C. H. Holz, vice-president; C. A. McDonald, secretary Newman, treasurer; preceding officers, R. F. Koehler, J. Pennypacker and Treu, directors; Arthur Houle, consulting engineer. Organized Jan. 5, with capitalization $1,000,000, shares $1 par. The former directors issu themselves 550,000 shares of stock, and when this was learned, the old b resigned, and suit was brought, resulting in the cancellation of the stock so i it having been a grab, pure and simple. All litigation is said to have been se 1910. Annual meeting, first Thursday in January.

Lands, 84 hectares, in Los Chinos Mountains, on the Yaqui River, sho iron outcrops up to 300' in width. Development is by the 96' Bisbee tu showing ore assaying 4 to 25% copper, with small gold and silver values, a shorter tunnels.

CADIA COPPER MINING & SMELTING SYNDICATE. AUSTRA

Dead. Was reorganized, circa September, 1908, as Cadia Copper Mi & Smelting Co., Ltd. Formerly at Cadia, Bathurst Co., Australia. Descr Vol. VIII.

CADIA COPPER MINING & SMELTING CO. LTD. AUSTRA

Office: Newcastle, N. S. W., Australia. Mine office: Cadia, Bath Co., N. S. W., Australia. Organized circa September, 1908, as a reconst tion of Cadia Copper Mining & Smelting Syndicate, with capitalization £120 shares £1 par.

Lands, held under lease from the Scottish-Australian Mining Co., Ltd., on Cadiangulong Creek, 15 miles south of Orange. Property has been a small producer of selected ore, in the past, and had a smelter, circa 1888, w treated 4,000 to 5,000 tons of ore. Property carries 2 parallel veins, one, kn as the Cadia or Iron Duke, of 12" to 9' width, carrying oxidized ore, with qu gangue, up to 13% in copper tenor. Mine was estimated, 1910, to have reser of 134,106 long tons of 4% copper ore. The 172' Chilcott shaft develops a v of about 5' width, carrying sulphide ore, and was estimated, 1910, to have de oped 1,650 long tons of 4.6% sulphide ore. Negative results were secured fr 1,080' of diamond drilling, done 1910. Mine lacks rail connections, and wag roads to Carcoar and Orange are sometimes in poor condition.

The smelter, built 1906-1907, has 4 reverberatory furnaces, and a sec hand blast-furnace bought from the Great Cobar. About 200 men are emplo when working full force. Production, 1906, was 1,043,840 lbs. fine copper,

INE. AUSTRALIA.
N. S. W., Australia. Mine office: Cadia, Bathurst Co.,
nds, on Waterfall Creek, about 1½ miles from Cadia,
ittle Canoblas mine, show a tremendous blowout, and
n of low grade iron ore. A number of shallow shafts
bonate and sulphide ores and tetrahedrite. Formerly
iron ore was taken from this mine for fluxing the ores
The smelter has a small water-jacket blast-furnace,
9. Property considered promising.

MINAS DE CALA. SPAIN.
ain. Mine office: Cala, Santa Olalla, Huelva, Spain.
lent; Don Emilio Vallejo, secretary. Organized Aug.
Spain, with capitalization 15,000,000 pesetas. Prop-
s, area 346 hectares, at Cala, carrying magnetic iron ore
ore bodies apparently being extensive. Company is
97-kilometer railroad, from the mines to San Juan del
adalquivir River. in the adjoining province of Sevilla.

CO., LTD. ARIZONA.
e, perpetrated by Douglas, Lacey & Co., 66 Broadway,
ethods of this firm see Douglas, Lacey & Co. Formerly
z Co., Ariz. Described Vol. IV.

S i FUNDICION DE CALAMA. CHILE.
Chile. Mine office: San José del Abra, Calama,
orks office: Calama, Antofagasta, Chile. Organized
talization 600,000 pesos, shares 100 pesos par, and reor-
nder laws of Chile, with capitalization £250,000, shares

east of Calama and 238 kilometers from the port of
Chilean desert, with hard living conditions, and high
d transportation. Property includes the Rosario del
Gregorio and Ibacache mines, which show considerable
erous pyrite, which scarcely can be considered as ore,
s, and probably not for years to come. The Rosario
icamata, is the principal producer of the district, and is
eters and for length of 200 meters. A railroad is planned,
all costs are excessive, owing to inadequate transporta-

s a hydro-electric power installation, with a 260-h. p.
to a 250-h. p. dynamo, taking water from the Rio Loa,
nned to greatly enlarge this plant, and completely elec-
properties and the smelter. There is a well equipped
all iron cupola, employing about 60 men.
er, No. 4 Ball mill, 2 Ferrari tables and 3 jigs, and works
d preferable to wet concentration. Ore milled averag-
d up to 85% silica is used for converter linings. Con-

as Los Chorrillos, built 1907, has 3 reverberatory cal-
ining limestone used for briquetting, and a new 100-ton
aving 2 series of jackets, with rectangular forehearths.
es. The converter department has no dust-chamber,
n chimneys. There are 2 stands, with four 1.7x2.1-
neter shells, equipment including cylindrical pans and
perated electrically. Ores smelted average about 10%
re is a shortage of sulphide ore, and ores smelted are
ous, necessitating heavy coke charges, one ton of coke

being required for smelting 1.6 tons of charge, and the limestone used carries much baryta. Losses are very high, owing to lack of du chambers, and there also are heavy losses in slags, which average a owing to the very refractory nature of both ores and fluxes. Smelter the high average wages of 4 pesos per day. The smelter power pl electric power and a producer gas plant, with a 320-h. p. Fielding engine, the entire gas plant and engine costing 95,266.81 pesos. The Riedler air-compressor, and Nos. 6 and 7 Wilbraham-Green rota Production was 1,717,035 lbs. fine copper in 1903; 3,480,085 lb 3,030,413 lbs. in 1908, and circa 3,000,000 lbs. in 1909. The prop handled, despite a number of serious drawbacks.

CALAMONT COPPER CO. M

Office: 263 Twelfth St., Oakland, Cal. Mine office: Norri Co., Mont. Walter V. Harrington, president; Wm. F. Davis, vic Mark E. Davis, managing director; Hugh J. Leonard, secretary; Thos treasurer; preceding officers, Jas. Keller and F. G. Crist, directors. November, 1909, under laws of Arizona, with capitalization $5,000, $10 par, nonassessable. Apparently is connected in managemen Montana-Hecla Mining Co.

Lands, 19 claims, area 380 acres, known as the Old Colony grou the Montana-Hecla, 5 miles southeast of Norris, carrying auriferous a erous copper ore. Development includes several shallow shafts, v 100′ two-compartment shaft on the Big Jack claim, and a 116′ tun agement stated, in a letter to stockholders, that the company had b $1,500,000 for the property, by Boston capitalists, on a bond and lea refused this offer, as the property easily should be worth $50,000,0 upon development. The management was negligent of its opportun adding a few more ciphers to the estimated value of its property—up ment—as ciphers are cheap, and very filling.

CALAVERAS COPPER CO. CA

Office: 87 Ames Bldg., Boston, Mass. Mine office: Coppero veras Co., Cal. Chas. M. Hayden, acting president; J. Newton Col and treasurer; preceding officers, Oliver Ames, F. Lothrop Ames, Sa Gilmer Clapp, Theo. Furman and Warren N. Akers, directors; Josiah general manager; Nicholas Treloar, mine superintendent; Olof smelter superintendent. Organized Aug. 31, 1909, under laws of Del capitalization $5,000,000, shares $5 par, reduced, Aug. 24, 1910, to shares $5 par; issued, $1,868,750. Bonds, $450,000, at 6% owned b Estate, which formerly owned the property. State Street Trust C registrar; Federal Trust Co., Boston, transfer agent. Stock is lis Boston curb. Annual meeting, second Monday in February.

Lands, 2,833 acres, including the Union, Keystone and Empire also including ranch and water power lands, bought Aug. 31, 190 Copper Co., 14 miles from Milton, the nearest rail point. Mines, o were considerable producers, paying fair dividends, circa 1861-1866, 125,759 tons of ore, said to average 10% copper, 1861-1907. Or amphibolite schists underlying Mariposa slates, near intrusions orite, the ore-bearing schist ranging 1.0′ to 2.0′ in width. Ore occu of about 15′ average and 70′ maximum width, connected by stringe by company to yield one-fifth smelting ore, of 8% copper tenor, an concentrating ore, of 3% tenor, giving an average of about 4%. Th zone, about 30′ in depth only, carried rich oxides and carbonate native copper and is succeeded by chalcopyrite, without gold or si and free from arsenic, antimony, zinc, bismuth and other undesirab blister copper therefrom making good wire-bars without electrolyti

The strike of the vein is proven for 8,000′ by 20 shafts, mainl

at value. Principal development is on the Union, Keystone , with about 3 miles of workings. General manager Trerise rves, including probable ore, to the 800′ level, at 10,500,000

ine has the 800′ Main shaft, with double-drum hoist; No. 2 haft, 500′; No. 4 shaft, 80′; No. 5 shaft, 100′, and No. 6 shaft,

ine has the 280′ two-compartment Main shaft, without equip- 60′, No. 2 shaft, 50′, and No. 3 shaft, 35′.
e mine has the 500′ Main shaft, vertical to the 4th level and level, connected with the main workings, but with no equip- ′ three-compartment Discovery shaft, connected by upraises rkings.
eystone mine has the 300′ Old shaft and the 300′ two-com- ft, with a small hoist, circa 2,000′ north of the Union shaft, ein.
cludes a 1,000-h. p. steam plant at the Union mine, with 3 Nordberg and 5-drill Leyner air-compressors; company also h. p. at the mill, and same at the smelter.
owns about 60 buildings, including a 2-story 10-room office -houses, bunkhouses, a stone warehouse, brick warehouse se, a good machine-shop, smithy, 3 barns and about 40 dwell-

nill, 75x200′, of steel frame, is connected with the mines by ram. A dam, impounding water for the mill, is planned to s storage capacity.
connected with mill and mines by circa 4,000′ of electric and 00-ton Orford smelter, installed 1899, was burned, circa 1904. er, with steel frame, of 300 tons rated daily capacity, has 2 rs, a 150-ton blast-furnace and a 150-ton reverberatory fur- rter has 2 Allis-Chalmers stands. Smelter fuel is petroleum

is said to have 140,000 tons of ore mined, ready for smelting, o have blocked out 600,000 tons of ore. Management esti- ction would begin, 1910, at the rate of 10,000,000 lbs. per eased to 17,000,000 lbs. within the year, and, Dec. 31, 1910, oduction, at 20,000,000 lbs. fine copper. The management blister copper at 8.33 cents per pound, laid down in New York, the Pacific coast, at 7.83 cents per pound, and an official of d, at the end of 1909, that the treasury funds were sufficient rty to a productive basis of 10,000,000 lbs. yearly, and leave he treasury for working capital. Instead of beginning pro- ere reduced, early 1911, and property was practically idle, figures of estimated costs do not seem warranted, but the means devoid of merit, though market manipulation of the flagrant nature, stock selling up to $11 and afterwards down atter half of 1910. Is not regarded favorably.

NING ASSOCIATION. NEW MEXICO.

Alamagordo, Otero Co., N. M. E. A. Hersperder, superin- ccounts. Lands include the Black Burro mine, showing opper and lead. Idle some years and perhaps succeeded by Co.

NING CO. NEW MEXICO.

erly at Jarilla, Otero Co., N. M. Described Vol. VIII.

ES. ITALY.

Travis, Torino, Italy. Property, in the western Alps of

Piedmont, formerly was a considerable producer of nickel, cobalt latter from chalcopyrite, found in stratified Archæan rocks. Idle.

CALCITE COPPER CO.

Dead. Formerly at Vicksburg, Yuma Co., Ariz. Fully descri

FUNDICIÓN DE CALDERA.

Owned by Sociedad Industrial de Atacama.

MANUEL CALDERON.

Office and mine: Coro Coro, La Paz, Bolivia. Property is th tin mine, worked in a primitive way, which was a small producer o per from conglomerate strata, at last accounts.

CALDWELL COPPER CO.

Dead. Officers were R. R. Goodell, president; R. Skiff Shelde dent; Courtney C. Douglass, secretary and treasurer; preceding d W. Nichols and Allen F. Rees, directors. Organized Jan. 11, 1906 of Michigan, with capitalization $2,500,000, shares $5 par. Wa through ownership of 51% of stock, by Calumet & Hecla Mining C merged, December, 1906, in La Salle Copper Co. Lands were 560 a tion 4, T. 55 N., R. 33 W., lying south and west of the Tecumseh min ing the Kearsarge amygdaloidal bed. Formerly at Calumet, Ho Mich.

CALEDON COPPER CO.

Dead. Formerly at Zoutpansberg, Transvaal. Described Vo

CALEDONIA COPPER CO., LTD. NEW CA

Dead. Was a bad egg. Formerly at Noumea, Diahot, New Fully described Vol. VI.

CALEDONIA GOLD & COPPER MINING CO.

Office: Wallace, Idaho. Mine office: Wardner, Shoshone A. B. Campbell, president; Chas. McKinnis, secretary and mana near the Bunker Hill & Sullivan, is opened to depth of 500', showing level, a vein of 2' to 4' width, carrying gray copper ore, with a goo silver-lead ore, and a little native copper. Employed circa 20 men and shipped a little ore. Presumably idle.

CALEDONIAN EXPLORATION CO.

Dead. Formerly at San Nicolás del Oro, Coyuca de Catalán, Mex. Described Vol. V.

CALEDONIAN MINING CORPORATION, LTD. NEW CA

Dead. Formerly at Noumea, Diahot, New Caledonia.

CALHOUN TUNNEL & MINING CO.

Dead. Became bankrupt. Formerly at Central City, Gilpi Described Vol. VIII.

COMPAÑÍA MINA DE CALIFORNIA.

Dead. Was organized 1901, with capitalization 1,000,000 pe were 40 hectares, apparently having but slight development. Cumuripa, Guaymas, Sonora, Mex.

CALIFORNIA-ALASKA MINING & DEVELOPMENT CO.

Dead. Operating office was Valdez, Alaska. Austin E. manager. Property, the Gelineau & Bell group, near the Alaska Copper Co., in the Copper River district, produced an 800-lb. ma 1908. Formerly at Copper Center, Copper River district, Alaska.

CALIFORNIA-AMECA MINING CO.

Mine office: Ameca, Jalisco, Mex. Property is the San Pedro ing copper ore. Idle and apparently moribund.

CALIFORNIA-ARIZONA COPPER CO.

Mine office: Wellton, Yuma Co., Ariz. F. A. Meyer, superi last accounts. Mine has tunnels of 100' and 160', with but slight d Presumably idle.

IZONA COPPER MINING CO. ARIZONA.
y at Ft. Huachuca, Cochise Co., Ariz. Described Vol. IV.

IZONA DEVELOPMENT CO. ARIZONA.
y at Ft. Huachuca, Cochise Co., Ariz. Described Vol. VI.

PER CO. CALIFORNIA.
ceeded, August, 1906, by California-Nevada Copper Co. Madera Co., Cal. Described Vol. V.

ONA MINING & MILLING CO. CALIFORNIA.
ge Bldg., Salt Lake City, Utah. Letter returned unclaimed ce, Manvel, San Bernardino Co., Cal. W. G. Craig, presi- vice-president; W. S. Zehring, secretary; E. O. Howard, fficers, Harrison O. Shepard, A. W. Smith and Andrew T. ganized December, 1906, under laws of Utah, with capital- res $2 par. Lands, 16 claims, 8 patented, circa 5 miles about 7 miles from the Salt Lake railway, showing aurif- rous copper and lead sulphides, with quartz gangue, well on. Mine is said to have considerable ore of good grade g. Idle.

D & COPPER CO. CALIFORNIA.
enceville, Nevada Co., Cal. C. C. Bitner, president; manager, at last accounts. Lands, 65 acres, 3 miles north 7 miles from nearest railway station, Wheatland, on the vay, with good wagon-road connection. Property shows a d iron-stained diorite, underlaid by a 4′ fissure vein, in 48° W. and dip of 50° NE., carrying good grade auriferous lachite, bornite and chalcopyrite, associated with pyrite, line has a 1,000′ main tunnel, with back of 225′, and about A little high grade ore is shipped to Shasta county 15 men, 1908.

D & COPPER CO. CALIFORNIA.
in St., Riverside, Cal. Mine office: Vontrigger, San A. H. Cram, president and general manager; C. W. Page, Hibbard, secretary; Citizens Bank, Riverside, treasurer. capitalization $500,000. Lands, 9 claims, patented, 2 miles 18 miles west of the Colorado River, known as the Von-, carrying contact deposits between granite, quartzite and te dykes. Property is claimed to carry 8 clearly defined tly auriferous copper ore, in 2 ore zones of 200′ to 300′ traceable 5 miles. Ore is oxidized to depth of circa 80′, orted to range 9 to 15% in copper tenor, with fair gold and ed by slightly auriferous bornite and chalcopyrite. Main 826′ wide at surface, and more than 500′ wide on the 300′ imed to have large bodies of 4% copper ore, with gold and has shafts of 100′, 150′ and 317′, and a 350′ tunnel, not l for several years, and now has about 2,000′ of workings, formerly claimed.

des a 100-h. p. gasoline engine, 15-h. p. hoist and a small d in a power building variously reported as 18x34′ and ught 6½ miles from Hackberry Springs, through a steel 00′ fall to a 40x50x7′ reservoir, cement-roofed, of 100,000

of 100 tons estimated daily capacity, has a 100-ton Samp- Davis rolls, automatic mixer and grinder, agitating tank anks, designed to extract copper electrically, without the process devised by President Cram. Apparently the mill

has not yet proven a success. There is an 1,800′ flume for wasting ta
early 1910, lumber was on the ground for four 40-ton cyanide tanks.

The mine is claimed to have shipped carloads lots of ore retur
10.9% copper, with small gold and silver values, and it was claimed,
that 30,000 tons of ore were on the dump, which may or may not have
Company apparently has confined operations, for several years past,
building a mill having an untried reduction process, and selling stoc
continued mine development. Is not regarded favorably.

CALIFORNIA IMPROVEMENT CO. CAL

Letter returned unclaimed from former office, 101 Sansome St.,
cisco, Cal. Mine office: Mills College, Alameda Co., Cal. F. M. Sr
dent and general manager. Property is the Leona Heights mine, i
skirts of Oakland, lying south of the Alma mine, with similar ore.
veloped by tunnels, has an ore body of about 12′ width, with a promin
ite gossan, ore being cupriferous pyrite, carrying 1 to 2% copper and
sulphur. Production, 1905, was 4,303 tons of pyrite, valued at
shipped crude to acid-makers. Presumably idle.

CALIFORNIA & MASSACHUSETTS COPPER MINES CO. CAL

Inactive. Property, at Red Bluff, Tehama Co., Cal., is leased, fo
to Chicago Copper Refining Co. Described Vol. VIII.

CALIFORNIA MINERAL LAND CO. CAL

Mine office: East Auburn, Placer Co., Cal. L. C. Trent, mana
accounts. Lands, only slightly developed, show auriferous and ar
copper ores. Presumably idle.

CALIFORNIA MINING CO.

Dead. Formerly at Park City, Summit Co., Utah. Described

CALIFORNIA MINING CO., S. A.

Dead. Formerly at León, Guanajuato, Mex. Described Vol.

CALIFORNIA MOUNTAIN MINING CO. CO

Mine office: Eureka, San Juan Co., Colo. A. H. Kunkle, super
at last accounts. Has auriferous and argentiferous ores of lead, copp
with electric power. Presumably idle.

CALIFORNIAN COPPER SYNDICATE, LTD. CAL

Dead. Was succeeded, April, 1902, by Fresno Copper Co., Ltd.
at Clovis, Fresno Co., Cal.

CALIFORNIA-NEVADA COPPER CO. ALASKA & CAL

Office: 1801-43 Exchange Place, New York, N. Y. Letter re
claimed from former mine office, Daulton, Madera Co., Cal. M
Juneau, Alaska. F. L. Underwood, president; M. W. O'Boyle, vice-
preceding officers and C. H. Briggs, executive committee; A. W.
secretary and treasurer; preceding officers, H. W. Hoops, J. R. Pow
Hammer, L. F. Burpee, Capt. S. M. Milliken, W. S. Comstock, G.
E. N. Bement, W. A. Clark and G. B. Garrison, directors; Walter
manager; Angus Mackay, superintendent. Organized Aug. 11, 1906, u
of Maine, with capitalization $2,500,000, shares $5 par, apparently in
$7,500,000. Bonds, $2,500,000 authorized, at 7%, convertible into st
5 years. Controls, through stock ownership, the Bristol Consolidate
Smelting Co., and owns the Ne Plus Ultra mine, near Daulton, for
by the California Copper Co.

The copper mine, at Daulton, shows a vein channel up to 200′
with gossan outcrops, lenticular ore bodies of 9′ to 40′ width carrying c
oxides and silicates, latter at depth, said to average 3% copper, 1 oz.
$4 gold per ton with about 28% sulphur and 40% iron. Development i
of 100′, 120′, 200′ and 200′. The 100-ton smelter, at Madera, 12
the mine, was built by the California Copper Co., 1899-1900, closing
a four months' campaign. The copper property has been idle for sev

, area 240 acres, near the Alaska-Treadwell, at Juneau, have 6 veins of 15′ to 60′ width, opened by 2 tunnels, and ıcer since 1888. Company was said, July, 1910, to plan a Ebner mine.

DA MINING & MILLING CO. CALIFORNIA.
Exchange, Denver, Colo. Letter returned unclaimed from ishop, Inyo Co., Cal. B. Gregory, president; J. E. Rein-Albert E. Gregory, superintendent. Organized Dec. 7, 1906, ı, with capitalization $1,500,000, shares $1 par. Lands, 10 of Black Cañon, 5 miles north of Cedar Flat and circa 16 shop, developed by a number of 10′ pits and tunnels, said eins carrying auriferous and argentiferous copper and lead le.

ADISE CONSOLIDATED MINING CO. ARIZONA.
Iowa. Mine office: Paradise, Cochise Co., Ariz. J. W. W. E. Stoner, secretary; W. J. White, treasurer; W. V. ent; preceding officers and John Lorenz, directors. Organ-ıder laws of Arizona, with capitalization $2,000,000, shares ıction of the California & Paradise Mining Co. Manage-1910, that the company had $40,000 in its treasury, for s.

, known as the Leadville mine, 14 miles from Rodeo, the pened by a 140′ two-compartment shaft, retimbered circa vein assaying up to 62.4% lead, 1.2% zinc and 19.2 oz. ɔment includes steam power and a 35-h. p. double cylinder late 1910.

RADISE MINING CO.
rganized June 25, 1910, as California & Paradise Consoli-ormer office was Vinton, Iowa. Officers were J. W. Hay-E. Stoner, secretary; W. J. White, treasurer. Organized ws of Arizona, with capitalization $500,000, shares $5 par. s, known as the Leadville mine. Formerly at Paradise,

PER MINING CO. AUSTRALIA.
at Callington, Adelaide Co., South Australia. Described

ELOPMENT SYNDICATE, LTD. AUSTRALIA.
anized July 3, 1907, under laws of Great Britain, and liqui-F. C. Bell was liquidator. Apparently little or no work was Formerly at Callington, Adelaide Co., South Australia.

COPPER, LTD. ENGLAND.
rgate St., London, E. C., Eng., and 16 Place Vendôme, office: Calstock, Cornwall, Eng. G. Ardillier, Léon de ıes Dreifuss, directors; John A. Russell, secretary; G. er. Organized May 5, 1900, under laws of Great Britain, 50,000, increased, June, 1903, to £100,000, shares £1 par; ɔentures, £14,120, at 5%. Property is the Prince of Wales l licenses on adjoining lands. Equipment includes a 56-eral years and apparently moribund.

MA DEVELOPMENT CO. ONTARIO.
ceeded, 1903, by Hermina Mining Co., Ltd. Formerly at

MA MINING CO. ONTARIO.
h St., Calumet, Mich. Mine office: Massey, Algoma, chairman; Lucas Hermann, secretary. Organized circa ion $1,000,000, shares $5 par, assessable; issued, $100,000,

paid in, $1.75. Was a reconstruction of the Copper Queen Mining
At last accounts had no debts, with $600 in the treasury.

Lands, 957 acres, freehold, showing a 45′ fissure vein, traceable cir
carrying medium grade chalcopyrite, more or less auriferous, with
bornite and malachite, giving assays of 5 to 25% copper. Has 2 s
1 being 138′ deep, and 2 tunnels, longest 195′. Lands are heavily tim
well watered. Idle several years.

CALUMET & ARIZONA MINING CO. A

Office: Calumet, Mich. Mine office: Warren, Cochise Co., Ari
office: Douglas, Cochise Co., Ariz. Chas. Briggs, president; C
Hoatson, vice-president; Capt. Thos. Hoatson, second vice-president; G
Campbell, secretary; Peter Ruppe, treasurer; preceding officers, Thos
Chester A. Congdon, Chas. d'Autremont, Jr., and Geo. E. Tener,
John C. Greenway, general manager; W. B. Gohring, mine superi
Henry B. Paull, auditor; W. E. McKee, master mechanic; W. H. Whit
neer; J. E. Curry, chief clerk; M. A. Peterson, purchasing agent; J. E
superintendent Courtland mine; Alfred Paull, superintendent Super
A. J. McDermott, smelter foreman.

Organized March, 1901, under laws of Arizona, with capi
$2,500,000, shares $10 par, increased, Feb. 15, 1911, to $6,500,000, s
par, and, after absorption of Superior & Pittsburg Copper Co., will
standing $6,285,710. The merger, to be effected early 1911, will give
Calumet & Arizona for 3½ shares of Superior & Pittsburg, and, Marc
very large majority of the stock of the Superior & Pittsburg was depos
the State Street Trust Company, Boston, for the merger. Merchants
Bank, Calumet, and American Trust Company, Boston, registra
Street Trust Company, Boston, transfer agent. Stock is listed on th
stock exchange. Annual meeting, second Monday in April.

Balance sheet of Nov. 30, 1910, gave quick assets of $3,929,632,
$2,157,729 cash, with accounts payable of $169,067. Has paid divi
follows: $6.50 in 1904; $8.50 in 1905; $13 in 1906; $16.50 in 1907; $4
$4 in 1909, and $4 in 1910, a total of $57.50 per share, or $11,500,000.

Lands include the original claims at Bisbee, the Mammoth group
1907, and various other properties in Arizona, New Mexico and Son
under bond and lease. The option on the Copper Giant, at Coppe
Graham Co., Ariz., was sold, April, 1910, to Col. Frank J. Sibley, who
thereon the Calumet & Copper Creek Mining Co.

The Calumet & Arizona mine proper includes 12 claims, patented,
acres, adjoining the Copper Queen, side-line agreements with the Copp
insuring freedom from possible litigation, and continuance of the exc
neighborly relations existing from the very inception of this company.
is opened in limestone, near a porphyry contact, with occasional po
intrusions. The surface gives small indications of values, showing but s
infrequent outcrops, the existence of the Irish Mag ore bodies having been
from underground work in the adjoining shafts of the Copper Queen, af
ful study of the general geological conditions of the district. Ore
highly irregular bodies, the mine having native copper, cuprite, me
malachite, azurite, chalcocite and chalcopyrite, usually with a talcose
and with considerable hematite and manganese ores, the latter carryi
chite in small disseminated nodules, frequently averaging 10 to 18%
per. The ore, which is practically self-fluxing, averages about 2 oz. si
0.05 oz. gold per ton, as smelted. Diamond drill borings to depth
have penetrated limestone strata to that depth. The ore bodies are ext
developed, but are not largely blocked out, owing to the constant shiftin
ground, caused by the creeping of the mountain above, as is the cas
neighboring Copper Queen mine, requiring very heavy timbering, with

tant care for all openings, which renders it prudent to
oeking out ore but a comparatively short time ahead of
nents. Timber is secured from a great distance, and to
ies, large stocks are carried. The mine as a whole is not
l small mine fires have caused trouble, but have not done
openings were 27,562′ in 1909, and average about 5 miles
ve electric traction on the 1,150′ level.

t Irish Mag shaft, sunk on a single 20-acre claim, was
the shaft is sunk in hard limestone throughout, except
dies were cut, rendering it unusually safe from drawing.
ed, 1909, being closed for the first time in nearly 10 years,
0, by 200′, to depth of 1,350′, with bottom level opened
pened at 100′ intervals, former upper level being at 750′,
ned, 1909-1910, at 450′ and 550′, and the 750′ level shows
oxidized ore, opened, 1910, at a point where the ground
ren. The Irish Mag shaft has yielded some of the best
including some entire stopes of 30 to 40% copper tenor.
ist on the 1,050′ level.

ft has a 78′ steel headgear, and a 114′ ore-bin. The old
was replaced, 1909, by a 250-h. p. electric hoist, raising

mpartment Oliver shaft develops both of the Senator
0′. The upper workings show high grade oxidized ores,
carry rich sulphides, having large bodies of oxide and
950′ to 1,250′ levels. Important new ore bodies were
and 1,250′ levels. The Oliver mine was estimated, 1910,
rves of 647,000 tons of 5.21% copper tenor, carrying
pper. The Oliver has a 600-gallon Nordberg electric
with a powerful Nordberg electric hoist.

started November, 1908, is on the line between the Hope
ich lie circa 2,000′ southwest of the Irish Mag shaft, ad-
Duluth mine of the Superior & Pittsburg. This ground
cut from the Irish Mag that traversed 600′ of the Copper
about half way across the group, showing nothing of
shaft, about 600′ deep, has an electric hoist.

n has been explored, and slightly developed, by cross-
ft, and from the Cole shaft of the Superior & Pittsburg,
e ore opened on the 1,050′, 1,150′, 1,250′ and 1,350′ levels.
a promising ore body, opened by a drift from the 1,250′
haft.

n, which is the southernmost, wedges into the holdings
burg. The Gibraltar has several exploring shafts and
and a little low grade copper ore of promising appear-
mercial tenor, and good ore was opened, 1910, in a drift
the Oliver shaft.

Angel and Old Republic claims lie on the porphyry side
secured mainly as a possible smelter-site, then being con-
se for ore, but, in view of recent developments in the
of possible mineral value.

ment is very complete. The original machinery plant
Irish Mag shaft, on a steep hillside, where limited room
, but the principal plant is now at the Oliver shaft, in-
rine boilers, burning crude petroleum, with storage tanks.
pressor plant, at the Oliver, has a 35-drill Sullivan Corliss
air-compressor, with 17x34″ steam cylinder and 20x34″
iston displacement of 6,600 cubic feet of free air per min-

ute. There also are 3 class WB2 Sullivan straight-line air-compresso of the ore is so soft that it can be bored with a breast-auger, thus r quirements in the way of air for power-drills. Electricity is used on surface, and also for pumping. The electric power plant at the C has 1,000-kw., 500-kw. and 300-kw. Westinghouse-Parsons 2,200-vo 3-phase turbo-generators, two 220-kw. 2,200-volt 60-cycle 3-pha direct-connected with the steam turbine, a 300-kw. General Electric verter, transforming a 2,200-volt alternating current to a 550-volt rent, for operating the street-car line to Warren, four 40-h. p. Buff engines, direct-connected to four 25-kw. 115-volt Crocker-Wheeler for electric light and power for ventilating fans, and various mino machinery.

The steel-frame machine-shop is divided into two 60x48′ par machine-shop and smithy. Adjoining is a plate-shop, 40x128′, of s with corrugated iron roof and siding. There is a framing mill at the also a warehouse and office building. A 60x125′ administration planned to be erected at Warren, the townsite adjacent to the Calumet and Superior & Pittsburg mines. A hospital with an efficient sta tained for employes, and a model changing-house has hot and cold runn tub and shower baths and lockers for 500 men. Fire protection is fu direct pipe-lines to large storage tanks, giving an effective pressure of 1 with hose-houses and hose-carts at each shaft, all hose-couplings bein connect with those of the Bisbee fire department. An automatic system has 25 stations underground and on surface, and is conn the smelter at Douglas.

The Mammoth group, at Copper Creek, Graham County, Ari claims, known as the Scanlon or Clark-Scanlon property, 16 miles n Mammoth. This property, bought September, 1908, has been tested by diamond drills, giving good cores, and has a 600′ two-co working shaft, with several levels opened, and considerable mediu grade sulphide ore is blocked out. A 15-mile railway will be required this property a producer.

A bond on the Leadville property, at Pearce, Cochise County, A forfeited, 1907, and apparently the Costello-Casey or Collins group o near the Leadville mine, having 2 shafts, showing considerable good and sulphide ore, has been forfeited also.

The Courtland mine, at Courtland, Cochise County, Arizona, miles north of Bisbee, bought for a price said to have been $2 developed by the April Fool, Germania and Miami shafts, 2 former of each. Production from the Courtland mines was 4,077 tons of ore, these mines were producing about 100 tons of 5% ore early April, were closed down circa September, 1910, to remain idle until copper better price.

The Superior mine, near Lordsburg, Grant County, N. M., was t circa July, 1910, under a $100,000 bond and lease, and began produ 1910, shipping about 50 tons daily of silicious ore, averaging about 3 with fair gold and silver values, used for converter linings. Deepest of the Superior are about 300′.

The San Felipe mine, in the Arizpe district of Sonora, México, in hectares of mineral lands, and nearly 1,000 hectares of adjoining grou total holdings of circa 3,000 acres.

The smelter is at Douglas, 25 miles from the mine, receiving or El Paso & Southwestern railway, at a very favorable freight rate. stack was blown in Nov. 15, 1902, and the plant was thoroughly overh enlarged, 1907-1908, and again enlarged, 1910, giving the works a c nearly 3,000 tons daily.

t the smelter in steel ore-bins circa 200′ long, with 2 rows
eing surmounted by a railway track. The entire plant is
l-gauge railway line, having tracks to each furnace and to
the works.
l frame blast-furnace building has a steel dust-chamber and
ack, of 16′ diameter. There are 6 furnaces, originally of
ch, but 5 have been enlarged to size 44x300″, with daily
each, and the one 300-ton furnace is to be enlarged, 1911,
plant is to be again remodeled shortly, with considerable
er increase in capacity, with the addition of a seventh 500-
leration has been given to the matter of building a rever-
r treating flue-dust and slags, and it is probable that the
Queen will be followed in this respect.
building has 4 stands. Matte is discharged into tilting
nce by 3 electric traveling cranes to the converters, which
per of 99.2% tenor, carrying small gold and silver values,
ls Copper Co., New York, for refining. The converter flues
t-chamber. The lighting plant has a silica mill, operated
, and a briquetting plant operated by a 100-h. p. motor.
e, formerly 80x160′ in size, was increased, 1907, by the build-
tion 100x100′ in size, the new building being divided through
of columns into 2 bays, each 50′ wide, and each served by
traveling crane. Equipment includes a 500-kw. 440-volt
is-Chalmers-Parsons turbo-generator, a 160-kw. synchro-
r set, which can be run to furnish electric energy at various
ther an alternating or direct current; an 850-h. p. Nordberg
. p. engine running 2 Nordberg air-compressors, with cross-
ds having 22″ and 42″ cylinders and 48″ stroke, and air
giving a 12-pound blast pressure; 2 Murray-Corliss tandem-
ith 14″ and 28″ cylinders and 36″ stroke, direct-connected
. 10 blowers; a pump of 5,000 gallons per minute capacity;
d vertical-beam condensers, having steam cylinders of 14″
roke; two 36x24″ vacuum pumps; a direct-acting Prescott
water; a 500-gallon Prescott compound duplex mine pump
lic power for converter stands, and various minor engines,
ing machinery with an aggregate of 3,750 h. p.
e of the power plant has 250-h. p. and 280-h. p. boilers,
with four 45,000-gallon oil-tanks for storage. Water in
red from flowing artesian wells, of 450′ average depth.
t includes a machine-shop and smithy, both of steel frame,
-room lodging houses, and a considerable number of dwell-

1910, were 1,274 men, of whom 805 were at the mine and
Labor is not organized, as a referendum vote, on the Austral-
decided, by majority of 4 to 1, against organization under
ion of Miners, this vote having been taken at the request
unday work was discontinued, August, 1910, at the request

e average returns of 7.7% copper in 1904; 7.9% in 1905;
% in 1907 and 4.7% in 1908. Costs have ranged from the
ts per lb. in 1906, to the high point of circa 10.5 cents per

been as follows: 1,200,000 lbs. copper in 1902; 25,535,857
,895 lbs. in 1904; 31,772,896 lbs. in 1905; 36,934,387 lbs.
silver and 4,241 oz. gold in 1906; 30,039,473 lbs. copper
lbs. copper, 155,802 oz. silver and 7,628 oz. gold in 1908;

27,747,853 lbs. copper, 191,234 oz. silver and 5,660 oz. gold in 19
24,000,000 lbs. copper in 1910.

The merger of the Pittsburg & Superior Copper Co. in the
Arizona Mining Co., to be effected early 1911, is logical, and to t
ests of both properties. The Calumet & Arizona has a large ca
fine smelter, and a mine good for some years, though one that ha
crest of production, while the Superior & Pittsburg has a magnifice
tremendous ore reserves, but has found its ore so deep, and its mine
the cost of development has been very heavy. The Superior & P
lacks smelting facilities, and the large cash resources of the Calume
The merger plans were fixed after the appraisal of both mines b
Ricketts and Jas. L. Douglas, who, with a number of assistants, spe
months in careful study of the properties, and of the capability and
these gentlemen there can be no question. After payment of di
new consolidated company started business, circa May, 1911, with
about $3,500,000 in quick assets, and with a productive capacity
60,000,000 lbs. fine copper yearly. The merger should result in dec
and the consolidated property has a long and profitable life ahea
regardless of the outcome at the various outlying properties. The
is excellent in all respects.

CALUMET & BISBEE DEVELOPMENT CO.

Letters returned unclaimed from former office, Calumet, Mich.
mine office, Bisbee, Cochise Co., Ariz. Frank S. Carlton, preside
Oates, secretary. Organized Oct. 20, 1902, under laws of Arizona,
ization $400,000, shares $10 par; 15,000 shares issued and fully paid
claims, at Don Luis, adjoining the Lake Superior & Pittsburg. Has
shaft. Idle since 1904, and apparently moribund. Fully describe

CALUMET & BOSTON COPPER CO.

Dead. Formerly at Bisbee, Cochise Co., Ariz. Described Vo

CALUMET & BUTTE DEVELOPMENT CO.

Dead. Was reorganized, 1907, as Calumet & Butte Mining Co
at Butte, Silver Bow Co., Mont. Described Vol. VI.

CALUMET & BUTTE MINING CO.

Dead. Formerly at Butte, Silver Bow Co., Mont. Describe

CALUMET-CLIFTON COPPER CO.

Dead. Was reorganized Feb. 27, 1907, as Clifton-Arizona Copp
Made grossly exaggerated claims. Formerly at Clifton, Graham Co.
scribed Vol. VIII.

CALUMET & COCHISE DEVELOPMENT CO.

Dead. Was liquidated, 1906, with all debts paid. Formerly
Cochise Co., Ariz. Fully described Vol. IV.

CALUMET CONSOLIDATED COPPER CO.

Dead. Formerly at Kelvin, Pinal Co., Ariz.

CALUMET COPPER CO.

Dead. Formerly at Turret, Chaffee Co., Colo. Described Vo

CALUMET & COPPER CREEK MINING CO.

Mine office: Copper Creek, Graham Co., Ariz. Col. Fran
president and general manager; John B. Wright, secretary; H. M. Ha
Organized circa 1910, with capitalization $5,000,000, shares $10 p
36 claims, including the Copper Giant mine, formerly under test,
year, by the Calumet & Arizona Mining Co., also other copper cla
of Col. Sibley, in the Bunker Hill district. Property is claimed
bodies of 40′ to 150′ width, and has shafts of 450′ and 650′.

CALUMET COPPER MINING CO.

Dead. Was merged, 1907, in Kelvin-Calumet Copper Minin
merly at Kelvin, Pinal Co., Ariz.

MINING CO. **WASHINGTON.**
was sold, under foreclosure, to Mount St. Helens Con-
Formerly at Spirit Lake, Skamania Co., Wash.

MINING & SMELTING CO. **COLORADO.**
at Rollinsville, Gilpin Co., Colo. Described Vol. VIII.

MINING CO. **MONTANA.**
York Life Bldg., St. Paul, Minn. Mine offices: Wickes,
., and Radersburg, Broadwater Co., Mont. Elmer E.
Wm. J. Shindler, vice-president; Olin H. Espey, secre-
receding officers and H. L. Siebert, directors. Organized
laws of Arizona, with capitalization $1,500,000, decreased,
500,000, shares $1 par, nonassessable; issued, $330,000.
14, 1911, showed balance of cash and bills receivable of
s were bought for $100,000, vendors getting 25,000 shares
curity Trust Co., St. Paul, and Boston Safe Deposit &
Federal Trust Co., Boston, transfer agent.
are 7 claims, including the Minnesota mine, 16 acres,
re millsite adjoining, 3½ miles from Wickes, on Clancey
ota mine, worked at intervals since 1869, is said to have
$500,000 worth of ore, prior to 1903. Old workings were
shaft, with a 230′ winze, caved and in bad shape. New
425′ two-compartment shaft near the mouth of the lower
400′ of workings, showing argentiferous and auriferous
of about 3% copper tenor. The Minnesota has a fissure
and porphyry, up to 100′ in width. Equipment includes
t good for 1,000′, smithy and bunkhouse.
property is 140 acres, known as the Mammoth group,
g and Black Friday mines, bought, 1910, for a reported
130′ shaft shows ore, reported by management to aver-
in gold, copper and other values. A prospect shaft on
shows a 6′ vein.

TH DEVELOPMENT CO. **ARIZONA.**
y at Bisbee, Cochise Co., Ariz. Described Vol. IV.

BE MINING CO. **ARIZONA.**
und up, 1908. Formerly at Globe, Gila Co., Ariz. Fully

LA MINING CO. **MICHIGAN.**
urton Place, Boston, Mass. Mine office: Calumet, Hough-
ll office: Lake Linden, Houghton Co., Mich. Smelter
oughton Co., Mich., and 1 Austin St., Buffalo, Erie Co., N.Y.
w, president; Rodolphe L. Agassiz, vice-president; Jas.
ral manager; preceding officers, Francis L. Higginson and
vell, directors; Geo. A. Flagg, secretary and treasurer;
erintendent; W. M. Gibson, assistant superintendent; E.
ngineer; E. D. Leavitt, consulting mechanical engineer;
f clerk; John Knox, chief mining captain; Henry Fisher,
Jas. B. Cooper, smelter superintendent at Lake Linden;
melter superintendent at Buffalo; C. H. Benedict, mill
H. Soddy, superintendent of motive power; Hon. Chas.
lter clerk at Lake Linden; Geo. N. Kendall, smelter clerk
E. Bay, land agent.
, under laws of Michigan, with capitalization $2,500,000,
in, $12. Charter renewed, 1900, for 30 years, and amended,
w laws of Michigan, making the corporation a securities-
s well as a mining and smelting company. Was organ-
tion of the Hecla, Calumet, Portland and Scott mining

companies. Fiscal year ends April 30th. Stock is listed on the B exchange, and traded in on the unlisted department of the New exchange. Annual meeting, third Wednesday in August.

Balance sheet, of April 30, 1910, gave cash and quick $8,546,706.49, with liabilities of $879,408.34, leaving a balance of q of $7,667,298.15, not including a sinking fund of $376,205, created i of notes maturing March 1, 1912, and not including notes outstand date, which were $1,700,000 at 5%, due March 1, 1912; $4,134,0 due Feb. 18, 1919; $1,685,000 at 5%, due Feb. 18, 1919, and $1,000, due March 1, 1919, these notes aggregating $8,519,000. A develop of $2,000,000 was created, during the fiscal year ending April 30, 19 purpose of buying outright and obtaining control of other proper vicinity of the mine. Company carries $1,000,000 to $1,250,000 i which are not listed as an asset.

Dividends were $5,000,000 in 1905; $7,000,000 in 1906; $6, 1907; $2,000,000 in 1908; $2,700,000 in 1909, and $2,900,000 in 19 dividend disbursements, to end of 1910, were $112,500,000, or $1,125 being the largest dividends ever paid by any incorporated mining and, in addition, the Hecla Mining Co. and Calumet Mining Co., b amalgamation under the present title, paid dividends aggregating $

Since the change in charter, 1905, permitting the acquisition other corporations, the Calumet & Hecla has secured control of va mines and mineral tracts, by organizing subsidiary corporations, a acquiring stock in companies previously organized. In 1905 the bought the following stocks, at a cost of $8,592,129.99 in cash and no shares of Osceola; 19,400 shares of Tamarack; 24,796 shares of Ahme shares of Isle Royale; 10,316 shares of Seneca; 25,000 shares of Laur attempt to secure physical control of the Osceola Consolidated Min the annual meeting March, 1907, was met by determined opposit took the fight into the Michigan legislature and the federal cour nearly 2 years of strenuous litigation, the Calumet & Hecla secured the Osceola and other Lake Superior mining companies formerly management of A. S. Bigelow, through a bargain with Mr. Bigelow, his entire stock interests were sold to the Calumet & Hecla.

The shareholdings of the Calumet & Hecla in subsidiary comp as follows on Apr. 30, 1910: 42,978 shares of Allouez Mining Co.; 44, of Centennial Copper Mining Co.; 19,400 shares of Cliff Mining Co.; 20, of Frontenac Copper Co.; 50,100 shares of Gratiot Mining Co.; 153, of La Salle Copper Co.; 18,000 shares of Manitou Mining Co.; 32,781 Osceola Consolidated Mining Co.; 50,100 shares of Superior Copper C shares of Dana Copper Co.; 35,450 shares of St. Louis Copper Co.; 33, of Laurium Mining Co.; 11,207 shares of Seneca Mining Co.; 27,507 Isle Royale Copper Co.; 24,796 shares of Ahmeek Mining Co.; 19,400 Tamarack Mining Co., and 465 shares of White Pine Copper Co.

Of the foregoing companies, there are 4 directly subsidiary cor these being the Frontenac Copper Co., of which the Calumet & Hecl entire stock issue; the Manitou Mining Co., in which the Calumet & H a 90% interest; the Gratiot Mining Co., in which a bare control is o the White Pine Copper Co., of which the Calumet & Hecla will o control, at a cost of about $100,000.

The landed holdings of the Calumet & Hecla, including proper outright, property controlled through subsidiary corporations, min under option, and timber and miscellaneous lands, in Houghton, Kewe Ontonagon counties, Michigan, amounted, Apr. 30, 1909, to 209,051 which 102,804 acres were in Keweenaw county. The company, wit sidiaries, has a shore-line of more than 34 miles, including the shore

lle and Torch Lake, and approximately 60,000 people are
rations of the company and its allied interests.
Hecla mine proper, area circa 2,750 acres, lies in a com-
s 11, 13, 14, 15, 22, 23 and 24, Town 56 North, Range 33
which the company owns considerable tracts, west of the
rying the underlay of the Calumet conglomerate at such
hat opening would require a 2-mile vertical shaft, and it
her these lands ever will become available for mining on the
te. The lands west of the Tamarack were explored, 1904,
earch of a supposed cupriferous conglomerate, but nothing
l.
umet & Hecla mine is opened on the Calumet conglomerate
ine has been developed on the Osceola amygdaloid, while
has been partly developed on the Kearsarge amygdaloidal

nglomerate has proven unprofitable both to the north and
t & Hecla, though workable at the Tamarack mine, which
derlay by vertical shafts. The conglomerate has an aver-
E., with average dip of 37° 30′ with the horizon. The bed
40′ maximum width, with an average of 12′ to 14′, giving
f stoping ground, or about 43,200 tons of stamp-rock, per
richer portions of the conglomerate are in the central part
la tract. The walls of the conglomerate carry considerable
e amygdaloidal footwall, and much of the adhering trap
d is now milled. Pillars of 75′ and even up to 150′ width,
every conglomerate shaft, contain stamp-rock equivalent
stoping ground available before the robbing of the pillars.
ne is opened 6 to 8 years in advance of immediate require-
rds of 200 miles of shafts, drifts, crosscuts and winzes.
000′ and 30,000,000′ of timber, board measure, is used in
nd to the end of 1910, fully 800,000,000′ of timber had gone
pillars are used extensively as supports, in crosscuts con-
et shaft with drifts on the bed, and in various incline shafts
ing-wall. Iron, mainly scrap material, such as wornout
engths and placed above I-beams, is used for lagging, to
nglomerate bed in the lower workings is not up to its aver-
g wide, but low in copper contents, and it is evident, from
y the deep shafts in the district, that while the cupriferous
ake Superior may descend to tremendous depth, copper
lly below 4,000′.
e mine, which, until a few years ago, was the entire Calumet
the present rate of production, of between 10 and 15 years,
years of scramming, with greatly decreased output. The
riorating rapidly in average copper contents with depth.
nally 165 to 175 power drills on the conglomerate, and 115
mygdaloid, and at one time, circa 1907, worked 315 drills,
ver in use in any mine.
Hecla has suffered severely from underground fires. The
metal cannot burn, like sulphide ore, but the old timbering
early as inflammable as so much tinder. The really serious
ber, occurred in 1884, July and November, 1887, Nov. 30,
900. All possible precautions are taken against mine fires,
partial fire-proofing of all mine timber with zinc chloride
kling of all shafts, the maintenance of water-pipes and hy-
mical engines, an electric alarm system and 18 telephones
ions, from the 8th to the 51st levels, inclusive, in 5 different

shafts, so distributed as to be most readily accessible from all parts of
From the first 4 fires the Calumet & Hecla suffered aggregate losses
millions of dollars, while a number of lives were lost, and 3 valuable s
drawn so badly that they were abandoned. The fifth and last fire,
1900, severely tested the mine's fire system, the fire breaking out o
evening, when the mine was deserted by all but a few employes, a
great headway before it was discovered. The burning portion of the
shut off by closing the fire-doors, and the mine was sealed at surface, b
the mouths of the shafts with heavy timbers, with dirt tamped tightl
crevices between. Wherever gas escaped through holes in the earth
tamped in and luted with water. The fire was extinguished in three
the South Hecla portion of the mine continued working without int
The 5 serious fires, and sundry smaller blazes, nipped in their inceptio
been of mysterious origin, and there seem reasons for suspecting inc
Great precautions are taken to prevent unauthorized persons entering
and permission to go underground is given only by the president, i
each pass being for a single trip.

The conglomerate property of the Calumet & Hecla is worked
arate mines, known as the Hecla and Calumet branches, the South H
a southerly continuation of the Hecla branch, and the Red Jacket ver
a part of the Calumet mine. The Calumet to the north, the Hecla in t
and the South Hecla at the south, form one continuous mine, devel
Calumet conglomerate by incline shafts, the Red Jacket shaft opening
bed vertically. The conglomerate, opened for 2 miles along the out
11 shafts, 8 being known as single compartments, which means a singl
compartment, with 2 shafts having 2 hoisting compartments, and on
shaft having 6 compartments. Six shafts have auxiliary electric h
the mine has electric station pumps for forcing water to surface with ste
actuated by compressed air for short lifts, but it is planned replacing th
by electric pumps also.

The conglomerate shafts on the outcrop are as follows, from north
Nos. 6 and 5 Calumet have 2 compartments each, No. 5 being botto
78th level. There is a considerable stretch of lean ground from No.
the Centennial boundary.

No. 4 Calumet, with 1 hoisting compartment, has a vertical depth
and an actual depth of 8,100′ on the incline of 37° 30′, with a 190′ winz
bottom, giving a total depth of 8,290′ from the collar of the shaft to th
of the winze.

No. 3 Calumet shaft has been abandoned.

No. 2 Calumet shaft, with one compartment, is 7,000′ deep, p
at the boundary, and it is to be gutted in the near future.

No. 1 Calumet shaft has been abandoned for some years.

No. 1 Hecla shaft has been abandoned.

No. 2 Hecla shaft, 4,400′ deep, is bottomed at the Tamarack b
Stopes are exhausted and the mine is being robbed by removal of sha

No. 3 Hecla, 4,000′ deep, also is bottomed at the Tamarack boun
is being gutted.

No. 4 Hecla shaft has been abandoned for some years.

No. 6 Hecla shaft, with 1 compartment, is 6,200′ deep, in good
and can be sunk to circa 8,500′ depth.

Nos. 7 & 8 Hecla, a double shaft of one compartment each, are 6,3
in good ground, and can be sunk to about 9,000′ depth.

Nos. 9 & 10 Hecla, a double shaft with 2 compartments, is 6,500′
can be sunk to 8,100 depth. The 78d level has shown a marked impr

No. 11 Hecla, 2,400′ deep, showed very poor ground at the bot
gutting was begun several years ago, robbing all pillars from the bo

s shaft will be abandoned within a comparatively short

, at the company's southern line, is 6,700′ deep, bottomed partly gutted, disclosing a formation entirely barren of s shaft is practically abandoned.

vertical shaft, of 1,800 tons daily capacity, permanently th, cuts the bed at 3,287′. Rock temperature was 87° F., by connection with No. 4 Calumet shaft, exhaust air aiding in cooling the mine. The Red Jacket was ine unconnected with the older shafts, to give reserve ut owing to heat and danger, connection was made with he Red Jacket shaft is 14′ 6″ by 24′ 6″ within timbers, and ement from collar to the solid rock, and timbered below here are 6 compartments, 2 used for hoisting, 2 for water, plies. The 2 hoisting compartments, at the eastern end, Kimberly self-dumping skips swung under. The 2 west- ve double-deck cages for men and material, and the 2 have large cylindrical steel bailers, for raising water. cket shaft is lowered through No. 5 Calumet, with which nected by a crosscut. The Red Jacket shaft hoists rock n shafts below the 56th level, at which point the conglom- There are 9-ton steel storage bins at the various productive intaining the uninterrupted hoisting service that is abso- aft of a mile depth. A ventilating chimney at the collar with ice formerly caused in winter by vapors arising from rockhouse of the Red Jacket is 100x100′ on the ground, crushers, one for poor rock.

s" is a tract of 200 acres, a quarter-mile wide and 1¼ een the Tamarack and Tamarack Junior mines, carrying onglomerate at great depth, and, to obviate sinking a al shaft, this tract is opened by a blind shaft, starting Jacket vertical, and near the bottom of Calumet No. on the Tamarack boundary line at a depth of 8,100′. nk 25′ under the footwall, at the same angle as the te, thus assuring solidity of walls while saving long and the bed on each level. A "footwall drift" on the 57th ular drift, at a distance of 25′ in the footwall, between l shaft and the blind shaft, offering an avenue for opera- confusion certain to result were the regular mine drifts The blind shaft starts in the footwall drift, under and level, and eventually will be about one mile in depth, e 40-acre tracts, leaving the fifth and last to be opened he blind shaft, which doubtless will be sunk on the same y for this peculiar method of development arose from ndary lines of the property run north and south, while s N. 39° E., giving a plane of dip of N. 51° W. Owing eing sunk on the dip of the bed, while the blind shaft n lines, the latter descends diagonally on the dip of the haft an average dip of about 22° only, although the bed unusually flat incline permits the hoisting of rock in ic hoist on the 57th level, cars being hauled through the ed into the steel bins of the Red Jacket shaft for hoist- nsfer at the mouth of the blind shaft. The workings of w the conglomerate bed to average about 14′, with about ck, the bed as a whole being very lean, at this great d workings of the Tamarack Junior mine of the Osceola

Consolidated, which adjoins the "Five Forties," are drained by holes bo by diamond drill from the blind shaft.

A drainage drift is being driven, at depth of about 5,000', measured the incline, circa 250' from the conglomerate, with a length of 2 miles, exte ing from No. 12 South Hecla shaft, the extreme southern end of the mine No. 4 Calumet, the most northerly shaft but one. This drift will drain wa to No. 4 shaft, from which it will be lifted to surface by centrifugal ele pumps.

The amygdaloid mine of the Calumet & Hecla is opened on the Osc amygdaloidal bed, which outcrops 730' east of the Calumet conglomerate, w parallel strike and average dip of about 40°, underlying the entire main tra the Calumet & Hecla mine. There are 6 shafts in the amygdaloid mine, Nos to 18 inclusive, numbered from south to north. Shafts are duplicates in e each having 3 compartments, of which 2 are used for hoisting and 1 for pu and ladderways. The amygdaloid mine has nearly 30 miles of workings, a has frequent connections with the conglomerate by crosscuts. The amyg loid mine was closed 1901, and reopened 1904. In this mine the Osceola b runs about 35' in width, with principal values along the foot and hanging, middle third being lean, as a rule. Laterals in the Osceola workings are ca as drift-stopes of 12' height along the hanging-wall. The Calumet & He owns, on its main tract, about 11,000' of the strike of the Osceola bed. D veloped ore reserves of the amygdaloid mine were estimated, April, 1909, about 15,000,000 tons, and the Osceola bed has been found to carry fair copp values, at a vertical depth of nearly 1 mile, in the Tamarack property. Pr duction from the amygdaloid mine, for the year ending April 30, 1910, w about 13,000,000 lbs. fine copper, from Osceola rock averaging 15.85 lbs. copp per ton, and Mr. MacNaughton estimated that copper could be produced fro this bed at a cost of about 8 cents per pound.

No. 13 shaft, the southernmost on the Osceola bed, was opened to th 23d level, March, 1908.

No. 14 shaft, 3,200' north of No. 13, was at the 23d level March, 1908.

No. 15 shaft, 2,600' north of No. 14, was at the 16th level March, 1908.

No. 16 shaft, 1,800' north of No. 15, is the principal productive shaft o the amygdaloid mine.

No. 17 shaft, 1,800' north of No. 16, was at the 11th level March, 190

No. 18 shaft, the northernmost of the amygdaloid mine, started 1907, wa circa 300' deep July, 1908, giving a good showing of stamp-rock.

The Kearsarge amygdaloidal bed outcrops about 2,200' east of the Osce amygdaloid and 2,900' east of the Calumet conglomerate, with parallel strik and dip of about 41°, underlying the entire main tract. Work of developme was begun August, 1903, and there are 3 shafts, numbered from north to south each having 3 compartments, and being practically duplicates of those on th Osceola amygdaloid. The shafts are "timbered" with steel, brick and con crete, the hanging-wall being lined with 3 arches of brick, laid in 3 to 5 course thickness being increased with depth, supported by 2 rows of I-beams, which serve also as dividers for the shaft. The Kearsarge bed, as opened by the shafts, is erratic, though showing stretches of ground that probably will yie 18 to 22 lbs. fine copper per ton, with reasonable selection. The Kearsarg shafts have permanent equipments, with railroad tracks, and are connected with the compressed air mains of the company's system. The Kearsarg shafts have been idle several years.

No. 19 shaft, about 1,000' south of the Centennial boundary line, is 1,200' deep, and furnished some stamp-rock to the mill, but was closed down October 1907.

No. 20 shaft, next south of No. 19, is about 1,300' in depth, and idle also.

No. 21, the southernmost shaft on the Kearsarge bed, is 8,000' south of

ow depth, showed well in copper, but deeper workings

gdaloid, lying between the conglomerate and the Osceola little opened, but might prove payable, as it shows some scut on the 900′ level.

uses at the conglomerate incline shafts, of uniform pat- -ton railroad cars. The old 5-ton skips were replaced, s. Rock is hoisted to the top of each shaft-rockhouse, izzlies that allow the finer rock to fall through, the larger in 24x36″ crushers, going thence to 18x24″ crushers on Crushed rock falls by gravity into storage-bins, whence that take it to the mills, railroad tracks running under- The standard equipment includes a 50-h. p. induction or driving crushers.

pment at the Calumet & Hecla is the most complete the world. With few exceptions everything is dupli- ible delay or suspension, by reason of fire or accident.

at the main mine, on the Calumet conglomerate, include and 6 hoisting plants. The hoists of the conglomerate ul, ranging in capacity from 1,000 to 8,000 h. p. each. and from work, in the incline shafts, by man-cars, these ving tiers of circus seats, replacing skips when needed, on or off the skip-tracks by large cranes. This method , quickest and cheapest for moving men in and out of

et shaft there is a group of the most powerful mining . The 62x146′ brick engine-house contains the 4,700-h. p. rior," with 40″ cylinders and 72″ stroke; the auxiliary d "Rockland," of 2,000 and 600 h. p. respectively; two of 25 and 40 drill capacity, and the engine "Mackinac," e-cylinder triple-expansion steel giant, operating 4 Nord- with a combined capacity of 650 drills, or about double ne mine. There also are four 35-drill auxiliary compres- itt compressor, water was injected into the compression Nordberg machines deliver the compressed and greatly ical steel cooler, 12′ in diameter and 30′ high, into which above and drawn off at the bottom, this cooling the air as 4 drums, each 8′ 6″ wide and 20′ 6″ in diameter, serv- 2 of these drums carrying nearly 2 miles of steel cable lied by batteries of boilers in 2 boiler-houses adjoining, himney 250′ high, with inside diameter of 12′ 6″. Loco- into the boiler-houses, where it is fed to the grates by

engine-house, of brick, flanked by a large boiler-house, . compound hoisting engine "Frontenac" and 2 auxiliary 00 h. p., also a 30-drill Rand air-compressor and a pair ompressors, with combined capacity of 144 drills, being f this type ever constructed.

a plant is the "G. H. & S." engine-house, having the neca" engines, of 2,000 h. p. each. The Hecla boiler- rs and a 200′ smokestack, of 9′ 6″ internal diameter.

operating Hecla shafts Nos. 7 and 8 contains the engines abic," each of 2,000 h. p., which operate 25′ drums by 00-h. p. Leavitt engine for man-cars. A 50x120′ boiler- nd a 250′ smokestack of 12′ 6″ internal diameter.

The South Hecla engine-house at shafts Nos. 9 and 10 contai
"Detroit" and "Onota," of 1,000 h. p. each.

The South Hecla engine-house at shafts Nos. 11 and 12 has t
Lidgerwood hoists.

The Red Jacket shaft has an 8,000-h. p. quadruple hoist,
70x220′ brownstone building, and in an adjoining brownstone buil
with a 250′ smokestack of 12′ 6″ inside diameter, are ten 1,000-
At the rear of the engine-house is a 32x412′ brownstone annex,
cement and roofed with slate, in which is carriod the fleet-gear
10-tons load perpendicularly from a depth of one mile, the weigh
and steel cable nearly equals that of the cargo of rock, but wi
counterbalance the engines can hoist 10-ton loads at a speed of
hour, the regular hoisting time being about 90 seconds for the ver
of nearly a mile, including time taken for starting and stopping
ment no locomotive could duplicate on a horizontal plane. The
ates on a system devised by S. B. Whiting, formerly manager of
To overcome the dangerous strain caused by unequal wearing,
ential rings are placed on the sheaves, the cables taking 4 complete
the driving sheaves.

Equipment at the amygdaloid shafts on the Osceola bed is p
same at shafts 13, 14, 15, 16 and 17, the new shaft, No. 18, havin
engine and boiler-house, with a small Lidgerwood hoist. Shafts
have large stone engine-houses, with a steel engine-house at No
13 to 17, inclusive, have Nordberg first motion double conical-
operating 10-ton skips in balance, good for 5,000′ depth each. N
house has an electric air-compressor, used as a "booster," bringing
up to 85 lbs. All engine-houses have air connections with the mai
plants at the old mine, and shafts 13, 14, 15, 16 and 17 have pern
rockhouses of the same general design as at the conglomerate work

The 225x250′ machine-shop has an equipment excelled by
the largest shops in the country, including a 25-ton electric traveli
mammoth planers, with electric power throughout. These shops
of handling anything and everything in the line of repair work, a
complete manufacturing facilities for the making of mining, milling
machinery, and have turned out hundreds of Wilfley tables, and
machinery, under agreement with the owners of the patents.

The 78x96′ foundry has 2 iron cupolas, and a brass foundry,
electric traveling crane.

The pattern shop, of brick and steel, just north of the found
partments, one for the shop proper and one for storing patterns.

The carpenter-shops are of great size, and are equipped with
line of labor-saving machinery as can be found in any general
establishment.

The blacksmith shops are of larger size than may be found elsew
in the works of a few of the very largest manufacturers of machi
equipped with steam hammers, forges, blowers, emery-wheels, etc.
smithy alone sharpens upwards of 50 tons of steel drills daily, requ
vices of a small regiment of drill-boys between the shops and mines.
blacksmith shop does general blacksmithing and forging for the
a stone addition of 66x152′ having been built to the Hecla shop in
various shops of the Calumet & Hecla employ upwards of 100 blac

A timber mill at the mine mortises and tenons the bed-pieces, le
of the square sets that are used underground, and furnishes blocks

The electric building at the mine is 74x74′, of stone, housing th
power and lighting plant, but the main electric plant now is at the
Linden.

e a very large brick building for general supplies, and steel and iron, oil, paint, etc., the main buildings having There also are barns and a considerable number of s, required in connection with the operation of the mine. is a large and handsome stone structure, housing the tments and the engineering force of the mine. The com- ne system has an exchange with about 150 instruments, deep underground stations, with local and long-distance

ntains a large hotel and a fine stone clubhouse for em- g bath-rooms, bowling alleys, etc. The changing-houses rious shafts, are well equipped with hot and cold running ckers.

ecla public library, having 32,606 volumes on Sept. 30, nt of circulation in the state of Michigan, with an attend- ot including visitors. In addition to books in English, nan, French, Italian, Swedish, Danish, Austrian, Finnish riodicals and newspapers in a score of languages, about es being represented on the company's payroll. There ranch library and clubhouse at Lake Linden, for employés smelters.

intains a hospital, for employés solely, with complete apparatus. Nearly a dozen physicians on the hospital employés and their families.

ns about 1,200 dwellings, furnished to employés at an n actual cost, plus cost of maintenance, and upwards of ned by employés on lands leased from the company at

lhouses on the lands of the Calumet & Hecla, most of he company, including a fine manual training school, t high school building at Calumet.

cla lands there are upwards of 30 churches, of a dozen ns. All of these sites were donated by the company, tantial aid has been given in their erection and main- rdless of creed.

ntains 3 distinct systems of waterworks, one at the mines mills in Lake Linden, and one on the shore of Lake Supe- of Calumet. The Lake Superior plant pumps water for net against a head of 600′, with an electric centrifugal lons daily capacity. This plant also furnishes water to oilers, on Torch Lake. At the Calumet dam and mine ing a combined daily capacity of upwards of 45,000,000

ntains a complete fire department, modeled on metropol- tection to the mine buildings and location, and responding et, Laurium and the other towns that go to make up the t, with 40,000 population, that has grown up around this

h Lake railroad, owned by the company, connects the nd shops by upwards of 20 miles of main tracks, spurs every shaft, shop, warehouse, mill and furnace. The s formerly used were replaced, 1908, by 150 forty-ton e line widened to standard gauge, by the addition of a locomotives were bought, and the old narrow-gauge standard gauge, in the company's shops.

The stamp-mills are at Lake Linden, 4 miles from the mine, 998 acres, having several miles of frontage on Torch Lake. The known as the Hecla and Calumet, each originally having 11 L stamps with 14x21½″ cylinders and 24″ stroke. A 165x308′ ste the Hecla mill, with 6 stamps, was built in 1903, and, upon it the rebuilding of the 2 old mills was begun, each being divided int with one section rebuilt at a time, each section requiring approxima for completion, remodeling being completed in 1907. Great as w this work, the new mills practically had paid for themselves upo through reduced cost of operation and increased saving of copper mills are termed rebuilt, they actually are entirely new mills, stand old sites, practically nothing of the old material having been utilize mills handle rock with about 60% of the wash-water formerly requi a double saving, inasmuch as all water used in the mills first must b and thereafter raised as sludge, by the sand-wheels, for dischargin

The new mills, built by the Wisconsin Bridge & Iron Co., steel frames, with concrete foundations, cement floors, corrugate and Carey roofs of tarred burlap. Foundations are much heavie in the old mills, and the wash-room below the heads is much greate tions are of very massive piles, spaced 20″ apart, with 2 and 3 tiers d rock, and topped with 6x12″ square timber, capped by a 4′ 6″ bed The mills have 29 Leavitt heads and 1 Nordberg steeple-compou which 28 heads are in commission regularly, with 2 in reserve, 20 he conglomerate rock and 6 crushing amygdaloid rock. Stamps are steam power, except the 6 stamps in the Hecla addition, which have 25-h. p. motors each, but the other milling machinery is operated The Leavitt heads have a daily capacity of about 400 tons of co 500 tons of Osceola amygdaloid or 550 tons of Kearsarge amygdalo

The mill equipment, below the stamps, includes Woodbury-Be ten 4-deck Evans-Rawlings round tables, from which slimes are tr Wilfley tables; Chilean regrinding mills and Averly grinders and The 220 Wilfleys effect a considerable saving of the very fine copp lost, and greatly reduce the water consumption. By special arran Wilfley tables were built in the company's shops.

As the mills stand on the flat western shore of Torch Lake, but water level, tailings speedily filled the shallow lake for some distan and to waste the sand it became necessary to secure a considerable i tion, which is gained by sand-wheels. The material entering the r glomerate rock leaves as coarse sand to the extent of fully 8,000 The sludge is washed through launders to the sand-houses, where it up by the buckets of the wheels and dumped, high above, into laund on trestles far out into the lake, these spouting forth miniature bric aras. There are two wheelhouses, one for each mill. The Calu house has sand-wheels of 40′ and 50′ diameter, and the Hecla wheelh for the sands from a much larger mill, has sand-wheels of 40′, 50′ and ter, the latter being housed in a three-story steel annex, 65x78′ on and 94′ high. The old wheelhouses are of wood, iron-sheathed. T the annex to the Hecla wheelhouse weighs 490 tons, and the building i with a 45-ton Sellers traveling crane. The sand wheel is to appearance bicycle wheel, fitted with spur gearing where the rubber tire should complete wheel weighs 500 tons, and is mounted upon massive concret Four 25-ton iron bed-plates support the pillars carrying the 21-ton Kr steel axle, which is 27′ long and 32″ in diameter with a hollow core of 26 Radiating from axle to rim are 2″ steel spokes 32′ long. The rim is in 20 weighing 10,700 lbs. each, the inner perimeter of the wheel having 55 in pairs, each 3′ wide and 4′ 6″ long, and holding 100 gallons, giving t

ons per revolution. The completed wheel is 10′ wide and
by gear and pinion, power being furnished by a 700-h. p.
years were required to build and adjust this monstrous
for another wheelhouse were begun April, 1908, and
is to be installed.

ant, built 1908-1909, and in full commission January,
340′ building. The frame is of structural steel, resting
s, the floor being of stamp-sand, with a concrete capping,
ntering into the construction of the building. Power is
-h. p. induction motors, giving about 100% excess capac-
delays through overhauling and repairing. The plant
0. Equipment, built almost exclusively in the shops and
ny, consists of 48 Chilean mills, resting on concrete piers,
pier being a hollow octagon 6′ high and 7′ in diameter,
low being filled to a height of 10′ with stamp-sand, capped
piers are joined by concrete ribs, in which a heavy steel
sing through each pier connection. There are 200 Wilfley
the plant having 1 grinder, 18 tables for roughings, 4
d 12 tables for slimes. Product from each set of 2 grind-
nk, from whence the roughings go to the first three tables,
ner tables, the middlings from each 15 tables going to 2
e coarse sands from the Calumet mill go to sand-wheel
to wheel No. 1, the coarse sand elevated by wheel No. 2
ng plant, where the amount going to each mill is regulated
low tank at the end of the launder caring for the surplus,
the mill. A 65-ton Hardinge conical tube mill, crushing
liameter at the larger end, tapering to 11″ at the discharge
sands being accomplished by the use of Danish pebbles
ck.

ill has traveling cranes, and every piece of machinery is
eakages can be repaired quickly. The mill is fed with
ps treating the richer rock in the Calumet mill, sands
copper per ton. No slimes go to the regrinding plant,
y coarse gravel and sand from the jigs and tables. The
l, of good average tenor, which is pumped into bins, and
for shipment to the smelter. Labor costs are very low,
atic throughout, and the force is only 12 men and boys

figures on a 50% extraction of copper values from the
April, 1909, treating the richest tailings from the stamp-
out 4 lbs. of copper per ton from the material treated,
cents per pound, on a basis of about 2,000,000 lbs. yearly
was said to be recovering about 5 pounds of copper per
5 cents per pound, for copper in the form of mineral, equal
und for finished copper, laid down on the seaboard. Pro-
e tailings plant, was circa 2,000,000 lbs. fine copper, and,
action, the plant will have a capacity of 3,000,000 lbs. or
regrinding plant apparently has proven its ability to
a substantial profit, but there is some question whether
e lake have not oxidized to a point where extraction will
h, to offset this, the older tailings are the richer in copper.
ke Linden mills are the most extensive in the world, con-
00 tons of stamp-sand, carrying an average of 8 to 10
on in the newer sands, and 12 to 20 pounds in the older
arrying about 500,000,000 lbs. of copper—an amount
roduction of any but the largest copper mines of the world.

Water for the mills is supplied by 4 pumps, of which the "
the most powerful in the world, having a daily capacity of 60,00
Auxiliary pumps are the "Huron," and "Ontario," of 20,00
capacity each, the "Erie" of 10,000,000 gallons, and an I. P. Mo
22,000,000 gallons daily capacity.

The electrification of the Calumet & Hecla was begun in 1904
ally will be completed, at mines, mills and smelters, except for
big compounded hoists and air-compressors at the mine, where a
steam to electricity would be doubtful economy, as well as neces
mous initial outlays. Electricity now actuates the crushers in th
the shops, many of the underground pumps, the Lake Super
station, some of the stamps, and the milling machinery below the

The central power station, of steel, with 12,000-h. p. capacit
at the mills rather than at the mine, because fuel can be delive
from the largest vessels plying the great lakes, effecting a saving
cents per ton on transportation cost of coal formerly burned a
with a much greater saving in the case of isolated plants lacking
tions, and there also is a saving in slack, resulting from one less ha
coal. Some of the former steam installations consumed as much
of coal per horsepower-hour, while the new electric plant requ
mately 1½ pounds per horsepower-hour. There are numerous oth
resulting from a central electric power plant, especially in labor,
formerly employing 100 firemen in its various power plants, the c
tion of the Calumet & Hecla, at its mines, mills and smelters,
250,000 tons yearly. Machinery at the power plant includes the
"Saginaw" and "Gratiot," the former an Allis-Chalmers twin ver
compound-expansion engine having 17x40x48" cylinders, each
direct-connected to a 1,000-kw. alternating current generator, and
engines "Owego" and "Ontonagon," of 3,000 h. p. each, built c
hoisting purposes, direct-connected to 2,000-kw. generators.
equipment of the mills includes 15 motors, of 20 to 250 h. p. each.

The 108x220' boiler-house, of steel frame, with two 200' se
brick-lined steel smokestacks, has twenty 500-h. p. Babcock-Wil
boilers. There are coal crushers, feeding an endless link-belt syst
steel link buckets, of 60 tons hourly capacity, taking coal to ov
whence it is fed to the grates by Roney automatic stokers. W
ments at the boiler plant are about 750,000 gallons daily, and water
secured from a reservoir, artesian wells and Torch Lake, going thro
filtration plant of 500,000 gallons daily capacity, in which imp
precipitated by lime, but the new plant takes water from a 75
reservoir, fed from Lake Superior via the Calumet pipe-line.

Miscellaneous buildings at the millsite include a 50x100' steel fr
48x175' warehouse, machine-shop, carpenter-shop, paint-shop and s
shops and warehouses required in connection with the works.

The Torch Lake smelter is at Hubbell, about a mile south
on a 30-acre site having ample frontage on Torch Lake, with
in front and 3 railways at the rear. The smelter has 4 brick furna
each 80x130', and a 50x70' blister copper furnace building, both bl
and reverberatories having been rebuilt within the past few years.
11 reverberatories, which are top-charged, having platforms abov
the mineral is thoroughly dried before charging. The reverbera
95' stacks. The largest blast furnace is 40x90' at the tuyeres, it
[illegible] of reverberatory furnaces for
the smelting work required in the process of reducing the native cop
treated. Work was started January, 1911, on a new steel-fra
building, to have two 150-ton reverberatory furnaces, of the so-ca

r the furnaces of the Lake Superior Smelting & Refining
the smelting plant is fully abreast of the times, in all

eral-houses, with a combined storage capacity of 18,000
lumet & Hecla mineral now carries less than 60% copper,
ower than formerly, to effect the saving of the very fine
t in the slimes.
at the smelter has three 125-h. p. boilers, and a fourth
building, generates steam by the combustion of waste
eratory furnaces. A small electric plant has an 85-kw.
kw. generator in reserve.
orks have a 2-story assay office and laboratory, 40x42'
exceptionally well arranged and complete in equipment.
and a large warehouse for supplies.
uction plant, known as the Buffalo Smelting Works, at
orthern part of Buffalo, is located on the Niagara River,
ront and direct rail connections in the yards. The works
and blast-furnace buildings, an electrolytic plant, 2
houses, office, laboratory and coal-sheds. The works are
ve grown to nearly the capacity of the site, and soon will
One of the furnaces was rebuilt, 1909, to larger size. A
finery, originally installed for experimental purposes, has
ith 700 tanks having multiple arrangement of electrodes,
increase its capacity to 20,000,000 lbs. of anodes yearly.
rade mineral was shipped to the Buffalo works for smelt-
l grades of mineral are treated at both plants, though the
per workings of the Calumet & Hecla, which is decidedly
exclusively at the Buffalo works, by electrolysis, which
considerable silver, formerly lost. The Buffalo plant
en.
steamers and barges, operated by the company, carries
ngs back return cargoes of coal, this fleet including the
o. A. Flagg, of 3,300 tons register. Sufficient mineral is
lo works, during the open season of navigation, to keep
eadily during the closed season, from December till May.
of the Calumet & Hecla is extensive, including a series
eds at Lake Linden, one of 200,000 tons capacity, the
ood and the new of steel. There is a series of docks at
s on Torch Lake, all with substantial wharves having at
er alongside, frequent dredging being required to main-
ar water, owing to stamp-sand filling in. The 750' coal
oists, and three 52' movable derricks, one of wood and

Hecla owns and operates the ship-canal connecting Torch
ment waterways on Portage Lake, this canal being 21'
ting the largest vessels plying the great lakes. Tolls,
on soft coal to 50 cents per ton on package freight, are
ny, on independent cargoes entering Torch Lake through

e head of Torch Lake, receives logs by rafts, and ships
mber by a branch of the Hecla & Torch Lake railway.
s sawmills at Ashland, Wisconsin, and Sheldrake, Michi-
hern shore of Lake Superior, the latter having a capacity
d lumber yearly, with several years' supply of standing
eto. The company owns extensive tracts of pine, hem-
imber along the southern shore of Lake Superior, this

land carrying between 400,000,000′ and 500,000,000′ of standing ti
company also has a long-term timber contract with the Keweenaw
Ltd., and buys extensively of jobbers, the requirements for undergro
ing alone being 25,000,000′ to 30,000,000′ annually, in addition to th
lion feet of timber and lumber used on surface at the mines, mills a

An aid fund for employés, instituted 1877, and managed
chosen by the workmen, pays death and disability benefits, eno
having been disbursed since the formation of the fund, every dol
the sick and injured, or to families bereaved of their bread-winn
dent or disease. Surplus monies accumulated in this fund have b
in the company's shares, bought on the open market. Disburse
this fund are $50,000 to $75,000 yearly. For the maintenance
each employé pays 50 cents monthly, and the Calumet & Hecla ad
amount. The value of the aid fund, at cost, was $85,878.79, on Ju
The company is said to have established, 1907, a pension fund for
ated employés of long and faithful service, some of whom have wor
at the property, since its inception, in 1866.

The company markets its own copper, and for many years thi
the business was looked after by Col. T. L. Livermore, who resig
president, at the close of 1910, after four decades of honest and eff
with the hearty good-will and respect of everyone in the copper tra

Beginning with the new century, the policy of the Calumet &
been one of expansion. Almost from its birth it was the greatest
ducer of the world, and the most profitable mine of any metal. Th
was progressive, leading all other mines in the introduction of he
machinery and modern methods, but was self-contained and self-su
was seen, however, in 1901, that the old mine, great as it was, m
an end sometime, hence a radical change in policy, which included
struction of its mills, many changes in mining practice, and, most
of all, the acquisition of mineral resources outside of the old mine,
to the opening of a fine new mine on the Osceola amygdaloid, up
tract, and the tentative opening of a mine on the Kearsarge amyg
consequence of this policy of expansion, the Calumet & Hecla, inste
the decadent property that it would be but for this, continues well a
in both production and earnings. Costs have been reduced largely,
effected in innumerable ways. The growth of the property, duri
century, has been well balanced, every department having been br
higher degree of efficiency. Operating costs have been largely red
out cutting wages, while charging millions of dollars for new equip
to operating expenses, and, despite the decreasing percentage of co
deepened mines, the cost of making a pound of copper was red
almost 11 cents, in 1901, to the present cost of 8¼ to 8½ cents.

The mine that stands still is going backward, and distasteful as
to those who are swallowed, the big fish must swallow the little
swallowed themselves by still larger fish. The position of the
Hecla, for nearly 40 years, was one of splendid isolation, and the co
self-centered and self-sufficient, but, with the dawn of the new cent
seen that the life of this magnificent mine could be measured by a
than two decades, hence the change in policy, effected in 1901,
radical changes in the management of the mine, with greatly red
supplemented, in 1904, by the first small purchases of mining lands
the main tract, and followed, in 1906, by extensive purchases of sto
in mining companies having neighboring properties. A further st
policy of expansion was reached in January, 1911, when the m
made public its plans for a reorganization of the company, with
creased capitalization, and the merging of all of the principal subs

company with the old title. These plans call for the e Calumet & Hecla Mining Co. with a capitalization of 0 shares of $25 par, which is the maximum capitalization f Michigan. Of this capitalization it is proposed giving ,000 shares of the Calumet & Hecla, and giving stock in stock in the corporations that it is proposed to absorb, s: 48,075 shares for the 96,150 shares outstanding of ted Mining Co., or fifty one-hundredths shares of new Osceola; 40,000 shares for the 50,000 shares outstanding g Co., or eighty one-hundredths shares of new stock for 1 00 shares for the 100,000 shares of the Superior Copper undredths shares of new stock for 1 share of Superior; 100,000 shares of the Allouez Mining Co., or seventeen of new stock for 1 share of Allouez; 13,200 shares of 00 shares of the Tamarack Mining Co., or twenty-two of new stock for 1 share of Tamarack; 6,059 shares of 77 issued shares of the La Salle Copper Co., or two one- new stock for 1 share of La Salle; 6,000 shares of new ares of the Seneca Mining Co., or thirty one-hundredths or 1 share of Seneca; 5,400 shares of new stock for the the Centennial Copper Mining Co., or six one-hundredths or 1 share of Centennial; 4,000 shares of new stock for he Laurium Mining Co., or ten one-hundredths shares of of Laurium. This plan would give an issue of 328,568 umet & Hecla Mining Co., out of 400,000 shares capital- provide for the absorption of the Gratiot and Isle Royale y or may not be taken in later. In addition to the stock given for the 100,000 shares of old stock of the ing Co., the old company is to receive 69,166 shares of new its stockholdings in the various subsidiary corporations f 240,000 shares of new stock for the 100,000 shares of old ve to each old shareholder of the Calumet & Hecla two of new stock for one of old. Preparation has been made ts, covering rights for fractional amounts, through de- e Old Colony Trust Co., of Boston.

were made public Jan. 4, 1911, after 7 months of con- nagement. The various properties were examined by nd his report thereon was used, together with the data e basis for figuring the values of the properties that it rb. Independent directors of some of the subsidiary hat they were not notified of the merger plans until proposed merger met with strenuous opposition from ber of companies that it was proposed to absorb, the ming from the shareholders of the Osceola and Ahmeek. on from the Boston stock exchange, which desired a new pitalization of 1,000,000 shares, to provide stock having e to investors and speculators, but the management of ble to meet the wishes of the exchange in this matter, red best to reorganize under the laws of Michigan, which incorporation of any mining company having more than ar value fixed arbitrarily at $25 per share, regardless of aign of publicity was carried on actively, for two months, ent of the company and the protesting shareholders of tions, but at the annual meetings of the subsidiaries, on 11, informal votes in favor of the proposed merger were That the votes were informal rather than formal was

due to an injunction, issued by the federal court in Grand Rapids, Michig restraining the Calumet & Hecla from completing its merger. This inju tion was secured by Godfrey M. Hyams, formerly general manager for Bigelow interests, that controlled the Osceola, Ahmeek, Tamarack, Seneca Laurium companies, until early 1909. The Calumet & Hecla secured con of these companies only after two years of active litigation, and the fore officials of the Calumet & Hecla testified in the courts, during such litigat that there was no intention whatever of merging the properties so acquired, a these statements undoubtedly were true, when made, but in the two years th passed between the acquisition of control of these disputed properties and putting forth of the merger proposition, the management of the Calumet Hecla Mining Co. changed entirely, through the death of Alexander Agass many years president of the company, the resignation of Col. T. L. Liverm for many years vice-president, and the death of Quincy A. Shaw, Sr., the larg stockholder, a director from the date of organization, and one of the contro factors in the company from its inception.

Another snag in the path of the merger was the proposed Chadbourne bi providing for the right to any shareholder in a merged Michigan corporation demand a court appraisal of his holdings, and cash payment therefor, rat than payment in stock of any merger company, but the Chadbourne bill, a passing the lower house of the Michigan legislature, was recalled, and put sleep on the closing days of the session. There also is the possibility some trouble with the federal authorities, who are making vigorous effor to sweep back the tide with a broom, and prevent consolidations of all so instead of going about the matter sensibly, and, seeing that consolidations a inevitable, regulating such mergers, instead of attempting to strangle them. Th likelihood of interference from the federal authorities, however, apparently the least of the troubles ahead of the merger.

The proposed merger undoubtedly would result in considerable economie estimated, apparently on good grounds, at $1,000,000 to $1,500,000 yearly, th higher figure amounting to one cent per pound on the productive capacity o the merged property. The difficulty in this case is to satisfy the shareholder of the properties proposed to be merged that they are receiving their fair propo tion of the benefits that undoubtedly would accrue to the various properties considered as a whole.

The conglomerate rock from the old Calumet & Hecla workings has shown a strongly declining tendency in values for many years past, and a rather alarm ing decline within the past few years. Net returns were almost 5%, or 100 lbs. of fine copper per ton in 1873; 4.75%, or 95 lbs. fine copper per ton, in 1888; 3.012%, or 60.24 lbs. per ton, in 1889; 59.93 lbs. in 1900; 52.44 lbs. in 1905; 39.68 lbs. in 1907; 35.03 lbs. in 1908; 32.25 in 1909, and a trifle under 30 lbs. in 1910. Rock from the Osceola amygdaloid returned 18.45 lbs. per ton the fiscal year ending Apr. 30, 1907; 17.06 lbs. in the fiscal year 1909, and 15.85 lbs. in the fiscal year 1910, when production was about 13,000,000 lbs. The average for all rock milled, during the calendar year 1910, probably was little if any better than 26 lbs. fine copper per ton.

Detailed figures, by years, of both production and dividends, from the organization of the company, in 1871, may be found in the statistical chapter. Recent production has been as follows: 100,023,420 lbs. fine copper in 1906; 83,863,116 lbs. in 1907; 81,660,723 lbs. in 1908; 78,652,618 lbs. in 1909, and circa 71,500,000 lbs. in 1910.

CALUMET & JEROME COPPER CO. ARIZONA.

Mine office: Jerome, Yavapai Co., Ariz. Geo. W. Avery, president; Geo. H. Avery, secretary and treasurer; preceding officers and Jos. Larson, directors. Organized April, 1907, under laws of Arizona, with capitalization $1,500,000, shares $1 par. Lands, 5 claims, one-half mile south of the United Verde

e Cleopatra. Property is traversed by an immense dyke, h. Development consists of several tunnels, of 75′ to planned to be driven 400′ to give a back of 800′.

Y COPPER CO. **ONTARIO.**

te Bldg., Rochester, N. Y. Mine office: Massey, Al-k, president and general manager; B. F. Freshwater, first riggs, second vice-president; Frank A. Beyer, third vice-s, secretary; Samuel B. Williams, treasurer; preceding onneau, C. C. La Clare and E. E. Shutt, directors; E. A. tendent. Organized Apr. 28, 1909, under laws of South ation $5,000,000, shares $1 par, nonassessable; issued, eeting, fourth Tuesday in April.

area 880 acres, and a 12-acre smelter-site. Property hist, having 4 fissure veins, of 6′ to 9′ estimated average , carrying chalcopyrite, bornite and chalcocite, estimated rage 6% copper, with a trace of gold. Mine has about imated to give 50,000 tons blocked out for stoping, and ost of 8 cents per pound for finished copper. Idle, but , 1911.

MILLING & SMELTING CO. **WYOMING.**

at Encampment, Carbon Co., Wyo. Fully described

ANA DEVELOPMENT CO. **MONTANA.**

at Helena, Lewis & Clark Co., Mont.

ANA MINING CO. **IDAHO & MONTANA.**

Minn. Mine office: Baker, Lemhi Co., Idaho. Saml. . Buchanan, first vice-president; Gust Levine, second x, secretary; Solomon Goldberg, treasurer; preceding offi- Angus McDonald, directors; P. J. Whitty, superintend- laws of Arizona, with capitalization $300,000, shares $1 the Boston curb.

ea 180 acres, in the Copper Queen district, on the Idaho- ding the Dark Horse mine at the head of the Big Hole, Property is reported to have 5 veins carrying bornite, depth of 12′. Mine formerly was worked from the Mon- eing developed from the Idaho side, by a tunnel of circa cut the 5 veins diagonally, unless the number of veins is pth. The Dark Horse mine has tunnels of 125′ and 160′, ment shaft, with circa 800′ of workings, showing aurifer- rnite and chalcocite. The main tunnel, late 1910, cut a iving assays of 6% copper, 2.5 oz. silver and $9.60 gold to show 3 practically parallel veins, of circa 12′ to 22′ t, to the Salt Lake smelter, gave returns of 18% copper, ts gold per ton, and shipments, 1907, to the Washoe smelt- per, 73 oz. silver and 38 cents gold per ton. Mine is said e on the dump. It is hoped that property will be placed road by construction of the Gilmore & Pittsburg line. s two 50-h. p. boilers, a hoist good for 2,000′ depth, and ompressor. The standing of the stock has been injured

XICO MINING CO. **NEW MEXICO.**

ndolph St., Chicago, Ills. Mine office: Magdalena, lex. McCallum, president; Alpheus McCallum, vice-pres- , J. A. Pement and Philemon Pement, directors. Organ- Mexico, with capitalization $1,000,000.

Lands, 12 claims, area 240 acres, in process of patenting, in H miles from a railroad, having crosscut tunnels of 120′ and 200′, showi ing up to 21.2% copper, 20 oz. silver and $19.84 gold per ton, wi lead and zinc.

CALUMET & ONTARIO DEVELOPMENT CO.

Dead. Formerly at Massey, Algoma, Ont. Described Vol. V

CALUMET-PINAL MINING CO.

Office: 1267 Broadway, New York, N. Y. Mine office: Red Co., Ariz. Chas. Deitz, president; Geo. E. Crawford, secretary; H Guild, resident manager. Organized July 3, 1905, under laws of A capitalization $1,000,000, shares $1 par; issued, circa $850,000. Sec fer & Registration Co., transfer agent and registrar.

Lands, 17 claims, area 340 acres, and a 5-acre millsite, in th district, 15 miles from Red Rock, nearest railway point. Property Cloudburst and Yankee Girl mines, opened 1879-1880, for silver, have produced high grade ore, carrying mainly silver, to value of ab The Yankee Girl has a 96′ shaft. Principal development is on the having a 300′ shaft, on the same vein, of 18′ estimated average width, base and andesite, carrying copper carbonates and chalcocite, givi to 36.2% copper and 36.5 oz. silver, with a trace of gold. Anoth apparently of promise, being opened at 275′ depth, assays 6.4% co silver and $2.50 gold.

Equipment includes a gasoline hoist, gasoline engine and Bu for ventilation. Management plans deepening the Yankee Girl s and connecting the shafts by a drift on the 300′ level. Local mana sidered good.

CALUMET & PITTSBURG MINING CO.

Dead. Was merged, 1907, in Superior & Pittsburg Copper Co at Bisbee, Cochise Co., Ariz. Very fully described Vol. VII.

CALUMET & SAULT STE. MARIE DEVELOPMENT CO.

Office: Calumet, Mich. Letter returned unclaimed from t office, Massey, Algoma, Ont. Fred. Roehm, president; Wm. F. Ash tendent. Lands, near the Hermina, have a 100′ shaft, showing a reported width, carrying auriferous chalcopyrite. Idle some year ently moribund.

CALUMET & SONORA MINING CO.

Office: 606 Sellwood Bldg., Duluth, Minn. Mine office: Arizpe, Sonora, Mex. Jerome E. Cooley, president; L. C. Harris, vi B. Silberstein, second vice-president; H. W. Coffin, secretary; A. manager; preceding officers and J. W. Norton, directors; Dwight E. consulting engineer; A. N. Hauser, superintendent. Organized M under laws of Minnesota, with capitalization $300,000, increased shares $10 par. Holds title to lands through a Mexican corporati met & Sonora of Cananea Mining Co., S. A. Owns $1,200,000 st Cananea Copper Co. Annual meeting, second Tuesday in October

Lands, circa 630 acres, known as the Catalina group, adjoining de Cobre mine on the northeast, about 3 miles northwest of La Ca Buena Vista group formerly owned was transferred to the Sou Copper Co.

The Catalina group has 2 practically parallel fissure veins, car tiferous galena, sphalerite and chalcopyrite, apparently in the rati parts galena, 5 of sphalerite and 1 of chalcopyrite, but copper is said t ing with depth. Copper ore is mainly chalcopyrite, with a litt and bornite. Ore is difficult of reduction, because of excess of zinc ment is by 2 old shafts, of circa 75′ each, and several new shafts, t being the Chivera, sunk at an angle of 70°, which was sinking for t

nd the Catalina No. 2 shaft, circa 250′ deep, early 1910. nt of copper-lead ore returned 3.64% copper, 53% lead, gold per ton.

les a 150-h. p. steam plant, with a 40-h. p. hoist and an at the Chivera shaft, and a 40-h. p. boiler and hoist at the Company has a concession for the importation of petro- plans taking electric power from the Greene-Cananea.

o 125 tons daily capacity, was bought complete, in Joplin, ne mine. Company is said to plan an electrostatic plant, ncentrates are stored, and shipment of lead concentrates , 1909, to the El Paso smelter. Production, July, 1910, ,000 lbs. of lead concentrates and 754,000 lbs. zinc concen- nen are employed. Property was promoted as a copper a lead and zinc mine, of considerable promise, with a little ns of increased copper at greater depth.

S MINING CO. **TEXAS.**

Lapids, Iowa. Operating office: Carlsbad, N. M. John nd general manager; Wm. Fullerton, secretary and treas- general manager. Organized, May, 1901, under laws of apitalization $250,000, shares $1 par. Lands, 36 claims, 40 acres of oil lands, in the Guadalupe Mountains, El Paso southwest of Carlsbad, the nearest railroad point, showing ng 20% copper, 5% lead and 1 oz. silver per ton, with a d by tunnels of 40′, 200′, 210′ and 328′. Has expended aims to have $500,000 worth of ore developed, which seems 3-ton test smelter shipment returned 19 to 24% copper. apparently moribund.

UI RIVER COPPER CO. **MÉXICO.**

unclaimed from former office, La Cananea, Sonora, Mex. a, Ures, Sonora, Mex. H. C. Rolfe, president; Geo. H. J. Elliott, treasurer. Organized Apr. 28, 1903, under laws talization $3,000,000, shares $10 par. Apparently is suc- uerita Mining Co., and bought lands of the Venice Copper ropa, area 85 hectares, opened by a 1,200′ tunnel, showing fair tenor at shallow depth. Was said to have a 50-ton pparently moribund.

COPPER CO. **AUSTRALIA.**

illthorpe, Bathurst Co., N. S. W., Australia. John Mills, t accounts. Lands, 100 acres, near the Cadia mine, in the carrying a vein with NW. strike. Development is by 2 n a vein of about 15′ width, carrying a 3′ paystreak assay- , 10 oz. silver and $30 gold per long ton. A general sample f main shaft gave an assay of 12.1% copper, 5 oz. 4 dwts. s. gold per long ton. Several parcels of ore shipped returned et. Equipment includes a hoist. Suspended operations, lisposal of machinery plant, and probably will liquidate.

NES DE CUIVRE DU CAMAQUAM. **BRAZIL.**

, Belgium. Mine office: Camaquam, Cacapava, Rio l. J. Devolder, R. de Bauer, Baron C. H. de Broqueville, usin, A. Dumont, L. Nève, F. Chaves, J. Kerryn de Letten- irectors. Organized Dec. 20, 1899, under laws of Belgium, ,900,000, shares f500 par. Has debentures of f250,000. kilometers from Rio Negro station on the Southern Brazil- ilometers from the Rio Camaquam, show an intrusive core ded by conglomerate and sandstone, carrying fissure veins ut rich in the conglomerate, and leaner in the sandstone,

veins averaging about 4′ in width, but lacking regularity, and even contin
The oxidized zone is shallow, the secondary zone carrying considerable ch
cite and bornite, with gangue of quartz and occasional barite. The ore b
the shallow zone of secondary enrichment is mainly chalcopyrite, associated
pyrite, showing occasional particles of chalcocite and dendrites of native co
Four veins worked average 4′ in width and carry circa 6.5% copper and
grams gold per metric ton. Mine is opened by 3 adits, having backs of 20
350′, and a fourth adit is planned to be driven 3,300′, to cut additional
shown at surface.

Equipment includes a fair mining plant, with a hydro-electric installa
taking water from a dam 453′ long and 53′ high, holding sufficient wate
run the mill for the entire year, as there are long drouths occasionally.
ore is hand-sorted, selected ore assaying about 30% copper. Gangue re
discarded, and remainder, averaging about 70%, after hand-selection, is
centrated in an 80-ton mill with hand-jigs to an average of about 28% co
tenor. Smelter has a small matting furnace. Production, 1904, was 90 to
tons of 28 to 30% ore monthly, shipped to England for smelting, and al
225 tons monthly of matte of 45 to 50% copper tenor. Production, 1907
estimated at 2,000,000 lbs. fine copper. Presumably idle.

CAMAS COPPER MINING & MILLING CO. WASHINGTO

Mine office: Plains, Sanders Co., Mont. L. L. Colvin, president and m
ager; H. G. Remick, vice-president; S. K. Williams, secretary and treas
preceding officers, D. C. Hervey and H. H. Carlson, directors. Organi
December, 1910, with capitalization $600,000. Lands, 2 claims, unpate
area 40 acres, with a 5-acre millsite adjoining, on the Flathead Indian reser
tion, showing a vein of 3′ to 4′ width, said to lie between porphyry and gran
carrying ore giving assays of 18.1% copper, 1 oz. silver and 60 cents gold
ton. Company plans sinking a shaft and driving a tunnel.

CAMBERS MINE. MONTAN

Owned by Anaconda Copper Mining Co., at Butte, Silver Bow Co., Mo

CAMBRIA COPPER CO. NEVAD

Mine office: Aurum, White Pine Co., Nev. Owen Pritchard, superinten
ent, at last accounts. Lands, 4 claims, area circa 80 acres, known as the Te
group, at Muncey Creek, Spring Valley, in the Silver Mountain district, ci
30 miles north of Ely, also 10 miles of water-rights, on Muncey Creek, and
acres of ranch lands. Has shipped carload lots of ore to Salt Lake smelter
turning 22.55 to 23.4% copper. Presumably idle.

CAMBRIAN CONSOLIDATED MINES, LTD. WALE

Dead. Was wound up, September, 1904. Formerly at Caerwych, Me
oneth, Wales. Described Vol. V.

CAMBRIAN COPPER MINING CO., LTD. WALE

Dead. Was wound up, voluntarily, February, 1903. Formerly at Ca
wych, Merioneth, Wales. Described Vol. III.

CAMBRIAN MINING & DEVELOPMENT CO., LTD. ONTARIO

Office and mine: 5 Mooring Block, Port Arthur, Thunder Bay distri
Ontario. C. H. Krause, president and manager; Lester Cain, vice-presid
S. John Schulte, secretary and treasurer; preceding officers, Edw. A. Grocht
and W. D. B. Turville, directors; Capt. Walpole Roland, engineer. Organi
Sept. 10, 1909, under laws of Ontario, with capitalization $1,000,000, shares
par; issued, $304,980. Company succeeded the Jasper Copper Co., Ltd., whi
was a bad egg. Annual meeting, first Tuesday in September.

Lands, 49 claims, area 1,960 acres, and a 40-acre millsite, on Sturgeon an
Jean Pierre bays, on the Black Bay Peninsula, 13 miles from Wolf River st
tion, on the Canadian Pacific railway. Property, circa 40 miles east of Fo
Arthur, is on the northern fold of the Keweenawan syncline, and carries vario
amygdaloidal strata, with average dip of about 35° SE. Development is l

6′, showing native copper disseminated in an amygdaloi-
ned to average 4 to 10%, but said by Mr. Krause to aver-
. Four Cyclone core drill holes, bored 1910, cut amyg-
ng native copper. Buildings include log bunkhouses.
ng a working shaft, 1911. Frank L. Levy, the financial
e worse than worthless Jasper Copper Co., Ltd. that this
ut Mr. Krause is considered competent and trustworthy.

G & MILLING CO. **CALIFORNIA.**

at Placerville, Eldorado Co., Cal. Described Vol. VI.

ER MINING CO. **NORTH CAROLINA.**

at Jamestown, Guilford Co., N. C.

ING CO. **IDAHO.**

rall was manager. Property was gold-copper claims near
veloped by shaft. Equipment included steam power, and
circa 20 men. Formerly at Doniphan, Blaine Co., Idaho.

ES DE CUIVRE DE CAMPANARIO. **SPAIN.**

Haussmann, Paris, France. Mine office: Valverde del
in. Ch. Chaput, A. de Dietrich, P. Keller, M. Landon,
and J. Strap, directors; D. Antonio Guijarro Orta, manager.
906, under laws of France, with capitalization f5,000,000,
ds, 87 hectares, including 6 old mines, estimated by com-
000 metric tons of ore, and actually having about 150,000
priferous pyrite in sight. Equipment includes an elabo-
rface plant, and property is a small producer. Prospects
poor, and exaggerated claims of the company are not liked.

A CAMPECHANA, **MÉXICO.**

y ANEXAS.

ón, Guanajuato, Mex. Lands, 17 kilometers northeast
ade lead and copper ores, with fair silver values. Mine is
able ore blocked out, averaging 2 to 3% copper, 2 to 5%
ms silver per metric ton. Equipment includes a concen-
ons daily capacity, completed 1908, and concentrates are
uis Potosí smelter.

NERA LA CAMPECHANA *6* **MÉXICO.**

NEXAS, S. A.

ón, Guanajuato, Mex. Organized Jan. 12, 1907, under
capitalization 300,000 pesos. Property is La Campechana
ving lead and copper ores.

MINING & MILLING CO. **ARIZONA.**

th Main St., Tucson, Ariz. Mine office: Oracle, Pinal
. F. Cody, president; Capt. John D. Burgess, vice-presi-
onsulting engineer; L. W. Getchell, treasurer and general
chell, superintendent. Organized March 4, 1910, under
capitalization $600,000, shares $100 par, nonassessable;
se corporation, and is being financed by Col. Cody, better
. Annual meeting, first Tuesday in February.

by company as 6 claims, area 120 acres, in the Old Hat
reported, apparently correctly, as 91 claims, including the
14 claims, Bonito and Maudina groups of 36 claims, and
up of 41 claims, with several millsites. Property, in the
tains, about 6 miles southeast of Oracle, and circa 40 miles
ws a mineralized zone, traceable for miles, on the com-
00′ to 1,800′ width, between Archæan granite and lower
imentaries, with dioritic intrusion of two ages. Surface
tiferous and auriferous lead, with only small quantities of
sappearing at little depth, and being replaced by chalco-

pyrite and chalcocite, with some bornite. Ore is estimated by to average 0.15% copper, 11.5% lead, 9 oz. silver and $2 gold velopment is by 8 pits, of 10′ to 30′, shafts of 70′ and 130′, and t 35′, 70′, 96′ and 310′. The property also carries some very rich po and has scheelite.

The 60x72′ experimental mill, of 40 tons daily capacity, has t gravity stamps, a 7x14″ Blake crusher, 2 rolls, one No. 5 Wilfley Johnston-Risdon table, a vanner, and the Behrends flotation and tom for fines, slimes, and tungsten concentrates. Managemer ting the lead-copper ores from the surface zone about 17 into 1, g trates carrying approximately 70% lead and 2.5% copper, with g values. If the experiment is successful, this will be followed by horizontal bessemerizing plant, devised by Capt. Burgess. Mana continuous development. Property considered promising and mana

SOCIEDAD ANONIMA COBRES DE CAMPÓO.

Office: Santander, Spain. Mine office: De Soto, Santande Alberto Gutiérrez, president; D. Luis Torres Quevedo, secretary. years and apparently moribund.

CAMPO SECO COPPER CO. C

Mine office: Campo Seco, Calaveras Co., Cal. Organized Property is 5 claims, known as the Galligher group, near the P Works, opened by tunnel, with considerable development, and ha serves of high grade ore blocked out. Ore carries fair values in go claimed in the press to be more than sufficient to pay cost of mini ment, leaving the copper net, which, of course, is not true, as this i with any copper mine in the world.

CAMPRODEN COPPER SYNDICATE, LTD.

Office: 3 Lord St., Liverpool, Eng. Letter returned unclaime mine office, Camproden, Gerona, Spain. Wm. E. Mouncey, cha Stanfield, secretary. Organized under laws of Great Britain, with £5,000. Idle some years and presumably moribund.

CAÑADA DEL ORO MINING & DEVELOPMENT CO.

Letter returned unclaimed from former office, Tucson, Ariz. Oracle, Pinal Co., Ariz. Eugene S. Dives, president; Maj. W. A secretary and manager; Louisa M. Matos, treasurer; preceding Waters and Uri Embody, directors. Organized 1906, with $1,000,000. Lands, 23 claims, in the Cañada del Oro district of the lina Mountains, showing well defined ore bodies, having 7 shafts with about 1,000′ of openings, carrying ore said to give assays of $ per ton, in lead, copper, silver and gold. Idle and apparently mor

CANADA NICKEL CO.

Dead. Lands were sold, 1906, to Ontario Nickel Co. Forme ington, Vroma Ont.

CANADIAN-AMERICAN EXPLORATION CO., LTD. BRITISH

Office: Vancouver, B. C. Mine office, Van Anda, Texada Stock is $10 par. Lands, 3 claims, known as the White Swan grou bond and lease near the Lucky Jim mine, on Valdez Island, and c ing the Marble Bay mine, on Texada Island, latter having a 50′ s at and near surface mainly pyrrhotite, associated with pyrite, ca chalcopyrite and magnetite, latter not especially auriferous. Bu burned by the forest fires of August, 1910, but machinery was save by sale.

CANADIAN-AMERICAN MINING CO. BRITISH

Dead. Property at Gribbell Island, Skeena River division, trict, B. C. Described Vol. VIII.

OLIDATED MINES, LTD. **BRITISH COLUMBIA.**
as changed, 1906, to Consolidated Mining & Smelting Co.
rmerly at Trail, Trail district, B. C.

OLIDATED MINING CO. **BRITISH COLUMBIA.**
on, Kootenay district, B. C. Lands, 7 claims, 3 fractional,
ing a 150′ shaft showing a considerable body of auriferous
rade. Has steam power. Former owner shipped about
he Trail smelter. Presumably idle.

ER CO. **ONTARIO.**
Exchange Place, New York, N. Y. Mine and works
, Algoma, Ont. A. P. Turner, president; F. S. Jordan,
Ashley, secretary and treasurer; preceding officers, A. Mon-
directors; Capt. John Lawson, general superintendent;
etallurgist; G. E. Silvester, engineer; C. T. Mitchell, con-
Vm. Hambly, superintendent Creighton mine; H. C. Meek,
n Hill mine. Organized Jan. 6, 1886, under laws of Ohio,
2,500,000, shares $100 par, and is licensed in Canada by spe-
t. Is controlled, through practically entire stock owner-
l Nickel Co.

Copper Co. is the world's largest nickel mine, and also is a
resent importance, and even greater future promise. Ore
, and the first mine was opened in 1886. Lands are 16,765
5 acres leasehold, all in the district of Algoma, in the vicin-
tensive diamond drill borings have shown large reserves of

re bodies are irregular contact deposits in basic igneous
ith norite gabbro penetrated by stringers and bunches of
e of nickeliferous and cupriferous pyrrhotite, with dioritic
in the form of chalcopyrite, and nickel occurring mainly as
t of the iron in chalcopyrite and pyrrhotite, with small
dite, which is the mineralogical equivalent of chalcopyrite
nickel for copper. Ores carry 1 to 4% copper and 2 to 6%
ge of 2 to 2.5% copper and 4 to 5% nickel. The company
men.

mine, employing about 400 men and producing circa 150
06, has 2 shafts, but extraction is mainly from an immense
wide from foot to hanging, 520′ long and 150′ deep. The
acks, converging to an entry on the footwall that leads to
re is broken in steps, and thrown to the bottom, where
amed to the shaft. Drill borings prove the Creighton ore
distance west of the pit. No. 1 shaft is 320′ deep, with 4th
. A new shaft, No. 2, sunk in the granite, about 500′ west
3 compartments, with walls concreted for about 40′ depth
s 390′ deep, with 4th level at 370′. No. 2 shaft has a rock-
ground and 72′ high, of reinforced concrete to the bin floor,
ls are of 3″ planks, 10″ wide, spiked together. The rock-
ludes two 18x30″ Blake crushers and a picking belt 3′ wide

nine has an air-compressor with piston efficiency of 1,635
per minute, driven by a 300-h. p. 550-volt constant-speed
The Creighton mine is operated exclusively by electricity
; and other work.
ich produced circa 200 tons daily, 1906, was idle at last

The Crean Hill mine, about 2 miles east of the Victoria, is opened by 2 shafts No. 1, with 4 compartments, being 300′ deep, sunk at an angle of 57°. Production is about 300 tons daily, with stoping on the first, second, fourth and fifth levels. A dry-walling system is used underground, and there are open workings, operated summers only. Production is about 300 tons daily, with force of circa 400 men. Extensive diamond drill borings have shown a series lenses from 50′ to 80′ in width, carrying a larger amount of pentlandite than from any of the other mines, and requiring different treatment from the mass ores found at the Creighton and Stobie mines.

Miscellaneous mines include the Stobie, 4 miles north of Sudbury, having ores similar to those of the Creighton, No. 3 mine, and various other workings. A quartz quarry, near Naughton, about 15 miles northeast of Sudbury, produces about 150 tons of quartz daily, used for fluxing and lining converter shells.

The machine-shop, smithy and foundry, large and well equipped, are under one roof, and there also is a large carpenter and pattern shop. The 35x80′ fireproof laboratory building, of concrete and brick, 2 stories high, is exceptionally well equipped. At the Creighton and Crean Hill mines there are 36x80′ changing-houses, with concrete floors, brick walls and tile roofs, having separate lockers for each man, with enameled basins and shower-baths.

Electric power is used throughout the mine and works. A subsidiary corporation, known as the Huronian Company, has a hydro-electric installation at High Falls, on the Spanish River, utilizing an effective head of 85′, with total available energy of about 14,000 h. p., of which about half is now developed. The power-house at High Falls is 55x106′, of brick and concrete. Installation includes two 3,550-h. p. turbines, with speed of 375 revolutions per minute, each direct-connected to a 2,000-kw. 2,400-volt 3-phase 25-cycle generator, with space for 2 additional units, of which one is under construction. The transmission line, of about 30 miles length, has double sets of poles, spaced at 150′ intervals, carrying 6 bare No. 1 copper wires. At Copper Cliff there is a 100x200′ sub-station, where the current is stepped down to low voltage, and distributed to various motors about the mines and works.

Water for general use and fire protection is stored in a 60,000-gallon steel tank.

The company's private railway line has 20 miles of track, connecting with the Canadian Pacific, and reaching the principal mines, roast-yards and works, and is equipped with 9 locomotives, circa 250 fifty-ton drop-bottom dump-cars, and a brick roundhouse.

Ore is heap-roasted, in yards near Copper Cliff. Roast-heaps of circa 5,000 tons size are built up by unloading raw ore from wheelbarrows. The company has experimented extensively with the size and shape of roast-heaps, obtaining the best results from heaps requiring about 3 months' roasting. Roasted ore is loaded from heaps by steam-shovels, and taken to the smelter by rail.

The smelter, at Copper Cliff, 6 to 20 miles from the various mines, is of 2,000 tons daily capacity. These works were perhaps the first to use the Bessemer process for treating nickel ores. The new plant has taken some ideas from the Tennessee Copper Co., mixed charges of raw and roasted ores being a modification of the Tennessee process.

The smelting plant is served by electric locomotives, and has 35x700′ ore-bins, of 15,000 tons capacity.

The 85x375′ blast-furnace building, alongside and parallel with the converter building, has five 50x204″ 400-ton blast-furnaces, set in a row down the center of the building, each furnace having 2 tiers of water-jackets, the lower being 8′ 6″ and the upper of 6′, furnaces having a total height of 35′. Slags flow from the back of the settlers into 22-ton cast-iron slag-pots, which are made in sections, with 4 side-pieces and a separate bottom.

peratory building, to be in operation the first half of 1911, ile east of former plant, and is 140x188′, of steel, with con- lt that it can be expanded to the southward when necessary. hed by a high-level railway track, 70′ above the yard, and e-bins for ore, coal and flux. There are electric cranes. This -dust, fine ores, slags and bottoms. There are two 12x112′ atory furnaces sending matte to the converter plant by rail. y locomotives, in 25-ton slag-cars. The smokestack is 200 eter, built of Custodis radial brick, on a concrete base. The burn coal, pulverized to 200 mesh, with the pulp blown into pressed air, giving an intense flame, with close regulation, pulverizing plant being in this building. Two steam boilers te gases. The dust-chamber is of concrete.

building is 60′ from the cupola building, and parallel 60x280′ main structure, with a shed 35x280′ for matting, , and at one end is the relining department, 60x112′ with a e, having a continuation of the crane-run of the main build- r material, etc., entire length of the converter building being e is of steel frame, with corrugated sides and roof, having electric traveling cranes, of 55′ 8″ span, and a 20-ton auxiliary settlers in the blast-furnace department is poured into cast- iameter and 5′ deep, and taken by electric crane to the con- 10 stands, with 10-ton shells, 84x126″, of the Anaconda type. of the blast-furnaces is a matte of 30 to 35% tenor in com- pper, the second fusion product, from the converters, being of 77 to 82% combined metallic tenor. Stands are con- rom 2 pulpits, each handling 5 stands, each stand having a otor, with solenoid brake. Blowing is precisely the same as nary copper matte, except that the blast is cut off as soon as ninated. The copper and nickel behave as one metal, sim- e, up to the final elimination of sulphur and iron. Matte is erters in clay-lined ladles, by crane, and poured into moulds . Slag from converters is poured into steel slag-pots, lifted s and taken to the slag-casting machine, which consists of a work, of 58′ diameter, on a circular track, carrying cast-iron continuous flat ring. The moulds, 4x12x30″, holding 150 , are mechanically rotated under the stream of slag. The ed to cool before the moulds reach a hand-controlled tripper, moulds, dropping the bricks into a hopper, a chute from the the slag-bricks into a skip, that carries them up an inclined steel bin above the charging tracks landing to the blast-

rtment has a silica mill, with large bins for storage of mate- mped by machine.

ude a small silver smelter, which, 1910, treated circa 5,000 om the Cobalt district, securing therefrom about 8,500,000 average returns of about 1,730 oz. silver per ton. Product r is speiss containing silver, nickel and cobalt, sent to the rting and refining.

wer plant, in a 101x158′ building, includes a complete steam e for emergencies, but regular operation is by electric power ower plant includes 3 Nordberg radial-valve blowing engines, ction motors arranged to work at 3 speeds, to give full con- r for the furnaces. The converter blast is furnished by a essor with capacity of 12,600 cubic feet of free air per minute, le pressure.

A special product of this company is a monel metal, which is a n
of nickel and copper, being merely nickel-copper matte deprived of
and averaging 68% nickel, 30.5% copper and 1.5% iron. This m
corrosive, easily worked, and is coming into general use quite rapi
unique field.

The nickel-copper matte from the converters is shipped to the
per Co., New Brighton, N. Y., where it is smelted with sodium sulp
ing the separation of the combined nickel and copper, and the resul
product is refined electrolytically.

Production was 8,010,000 lbs. fine copper, and 13,996,000 lbs
1903; 5,500,000 lbs. fine copper and 9,486,000 lbs. nickel in 1905; 15,7
copper and 26,282,991 lbs. nickel in 1909, and for 1910 was circa 17,
copper and 31,000,000 lbs. nickel. This mine is the largest nickel p
the world, and also one of the forty leading copper mines of the wor
excellent management.

CANADIAN MINING & DEVELOPMENT CO. M

Dead. Formerly at Basin, Jefferson Co., Mont.

CANADIAN SMELTING & REFINING CO., LTD.

Dead. Formerly at Sault Ste. Marie, Algoma, Ont. Described

CANADIAN SMELTING WORKS. BRITISH C

Owned by Consolidated Mining & Smelting Co. of Canada, Ltd., at

SOCIEDAD ESPLOTADORA DEL CANAL BEAGLE.

Dead. Was organized Sept. 5, 1906, under laws of Chile, with
tion £15,000, shares £1 par. Lands were 30 pertenencias, area 15
243 miles by water from Punta Arenas, on the Beagle Canal, north of
Fuego, in latitude 54° 52′ S., longitude 68° 58′ E. Property was a
circa 1905, explorations not resulting favorably. Formerly at Yende
allanes, Chile.

CANANEA-ARIZONA CONSOLIDATED COPPER CO. ARIZONA &

Dead. Formerly at Globe, Gila Co., Ariz., and La Cananea, Ari
ra, Mex. Described Vol. VIII.

CANANEA-BISBEE DEVELOPMENT CO.

Dead. Formerly at La Cananea, Arizpe, Sonora, Mex. Desc
VIII.

CANANEA-BOSTON MINING CO.

Letter returned unclaimed from former office, Bisbee, Ariz. M
La Cananea, Arizpe, Sonora, Mex. H. S. Smith, president; F. R.
vice-president; P. R. Crowell, secretary and treasurer; preceding offic
Williams, and M. J. McKelligon, directors. Organized June 8, 1
laws of Arizona, with capitalization $350,000, shares $1 par, non
Mine, near the Calumet & Sonora, northwest of La Cananea, has 2
as the Reeves and No. 1, about one-half mile apart, developing a
carrying values mainly in silver-lead ore.

CANANEA CENTRAL COPPER CO.

Office: 1400 Alworth Bldg., Duluth, Minn. Mine office:
Arizpe, Sonora, Mex. Capt. Jas. Hoatson, president; Chas.
vice-president and treasurer; G. Ashley Tomlinson, second v
ceding officers, Thos. F Cole, Chester A. Congdon, Wm. J. C
ton, John D. Ryan and Chas. d'Autremont, Jr., directors; I
general manager; Frederic R. Kennedy, secretary; Danl.
secretary; Wm. G. Hegardt, assistant treasurer.

Organized Aug. 6, 1906, under laws of Minnesota,
$10,000,000, shares $10 par; issued, $6,000,000. Owns the
of San Pedro Copper Co., S. A., organized under the laws of
the American, Copper Belt, Bryan, Seguro, Square, El Gra

ims. Owns 268,270 shares of the Cananea-Duluth Copper
ut 966 shares of the issued stock, and latter is to be wound
nce of stock outstanding can be secured. Company owns
k of the Cananea Development Co., S. A., organized under
ch holds title to Los Dos Naciones claim, at La Cananea.
ment, of Dec. 31, 1909, showed cash assets of $1,545,336.16,
as loaned to Greene-Cananea Copper Co., $534,767.52 was
-Duluth Copper Co., and $686,973.02 was loaned to San
S. A. Accounts payable were $180,382.77.
08 acres, including the holdings of subsidiary companies.
e turned over a large portion of this land to the Cananea
from Col. Greene including properties granted the Sonora
on May 4, 1904, which concessions were allowed to expire
land was denounced immediately thereafter by Col. Greene,
ned over to the new company, presumably for the benefit
solidated, in exchange for $2,000,000 stock in the Cananea
said to have been given, October, 1906, to the Greene Con-

Central Copper Co. is controlled, through the ownership of
otal stock issue, by the Greene-Cananea Copper Co., and,
at the properties of the Cananea Central and its subsidiary
erated as a portion of the Greene-Cananea, the mines are
under the title of Greene-Cananea Copper Co.
2,939,924 lbs. fine copper, 175,011 oz. silver and 1,178 oz.
440,464 lbs. copper, 303,019 oz. silver and 2,047 oz. gold in

OLIDATED COPPER CO., S. A. **MÉXICO.**

2 Broadway, New York, N. Y. Mine office: La Cananea,
. Dr. L. D. Ricketts, president and general manager; Jas.
ident and general superintendent; Geo. Young, secretary;
reasurer; preceding officers and L. A. Hagy, directors. Or-
99, under laws of México, with capitalization 20,000 pesos,
ar. Entire stock issue is owned by Greene Consolidated
ananea Consolidated being merely the company holding
rated as a close corporation. Description of the property
any is given under title of Greene Consolidated Copper Co.,
e stock issue of the Cananea Con[illegible] Copper Co., S. A.
ananea Consolidated is supp[illegible] the operating
Greene Consolidated was supp[illegible] entire stock
a Consolidated, there sc[illegible] las aya-
, or else a juggling of [illegible] Con-
Greene Consolidated [illegible] Central
have been turned o[illegible] quar-
ned by the Greene C[illegible] Con-
This stock, if sold [illegible]
4,000,000 cash in [illegible]
of stock in questio[illegible]
being issued $5 pa[illegible]
ock in question w[illegible]
le, John D. Ryan, C[illegible]
and Cleveland H. D[illegible]
er share.
the year 1909 ga[illegible]
59.25, reduced to $[illegible]
l improvements. A[illegible]
n hand, $2,324,685.[illegible]

accounts receivable, with liabilities of $1,531,674.43, in notes a
payable.

The 51% of stock of the Sierra Madre Land & Lumber Co.,
as an asset of the Greene Consolidated, never was opened by the
solidated, but was owned by the Cananea Consolidated, which s
back to Col. Greene, who was unable to pay for it. The sale price
by 75% of the stock of the Sierra Madre company, which was forf
son of non-payment of Col. Greene's notes to the Cananea Cor
Greene Consolidated, and the 75% stock interest reverted to the C
solidated Copper Co., but was lost, through foreclosure on the pr
Sierra Madre Land & Lumber Co., resulting in a net loss of nearl
to the Cananea Consolidated. Even this was preferable to attempti
the lumber company, as the Cananea Consolidated already had its h

The company holds a concession for a railway from La Cananea
Arizona, and expended about $150,000 on construction of same, bu
of freight rates by the Cananea, Rio Yaqui y Pacifico railway ca
pension of construction. The company has authorized 6% bonds
of $10,000 per kilometer, for a 52-kilometer railway line, to be s
20-year first mortgage on the railway, with principal and interest
by the Greene Consolidated Copper Co.

A mortgage loan of $400,000 to the Sierra Madre & Pacific rai
paid, 1909.

Col. Wm. C. Greene turned over about 4,000 acres of mineral
Cananea Central, which originally was part of the concessions gra
nora Copper Co., S. A., in 1904, allowed to lapse May 17, 1906,
diately thereafter denounced by Col. Greene privately, and turned
Cananea Central, presumably for the benefit of the Cananea Con
exchange for $2,000,000 stock in the Cananea Central.

The mines and works of the Cananea Consolidated are describe
title of the Greene Cananea Copper Co., in connection with the p
the Cananea Central Copper Co.

CANANEA DEVELOPMENT CO.

Letter returned unclaimed from former office and mine, L
Arizpe, Sonora, Mex. Jas. H. Kirk, president and mine superinte
Paull, vice-president; Geo. Young, secretary; John A. Campbell, tr
ceding officers and L. A. Hagy, directors; Dr. L. D. Ricketts, gene
C. A. Warren, engineer. Organized Aug. 8, 1905, under laws
with capitalization 10,000 pesos, shares 10 pesos par. Is controll
stock ownership, by the Cananea Central Copper Co., which is a s
the Greene Cananea Copper Co., and is one of the two operating
of the Cananea Central Copper Co. Production was 61,215 wet
giving an average extraction of 37.61 lbs. copper per ton, and yieldi
lbs. fine copper, 160,102 oz. silver and 1,046 oz. gold, in 1908, and was
tons of ore, giving an average extraction of 27.94 lbs. fine copper pe
ing 4,168,850 lbs. fine copper, 251,435 oz. silver and 1,648 oz. go
Property is described under title of Greene Cananea Copper Co.,
is practically a component part.

CANANEA & DULUTH DEVELOPMENT CO.

Dead. Was succeeded, circa 1906, by Cananea-Duluth Minin
merly at La Cananea, Arizpe, Sonora, Mex.

CANANEA-DULUTH MINING CO.

Office: 1400 Alworth Bldg., Duluth, Minn. Mine office:
Arizpe, Sonora, Mex. Co
of which $268,3
company a mere
consisting solely of

yable, leaving a balance of assets of $11,283.76. Company
nd up, if the small balance of stock outstanding can be re-
s described under title of Greene Cananea Copper Co., of
is practically a component part.

RN MINING CO. **MÉXICO.**

y at La Cananea, Arizpe, Sonora, Mex. Described Vol. VIII.

BE EXPLORATION & **ARIZONA & MÉXICO.**
T CO.

ly at Globe, Gila Co., Ariz., and La Cananea, Arizpe, Sonora,
ed Vol. VIII.

NAL MINING CO. **MÉXICO.**

ganized circa July, 1907, under laws of Arizona, with capi-
), by W. J. Downing and B. H. Yeager. Apparently no
rmerly at La Cananea, Arizpe, Sonora, Mex.

ND COPPER CO. **MÉXICO.**

y at La Cananea, Arizpe, Sonora, Mex. Described Vol. VIII.

IERN MINING CO. **MÉXICO.**

a Cananea, Arizpe, Sonora, Mex. Organized circa May,
ning the Calumet & Sonora Mining Co., are said to give a
owing, mainly in lead and zinc ores, and experimental ship-
f about 18% copper and 30 oz. silver, with small gold values.
discussed for 1911.

IERN MINING & DEVELOPMENT CO. **MÉXICO.**

office was Warren, Ariz. Officers were A. T. Sowles, pres-
, vice-president; H. B. Hanscom, secretary; I. W. Wallace,
d Apr. 5, 1907, under laws of México, with capitalization
peso par. Lands were 325 hectares, lying north and north-
de Cobre mine. Was merged, circa 1909, directly or indi-
Cananea Mines Corporation. Formerly at La Cananea,

MINING CO. **MÉXICO.**

unclaimed from former mine office, La Cananea, Arizpe,
hall P. Wright, president. Is said to be controlled by the
Lands, circa 1,200 hectares, about 2 miles northwest of
s of the Greene-Cananea, on the line of the Cananea road
shafts, deepest 112′, showing ore from depth of about 40′,
assays of about 17% copper. Idle since May, 1908, and
d.

O. **MÉXICO.**

office was 1206-24 Broad St., New York, N. Y. Was
1906, under laws of Maine. No trace of operations ever
at La Cananea, Arizpe, Sonora, Mex.

COPPER MINING CO. **MÉXICO.**

office was 919-607 South Main St., Los Angeles, Cal. No
ecured, and company apparently was a stockjobbing outfit.
anea, Arizpe, Sonora, Mex.

A DEVELOPMENT CO. **MÉXICO.**

r at La Cananea, Arizpe, Sonora, Mex. Described Vol. VIII.

RN COPPER CO. **MÉXICO.**

unclaimed from former mine office, La Cananea, Arizpe,
Wilkie, general manager; preceding officer, M. McDon-
T. Fittman and J. R. Martin, directors. Capitalization
ly is controlled by Chas. Schwab. Lands, 398 hectares, 7
slightly developed, said to show promising ore indi-
cations moribund.

CANANEA WEST MINING CO.

Dead. Was succeeded, circa April, 1907, by Cananea Western
Formerly at La Cananea, Arizpe, Sonora, Mex.

CANAS MINES, LTD.

Dead. Formerly at Zimapán, Hidalgo, Mex. Described Vol. V

CANBELEGO COPPER MINING CO., LTD. AU

Dead. Was reorganized circa March, 1909, as Canbelego, Ltd.
at Hermidale, Canbelego Co., N. S. W., Australia. Described Vol

CANBELEGO, LTD. AU

Office: Cobar, N. S. W., Australia. Mine office: Hermidale,
Co., N. S. W., Australia. Organized circa March, 1909, with ca
12,500, shares 5s par, as successor of Canbelego Copper Mining
issued, £5,000, fully paid. Lands carry considerable timber, availa
and mining use. Mine has 2 parallel veins, with aggregate reporte
about 40′, showing occasional stretches of good ground, the prin
apparently being of about 5′ average width. Main shaft is 270′, sl
phide ore, from which selected samples assayed 18% copper. Has s
eral hundred tons of ore to the Great Cobar smelter, No. 4 consign
long tons, assaying 12.34% copper.

CANBELEGO NORTH COPPER MINING CO. AU

Dead. Was liquidated 1908. Formerly at Canbelego, Canl
N. S. W., Australia.

CANBELEGO QUEEN CO., LTD. AU

Dead. Was liquidated October, 1907. Formerly at Canbelego,
Co., N. S. W., Australia.

CANDELARIA MINING & EXPLORATION CO.

Dead. Lands were sold to Mexican Standard Mining Co. F
Hidalgo del Parral, Chihuahua, Mex. Described Vol. V.

CANTON MINE.

Mine office: Pierceville, Fannin Co., Ga. Has micaceous schi
nated with chalcopyrite. Idle many years.

CANTON MINING CO.

Dead. Was succeeded by McKinley Mining & Smelting Co.,
succeeded by McKinley Consolidated Mines Co., which was suc
Willard-Ely Copper Co., which was succeeded by Consolidated Copp
history of the property thus constituting a notable series of succes
sort that the French term "a success of estimation." Formerly at
Pine Co., Nev.

JOAQUIN CANTÚ.

Office and mine: Mazapil, Zacatecas, Mex. Property is the Es
area 29 hectares, carrying ores of copper, lead, gold and silver.

CANYON COPPER CO.

Office and mine: Grandview, Coconino Co., Ariz. Jno. H. F
dent and general manager; H. H. Smith, secretary and treasurer; Jo
mine superintendent. Organized 1902, under laws of Arizona, with
tion $600,000, shares $10 par, buying lands of Last Chance Mining C
10 claims, area 200 acres, also a 10-acre millsite, in the Grand Ca
Colorado River, having contact deposits between limestone and por
to give average assays of circa 30% copper, from cuprite, melaconite,
azurite and coal oxyrde. In 1904 produced circa 350,000 lbs. fine
in 1907 made 80,989 lbs. fine copper and some silver. Property
promising. Idle since October, 1907.

CANYON GOLD & COPPER CO. M

Dead. Formerly at Canyon Ferry, Lewis & Clark Co., Mont.
Vol. VIII.

O. **ARIZONA.**
ice was Phœnix, Ariz. Was organized, circa 1905, as suc-
Copper Co., Ltd., which failed. Lands were 5 claims, area
Canyon district, showing auriferous and argentiferous
hides, with occasional native copper, developed by a 200'
and opencuts. Formerly at Mayer, Yavapai Co., Ariz.

INING CO. **UTAH.**
Utah. Mine office: Eureka, Juab Co., Utah. Henry
H. Pulver, vice-president; J. S. Bills, Jr., secretary and
ficers, Marcellus Smith, J. S. Bills, Sr., Geo. M. Sullivan
rs. Organized Apr. 20, 1909, under laws of Utah, with
shares 5 cents par; assessable. Lands, 7 claims, unpat-
silver-lead ore. Presumably idle.

PERÚ.
Canza, Icá, Perú. A. Garland & Co., owners. Is an
considerable producer. Numerous cupriferous veins, in
dies of ore that are oxides and carbonates above and sul-
al veins being opened to depths of 700' on the Adelaide,
or, and 500' on the Tapadita, the latter mine having been
the past. Idle several years.

APANNE VECCHIE e POGGIO BINDO. **ITALY.**
re sold to Società Anonima delle Minière di Montecatini.
arittima, Grosseto, Italy. Described Vol. V.

PPER CO., LTD. **NOVA SCOTIA.**
ate St., Boston, Mass. Letter returned unclaimed from
xheath, Cape Breton Co., N. S. John C. Watson, pres-
secretary; J. Dorr, treasurer. Capitalization $2,000,000.
xheath mine and adjoining lands, 10 miles from Sidney,
several cupriferous veins, of which the principal, aver-
rses felsite and diorite, carrying argentiferous and aurif-
a silicious gangue, ore averaging about 4.5% copper.
Idle some years.

OSPECTING, MINING **NOVA SCOTIA.**
NT CO., LTD.
. S. Letter returned unclaimed from former mine office,
n Co., N. S. F. W. Morley, president; W. F. Dennison,
McLennan, secretary and treasurer; preceding officers,
. McLennan, Dr. C. E. McMullen and Hon. D. McNeil,
n, mine superintendent. Organized under laws of Nova
tion $500,000, shares $1 par. Property is mineral lands,
le mine, which shows copper ore. Idle several years and

LTD. **CAPE COLONY & NEWFOUNDLAND.**
t. Place, London, E. C., Eng. Mine office: O'okiep, Little
Colony. Works office: Briton Ferry, Glamorganshire,
apney, chairman; preceding officers, John Taylor, J. M. V.
Reynolds and Marcel Paisant, directors; John Taylor &
John Franks, secretary; J. L. Dean, superintendent in
ef mine agent; J. Crofts, chief engineer; N. E. Moffatt,
erick A. Evans, smelter superintendent; Dr. A. de W.
Organized Apr. 30, 1888, as a reconstruction of Cape
Ltd., under laws of Great Britain, with capitalization
cumulative 6% preferred shares and £600,000 ordinary
£690,000. Annual accounts are made up to April 30th
ugust 31st in London, and are submitted in December.
kept for the Tilt Cove mine.

Profits have ranged from a net loss of £6,493 17s. 9d. in 1902, o ruption of business through the Boer war, this being the only yea profit was earned, up to the maximum profit of £379,910 1s. 1d. profits of £144,366 15s. 8d. in 1908; £90,223 19s. 5d. in 1909, and 9d. in 1910, giving total net profits, to Aug. 31, 1910, of £3,738,1 addition to which the Cape Copper Mining Co., Ltd. paid div 1888, aggregating £1,324,375. The present company paid divid 31, 1910, of £2,778,750. Dividends, 1910, were 4s. each on prefer nary shares.

The Tilt Cove mine is held on a 99-year lease, expiring 19 rental of £4,400, plus one-half of the net profits, and is separate under title of its owner, the Tilt Cove Copper Co., Ltd. Net profi Cove, divided equally, were £99,340 7s. 10d. in the fiscal year 1906, in 1907.

The company is entitled to one-half the net profits of the Chemical & Manure Co., Ltd., profits from this source being £2,2 1909.

Principal mines of the company are in Little Namaqualand, C lands including about 280 acres of freehold, and a few leasehold trac mines were opened, 1856, by Phillips & King, and were taken o the predecessor of this company. Principal mines, 1910, were Nababeep and Nababeep North, with a number of trial mines, id prospects. Ore is mainly chalcopyrite, with limited quantities of chalcocite, intimately associated with pyrite, showing occasional malaconite, and, near surface, a little malachite, azurite and chry bodies are irregular massive deposits of pyritic ore, associated with intrusives, in granite and gneiss.

The O'okiep mine, long the principal producer, has dwindling estimated, 1910, at only 8,000 long tons, though production has re tically unchanged for some years, and was 15,196 long tons of 14 tenor in the fiscal year 1910. The O'okiep East mine, showing a lim of low-grade ore, is idle.

The Nababeep mine, 5 to 6 miles west of O'okiep, opened 1890, Nababeep South, now the principal producer, and has increasing r mated, Apr. 30, 1910, at 219,800 tons of 5% ore, production for yea date being 54,050 long tons of ore assaying 5.44% copper, of wh 4,500 tons were secured from the capping, mainly by quarrying. developed by tunnels and a shaft.

The Nababeep North mine, supposedly nearly worked out, son for the fiscal year 1910 yielded 5,000 tons of 6.2% ore, obtained opencast workings.

The Narrap mine, about a mile east of the O'okiep East, wit similar ore, has ore reserves estimated, 1910, at 40,000 tons of 4% c and yielded 3,026 long tons of 4.64% ore in 1910. This property h tram, electric hoist and ore crusher. The Narrap South mine is idl

The Spektakel mine, on the Buffels River, 2 miles below its ju the Schaap River, and about 28 miles west of O'okiep by wagon-ro property, opened 1852, having ore bodies both in granite and ba rocks, and has been idle for some years.

The Carolusberg mine, about 6 miles southeast of O'okiep, i tunnel, and produced 1,311 long tons of 6.7% ore in 1910. The East mine, about 2 miles east of the Carolusberg, is idle.

Other idle properties include the Flat mine, 4 miles north of which was reopened, circa 1907; the Kopperberg mine near the C about 5 miles southeast of O'okiep, and the Coetsee mine, which wa and plant removed, several years ago.

has been substituted for steam throughout the principal power station, at the O'okiep mine, having 2 suction gas- ld steam plant held in reserve for emergencies.
ks at the mines include small smelters at O'okiep and Naba- ger, and both rebuilt, 1907-1908. The O'okiep smelter has ces, burning coke, a 16" Corliss engine, ore-gantry and electric ,571 long tons of ore in the fiscal year 1910. Production of matte of 48 to 50% copper tenor, shipped to the Briton Ferry g and refining. White employes are given furnished houses, are supplied to single men, and there are separate clubs, for en, at O'okiep. The company also maintains a good hospital the chaplain's salary, and contributes to the support of the

owns a 99-mile railway, with 16 miles of sidings, running from lloth, where there are docks, wharves, cranes, tugs and lighters dispatch of freight. The line is laid with 32, 37 and 50 lb. re carried free. Freight traffic for fiscal year ending 1910 was The company also owns 4 tugs at Port Nolloth. A tram- principal mines with the smelters.
its mines in South Africa, and its interests in the Newfound- npany was negotiating, late 1910, for a lease of the Baie Verte dland. Properties in the United States, formerly held under ndered, 1910, but the company secured title to some claims h no work is planned until a railway reaches the district.
holds an option, expiring March, 1913, on the Rajhoda prop- ndia. This mine shows an extensive belt of cupriferous rmation, with seams of copper ore of 2 to 6% tenor. Develop- dstone shaft, which has proven a fair amount of ore, of about During 1910 twelve boreholes were drilled, with a total of copper belt for nearly one and a quarter miles. This prop- promising.
erry smelter, which is the largest in Wales, in addition to any's own ores does a general custom business, smelting the a Copper Co., Ltd., under contract, treating 13,879 long tons d 883 tons of Namaqua matte of 54% copper tenor in 1906. works are located on the Great Western and Rhondda rail- canal connection with Swansea, receiving ores mainly by rail. volving cylindrical calciners up to 80' in length, heated by gas, ast-furnaces, making matte. Ores are smelted, without cal- atories, to a 76% white metal, which is refined by the Nichols which some of the white metal is calcined and mixed with un- al, the consequent reaction eliminating the remaining sulphur. ores are burned in kilns, for their sulphur contents, fumes lant, which makes circa 30,000 tons of chamber acid yearly. louble concentric chimney of steel and concrete, and a telpher- ling material. In 1906 the Briton Ferry works produced the 2 long tons of fine copper, of which 733 tons were turned out output was increased, 1909-1910. An electrolytic refinery is

s 17,192,000 lbs. fine copper in 1904; 16,358,720 lbs. in 1905, t official figures available, and is estimated at 15,000,000 lbs. nagement has been criticised occasionally for not adopting and machinery, but the circumstances of the case have pre- vances in this direction as would be warranted were the com- m[illegible] having enormous ore bodies available for development The great record of the Cape Copper Co., Ltd., as a steady

dividend payer, for forty years past, is perhaps the best answer to suc
founded upon a partial misconception of the facts.

CAPE D'OR COPPER DEVELOPMENT CO. **NOV**

Mine office: Cape d'Or, Cumberland Co., N. S. Idle many y

CAPE NOME COPPER MINING CO.

Office: 1 Dixon Bldg., Missoula, Mont. Mine office: Clinto
Co., Mont. Edw. Donlan, president; F. H. Woody, vice-president
kinson, secretary, treasurer and general manager; preceding officer
Coffey, directors. Organized November, 1906, under laws of Mo
capitalization $1,000,000, shares $1 par; issued, $924,400. Annu
first Monday in June.

Lands, 3 claims, patented, area 40 acres, adjoining the Aladdin
showing 4 fissure veins in granite, of which 3 are under developmer
average width, traceable 800′, being opened by 4 crosscut tunnels,
and 5 drift tunnels, of 75′, 850′, 620′, 430′ and 580′, with 3,750′
Equipment includes two 60-h. p. boilers, a 40-h. p. Lidgerwood
12-drill Ingersoll air-compressor. There are 6 buildings, includir
machine-shop and 2 small smithies. Property considered promising.
plans resumption in spring of 1911.

CAPILLITAS CONSOLIDATED MINES, LTD. **AR**

Office: 15 George St., Mansion House, London, E. C., Eng.
Cerro de Capillitas, Tucumán, Argentina. Works office: Pilciaõ,
Argentina. B. Wolfe, chairman; preceding officer, J. D'Anglard
Jobert and Gaston Poulain, directors; Geo. Hillsdon, secretary; P. Vit
manager. Organized Apr. 24, 1909, under laws of Great Britain, w
zation £600,000, shares £1 par; issued, £416,104, fully paid. W
struction of the Capillitas Copper Co., Ltd. Accounts to June 30
mitted Dec. 31, 1910, showed cash of £59,539, and debts of only
£5,143 calls in arrears.

Lands are extensive, including the Capillitas and Atajo group
and the Pilciao and Constancia smelters, also miscellaneous lands, fair
The Capillitas group, of about 20 properties, in the district of Anda
eastern part of Catamarca, shows 12 veins, principal development
owners having been on the Restauradora, Rosalia, Carmelita, La
Ortiz mines, reopened, under the former management, by 2 tunnel
old workings of La Grande, and by one tunnel in the Restauradora.
mines are 6 miles northwest of the Capillitas group. Former comp
ore from development work averaged about 15% copper, with goo
silver values, but the smelter returned an average of only 7% copper,
and 0.7 oz. gold per long ton. These mines have been worked, spa
by local capital, since circa 1850. The Restauradora mine has up
miles of workings on a vein of 18″ to 6′ width, ore, occurring irr
shoots, being mainly chalcopyrite, associated with pyrite, with consid
cocite and bornite.

The mines are located in an extremely rugged mountain count
tating former shipment of ore to smelters by pack-mules, mines
above sea-level, and more than 6,000′ above the temporary works
The nearest railroad station is Chumbicha, 165 kilometers distant, o
ingly rough and dusty roads, on which a traction engine was tried, b
the sand. The Argentine government promised, years ago, to
Córdoba Central railroad to Andalgalá, but the line failed to mate
cover the worst stretch between the mines and smelters, a single line
was ordered, from Bullivant & Co. [illegible] 22 miles in length,
span of 2,765′ and highest span [illegible]
designed to carry 40 [illegible]
with buckets of 500 [illegible]

able delays in delivery of material, but did not succeed bins at the smelter until May, when one blast-furnace was semi-pyritic smelting, with 5% charcoal charges, but ex- difficulties. Much trouble was had with the tram-line off. Experts from the designers were sent to Argentina, the trouble. Instead of a rated capacity of 150 tons daily, ty of ore transported in one day was 50 tons, and the aver- ths, was about 15 tons daily. The tram-line leaves a 20- ciao and Muschaca, over which transportation is by carts. two 50-ton water-jacket blast-furnaces, with dam, filter ng supplied through an 8½-kilometer pipe-line. The old as 2 reverberatory furnaces. The new smelter gave much but was amply capable of caring for all ore the tramway usion product was a 30% matte, resmelted to 50% copper cked and carted 120 miles, over a desert, to the nearest

918 long tons of ore smelted, yielding 176,960 lbs. copper, 3 oz. gold in 1905; 161,280 lbs. copper, circa 7,000 oz. silver in 1906, and circa 400,000 lbs. copper in 1907.

y made a bad fist of matters, failing ingloriously to secure ion, after many flowery promises. Given adequate trans- ufficient mine development and a modern smelting plant, be made profitable, and the present management appar- ion with the old crowd that boggled matters so badly, under Capillitas Copper Co., Ltd.

ER CO., LTD. **ARGENTINA.**

onstructed Apr. 24, 1909, as Capillitas Consolidated Mines, Cerro de Capillitas, Tucumán, Argentina. Very fully de-

IDATED MINING CO. **MONTANA.**

y at Helena, Lewis & Clark Co., Mont. Described Vol. VIII.

ER & GOLD CO. **BRITISH COLUMBIA.**

y at Van Anda, Texada Island, B. C.

NTAIN COPPER CO., LTD. **MÉXICO.**

nmercial Bldg., Kansas City, Mo. Mine office: Llano, Mex. M. H. Greene, president and general manager; ice-president; Wm. R. Berryhill, secretary and treasurer; McClure, J. C. Brewer, Thos. James and H. J. Sprink, tt, superintendent. Organized May 20, 1907, under laws talization $1,500,000, shares $1 par, nonassessable; issued, eeting, first Tuesday in June.

area 50 hectares, 9 miles southeast of Llano, between the d Sonora Copper Co. Property is said to show 20 paral- n a cross section of circa 250′, reported as 4′ to 60′ in width, carrying cuprite, malachite and chalcocite, said to average to 40 oz. silver and $2 to $10 gold per ton. Development nd 410′, and a 195′ crosscut tunnel. A test shipment of melter at Fundición, 1908, returned $14.70 per ton in cop- cents per pound.

des a 40-h. p. boiler and 8x10″ hoist good for 1,000′ depth, sistant's house and 6 dwellings for workmen. Manage- deepening shaft and crosscutting.

BRAZIL.

Brazil. Don José Gonçalves da leagues from a railroad, on the and is perhaps the most important

copper property of Brazil, having been worked, to some extent, at the past, showing the ruins of an old smelter with 2 furnaces. veloped to only shallow depth, pits and shafts of 1 to 28 meters de copper oxides. Ores apparently are distributed over a large extent but depth reached has been inadequate to determine the depth of zone, or the nature of the ores below. Property was last tested, English syndicate. Idle and for sale.

MINA CARAMBOLA.

Office and mine: care of D. Pablo Palacio, owner, Indé, Du Lands, 18 pertenencias, in two groups, opened by La Chusa shaft, c showing a 10′ vein of auriferous copper ore, carrying 4 to 30% copp silver per ton. Average assay values range from 3.5% copper an silver, in the silver ore, to 14.5% copper and 100 oz. silver in the copper ore. Was a small producer at last accounts.

CARBONATE ELY COPPER CO.

Letters returned unclaimed from former office, Provo, Utah, mine office, Preston, White Pine Co., Nev. Jesse Knight, gener Organized circa 1907, with capitalization $1,000,000, shares $1 par. claims, in Sawmill Cañon, shortly east of Preston, and about 35 m Ely. Mine was said, before purchase by Mr. Knight, to have a p body several hundred feet wide, assaying 4 to 6% copper, which Mine has a 2′ vein of carbonate ore, giving assays of 15 to 30% co oz. silver and $5 to $8 gold per ton, developed by a 385′ shaft. parently moribund.

CARBON COUNTY GOLD MINING & MILLING CO.

Dead. W. R. West was superintendent; Mine, operated carried auriferous and argentiferous lead and copper ores. Equipm a steam plant and 10-stamp mill. Formerly at Morgan, Carbon Co

CARDENAS COPPER CO.

Dead. Was absorbed, circa 1903, by Anita Consolidated Formerly at Williams, Coconino Co., Ariz.

MINAS CARDENILLO y ARMADILLO.

Mine office: Túxpam, Santiago Ixcuintla, Tepic, Mex. Fer owner; A. C. Gonzales, manager, at last accounts. Mines have s ores, with steam power, and employ about 50 men when active.

CARDIFF MINING & MILLING CO.

Office: 218 South Main St., Salt Lake City, Utah. Mine o Salt Lake Co., Utah. Fred W. Price, president and general mana A. McMillan, secretary and treasurer. Organized 1906, under la with capitalization $50,000, shares $1 par. Lands are the Mou group, northwest of the Columbus Consolidated, and on the divi Big Cottonwood and Little Cottonwood cañons. The mine has a said to show a 5′ body of high grade ore, and, 1910, mine had an 18″ to 36″ width, carrying sulphide ore giving average assays of 27 and 100 oz. silver per ton, opened in the drainage tunnel at depth of A little ore, shipped to the Salt Lake smelter, returned up to 2% co 3% lead and 35 oz. silver per ton, with small gold values.

DANIEL CARDONA.

Office and mine: Veta Grande, Zacatecas, Mex. Property is mine, carrying lead, copper, gold and silver ores. Equipment inclu mill, and property was a small producer at last accounts.

CARIBBEAN MINING CO.

Office: Holyoke, Mass. Mine office: Ophir, San Miguel Co., carry gold, silver, lead and copper. Equipment includes water pow stamp mill. Idle.

COPPER CO. **IDAHO.**

Gray, Bingham Co., Idaho. Frank A. Putnam, manager, ganized September, 1903, with capitalization $2,500,000, elop claims 65 miles southeast of Idaho Falls, in Bingham have an 8′ vein, traceable 3,000′. Idle for some years und.

A CARIDAD y ANEXAS. **MÉXICO.**

Adolph Marx, president, México, D. F. Mine office: a, Jalisco, Mex. Otto Vorath, manager. Capitaliza- Lands, 180 hectares, on the Rancho Pánuco, showing ad auriferous copper ores. Made small shipments, 1907, smelter. Presumably idle.

MINING CO., LTD. **SPAIN.**

nce Lane, Gresham St., London, E. C., Eng. Mine office: pain. Robert Summerside Simpson, chairman; preced- eason Woods and Thos. Geddees, Jr., directors; Geo. Organized Feb. 15, 1899, under laws of Great Britain, eased, 1901, to £350,000, shares £1 par; issued, £75,492. ding the Caridad, San Antonio and Descuido mines. Idle rently moribund.

MÉXICO.

care of Cárlos Blake, owner, Autlán, Jalisco, Mex. Lands, iles west of Autlán, showing a 30′ vein, carrying aurifer- chalcopyrite. Has about 400′ of openings. Idle.

GOLD MINING CO. **UTAH.**

ceded, 1907, by Carisa Gold & Copper Mining Co. of Mammoth, Juab Co., Utah. Described Vol. VI.

OPPER MINING CO. OF MAINE. **UTAH.**

Bldg., Salt Lake City, Utah. Mine office: Mammoth, C. Edw. Loose, president; Grant Snyder, general manager. laws of Maine, with capitalization $500,000, increased, ,000, shares $1 par; issued, $545.000. Was a reorganiza- ld & Copper Mining Co., which levied assessments of lends of $60,000.

patented, area 57 acres, adjoining the Centennial-Eureka, es, occurring as fissures in limestone and as contact deposits quartzite, 3 of which, more or less developed, of 4′ average rmer management, to give average returns of 5% copper, per ton, from oxidized ores. Mine, as sampled by Newton age assays of 4.51% copper, 3.54 oz. silver and 0.037 oz. ipped ore to smelter ranging up to 11% in copper tenor. though occasionally carrying rich pockets, and the esti- gement, of 80,000 tons of ore blocked out for stoping, was hough considerable concentrating ore is in sight. The ore ned on every level, but the grade of ore encountered is Mine is opened by 3 shafts, including the 350′ Cornish shaft, and by a 7,000′ tunnel, with about 5 miles of work-

was changed, 1908, after unmerciful market-rigging by a curb firm of which Chas. A. Stoneham was the controll- of former management of copper production of 1,200,000 s exaggeration, actual production being circa 250,000 lbs. 7,481 tons of ore, carrying average assay values of about g net smelter returns of $78,649, with estimated copper lbs. Idle.

CARLISLE COPPER CO.

Dead. Formerly at Butte, Silver Bow Co., Mont.

CARMACK GOLD & COPPER MINING CO. W

Dead. Formerly at North Bend, King Co., Wash. Descri

CARMAN CONSOLIDATED COPPER CO.

Office: Hibbing, Minn. Operating office: Douglas, Ariz. Arizpe, Sonora, Mex. Walter J. Power, president; J. F. Ross, treasurer; C. B. Bell, superintendent; preceding officers, J. S. Mart Prickett and F. S. Douglas, directors. Organized circa 1906, with $500,000, shares $2.50 par. Holds title to lands through Comp Plata, S. A., organized under laws of México.

Lands, 351 pertenencias, area 877 acres, in 9 groups, in the Pedrazzini and Chispas mines, showing several strong veins, with l ings. The Carmen and Don Placidio groups have dumps carryin tons of ore, claimed to average 4.65% copper, 62.2 oz. silver and per ton. The Blanca Rosa group gives ore assaying up to 16.8% silver and 0.42 oz. gold per ton. The Maria group has given ore copper, 107 oz. silver and 1.32 oz. gold per ton. Los Toros group assaying 4.2% copper, 29% lead, 38 oz. silver and 0.03 oz. gold per ore shipments to El Paso smelter have given returns ranging fr $4,575.79 per ton.

The Carman has had much litigation, with frequent arrests John P. Casey, the promoter, had to work hard for his profits, as h three times in Arizona and twice in México, but, notwithstanding ments, was paid $20,500 for a clear title, but C. B. Bell brough Casey for one-half of the profits, and secured a verdict of $23,250. the president, incidentally was arrested on a charge of perjury, b was dismissed without trial. A receiver was appointed for the comp but as the company had its lands in México, and its office in M Texas courts failed to get action. Property considered promising. idle.

COMPAÑÍA MINERA DEL CARMEN.

Mine office: Huarochirí, Lima, Perú. Lands, 61 pertenenci El Carmen mine, developed through La Carolina and Santa Rita t ing the Bella Unión vein, of about 1 meter average width, carrying and auriferous tetrahedrite, chalcopyrite, galena and sphalerite, as pyrite, with quartz gangue. Property also has the Aracucana vein width, which is rich, and is worked to some extent. Employed 1 Ore is shipped to the Casapalca smelter, and matte therefrom expo pool, via Callaó. Production, 1907, was 6,900 metric tons of o about 2.2% copper, 11% lead and 21% silver, yielding 334,658 lb 759,000 kgs. lead and 14,490 kgs. silver, and was 349,870 lbs. copper lead and 14,421 kgs. silver in 1908.

MINAS DEL CARMEN.

Mine office: Pueblo Hundido, Chañaral, Atacama, Chile. vieso, owner; Adriano Fernandez, manager, at last accounts. Land including El Carmen, Carmela, Cardúmen, Nuevo Araucana, Quil Lautaro and other mines. Property shows 2 main veins in syen Manto ranging 4 to 12 meters in width, with a minor vein of 2 to 3 both having north and south strike, with dip of 40°. Ore occurs shoots, the oxidized zone, of 100 meters average depth, carrying ox ates and silicates, and an abundance of native copper at approximat in the Carmen mine, with secondary sulphides at a vertical depth meters, followed by chalcopyrite, associated with arsenopyrite, diss gangue of iron oxide, limestone and decomposed porphyry.

El Carmen, the principal mine, is opened by 2 shafts, 190 mete

depths of 85 meters and 250 meters, the vein ranging 3 to an average width of 5 meters. The other mines are opened erties, as a whole, show reserves of about 75,000 tons of ore, enor. Dumps have about 7,000 metric tons of ore, of 6 to nd about 30,000 metric tons of 5% ore.
udes a good steam plant, and forces are about 100 men. e smelting. Production, 1903, was circa 6,000 metric tons circa 1,600,000 lbs. fine copper. Presumably idle.

MEN AMPLIACION. **MÉXICO.**
erralvo, Cuarto, Nuevo León, Mex. Marciano E. Villa- nager. Ores are argentiferous copper and lead sulphides.

CO. **MÉXICO.**
t St., New York, N. Y. Mine office: Mineral del Carmen, lex. Thos. B. Bell, president; Stephen A. Levy, secretary yne Von Leer, general manager; F. C. Seley, superintendent. s of New York, with capitalization $750,000, shares $50 par. rmen mine, area 160 hectares, and a considerable acreage ls, 45 miles from Rosario, the nearest rail point. The mine copper ores, with considerable development. A former y was annulled, 1910, and property taken over on the com- e mill has 40 stamps, 3 crushers and Frue vanners.

MINES, LTD. **CHILE & NEWFOUNDLAND.**
y at Cerro Blanco, Copiapó, Atacama, Chile. Described

MONA. **CHILE.**
Higuera, La Serena, Coquimbo, Chile. Property includes a, San Tomás and Santiago mines. Production, 1903, was s of ore averaging about 10% copper tenor. Presumably

ING CO. **ARIZONA.**
vere sold, 1909, to Arizona Empire Copper Mines Co. For- ma Co., Ariz.

NCROFT MINES, LTD. **ENGLAND.**
Carn Brea, R. S. O., Cornwall, Eng. Frank Harvey, J. P., r Brown, consulting engineer; Capt. Jas. Penhall, general athan, secretary; Nicholas Trestrail, engineer. Organized laws of Great Britain, with capitalization £150,000, shares ,366.
he Carn Brea, Tincroft and Cook's Kitchen tin and copper and Illogan, production being mainly tin. Carn Brea was by cost-book companies, and paid a 10% dividend on pref- mber, 1907. These mines, many years ago, made nearly yearly. From Apr. 15, 1900, to Dec. 31, 1910, the company g tons of ore, yielding £624,658 18s. 10d., and lord's dues ., running the small profit into a net loss of £4,829 13s. 16d., dues averaged only a trifle under 4d. in the pound. Pro- ded 672 long tons of copper ore, averaging 4%, equivalent ne copper, and 1907 copper production was 384 long tons of enor.

ER CO. **VIRGINIA.**
unclaimed from former office, Carnegie, Pa. Mine office: e Co., Va. Wm. McClain, superintendent. Lands, 176 t 2,000,000′ of timber, about half fit for sawing. Property le at surface, and 5′ at bottom of shaft, with a 12′ hanging- ch ore. Test shipment, to the Pennsylvania Lead Works,

Pittsburg, gave returns of 10.5% copper, 6.3 oz. silver and $10.80
Mine has a 76′ shaft. Idle since 1906, with no debts and no mone

CARNEY COPPER CO.

Office: 403 Eagle Bldg., Spokane, Wash. Mine office: Mul
Co., Idaho. Jos. L. Martin, president; C. D. Miller, secretary
preceding officers, Wilbur D. Greenough, Jos. Carson, J. H. Foss
Coal, directors. Organized 1906, under laws of Idaho, with
$1,500,000, shares $1 par.

Lands, 11 claims, 4 fractional, are 175 acres, carrying a good wa
formerly well timbered, but timber badly burned in the forest fi
1910. Mine, next east of the Reindeer, on the northern slope of
about 4 miles from Mullan, has 2 tunnels, No. 1 being 450′, with 3
No. 2, the lower tunnel, 1,090′, about half crosscut and half drift
are several opencuts and pits, showing ore of about 3% copper tenc
show up to 4′ of solid ore, carrying chalcopyrite, with some bo
tunnel shows an ore shoot up to 40′ in width, and about 175′ lo
about 2% copper, with small values in lead and silver, with a pay
10′ assaying 5 to 35% copper. Litigation with Jos. Carney, for
lands, was decided in company's favor June, 1908, giving an
Former buildings were destroyed by the forest fires of August, 19
erty is idle, but management planned resumption May, 1911, replac
and continuing development, with a view to early shipments.

CARNEY COPPER CO.

Letter returned unclaimed from former office, Norway, Mich.
Carney, Menominee Co., Mich. John O. Broden, president; Ant
superintendent, at last accounts. Organized 1904, under laws
with capitalization $20,000. Mine has an 88′ shaft, showing ore in
ing 1.4% copper. Idle since circa 1905, and apparently moribund

CAROLINA COPPER CO. NORTH

Office: 15 Atwater St. West, Detroit, Mich. Mine office: Cul
son Co., N. C. Lewis C. Waldo, president and treasurer; Tho
vice-president and superintendent; Hugh M. McCormick, secreta
officers, Stephen H. Knight, Geo. W. Clark, Thomas W. Newt
Bredin, David E. Thomas and Edwin P. Snider, directors. Organ
1901, under laws of Michigan, with capitalization $2,500,000, sh
issued, $1,585,000. Lands, 1,450 acres, freehold, including th
mine, showing 4 veins, of 27′ estimated average width, carrying m
pyrite, with estimated average values of 3% copper, 4 oz. silver
per ton, opened by a 55′ shaft and a 200′ tunnel. Lands also in
developed water power. Cloud was removed from title August,
some years.

CAROLINA GOLD & COPPER CO. NORTH

Dead. Formerly at New London, Stanley Co., N. C., and Gap
Co., N. C. Fully described Vol. VI.

CAROLINA KING MINING CO. NORTH

Dead. Formerly at Virginina, Halifax Co., Va. Described V

CARP LAKE MINING CO.

Letters returned unclaimed from former offices, Cleveland, O
York, N. Y. Mine office: Ontonagon, Ontonagon Co., Mich.
general manager, at last accounts. Organized 1855, under laws
and reorganized June, 1875, with capitalization $500,000, shares $25
were 1,087 acres, in Town 51 North, Range 43 West, near Lake S
part of holdings were sold to Porcupine Mountain Copper Co. Pr
native copper, occurring as irregular streaks of high mineral
up to 60% in copper [illegible] stamp mill running in connection
in streaks ranging from [illegible] for copper and silver.

ently is not an extension of the Nonesuch lode, as the strata
other physically, though carrying copper in a markedly
nds have an excellent water-power available, from Carp
ened, 1858, has several shallow shafts, and a 1,250′ tunnel,
with 20 gravity stamps. Idle some years, and apparently
ly described Vol. II.

MA MINAS DE CARRACEDO. **SPAIN.**

Spain. Mine office: Vañes, Palencia, Spain. Property,
idle.

E COPPER MINING & **ARGENTINA.**
RPORATION, LTD.

was sold, 1904, to Capillitas Copper Co., Ltd. Formerly
s, Tucumán, Argentina. Described Vol. V.

ANOS. **BOLIVIA.**

was sold, Aug. 6, 1909, to Corocoro United Copper Mines,
Formerly at Coro Coro, La Paz, Bolivia. Described Vol.

CO. **ARIZONA.**

was a group of claims, including the True Blue, on which
previous to 1905. Lands were sold to the United Globe
Globe, Gila Co., Ariz.

ION & 2 EAST GOLD & COPPER CO. **AUSTRALIA.**

s Towers, Australia. Mine office: Liontown, Daven-
nd, Australia. Capitalization £25,000, shares 5s. par.
r the Carrington United Mines Co., Ltd., developed by a
13″ vein of ore carrying good average values in copper and
ating. Stopes on the fourth level show 12″ to 48″ of heavy

one reverberatory furnace, for matting, and planned, 1907,
s. In November, 1908, mine shipped 8 tons 13 cwts. of
Port Kembla electrolytic works, assaying 57.8% copper,
r and 9 dwts. 16 grains gold per long ton. Was a small
unts.

TED MINES CO., LTD. **AUSTRALIA.**

hopsgate St. Within, London, E. C. Eng., and Mosman
Queensland, Australia. Mine office: Liontown, Daven-
Australia. J. Millican, J. P., chairman; preceding officer,
. Carrington, H. Pfeiffer and T. Webb, directors; S. W.
B. B. Clayton, London secretary; S. Harris, general man-
e manager. P. Millican, mill superintendent. Organized
erger of Carrington's Lion P. & C. Mining Co., Ltd., Car-
nd Mining Co., Ltd., and various other companies, under
with capitalization £60,000, shares 5s. par. Paid a 5%
, and a 10% dividend Feb. 3, 1910.

s, near Carrington's Lion & 2 East Gold & Copper Co.,
f Charters Towers. Mine has 4 shafts, deepest 630′, show-
s copper ore, with considerable bodies of copper sulphides
gs. Ore has been estimated to average about 10% copper,
. gold per long ton, with an average value of £8 per ton.
orks include a 20-ton concentrator having a Huntington
ith 3 small reverberatory furnaces, producing blister cop-
now idle, smelting costs being very high. Employs about
n, 1907, was 103 long tons of ore smelted, yielding 23,520
z. silver and 39 oz. gold, and, for March, 1910, the mill
of ore, yielding 84 tons of concentrates and £569 in gold

SOCIEDAD DE MINAS y FUNDICIÓN DE CARRIZAL.

Office: Catedal 2409, Santiago de Chile. Mine office: Carrizo Bajo, Atacama, Chile. Works office: Canto de Agua, cama, Chile. Samuel Gonzalez Julio, chairman; Alberto Fab chairman; Lincoyan Tirapegui Julio, secretary; Wm. M. Martin, ager; Arthur W. Martin, mine superintendent. Organized June 2 laws of Chile, with capitalization 2,100,000 pesos, shares 100 pe paid and fully issued. Fiscal year ends Oct. 31st. The Carriza owns about one-third of the stock. Dividends were 546,000 p 210 000 pesos, in 1907 and none in 1908, with total dividends of 1, to end of 1908.

Lands, 80 claims, area 555 acres, in 4 groups, and a 10-acre with about 600 square miles of miscellaneous lands. Lands are known as the Astillas,.Carrizal Alto, Cerro Blanco and Jarillas, all zal district, and include 14 different mines, many of which ar Estancia de Jarillas is used for raising alfalfa, and the pasturag Ore of the different mines is mainly sulphide, and average of ore s was 9.1% copper, and circa 205 oz. silver and 0.03 oz. gold pe Mines are heavily timbered, as a rule, at considerable expense. Murphy rock drills are used, with dynamite and blasting gelatin f

The Amarilla or Agua Amarilla mine, at Cerro Blanco, open the Amarilla shaft of 1,617′ depth, and La Estrella shaft of 1,765′ vertical, and the mine is opened for a length of about 400 met upper workings carry considerable silver, decreasing with dept rocks are porphyry and limestone. La Estrella shaft has its coll from the outcrop, cutting the vein at 120 meters depth. The sh meters in interior dimensions, framed with 12x12″ timbers, and h hoist. The Amarilla shaft has a hoist raising 1-meter cars with at hoisting speed of 150 meters per minute. About 300 men are the Cerro Blanco mines, and production, 1907, was 7,996 metric averaging 14% copper, equivalent to circa 2,450,000 lbs. fine cop about the same in 1908-1909.

The Astillas mine in the Frierina district, area 6 hectares, c shows syenite, carrying a vein of about 10 meters average width grade sulphide ore. Main shaft is 1,100′, and mine is opened to l meters, with 15 levels. Equipment includes a 200-h. p. steam plan age force, 1909, was 45 men. Production, 1909, was 3,062 metric averaging 5.8% copper, which is planned to be increased.

Los Bronces or Las Jarillas mine, opened 1881, has a 1,400′ s practically a continuation of Las Astillas mine, with similar ore, b somewhat broken at the bottom. Recent explorations have shown cations of additional ore bodies of promise.

The Coquimbana mine has an 820′ shaft, with 9 levels opene is developed for length of 390 meters. La Máquina shaft was at t 1909. Production of the Coquimbana, 1908-1909, averaged about tons of ore monthly.

The famous Carrizal Alto group, now idle, includes the Armoni Margarita mines, the former, 1,200′ deep, having been a notable p many years.

The Mina Socavón, at Carrizal Alto, has a vein with nearly NS dip of 60° to 80°, in granite. Ores, to depth of 70 meters, are oxidis ciated with iron oxides, below which occurs chalcopyrite, disseminat Extreme depth is 281 meters, with horizontal workings of about 25 length.

The Vizcachas mine, opened by a 103-meter shaft, has a vein o width, assaying 17.9% copper, and is somewhat wet.

aine has 3 levels opened, with only a malacate for equip-
antos is an exploration only.
des steam plants aggregating 144 h. p., with 5 hoists and
ressor. A survey has been made for the Carrizal railway,
ıe mines and works.
own as the Fundición de Chañarcitos, is an ancient estab-
rizal & Interior railway. There are six 13x20′ reverbera-
nce 1907, when a blast-furnace was substituted, to great
ola is a 42x84″ Allis-Chalmers water-jacket blast-furnace,
acity, with rectangular forehearth, and a 10-h. p. Conners-
st-chamber is of insufficient size, causing considerable loss of
tilization. Formerly about two-thirds of ore treated was
yritic smelting was begun, 1908, reducing coke charges to
luction of cost, fuel being costly imported coke. Flux is
arrying about 2.6% copper, in the proportion of 18% to
hauled by mules, assayed 0.869% copper, 1907. The
t has 5 shells. Matte is sent to the Guaycán smelter.
20.64 pesos per metric ton in 1903, reduced, 1909, to about
ecent production has been as follows: 6,272,087 lbs. fine
,492 lbs. in 1906; 3,600,978 lbs. in 1907; 3,447,994 lbs. in
bs. in 1909.

S DE CARRIZALILLO. **CHILE.**

hañaral, Atacama, Chile. Property includes several old
one shaft of 2,122′ depth. Idle some years, because of heavy
mine lacking adequate pumping equipment.

. CO. **MÉXICO.**

l, S. D. Mine and works office: Ayutla, Autlán, Jalisco,
Keller, president and general manager; Whitney Gilbreath,
Schneider, secretary; Hon. R. S. Vessey, treasurer; preced-
ere, Dr. W. H. Perry, Jos. Strawhorn and W. H. Brandow,
agin, Jr., general superintendent; T. B. McCall, mine super-
ayley, mill superintendent; Salvador Quintero, engineer.
1904, under laws of Maine, with capitalization $1,000,000,
ual meeting, second Tuesday in February.
ares, also a 50-acre millsite, 70-acre smelter-site and circa
llaneous lands, mainly well timbered, including the 7,500-
Property includes the lands formerly owned by the Ayutla
to the Carrizal. Property cost $60,000, and final payment

operty is an antigua, known to have been worked 1700 to
Dec. 1, 1906. The mine formerly was worked for native
shown at and near surface, the oxidized zone, showing a
epth of about 100′, being followed by chalcopyrite, with
. There are 30 known ore bodies, 12 of which have been
d, these occurring as fissures in andesite, having porphyry
s, carrying ore-shoots of 2′ to 12′ width, and 60′ to 600′
e is traceable about 3 miles.
whole has about 2 miles of workings, largely in ore of fair
showing a 5′ to 15′ vein, with average width of about 12′,
about 500′. Workings include the following shafts: San
o, 115′; Chico, 140′; Medram, 140′, with minor shafts of
and 90′, and a number of prospect pits. There also are the
No. 1, of 497′; No. 2, of 535′; No. 3, of 110′; Vesuvio, of
os Reyes, of 220′, and Chico of 526′. Mine was estimated,
tons of ore blocked out for stoping, averaging about 5.5%

copper, 5 oz. silver and $1 gold per ton, with silver values increasin
About 300 men are employed.

Equipment includes a 200-h. p. steam plant, furnishing 75
mines, 40 h. p. for the mills and 85 h. p. for the smelter, with an av
power, at Carrizo, rated at 330 h. p., and machinery for a 230-h. p
on the ground. Mine has 3 hoists and a 3-drill Leyner air-compre
ings, 19 in number, include a 30x36′ carpenter-shop, 14x20′ a
machine-shops, engine-houses and dwellings. It is planned using
throughout.

The company has given tentative consideration to buildi
narrow-gauge railway, through a fairly easy country.

The old 30-ton mill, enlarged, 1909, to 100 tons, is 60x100′, of
ment including a 6x15″ Sturtevant crusher, 2 rolls, 2 Hartz jigs, 1
2 Wilfley tables, 2 Deister tables, 2 Card tables and 1 slime tabl
treating about 75 tons daily, late 1910.

The smelter, on a 40-acre site, just north of Ayutla, 1½ miles f
est mine, receiving ore by carts and pack-trains, is rated at 75 tons d
but, under test, has treated 90 tons. A 42″ hexagonal Colorado
blast-furnace produces matte carrying circa 50% copper, 40 to 400
0.1 to 1 oz. gold per ton, sent to the Aguascalientes smelter for re
is Pocahontas coke, costing $19 per long ton laid down, and a little l
Smelter does a little custom business also, and the works include a sm
mill and laboratory, and are electric-lighted. Miscellaneous i
include a 4,000′ sawmill, and a 6-ton ice plant.

The smelter has run irregularly, and was again blown in, late 1
up the ore on hand. Late 1910 the company was said to be mill
tons of ore daily, and shipping concentrates of 18 to 20% copper
first month's run of the smelter, 1909, yielded 262,000 lbs. fine cop
silver and 36 oz. gold. Property considered promising.

CARR MINE & COLORADO CO., LTD. C

Dead. Was wound up, April, 1903. Formerly at Black H
Co., Colo. Described Vol. VIII.

CARROLL GOLD & COPPER CO.

Mine office: Humboldt, Yavapai Co., Ariz. A. J. Carroll, pre
Cloud, vice-president; Hon. C. P. Hicks, secretary; preceding o
Head, and G. E. Barth, directors. Organized June 2, 1906, with c
$750,000, shares $1 par. Lands, 5 claims, area 85 acres, in the A
trict, 6 miles east of Humboldt, having good surface indication
opened by a 240′ tunnel showing a vein of 2′ to 8′ width, stated
to assay a few thousand dollars per ton, which obviously was a slip
meant for a few dollars per ton, as the company has not made oth
the possession of any considerable quantity of developed ore of
Has shipped a little ore giving returns of 14% copper. Presumab

CARSON SMELTER.

Owned by Western Nevada Smelters Corporation.

CARTER COPPER CO.

Dead. Name was changed, 1903, to Manassas-Gap Copper-M
merly at Reager, Rappahannock Co., Va.

CARTER'S CONSOLIDATED, LTD. A

Mine office: Mt. Diamond, Northern Territory, South Austra
include holdings at Pine Creek and Mt. Diamond. The Mt. Di
has a 200′ vertical shaft, on a vein of 4′ to 5′ width, carrying chalc
to assay 10 to 12% copper. Company was said to plan building a sm
Presumably idle.

GUILLERMO CARVALLO.

Office, mine and [illegible] Quillota, Valparaiso, Chile

aria and Santa Elena mines, carrying a vein up to 2 meters ximately NS. strike and dip of about 45°, opened to circa neter tunnel. Mine shows oxidized ores and bornite, but zone of primary sulphides. Ore as mined averages about ite gangue.

niles from the mine, known as the Fundición de Llaillai, ratory furnace, burning Australian and English coke, cost- 1 ton of coke being required to smelt 3 tons of ore. Matte tenor, and slags average about 0.5%. Production, 1903, s of ore, of about 8% copper tenor, yielding 496,035 lbs. duction 1910 was 100 to 150 metric tons monthly of 12% ther smelters for reduction, yielding circa 400,000 lbs. fine eing idle, 1910, on account of the high price of fuel.

PPER & GOLD MINING CO. **ARIZONA.**
ceeded by Producer Mining & Smelting Co. Formerly at Co., Ariz. Described Vol. VI.

EVELOPMENT CO. **ARIZONA.**
rged in Copper Gulf Mining Co., which in turn was merged Co. Formerly at Vekol, Pinal Co., Ariz. Described Vol.

INING & SMELTING CO. **ARIZONA.**
windle perpetrated by Douglas, Lacy & Co. Formerly at Co., Ariz. Described Vol. VI.

MINING & SMELTING CO., LTD. **SPAIN.**
at Cabrales, Oviedo, Asturias, Spain. Described Vol. VIII.

ASAPALCA. **PERÚ.**
us & Johnston Co.

R MINING CO. **WASHINGTON.**
rged, circa 1902, in Mt. St. Helens Consolidated Mining Co. ake, Skamania Co., Wash.

R MINING CO. **WISCONSIN.**
y at Gordon, Douglas Co., Wis. Described Vol. VIII.

R MINING CO. **WYOMING.**
y at Encampment, Carbon Co., Wyo. Described Vol. V.

R MINING CO., LTD. **BRITISH COLUMBIA.**
y at Alberni, Vancouver Island, B. C. Fully described

& COPPER MINING CO. **WASHINGTON.**
l, Ohio. Letter returned unclaimed from former mine n Co., Wash. E. J. Worst, president; D. F. Brubaker, ner, treasurer. Organized 1901, under laws of Washington, 2,000,000, shares $1 par. Lands, 5 claims, known as the ar the head of Horseshoe Basin, somewhat difficult of 500' tunnel, cutting 2 small veins, and a test smelter ship- returns of $69 in copper, lead, silver and gold. Idle and d.

& CO. **NEW MEXICO.**
y at Santa Fé, Santa Fé Co., N. M. Described Vol. VIII.

OLIDATED COPPER CO. **WYOMING.**
y at Encampment, Carbon Co., Wyo. Described Vol. VIII.

ER CO. **WYOMING.**
ceeded, 1902, by Cascades Consolidated Copper Co. For- nt, Carbon Co., Wyo.

G & DEVELOPMENT CO. **WASHINGTON.**
y at Spirit Lake, Skamania Co., Wash. Described Vol.

CASHIER COPPER MINING CO.

Mine office: Mayer, Yavapai Co., Ariz. Hon. M. P. Sny and treasurer; G. W. Bedbury, vice-president and general man Eckerley, secretary. Organized January, 1905, under laws of capitalization $1,000,000, shares $1 par. Is controlled, through majority of stock, by Arizona Diamond Drill Mining Developmen 8 claims, area 152 acres, in the Agua Fria district, 5 miles northe showing country rock of Yavapai schist, carrying lenticular veins with silicious gangue, lenses following the planes of schistosity. idle.

CASHIER GOLD MINING & REDUCTION CO.

Mine office: Central City, Gilpin Co., Colo. Wm. Auger, su at last accounts. Lands include the Brooklyn mine, developed to carrying auriferous and argentiferous chalcopyrite and tetrahed values being in silver, running up to circa 700 oz. per ton. Has ste has been a small but steady producer, partly from work of lessees

CASH MINE CO.

Dead. Formerly at Groom Creek, Yavapai Co., Ariz. Descril

CASH MINING CO.

Office: Bangor, Me. Letter returned unclaimed from forme Groom Creek, Yavapai Co., Ariz. Harrington Blauvelt, manage Sivyer, consulting engineer. Organized September, 1908, as succ Mine Co. Mine, 12 miles south of Prescott, carries auriferous c gentiferous lead ores, developed by 2 shafts, deeper 400', with ab workings, and mine is credited with gold and silver production of ab Equipment includes steam power, a 10-stamp mill and a 40-ton Idle.

CASH MINING & MILLING CO.

Dead. Was succeeded by American Queen Mining Co. Gold Hill, Boulder Co., Colo.

ANTONIO GÓMEZ CASTELLANOS.

Office and mine: Compañía 48, Zacatecas, Zacatecas, Mex. cludes La Cobriza and La Iguana mines, carrying gold, silver and and employing about 35 men, when working.

CASTELLANOS y CA.

Mine office: Combarbalá, Coquimbo, Chile. Production, w was about 75 tons fine copper yearly, shipped as matte. Idle.

SOCIEDAD ESPAÑOLA MINAS DEL CASTILLO DE LAS GUARDAS.

Office: Apartado 162, Bilbao, Spain. Mine office: Castillo das, Sevilla, Spain. José A. Jáuregui, chairman; Victoriano Galdi man; Julio Astoreca, secretary; Cipriano R. Careaga, managing ceding officers, Anselmo R. de Rivas, Martín Aldama, Juan de jandro Gandarias, Luis Nuñez, Agustin Iza, Enrique Dias Rubín, tisteban and Fernando Merino, directors; Francisco de Zarraga, su Constancio Fernan, consulting engineer; Ceferino Lopez Sanches gineer. Organized July 12, 1901, under laws of Spain, with 7,500,000 pesetas, increased later to 10,000,000 pesetas, shares 500 issued, 9,000,000 pesetas. Debentures, 1,500,000 pesetas authori issued, 1,250,000 peseta. Annual meeting, in March.

Lands, 153 hectares, 23 kilometers from Zalamea La Real, ha kilometer private railway, known as the Ferrocarril de Minas Ca palme Ronquillo, connecting, at Estación Ronquillo, with the Ferr la y Cala. Property shows granite-porphyry and diabase, carrying one of which, under development, has a [illegible] of 40 meters width an length, proven for depth of 165 [illegible] carrying cupriferous pyri

% lead, 0.13% zinc and occasionally up to 2 oz. silver
etric ton. Mine was discovered 1843, and worked in a
over by the present company, 1901. Development is
Meneses, 142 meters; Don Pablo, 142 m.; Todos San-
50 m.; Malacate, 46 m.; Colorado, 110 m.; Dos de Mayo,
San Felipe, 102 m. The mine was estimated by the man-
000 tons of ore, with about 640,000 tons blocked out for
500,000 metric tons blocked for stoping at the end of 1910.
s a 683-h. p. steam and electric plant, with two 200-h. p.
neters each, a Duisburger 4-drill air-compressor, and
Schuckert electric drills.
s 153 buildings, with stone shops, including an 8x10 m.
smithy; 8x10 m. carpenter-shop, engine-houses, boiler-
rge number of dwellings. The company maintains sepa-
nd girls, a hospital for workmen and their families, and

,074 metric tons of ore, returning circa 500,000 lbs. fine
1,200,000 lbs. copper in 1908, and circa 2,750,000 lbs. in
developing well, and has a good management.

L BUITRON. **SPAIN.**

ía del Ferrocarril y Minas del Buitron.

MÉXICO.

ehuala, Catorce, San Luis Potosí, Mex. Properties are
Colón mines, in El Fraile district, near Matehuala, said,
about 400 metric tons weekly, of gold, silver and copper
s for reduction.

ARIZONA.

).
scott, Yavapai Co., Ariz. Organized circa September,
ns, known as the Dunkirk or Mt. Tritle group, circa 12
t, on the southern slope of Mt. Tritle, near the head of
ssayampa district, formerly owned by Dunkirk Gold &
later by Mt. Tritle Copper Co. Property is an old mine,
having tunnels of 150′, 160′, 170′ and 300′, driven at
0′, showing auriferous and argentiferous copper and lead
lues in copper, gold, silver and lead, in about the order

es steam and gasoline power, an air-compressor and an
30-ton mill has 4 Nissen stamps, 3 Wilfley tables, a 100-
000-gallon water tank. Property was said, 1909, to be
ons of ore monthly.

PPER CO. **ARIZONA.**

ganized, circa June, 1909, as Castle Dome Mining Co.
a Co., Ariz. Described Vol. VIII.

VELOPMENT CO. **ARIZONA.**

at Globe, Gila Co., Ariz. Described Vol. VIII.

PLORATION & REDUCTION CO. **ARIZONA.**

at Dome, Yuma Co., Ariz. Described Vol. VIII.

TALS CO. **NEW MEXICO.**

unclaimed from former office, Cincinnati, Ohio. Mine
Co., N. M. J. H. Allison, president; B. M. Ricketts,
Fritz, treasurer; E. Hedburg, manager. Lands, 12 claims,
tunnel, showing ore giving good assay values in copper
ly idle.

NING CO. **ARIZONA.**

unclaimed from former office, Calumet, Mich., and former
Gila Co., Ariz. Hon. Michael H. Moriarty, president;

John R. Ryan, vice-president; Paul Schneller, secretary; Bat. Q
preceding officers, W. H. Richards, W. H. Jobe, Capt. Thos.
Frank E. Keese, Jas. Clancey, Jas. J. Byers and A. C. Hubb
M. McCormack, manager; O. C. Scott, superintendent. Organ
under laws of Arizona, with capitalization $1,500,000, shares $5
$1 paid. Company was sued, July, 1909, by O. C. Scott, for $

Lands, 13 claims, area 260 acres, circa 17 miles west of Glo
ern side of Pinto Creek, and about 1½ miles northeast of the C
near the Continental mine of the Black Warrior, lands includ
Springs. Property shows schist and diorite. The Virginia sh
Idle and presumably moribund.

CASTREJÓN HERMANOS.

Office and mine: Huacana, Ario, Michoacán, Mex. Prope
mine, an old and small producer of copper ore, employing about

CASTRO-GRECIAN MINING CO.

Office: Salt Lake City, Utah. Letters returned unclaim
mine office, Bingham Canyon, Salt Lake Co., Utah. Dr. P. K
dent; L. C. Moore, secretary and treasurer. Organized 1905,
of Utah, with capitalization $1,500,000, shares $1 par. Share
clusively Greek residents of Utah. Lands were claims at Bin
United States mines, and miscellaneous claims in Carbon, Emer
counties, Utah, latter apparently sold, circa September, 1905, to
Milling & Development Co. Idle and apparently moribund.

SOCIEDAD MINERA CATALANA-VALENCIANA.

Office: 4 Calle de Gerona, Barcelona, Spain. Mine of
Castellon de la Plana, Spain. Domingo H. Santías, general ma
ized circa July, 1909, under laws of Spain, with capitalization 2
shares 500 pesetas par. Property is the Maria and Virginia
cinnabar and copper ores. Presumably idle.

CATALINA COPPER CO.

Dead. Formerly at La Cananea, Arizpe, Sonora, Mex. Desc

CATALINA COPPER MINING CO.

Dead. Formerly at Tucson, Pima Co., Ariz. Fully describ

CATARACT COPPER MINING CO.

Office: 308 The Bourse, Philadelphia, Pa. Mine office:
son Co., Mont. Carl G. Weidinger, president; Samuel B. Vroor
dent; Hon. Marcus L. Hewett, second vice-president and ge
John H. Cronin, Jr., secretary; J. L. Ketterlinus, treasurer; pre
Dr. Otis K. Newell and Carl F. Baker, directors. Organized
under laws of South Dakota, with capitalization $2,500,000, sha

Lands, 21 claims, area 420 acres, and 300 acres of placer
Cataract district, circa 12 miles from Basin, including several
for gold in early days. Country rock is granite, with intrusi
[illegible] pyrite, a
[illegible] granite.
[illegible]

[illegible] as the Bullion, having be
[illegible] to 20' wide
[illegible] ore, the Bulli
[illegible] by 4 tunnels, includi
[illegible] has shrun
[illegible]

[illegible] vein of ore of
[illegible] The mines, as a whole,
[illegible] tons of low grade ore in sight, averaging abo
with gold and silver values, which figures are considered excessive

es a 6-drill air-compressor, and there are necessary mine

of 150 tons nominal daily capacity, and actual capacity s to have been built wrong, and gave trouble in operation. er has a 44x144″ Colorado Iron Works water-jacket blast- ne, Connersville blower and a small electric plant. The located for economical receipt of coal and fluxes.

00 tons of ore, 1905, gave a 10 to 15% matte, with a tion of 2.29% copper, 18 oz. silver and $7.60 gold per ton. been in financial straits almost since organization, and the extremely liberal promises made from time to time. mpany, Marcus L. Hewett, is said to have made individ- from the sale of the company's stock. Is not regarded resumably moribund.

. MINING CO. **WYOMING.**

at Encampment, Carbon Co., Wyo. Described Vol. V.

PER CO. **MÉXICO.**

ere Abraham Cruz, president; H. O. Barnes, secretary was 211 Binz Bldg., Houston, Texas. Lands were 137 railway, carrying argentiferous copper ore. Company duction September, 1908, but failed to do so. Formerly Aguascalientes, Mex.

ING CO. **MÉXICO.**

d egg. Formerly at Tepezalá, Ocampo, Aguascalientes, VIII.

ES DE CUIVRE DE CATÉMOU. **CHILE.**

Haussmann, Paris, France. Operating and works office: gres, Putaendo, Aconcagua, Chile. Mine offices: El ncagua, Chile, and Nogales, Valparaiso, Chile. Max ding officer, Comte Leopold-Fernand Balny d'Avricourt, rre, Octave Maggiar, Emil Parif, Eugene Renevey, Ernest e, Adam Collignon, A. L. Pearse, Georges Renevey, L. n, directors; Guillaume Wouters, secretary; H. Macnutt, Vigeon, superintendent; J. R. Starkey, mill superintend- 2, 1899, under laws of Belgium, with capitalization par, divided into 10,000 preference shares at 8%, and without stated value. Debentures, f2,500,000 author- 070,000. Annual meeting, last Friday in June.

, with sundry miscellaneous tracts held in fee and under s, including the Finca de Ñilhue, of 7,500 hectares, giving 30,000 acres, in the districts of Putaendo, Los Andes, illota and El Ñilhue. Property includes numerous mines l elsewhere, with quarries of fluxing material, and the s a stock of 1,200 cattle, for transport and food, and is a cing costs.

ment reports that ores carry an average of 6% copper, 1903, that the average would be only about 3.5% copper n. Veins carry the usual oxidized ores in a compara- zone, succeeded by chalcocite, bornite and chalcopyrite. ntos Rojos mine, opened 1820, has country rocks of sand- with eruptive dykes traversing the sedimentaries, there of 5′ to 7′ thickness, composed of calcareous matter im- bornite, but having a little chalcopyrite and occasional ng 3 to 4.5% copper, 1% lead, 2% zinc and circa 30 ton. The oxidation zone has been eroded, leaving only blanket veins have been worked on a considerable scale,

since 1835, and the ore, while low in grade, is especially suitab
poses. Mine is developed exclusively by tunnels, having a
about 50 meters and length of about 800 meters, with ore r
for 3 to 4 years extraction. Former opencast workings have
The mine produces no water, and walls stand excellently withou
ing to development by tunnel and lack of water, Los Mantos
plant. Work is exclusively by contract, according to to
miners being paid 5 to 7 pesos per metric ton for ore won
ing excellent results, with higher wages, lower costs and th
inefficient workmen. Black powder is used exclusively by th
who accomplish about half the results secured by Italian
dynamite in the other mines of the company. Only about 8%
is discarded as waste, and ore is concentrated or smelted di
value, when the concentrator is operated. The ore is high in
difficult smelting. Ore is taken to the smelter by a 1,580-met
tram, with drop of 750 meters, having 500-kg. buckets. Ca
and guide cables last 5 years. In 1909 Los Mantos mine en
producing monthly 300 to 500 tons of ore of 3 to 5% copper t

El Salado mine, one of the Nogales group, and the great
the smelter, being in the Commune of Las Máquinas, Melon
Cabildo railway, was opened 1841. This property has 15 k
to 7′ average width, carrying mainly copper sulphides, wit
Several veins carrying oxidized copper ores, with gangue of al
the series of veins having an approximately NS. strike, with d
tween trachyte and feldspar-porphyry. The series of vein
quently with throws of 1 to 2 meters, and there is another se
veins crossing at approximately right angles to the dip, but wi
the dykes being partly decomposed porphyry, carrying occasi
and aluminous silicates. These veins have been worked exten
showing many antigua openings, and ore averages 7 to 8% in
ore better than 10% being shipped, with considerable quantities
for concentration later. Development is mainly by tunnels,
depth obtained being 80 meters, and old workings are about 150
This mine shows some immense chambers, one being called
recognition of its vast size. In 1909 production was about 1
high grade ore monthly, secured with an average force of 50 m
tion is by wagon, at a cost of 3 to 4 pesos per ton, and an aëria

La Unión group includes the Restauradora, San José and
ducing about 30 metric tons daily of 4 to 8% copper ore, mainly
secured with an average force of 150 men.

Miscellaneous mines include El Cobre de Melón, in the
opened 1886; El Ñilhue mine, in the department of Putaen
Las Máquinas de Catému mine, in the department of Putaen
La Esmeralda mine, opened 1860; La Constancia and La D
circa 10 kilometers from the smelter, carrying blanket veins, a
Malva, Tabourina, Caracoles, Almendro y Pleito and other pro
stages of development, some of considerable promise.

The company furnishes free medical services to employes a
and maintains schools for the children. There are numerous c
ings for the workmen. The mines and works have telegra
communication. Forces, 1909, averaged circa 800 men, with
wages of 4.5 pesos for underground workmen, and 2.5 pesos

Reduction works include 2 smelters, each with converter p
gate capacity of 200 to 300 metric tons of ore daily.

La Pena plant is at Chagres, 14 kilometers from Chagre
Andes Railroad. These works include a [illegible]

mainly American machinery. The mill, of 60 tons rated
y and Ferrari tables, and slime tables, but is idle since 1907,
er. Oil concentration has been considered.
, of 400 tons daily capacity, has two old 75-ton rectangular
urnaces, and new blast-furnaces of 36x96" and 36x120"
yeres, turning out 45% matte. The converter department
s, with 12 tuyeres each, of the Copper Queen type, turning
ing 99.7% copper and 32 oz. silver per ton. There is a 40-
t, and the converter department has a quartz mill. Power
-h. p. Pelton water-wheel and a 175-h. p. engine. Furnace
No. 6 Connersville blowers, and converter blast is furnished
pressor, with capacity to reduce 20,000 cubic feet of free air
. pressure. Fuel is coke, one ton of coke smelting 5.21 tons
eing highly silicious, with slags averaging 0.4 to 0.5% copper.
elter treated 19,063 metric tons of ore, of 6% average tenor,
, 1,046.25 metric tons fine copper, employing 90 men, at
pesos daily.
elón smelter, 16 kilometers from Estación del Melon, on the
ailway, has a 36x84" Allis-Chalmers cylindrical water-jacket
ng matte, which is sent to La Lota and La Poza smelters for
melted at this plant carry excess of silica and alumina, and
hur, necessitating the free use of low grade cupriferous pyrite
luxing. Fuel is very expensive, coke costing 43.5 pesos per
nglish coal 31 pesos per ton, one ton of fuel smelting about
quipment includes a Pelton water wheel, 60-h. p. locomotive
lower. A 4-kilometer aërial tram is proposed to the Nogale
ese works employed 40 men, at average wages of 2 pesos
2 metric tons of ore averaging 6% copper, producing there-
es, of 45.5% tenor, carrying 422,240 kgs. fine copper.
3,379,947 lbs. fine copper in 1907; 4,060,873 lbs. in 1908,
1909. Property is estimated to have, with further improve-
capacity of 12,000,000 lbs. fine copper yearly. Manage-

NAL DE MINAS i FUNDICIONES CHILE.
MELON.

office was Valparaiso, Chile. Organized Sept. 7, 1906,
with capitalization 2,000,000 pesos, shares 50 pesos par,
rca 1907. Formerly at Putaendo, Aconcagua and Quillota,

A DE CATIGUA. CHILE.

y at Tarapacá, Tarapacá, Chile. Described Vol. VIII.

R CO., LTD. RUSSIA.

Court House, Walbrook, London, E. C., Eng. Mine
ais, Russia. A. A. Swan, chairman; preceding officer, J.
citi, J. Douglas, E. B. Lockhart and J. N. Sparks, direct-
retary; W. R. Van Liew, general manager; E. Kneeland,
anized Oct. 4, 1900, under laws of Great Britain, with
00, shares £1 par, fully issued and fully paid. Company
rofit-sharing certificates, of no nominal value, granted to
g them to one-half of profits, after meeting charges of bond
a reserve fund until certificate holders are receiving an
bonded debt, when profit-sharing certificates will be ex-
ures, 000,000 authorized; issued, £579,000 at 6%, and
payable in installments of not less than 10%, beginning
Account, for year ending June 30, 1908, showed a loss of
ased for ending June, 1909, indebtedness was increased

by £293,100, including £146,740 paid for additional lands, an
pended on lands, buildings and plant. Original property w
£398,988. Shares are listed on the London stock exchange.

Lands are in 6 groups, including the Dzansulski copper mine
gul valley, in the Artvin district of Kutais, in the Russian Cau
miles from Batoum. Mine is developed extensively, managem
5,600,000 long tons of 3.1% copper ore practically in sight.
pyrite, minutely subdivided, in connection with pyrite, and is fri
very easily, causing low recovery. Principal ore body is a ma
50 to 100 meters width by 300 meters length, and other ore bod
to exist on the company's lands. Mine is worked opencast.

The mill, nominally of 500 tons daily capacity, planned as
a 1,000-ton mill, has electric power, with automatic operation thr
ore slimes badly in concentration, and is so high in silica and so d
that heavy fluxing is necessary, in a district where fluxing ores a
difficulty. Wet concentration, first tried, was succeeded by a
ration plant, which was abandoned 1909, and wet concentr
Ores are first crushed, at the mine, to 4-mm. size, by Blake cru
field high-speed rolls, then sent by aërial tram to the concentrato
by chilean mills and jigged, coarse tailings then being ground t
Chilean mills, and all tailings treated on Frue vanners. Present
is 500 tons daily, and it is planned enlarging the mill.

The old smelter, taken over with the property, was first in
tons capacity, then rebuilt, 1907-1908, to 500 tons daily capa
trates are dried, calcined and smelted in reverberatory furna
petroleum, and matte is converted and copper refined.

Production was 222,233 lbs. fine copper in 1907; 923,233 lb
1,757,426 lbs. in 1909. This company has expended immense
different results, the ore being very difficult to treat, but the
an immense tonnage of medium grade ore, and is considered
withstanding the unsatisfactory results secured so far.

CAUCASUS COPPER INDUSTRY CO.

Mine office: Armavir, Kutais, Russia. Production was
fine copper in 1907; 4,195,825 lbs. in 1908 and 6,608,426 lbs. in
first half of 1910 was 1,606,176 lbs.

CAVAN MINING & MILLING CO.

Dead. Former office was Stockton, Cal. E. W. King was
Leonard, vice-president and manager. Lands were 12 claims,
and a millsite, 10 miles from Raymond. Development include
40', 54' and 58' on the Sunset claim; shafts of 20' and 50' on th
claim; a 170' tunnel on the San José claim; a 140' shaft, on a v
width, showing oxidized ores to depth of 75', succeeded by cup
and a 700' tunnel, on the Rothschild claim. Selected ore gave
of 31% copper. Formerly at Ben Hur, Mariposa Co., Cal.

CAVE CREEK MINING CO.

Dead. Formerly at Cave Creek, Maricopa Co., Ariz.
Vol. VIII.

CAVERN GOLD MINING CO.

Mine office: Kelly, Socorro Co., N M. B. A. Stats,
Mine carries auriferous and argentiferous sulphides of copper,
ore values apparently being mainly in zinc. The property has
trator.

SOCIEDAD ESPLOTADORA DE CA[illegible]OMA.

Office: [illegible], Chile. [illegible] Cayloma, A
Org[illegible]

r labor, with good dwellings for employés. Ore values steam tram-line connects the mines and mill, and at last planned replacing the old installation with a modern

MENT CO. MONTANA.
um Bldg., Duluth, Minn. Mine office: Divide, Silver . Fitzsimmons, president; Nels Anderson, vice-president; ary; Max P. Shapiro, treasurer; John Helehan, general icers, Jacob Stein and Jas. L. Norman, directors; Dwight lting engineer. Organized Apr. 4, 1910, under laws of alization $150,000, shares $1 par, nonassessable; issued,

rea 80 acres, in the Fleecer district, 15 miles southwest gon Short Line railway. Property shows granite, with lite and quartzite, carrying veins with a generally EW. g estimated to range 50′ to 125′ in width, traceable for e, melaconite, malachite, azurite, chrysocolla, chalcobornite. Work was begun June 16, 1910, and at end of a 100′ tunnel, and shafts of 45′, 100′ and 150′, showing copper, and from a trace to 70 oz. silver per ton. There Management plans deepening No. 3 shaft to 400′, equipist, and crosscutting, when water level is reached.

MELTING & REDUCTION CO. WASHINGTON.
ngdale, Stevens Co., Wash. Wm. Sheck, general man- . Lands, on the Columbia River, west of Springdale, , and company was said to plan a 50-ton mill. Pre-

LD & COPPER CO. ARIZONA.
at Kingman, Mohave Co., Ariz. Described Vol. VI.
. UTAH.
ged, 1909, in Cedar-Talisman Consolidated Mines Co. Milford, had a 275′ shaft, showing argentiferous copper ues mainly in silver. Formerly at Milford, Beaver Co.,

LD & SILVER MINING CO. ARIZONA.
at Cedar, Mohave Co., Ariz. Described Vol. VIII.
. ARIZONA.
Clifton, Graham Co., Ariz. Archibald Morrison, manager. 320 acres, circa 15 miles from Clifton, opened by a 65′ circa 200 tons of sulphide ore of about 19% copper tenor.

HAM MINING CO. UTAH.
eeded, Feb. 11, 1904, by South Columbus Mining Co. Lake Co., Utah.

ER MINING CO. MICHIGAN.
irton Place, Boston, Mass. Mine office: Calumet, Quincy A. Shaw, president; Rodolphe L. Agassiz, vice-gg, secretary and treasurer; Jas. MacNaughton, general ficers, H. F. Fay and Francis W. Hunnewell, directors; istant secretary and treasurer; John Pentecost, mining n, assistant engineer.
nder laws of Michigan, as successor of Centennial Mining n $2,500,000, shares $25 par; issued, $2,250,000; paid in, ent, 1905, was $4. Is controlled, through ownership of met & Hecla Mining Co., and is a borrower therefrom. 1, 1909, showed a deficit of $39,364.58, with net loss from

year's operations of $57,625.08, increased 1910. American Tr
transfer agent; Old Colony Trust Co., Boston, registrar. Ann
Tuesday in April.

Lands, circa 670 acres, being Section 12, Town 56 North,
and a triangular patch of about 30 acres, at the southeastern c
tract, bought to secure the outcrop of the Kearsarge lode, and
10 acres, bought 1905, of the Old Colony, for the surface plant.
was done, 1863, by the Schoolcraft Mining Co., which failed t
mine, and was reorganized, 1876, as the Centennial Mining Co
ganized, 1896, with present title. Expenditures of upwards of
made by the old companies, in unsuccessful efforts to open a pa
northern extension of the Calumet conglomerate. Seven shaf
able depth, were sunk on this bed, No. 3, the deepest, being bo
The Centennial lands are in the great mining camp of Calume
able for building purposes. Two additions have been platted, a
sold at good prices, mineral rights being reserved.

The present company did a little work, 1897, on the old co
then turned attention to the Osceola bed, deepening 2 shallow
and 1,150′ depth, respectively, shafts being 17x12′ inside of timb
The Osceola bed, where opened on the Centennial tract, av
in width, but is lean.

Work on the Kearsarge bed was begun September, 1899
outcrop of the Kearsarge occurring on the 30-acre tract bough
with only a 100′ right-of-way connecting it with the main tract,
to open the mine on the Kearsarge bed in a peculiar manner, by
are but 90′ apart, on surface, and continue parallel, on the dip
the 13th level, when the main tract is reached, after which No.
from No. 1 at an angle of 15° on the plane of the bed, 300′ be
curve. This method of opening gives short drifts until the shaf
Centennial tract. Each shaft is 17x18′ inside of timbers, with
sunk at an angle of 39° with the horizon, through an overburd
depth. The Kearsarge bed averages about 16′ in width, and
per values in the upper levels, followed by a comparatively b
the 14th level, when there came a gradual improvement, whi
has not been maintained, the mine as a whole proving disa
18 shaft of the Calumet & Hecla will soon reach the Centennia
New openings were 4,252′ in 1908, and 3,516′ in 1909.

No. 1 shaft, 3,816′ deep, can be sunk circa 12,000′ bef
boundary, and was idle during the latter half of 1910. No. 1 h
rockhouse, with 3,000-ton bins and a 32x72″ Nordberg duplex h
conical drum, good for depth of 6,000′, operating 5-ton skips.

No. 2 shaft, 3,947′ deep, shows fair ground from the 18th t
inclusive. This shaft shows poor ground to within 50′ of the
boundary, where drifts were stopped. The South Kearsarge d
ground up to the boundary, which seems strange. A few hole
could do no harm, as the Kearsarge has parallel beds. Equip
cylindrical steel shaft-rockhouse with 1,000-ton bins, and a
duplex straight-face hoist, with 2 drums of 14′ diameter and 15′
grooved for 1⅛″ cable. The hoist is fitted with devices to preve
and is calculated to raise 5-ton skips at the rate of 4,000′ per m
under 150 lbs. steam pressure.

The principal mine buildings are of ashlar-faced redstone, a
cate engine-houses for the two shafts. The new compressor ho
a 70-drill Laidlaw-Dunn-Gordon 3-stage compound air-compres
compressor house, 32x46′, has 35-drill Nordberg and 20-drill Ra
ors, with a Dean jet condenser in the basement. A 54x58′ boil

notive-firebox boilers, and a 125′ brick-lined self-supporting
7′ diameter. A 16x46′ frame pumphouse, with corrugated
-pump, fire-hose and hose-carts. The combination machine-
50x108′, with steel truss roof, having traveling cranes, with
end to end. Miscellaneous buildings include a 36x50′ car-
′ warehouse, 30x40′ office building, and a 25x50′ changing-
cold water, baths, lockers, etc. There also is a large number
ployés, the surface plant being well planned and substantial.
rved by the Copper Range and Mineral Range railroads, and
connecting the shops and shafts.

ed by the mill of the Lake Milling, Smelting & Refining Co.,
described. The Centennial employs about 400 men.

le a small production, 1898 and again in 1901, but began its
ly 5, 1904, since when the output has been as follows:
pper in 1904; 1,446,584 lbs. in 1905; 2,253,015 lbs. in 1906;
07; 2,196,377 lbs. in 1908; 2,583,793 lbs. in 1909. Rock dis-
in 1906; 11.02% in 1907; 5.68% in 1908, and only 1.7% in
ed yielded 13.58 lbs. per ton in 1906; 11.86 lbs. in 1907; 12.94
4.15 lbs. in 1909. Total cost of finished copper per pound
1908 and 15.61 cents in 1909. The mine has shown a loss
ome years past.

ockholders' meeting, March 8, 1911, the shareholders voted
nnial in the Calumet & Hecla Mining Co., on the basis of 6
& Hecla for 100 shares of Centennial. Further reference to
found in the article on Calumet & Hecla.

REKA MINING CO. **UTAH.**

5 Congress St., Boston, Mass. Operating office: Newhouse
ty, Utah. Mine office: Eureka, Juab Co., Utah. Wm. G.
lbert F. Holden, managing directors; preceding officers, E. L.
on Clark, J. J. Storrow, Sidney W. Winslow and C. G. Rice,
rop Batchelder, secretary and treasurer; Clarence E. Allen,
Brown, superintendent. Organized 1876, under laws of
ed, 1899, under laws of Maine, with capitalization $5,000,000,
ed, $2,500,000. Is controlled by United States Mining Co.,
of 99,864 shares of the 100,000 shares of issued stock, there
shareholders. Dividends were $7 per share in 1906; $2.50
908; nothing in 1909, and $6 in 1910, a total of $27 per share,
nual meeting, third Wednesday in April.

Tintic district, include the Centennial, Eureka, Tintic, Dove,
groups. The property has 4 large and a number of small ore
Fissure having circa 500,000 tons of ore blocked out. The
high values in gold and silver, and there are numerous bodies
arrying only small gold and silver values. Ore is estimated to
% copper, 14 oz. silver and 0.8 oz. gold per ton. The Big Stope
shoot, raking from the 400′ to the 2,400′ level, about 100′ in
nd over 400′ long, carrying ore running up to $30 per ton. The
is the largest gold producer of Utah.

is by a 2,225′ shaft, planned to be deepened to 2,500′, and the
nel, completed 1909, connecting with the shaft just below the
r is forked out and timber and supplies are sent underground
en tunnel. The mine is timbered with square sets, and for-
t the lower levels are wet, water being handled by a 500-gallon
electric pump. Reserves are estimated at 500,000 tons of
to medium grade. About 300 men are employed. Surface
steam and electric power with necessary engine-houses and

Production, was circa 80,000 tons of ore in 1907; circa 112,000 and 109,430 tons in 1909. Production of fine copper is estimated lbs. for 1909. Property is considered valuable and management

CENTENNIAL MILL.

Owned by Lake Milling, Smelting & Refining Co.

CENTENNIAL MINE.

Office and mine: Georgetown, Clear Creek Co., Colo. Dav owner and manager; S. G. Evans, superintendent. Lands, circa 640 cupriferous gold and silver ores in a 30′ paystreak, assaying up to 5 to 150 oz. silver and 3 to 5 oz. gold per ton. Has steam power.

CENTENNIAL MINING CO.

Dead. Was organized 1876, as successor of Schoolcraft Min capitalization $1,000,000, shares $25 par, and was reorganized, 189 nial Copper Mining Co. Formerly at Calumet, Houghton Co., M

CENTRAL ALASKA GOLD & COPPER CO.

Dead. Was succeeded, 1907, by Chisna Consolidated Mines Co at Landlock, Prince William Sound, Alaska. Described Vol. VI.

CENTRAL BLACK HILLS COPPER CO. SOUTH

Dead. Formerly at Custer, Custer Co., S. D. Fully describe

CENTRAL CHILI COPPER CO., LTD.

Office: 15 Angel Court, Throgmorton St., London, E. C., and works office: Panulcillo, Ovalle, Coquimbo, Chile. Eugene schmid, chairman; Bertrand C. Hinman, managing director; Harris general manager; Herbert L. Bromhead, secretary; Thos. Higgins, s intendent; H. M. McLaughlin, engineer. Organized June, 1894, struction of the Panulcillo Copper Co., Ltd., and reorganized, Ja with capitalization increased, November, 1905, to £400,000, sha issued, £312,468. Dividends were 6d. Apr. 10, 1900; 6d. Jan. 2 May 31, 1907. Net earnings were £10,932 in 1905; £24,913 in 1906 1907; 1908 gave a net loss of £12,616, and 1909 a net profit of £6,7

Lands include mines at Panulcillo, 25 kilometers northeast of mines in the vicinity of Nisñile. The Panulcillo group, area 56 kilometers from the smelter, includes the Panuncillo Alto and S mines, showing strong lenses of ore up to 150′ in width, with g strike, and dip of about 45°, worked to depth of 200 meters and 1,500 meters, principal development being by the 1,000-meter S tunnel. Ore is mainly chalcopyrite, associated with pyrite, in limes with some commercial production of malachite, azurite and chalcocit assay of ore is 3.93% copper, with about 12 grams silver per metric is strongly aluminous. Production is about 100 metric tons daily drills are used.

La Condesa mine, 3 kilometers from Panulcillo, has a 5′ vein, NS. strike, and is opened to depth of circa 100′ only. Productio about 600 metric tons of 6% ore. Apparently this mine is idle.

The Cocina and Inagotable mines, at Ferro Negro, show lens in width, with dip of about 45°. Production, 1903, was only 1,200 of 5.5% ore. The Cocina group of 4 mines is said to show near long tons of ore.

The Nisñile mine has a stockwerk, opened by 3 tunnels to d 300 meters, carrying ore that averaged 6.11% copper, 20 grams grams gold per metric ton, with monthly production of about 200 t

The 400-ton smelter, connected with the Panulcillo Alto mine 76 kilometers from Coquimbo, with freight rates of 3.1 peso per m fuel, and 6.7 pesos on matte and copper exported. This plant doe able custom business, employing 175 to 250 men, at average wages daily. Equip[illegible] 2 reverberatory furnac

x84′ blast-furnaces. The plant has no dust-chamber, and lags are hauled in cars to the dump. Coke charges, 1908, e smelter has 2 Cornish and 2 Lancashire boilers, of 160 p. and three 60-h. p. engines, and 2 Connersville blowers. r, and in connection are a machine-shop and a good labo- treats silicate custom ores, company's sulphides furnishing ed and exported to New York for smelting.

hat scarce, forces employed being about 250 men at the nen at the works.

ks smelted 42,800 metric tons of 5.48% ore, yielding 4,203 of 46.95% average tenor, and in 1908 the works smelted 5.5% ore, producing 4,526 metric tons of matte assaying slags averaging 0.5%. Recent production has been as fol- fine copper in 1905; 4,159,680 lbs. in 1906; 4,417,280 lbs. in 1908; 4,802,560 lbs. in 1909; 4,748,800 lbs. in 1910.

IDATED COPPER CO. MÉXICO.

, Minn. Operating office: Douglas, Ariz. Letter re- om former mine office, Fronteras, Arizpe, Sonora, Mex. ceeding La Union Consolidated Copper Co. Lands, 240 a Reina de Cobre group, in the Tordillo district of the Ajo niles west of Fronteras. Mine has a 100′ shaft, showing a average assays of 13 oz. silver and $12 gold per ton. Ship- ken from depth of 40′, returned 6% copper, 3.5 oz. silver Property considered promising. Idle several years and

CO. ARIZONA.

Globe, Gila Co., Ariz. Patrick Rose, treasurer; F. L. J. Powell, mine superintendent. Capitalization $100,000. s, 3 claims, between the Union and Gibson, on the divide ek and Pinto Creek, having a 160′ shaft, cutting a 4% ore of 30% copper tenor. Was developing with a small force

MINING SYNDICATE. AUSTRALIA.

bar, Robinson Co., N. S. W., Australia. Lands, 80 acres, f the Queen Bee mine, prospected during 1907, showing values in gold, silver and copper. Idle.

A CENTRAL DE COLLAHUASI. CHILE.

o de Chile. Mine office: Collahuasi, Tarapacá, Chile. 906, under laws of Chile, with capitalization 90,000 pesos, Presumably idle.

COPPER CO. NEW MEXICO.

y at Mineral Hill, San Miguel Co., N. M.

IÓN CENTRAL MEXICANA. MÉXICO.

ntes plant of the American Smelting & Refining Co.

CO. MICHIGAN.

was sold, circa 1905, to Frontenac Copper Co., and final divi- 08 cents per share, paid March, 1908, and company wound total dividends, 1864-1908, of $2,049,600. Formerly at naw Co., Mich. Described Vols. I. and II.

CO. WASHINGTON.

eller, Ferry Co., Wash. Jas. LeFevre, general manager, nds are developed by a 60′ shaft, showing ore assaying 3

& DEVELOPMENT CO. ARIZONA.

akelman, Pinal Co., Ariz. C. G. Werner, president, treas- nager; F. G. Angeny, vice-president and secretary; pre-

COMPAÑÍA MINERA CERRO DE LA GLORIA.

Office: Santiago de Chile. Mine office: Cachoapoal, O'H
Organized Nov. 28, 1906, under laws of Chile, with capitalizati
pesos, shares 25,000 pesos par. Presumably idle.

CERRO DEL COBRE MINING CO.

Mine office: Charcas, Moctezuma, San Luis Potosí, Me
Irizar, manager. Mine, developing by shaft, at last accounts, sh
crous and auriferous copper ores.

CERRO DEL COBRE MINING CO.

Office: care of Dr. C. D. Warner, Coldwater, Mich. Letter r
former mine office, Alamos, Sonora, Mex. Geo. L. Beach, secreta
urer. Organized under laws of Arizona, with capitalization $10,00
$10 par. Lands, 435 acres, circa 9 miles from Alamos, having se
shafts bottomed in ore, mainly sulphide. Property was worked on
for some years, furnishing considerable fluxing ores for reduction
of the district, and also ore for production of a little copper used b
making domestic utensils. A test shipment of 100 tons returned ci
per, 1.7 oz. silver and $4.03 gold per ton. Idle several years.

COMPAÑÍA EMPRESA SOCAVONERA DEL CERRO DE PASCO.

Office: Calle San José No. 135, Lima, Perú. Mine office:
lognesi No. 40, Cerro de Pasco, Junín, Perú. José Payán, chairma
officer, Baldomero Aspillaga, Américo Denegri, Octavio Besanç
Godoy, J. A. Barrios and Ernesto Odriozola, directors; Pedro Larr
tary and treasurer; Wm. C. Dawson, agent; John B. Wilson, engin
ized November, 1900, under laws of Perú, with capitalization £75
£1 par; nonassessable; issued, £720,000. Debentures, £60,000, a

Company holds a concession from the Peruvian government
Cerro de Pasco mines by means of tunnels, and collect a royalty of
extracted from mines so drained. Property is the 10,551′ Rumial
completed 1907, and the Quinlacoche tunnel of circa 6,000′ length.
has the 430′ Mesapata shaft, and the 432′ Yauricocha shaft, both eq
hoists. Machinery includes a 10-drill Rand air-compressor, and th
eral stone buildings. This company can collect royalties from othe
in the district drained, but has taken a 5% interest in the shares of t
Pasco Copper Co. in exchange for its drainage rights against the Cer
Mining Co. It is proposed driving laterals to the east and west, an
ore from this company's property.

SOCIEDAD MINERA CERRO DE PASCO.

Dead. Was organized under laws of Perú, with capitalizatio
sols. Property was mining lands in the Cerro de Pasco district,
1903, to Cerro de Pasco Mining Co. Formerly at Cerro de Pasco, J

CERRO DE PASCO COPPER CO.

Office: 5–15 Broad St., New York, N. Y. Mine office: Cerro
Junín, Perú. Organized 1908, under laws of New Jersey, with ca
$60,000,000, shares $1 par. Controls the Cerro de Pasco Mining C
ownership of entire stock issue, [illegible] controlled, through stock ow
Cerro de Pasco Investment C[illegible] stock interest in this co
given the Compa[illegible] del Cer[illegible] Pasco in ex
rights acquired [illegible] Ru[illegible] drainage t

CERRO DE P[illegible]

Office: 5-[illegible] offi
Perú. Mine o[illegible]
ción, Tiñahuar[illegible]
Hodge[illegible]
supe[illegible]

rganized June 6, 1902, under laws of New Jersey, with cap-
00. Owns the entire stock issue of the Cerro de Pasco Rail-
stock issue of Sociedad Minera Copaycocha, and entire
g founders' shares, is owned by Cerro de Pasco Copper Co.,
trolled, through stock ownership, by Cerro de Pasco Invest-
. Haggin is said to hold about 40% of the total investment,
Morgan is a large shareholder.
ms, and 70,000 acres miscellaneous lands, including copper
ocha and Yauli districts, and about 400 acres of land that
hs of the rich Cerro de Pasco district, with a smelter site
acts north of Cerro de Pasco.
lies 14,300' above sea-level, rendering physical labor very
ulation of the town is about 20,000. The surrounding
l all food and supplies must be brought in from considerable
r is divided into two periods, the wet and dry, the wet sea-
vember to April. The summers are not hot, owing to the
the winters are not cold, owing to the low latitude. Snow
time, summer or winter, but rarely remain on the ground as
en in winter. The fluctuation between mean summer and
is about 20° F., only.
vered at Cerro de Pasco A. D. 1630, and the production of
lose of the Nineteenth Century, is estimated at 450,000,000
a about 40,000,000 tons of silver and copper ore, nearly all
labor, and carried 3 to 6 miles on the backs of llamas, to
whence the silver bullion was transported, by llamas, 200
circa 1870, when a railroad was completed to Oroya. For-
est copper ores were worked, those shipped ranging 25 to
, after careful hand selection.
agree hopelessly as to the geology of the district, but in an
one mile wide and nearly two miles in length, there is ore
m, proving Cerro de Pasco one of the richest mineral fields
odies outcrop prominently, as crestones, or ridges, and carry
galena, zinc and cobalt. The oxidized zone carries con-
ing as high as 1 to 2 oz. per ton, occurring in rich but erratic
ilver values usually extend to about 100' depth only, occa-
to thousands of ounces per ton, in decomposed quartz, fol-
gentiferous copper ores, which, in turn, at a little greater
l by ores low in silver, but richer in copper, all of the copper
less argentiferous, being estimated to have averaged 15 to
he old workings. Primary ores below the water level are
yrite, associated with pyrite, tetrahedrite, arsenopyrite and
g little silver and only traces of gold. There are occasional
silver-lead ores, and occasional sphalerite up to 8% in zinc
ough to give any particular trouble, but practically all of the
nuthiferous, hence refractory in reduction. The ores carry
d 14 to 30% iron, the excess of silica requiring considerable
g.
of the Cerro de Pasco company includes hundreds of old
e opened to 300' depth, though the majority are under 100'.
property shows scores of tajos, big pits resulting from the
encast workings, some of these being nearly or quite 300'
y lies in a basin, and the mines are very wet, especially be-
. The Rumiallana drainage tunnel, begun April, 1877, by
completed 1907, by the Compañía Empresa Socavonera del
h which a financial arrangement was made, through a 5%

stock interest given in the Cerro de Pasco Copper Co., obviating the pa
of the 20% royalty to which the former company was legally entitled.

Old workings have been disregarded, and a new mine opened, by 2 t
of about 2 miles length each, and 5 new shafts. The Diamante, Peña
Carmen and Noruega 2-compartment shafts have 4 levels opened
are bottomed at 410'. The 4-compartment Esperanza shaft is planned
the hoisting for the entire mine, and the shops and power plant are ne
shaft. Waste is used for filling, timber being very expensive, and use
for lining shafts and timbering important tunnels. The mines are eq
with powerful pumps. Estimates of ore in sight vary from 2,000,0
75,000,000 tons, the latter figure being ridiculously excessive, and not c
nanced by the management, but there unquestionably are large reserves
blocked out, these including first grade ore of 8 to 10% copper tenor, wit
silver values, and second grade ore, of uncertain copper tenor, though pr
workable, in the main.

In addition to the regular mining work, considerable prospecting has
done, and many diamond drill borings have been made, near the main t
the Cerro de Pasco, and in the adjoining coal fields.

The reduction works, at La Fundición, near Tiñahuarca, 9 miles fro
mines, are connected therewith by rail. All buildings are of steel frames
ered with corrugated iron. The plant treats a small quantity of custom
and has a sampling mill with crushers, rolls and chain-bucket elevators.
works are terraced throughout, permitting the handling of material by gr
and are built on the unit plan, so that their capacity may be doubled,
desired, quadrupled, at later date.

The furnace building has twelve 2,000-ton flat-bottomed steel ore
with lining of double thickness of 2" plank, filled from railroad tracks a
and loading into charging-cars run alongside, that are drawn by small lo
tives, on a narrow-gauge track running on either side of each furnace, 2 car
stituting a charge. There are four 56x180" water-jacket blast-furnaces
brick-lined hearths and crucibles, discharging into five 16' settlers. Th
naces are of about 300 tons actual daily capacity each. Slag is granulat
running water. The smelter building has a steel stack, 220' high and
diameter. There are 6 reverberatory furnaces, and ten 18' six-hearth McD
calcining furnaces. A sintering plant was abandoned.

The converter department, in a separate building, has 7 stands,
84x180" shells. The converters, of the upright pattern, are tilted hydrauli
and blister copper is poured into moulds on a low car under the stand, cars
shifted hydraulically. The converter slags pour into ladles, and thence
iron moulds, slags being crushed in 2 slag-mills and discharged into bucke
vators, going to a storage bin on the feed-floor, for resmelting. The conv
department has quartz-mills for linings, and 2 large storage-bins for mat
Product of the converters is 99% blister copper, in cakes, shipped to Balti
for refining.

The power plant includes a boiler-house with sixteen 250-h. p. Bab
& Wilcox boilers, and an engine-house, latter having a 800-h. p. Nordberg
compound engine, direct-connected to a 440-kw. Westinghouse generator;
475-h. p. Nordberg engines, direct-connected to two 250-kw. generators; a
kw. Westinghouse alternator and dynamos, and 2 smaller dynamos furni
elevator power and light. There are 3 No. 11 Connersville blowers, driven
Nordberg cross-compound engine, a large Nordberg air-compressor for
reverber blast, and an air-compressor for the pneumatic operation of fu
doors, etc. The power plant is practically duplicated, as a precaution ag
accidents.

Miscellaneous buildings at the works include a 100x300' warehouse,
shop, carpenter-shop, smithy, an iron foundry with a 25-ton cupola

crane, pattern-shop, laboratory, office building and dwell-
ops being of structural steel frame.
urnishes its own fuel, owning extensive beds of bituminous
rent average quality, though with some coal of coking grade.
mines are at Goyllarisquisca, Quishuarcancha and Vincus-
branch line of the railway terminates at Goyllarisquisca,
al mine being about midway, and it has been proposed to
n to connect with the Quishuarcancha, at present accessible
pack animals. There are large reserves of coal of fair qual-
sca and Quishuarcancha, and production, early 1909, was
, of which 200 tons were used raw at the mines and on the
ns went to the coal washers near the smelter, the washed
for steam purposes and coking. The coke plant, near the
75-ton beehive ovens, making a satisfactory coke for blast-
being imported. The coal contains 50 to 60% fixed carbon,
and about 13% ash, with considerable sulphur.
brick plant has proven an important success, as imported
very costly, and the local plant turns out fire and silica brick
from clays found in the mines, and common building brick
y-pit near the Vincuscancha mine. This plant also makes

arry, 12 miles from the works, furnishes flux, and the company
urnishing material for lining converter shells.
Pasco railway, owned by the company and operated under a
ion, has a main line of 83 miles, running from Cerro de Pasco
nnection is made with the Central Railway of Perú, which
es to Callaó, the latter line being one of the most notable in
st $43,000,000, and gaining nearly 3 miles vertical elevation,
t altitude of any railroad on the globe, after surmounting
stacles, having an average grade of 2.5%, with no less than
g the Galera tunnel of 1 kilometer length, which cuts through
s. The Cerro de Pasco railway has a 21-mile branch to the
all spurs, sidings and yards, has about 125 miles of standard-
main line has an average grade of 1.5%, with a maximum
osts upward of $2,000,000. Equipment includes 13 locomo-
6 light switching engines at the smelter, and 59 steel ore and
a total of 247 forty-ton cars, rolling stock being of the best
ure. The railroad is on a paying basis.
has 2 hotels, one for native and one for American labor, and
use with bowling alley, swimming pool, gymnasium, etc.,
nter, and aids greatly in keeping the American workmen and
nted. The company also furnishes facilities for riding and
the altitude is very high, people of normal good health find
g comfortably in the rarefied air of Cerro de Pasco. Wages
$4 per day for white labor, and 60 to 75 cents per day for
or, the latter being tractable, and, for some purposes, fairly
, and even $2.50 per day, is paid the native timbermen. In
employed about 2,000 men at the copper mines, 1,500 men
0 at the Goyllarisquisca coal mine, 400 at the Vincuscancha
at the Quishuarcancha coal mine, a total of 5,166 men.
tion has been as follows: 3,389,787 lbs. fine copper in 1906;
1907; 23,646,921 lbs. in 1908; 30,327,423 lbs. in 1909, and
910.
Pasco undoubtedly is the most expensive copper proposition
h a total investment, to date, of nearly $23,000,000. Many
ents were met in the earlier days, but in the main these have

stock interest given in th[illegible] remain unsolved, suffici[illegible] of the 20% royalty t[illegible] [illegible]perty a success. The ores a[illegible]

Old workings h[illegible] which is 14,300′ above sea-l[illegible] of about 2 miles l[illegible] [illegible]n rise to an exceedingly comp[illegible] Carmen and N[illegible] [illegible]tements in the press that the c[illegible] are bottomed a[illegible] [illegible]fected by dividends, and other [illegible] the hoisting fo[illegible] [illegible]i, laid down in New York, are [illegible] shaft. Wast[illegible] [illegible] all likelihood, the production is [illegible] for lining s[illegible] [illegible] with prospects of increased producti[illegible] with pow[illegible] [illegible]perty is considered to have a possibl[illegible] 75,000,00[illegible] [illegible] yearly, though some years will b[illegible] nanced [illegible] blocke[illegible] silver [illegible] work [illegible]

[illegible] DE PASCO TUNNEL & MINING CO.

[illegible] 45 Wall St., New York, N. Y. Mine office: Cerro de [illegible] [illegible] Eleanor Rawl-[illegible], president and general manager; Cha[illegible] [illegible] H. H. Leary, secretary and treasurer; preceding [illegible] [illegible] Fred [illegible] and S. G. Harris, directors; Carroll D. [illegible] [illegible] Jos. [illegible] Chastaine, assistant secretary. Organ[illegible] [illegible] laws of Maine, with capitalization $2,000,000, shares [illegible] [illegible] and half in common stock. Annual r[illegible] [illegible] January.

The company [illegible] a 7% dividend, 1905, on preferred stoc[illegible] [illegible] from stock sales, and controlled the Copper [illegible] & Smelting Co., of Nevada, which lost its lands and went brok[illegible] lands are claimed to be 9 groups, area circa 2,000 acres, about hal[illegible] [illegible] and half [illegible] Acari district. The company formerly cl[illegible] the Ramallana tunnel, but that tunnel actually was the property [illegible] Empresa Socavonera del Cerro de Pasco, when claimed by t[illegible] [illegible] regarded favorably. Idle and moribund.

MINA CERRO DO GARALDO.

Mine office: Cacapava, Rio Grande do Sul, Brazil. Lands, [illegible] northeast of Cacapava, show ore outcropping at the summit of [illegible] slightly developed by 6 very shallow shafts, bottomed in mica-s[illegible] [illegible] with [illegible]. Presumably idle.

MINA CERRO MARTINO.

Letter [illegible] unclaimed from former mine office, Cerro [illegible] Grande do S[illegible] Brazil. Property 140 kilometers from Estación R[illegible] 130 kilom[illegible] from Cachoeira, on the Uruguayana railway, sho[illegible] somewhat [illegible] those at the Camaquam mine, but melaphyr [illegible] in evidence [illegible] much less conglomerate, latter shading into coa[illegible] with dip [illegible] 40°, veins crossing these at approximately right [illegible] per [illegible] as chalcocite, with gangue of pyrite and heavy [illegible] 17 to [illegible]. Property has but slight development. Idl[illegible]

CERRO MURIANO MINES, LTD.

[illegible] Was absorbed, Aug. 5, 1908, by Córdoba Copper C[illegible] [illegible] Sevilla, Spain. Very fully described Vol. VIII[illegible]

COMPAÑIA MINERA CERRO VERDE, S. A.

[illegible] incorporation of the San Xavier Copper Co.

CERULEAN COPPER MINING CO.

[illegible] High St., Oshkosh, Wis. Letter returned unclaim[illegible] [illegible] Copperton, Carbon Co., Wyo. O. T. Gilbert, preside[illegible] [illegible] vice-president; Ole Granberg, secretary; [illegible] officers and Henry L. Larsen, directors. C[illegible] [illegible] laws of Wyoming, with capitalization $1,000,000, [illegible] Lands, 6 claims, area 120 acres, with patents [illegible] district, showing contact deposits between limesto[illegible]

' pits, and shafts of 30', 48' and 65'. Idle since 1907, and
ıd.

ERÓ. **CHILE.**

Los Marquis, La Ligua, Aconcagua, Chile, and Ñipa, La
Chile. Works office: Cabildo, La Ligua, Aconcagua, Chile.
aguas mines adjoin the Marquis mine of Otto Harnecker,
haracteristics of ores. Greatest vertical depth is 130 meters,
ntal length of about 200 meters. The Mina Maria, at Los
eters from Cabildo, has a vein in granite, ranging up to 15' in
f 50° W., and dip of 68°, carrying auriferous and cupriferous
gangue, ore averaging about 4% copper and 40 grams gold
a Montoya, opened 1855, has a 900' tunnel opening a 15'
carrying argentiferous sulphides with calcite gangue. The
kilometers from Cabildo, includes the Castillo, Quisco and
ng an extreme depth of 350 meters, with 800 meters extreme
The mines at Los Marquis produce 6% ore and the Ñipa
production of selected ore averaging 25% copper, after dis-
ities of ore of about 4% tenor, suitable for concentration
ll ores treated is about 5% copper.
de Cabildo, at the terminal of the Calera & La Ligua railway,
ral custom business, but has been idle since 1907 and appar-
y out of blast. This was described Vol. VIII. Production,
os. fine copper.

& COPPER MINING CO. **COLORADO & WYOMING.**

ly at Black Hawk, Gilpin Co., Colo., and Tie Siding,
Described Vol. VIII.

STRIE MINIÈRE DE CHAGALI-HÉLIAR. **RUSSIA.**

e Godot-de-Mauroi, Paris, France. Mine office: Borcha-
. Alfred Massenet, president. Organized July 12, 1900,
e, with capitalization f1,600,000, shares f100 par, increased,
600,000, shares f100 par. Mine has 2 shafts, and employed,
133 men, of whom 72 were underground. Equipment in-
power plant, and a small smelter. Production, 1909, was
e, estimated to have yielded circa 600,000 lbs. fine copper.

SOLIDATED COPPER CO. **NEVADA.**

ad St., New York, N. Y. Mine office: East Ely, White
rcy Bullard, president; C. Kelleher, vice-president; H. A.
treasurer; T. E. Smith, assistant treasurer; preceding officers,
l E. Windsor and Fred P. Hue, directors; W. N. McGill,
R. Plate, superintendent. Organized Feb. 4, 1907, under
h capitalization $5,000,000, shares $5 par, nonassessable;
reconstruction of Chainman Mining & Electric Co.
s, partly fractional, partly patented, circa 2 miles from Ely.
869, for gold, but values turned to copper in the lower work-
has a 300' shaft, with about 3 miles of workings, showing
s of auriferous and slightly argentiferous iron ore. There
howing of iron oxides, carrying $1.50 to $10 gold per ton,
ay be underlaid by large bodies of copper ore, and the iron
ble for flux, especially as it contains very fair average gold
the old Chainman shaft has been abandoned, and mine is
hafts, known as the Aultman and Chamberlain, of 200'
ncludes steam and electric power, and an air-compressor.
, with a 125-ton cyanide plant, is under lease to McGill &
so have leased the Southern Cross mine, ore of which is
d upwards in copper, and up to $15 gold per ton. About
d.

CHAINMAN MINING & ELECTRIC CO.

Dead. Was succeeded, circa 1906, by Chainman Consolidate Formerly at Ely, White Pine Co., Nev.

COMPAÑÍA BENEFICIADORA DE MINERALES DE CHALCHUIHUITES, S. A.

Office: México, D. F. Mine office: Chalchuihuites, Somb tecas, Mex. Theo. Montgomery, president; Adolfo Trauwitz, se W. Meyer, treasurer. Organized March 6, 1907, under laws of capitalization 50,000 pesos, as the Mexican incorporation of the Na ing Co., and property is described under latter title.

CHALCHIHUITES MINES CO.

Office: 288 Garside St., Newark, N. J. Mine office: Chalch brerete, Zacatecas, Mex. Edw. H. Jones, president; C. C. Hams B. W. Farris, general manager. Lands, 192 hectares, including the mine, carrying ores of gold, silver, copper and lead. Is opened equipped with steam power. Presumably idle.

CHALCHIHUITES MINING CO., S. A.

Mine office: Chalchihuites, Sombrerete, Zacatecas, Mex. Straight, president; Francis E. Agnew, vice-president; José de Ra tary. Organized circa October, 1909, under laws of México. Prop La Florencia, San Felipe and Ampliacion de Milagros mines, near C carrying values mainly in silver, under development, with a small accounts.

CHALLENGE MINE.

Owned by St. Mary's Mineral Land Co., at Painesdale, Houghto

CHAMPION COPPER CO.

Office: 82 Devonshire St., Boston, Mass. Mine office: Houghton Co., Mich. Mill office: Redridge, Houghton Co., Mic Paine, president; Chas. J. Paine, Jr., vice-president; Frederic Stan tary and treasurer; Frederick W. Denton, general manager; prece Samuel L. Smith, Geo. P. Gardner, Nathaniel H. Stone and Hon. Ri directors; John Jolly, underground superintendent; Edw. Koepel, tendent; R. H. Leach, assistant mill superintendent; H. F. Mercer, c M. J. Harrington, chief clerk; Richard Trevarrow, mining captain; bell, master mechanic; Mark Cunningham, superintendent motive

Organized December, 1899, under laws of Michigan, with $2,500,000, shares $25 par. Is controlled jointly by Copper Range Co. and St. Mary's Mineral Land Co., through equal ownership of sto $44,000 stock in the Michigan Smelting Co. Net earnings were $ 1907; $777,480.14 in 1908, and $816,637.55 in 1909, company endi a surplus of $798,462.80. Dividends have been as follows: $3 in 1904; $10 in 1905; $12 in 1906; $10 in 1907; $5 in 1908; $8 in 1909 an a total of $59 per share, or $5,900,000. Company has sued the sta chusetts for excise taxes paid under protest, this tax being a fo larceny practiced by the grand old commonwealth.

Lands, 1,240 acres, being the S. ½ of S. 30, W. ½ and N. ½ of SW. ¼ of NE. ¼ of S. 31, T. 54 N., R. 35 W., practically all on the Neighbors are the Copper Range and Trimountain on the north, Mary's company and Hussey, Howe & Co. on the east; Hussey- and the Globe tract on the south, and Copper Range lands on the tract carries 9,047′ on the strike of the bed, and, at the present ang deepest shaft could go down to the impossible depth of 18,950′, bef the western boundary.

Development was begun in 1899, under direction of Dr. L. L. H 3 parallel amygdaloidal beds were uncovered by trenching, one o Baltic, showed phenomenal copper values. The two amygdaloid

copper in sufficient quantities to render their future explo-
fourth amygdaloidal bed, about 15′ wide, discovered 1901,
l, carries heavy copper to an encouraging extent, and there
f arsenical ore, apparently algodonite, near "C" shaft. The
surface is slight, and mineral contents variable, but on the
re is 2′ wide, and well mineralized.

altic bed at the Champion is circa 70°, with about the same
ountain, rather than the exaggerated easterly trend noted
The bed runs 13′ to 45′ and averages 24′ width, carrying
the Trimountain and Baltic. The surface of the tract is
verburden is less than is found either to the northward or
etches of lean ground in the mine are few, and the bed
in profusion, mostly in barrel size, but running up to masses
Only about 60% of the rock broken is hoisted, waste rock
staff of pickers, and used instead of timber, to secure the
lf, and thus doing double duty by saving the cost of hoist-
he cost of timber to secure the underground workings. The
nps.

nnected on numerous levels and about 3 miles of new work-
. The bed shows so little poor ground that nearly every
from end to end of the mine, eventually, giving the longest
y Lake Superior property. The only really poor ground
s shown in "E" shaft, between the 3d and 4th levels, and the
pes of phenomenal width and richness. The ground opened
rage value.

eloped by 4 shafts, named from north to south, with room
ts.

rely a site, there being no development.

northernmost, is 1,835′ south of the Trimountain boundary,
e mean water datum of Lake Superior, and is 1,776′ deep.
′ south of "B," is 1,616′ above the lake, and is 1,733′ deep.
0′ south of "C," is 631′ above the lake, and is 1,824′ deep.
′ south of "B" and 3,900′ north of the Globe boundary, is
hird level of "E" shaft has been driven 2,000′ toward the

ed 1,300′ south of "B," was abandoned on account of treach-
ut the Baltic bed was located, 1907, by diamond drill, at a
south of "E," and 2,100′ north of the Globe boundary.
erely a site, near the Globe mine, on which no work has

practically duplicates in all essential particulars, having
ses, with 90-ton ore-bins, enlarged, 1908, by the Wisconsin
Equipment at each rockhouse includes a steam-hammer for
ne 12x15″ rock-crusher, taking everything hoisted from the
tes. The shafts have duplicate first-motion Nordberg hoists
cylinders and double conical drums of 14′ diameter, with
00′ cables each, hoisting 6-ton skips. The engine-houses
ine rock with redstone trimmings, the boiler-houses adjoin-
and Burt boilers, with coal trestles connecting. Water for
rom a 12,000,000-gallon dam, 30′ from hardpan foundation
nt core, 5′ wide at the bottom and 2′ at the top, reinforced

use is made of electric power on surface, and there are
ectric pumps. The electric plant, at "F" shaft, has a 250-kw.
nerator, direct-connected to an Allis-Chalmers cross-com-
e.

The main compressor building, at "F" shaft, of steel, has a 100-d quadruple expansion two-stage air-compressor, with capacity to co cubic feet of free air per minute to a pressure of 70 lbs. per inch. Th operates at a steam pressure of 280 lbs., and has a regenerative feed-w Power is furnished by three 250-h. p. Geary water-tube boilers. there is a 40-drill Ingersoll-Sergeant cross-compound two-stage air with vertical receiver intercooler. The electric plant, with a 100-k is in the main compressor building.

Buildings at the mine include a 60x145′ machine-shop, of san slate roof, having a traveling crane and trolley rail for its entire a 30-h. p. electric motor. Adjoining the machine-shop is a 50x of redstone, having a trolley rail, for handling forgings, running its e The machine-shop and smithy have railroad tracks, connecting with Range line. The 32x60′ carpenter-shop is of wood, with iron sidi

Miscellaneous structures include a good office building, 2 chan warehouses, stables, 3 large boarding-houses and about 250 substa ings, located in the attractive townsite of Painesdale, which, in ad company's buildings, has a fine schoolhouse, hotels and business the much-appreciated Sarah Sargeant Paine memorial library, a ha stone structure, costing $30,000, erected by Wm. A. Paine as a me mother.

The water system, serving the mine and town jointly, has a 1,00 electric pump, at Lake Perreault, 4½ miles distant, distributing mains from a 200,000-gallon steel stand-pipe, on high ground, ne

An automatic telephone system, with about 40 instruments, c principal buildings and a number of pump-stations underground.

The stampmill, at Freda, on Lake Superior, 2 miles west of 215x400′, of steel frame on concrete foundations, with floors terrac the Wisconsin Bridge & Iron Co. An experimental graded crushin scribed Vol. VII, has been abandoned, as was cross-compounded s in 1906. The mill has been remodeled and enlarged at various tim has 6 Nordberg stamps, there being 4 compound stamps, with 15½ each treating about 700 tons daily, and 2 simple stamps, with 28″ about 660 tons daily capacity each, giving the mill a total capa 4,000 tons daily.

The wash department was remodeled, 1908, and given addi and larger settling tanks. The wash for the heads has Hodge gradu able-speed jigs, with plungers working simultaneously or alternate Woodbury jigs and Deister concentrating tables. Raggings are r Allis-Chalmers crushing rolls, having one roll fixed and the other bearing. The preliminary discharge from the stamp-heads is trea large jigs, having 30x48″ sieves, of punched steel, with ⅛″ openings, connection with the head. Each head has a V-shape settling tank, deep, 12′ wide at the top and 6″ wide at the bottom, slimes being spigots at the bottom. The flow of water through the settling tan exceed 6′ per minute.

The mill is heated by hot water from a Green fuel economiz 300° to 350° F. to a steel-clad chamber, whence heated air is draw by a Sturtevant blower, and distributed through the mills, the pumped back to the economizers, and thence fed to the boilers.

The steel boiler-house has four 200-h. p. Stirling boilers, 5 Scotch marine boilers, and 2 Hawley down-draft furnaces. Autom were tried, but discarded. Coal is brought to the boilers by tram, s to uniform size by a grinder, before feeding to the grates, and ashes into the lake through a launder. Exhaust steam passes through dry thence to a hot-well, from which water is fed to the boilers. Power

-h. p. Nordberg cross-compound engine, having 14″ and 32″ troke, with a 180-h. p. engine in reserve.
el pumphouse, with truss roof and traveling crane, has a ordberg triple-expansion pump. Water for the mill and he lake through a 1,020′ tunnel, the shore end having a well r than the lake level, this being the longest tunnel ever driven r. The intake crib has an area of 45 square feet, and, with unnel could furnish water for 10 stamps. Water cost is less ton of rock stamped. Screens have been installed in the he trouble formerly caused by sand and wood-pulp in the

includes a machine-shop, carpenter-shop, smithy, warehouse, d about 20 dwellings. There is a water system, with mains, -pump, and the works have a private telephone system.
was 708,685 tons, returning 23.268 lbs. fine copper in 1907; ning 22.38 lbs. in 1908; 753,908 tons, returning 23.88 lbs. in entage of copper recovered supposedly was somewhat larger 3 years have been as follows: $1.78 per ton of rock and nd for finished copper, delivered, in 1907; $1.62 per ton of per pound of copper in 1908; $1.80 per ton of rock and 8.45 f copper in 1909. Recent production has been as follows: copper in 1906; 16,489,436 lbs. in 1907; 17,786,763 lbs. in s. in 1909, and circa 19,000,000 lbs. in 1910. The Champion and richest of Lake Superior mines, and has been admirably ne has by no means reached its ultimate limit of output, and present mining and milling equipment, of producing nearly lbs. fine copper yearly.

PER CO. **NEW MEXICO.**

ngress Sq., Boston, Mass. Letter returned unclaimed from Embudo, Rio Arriba Co., N. M. Samuel Littlefield, presi- Cripps, vice-president; Thomas A. Maloney, treasurer; Wm. nanager, at last accounts. Organized under laws of Maine, $2,000,000, shares $1 par. Federal Trust Co., Boston, trans-

s, patented, area 100 acres, also four 5-acre millsites and a , on Copper Hill, in the Copper Mountain district of Taos t of Embudo, the nearest railroad station, and 25 miles north- perty is said to have 8 practically parallel veins, of 18″ to 20′ chist footwall and quartzite hanging-wall, carrying cuprite, ysocolla, succeeded at depth by chalcocite and gray copper, s and auriferous, with chalcopyrite beginning to show in with quartz gangue. Development includes a small amount shafts and surface-cuts on several claims, a 145′ shaft sunk Oxide mine, and a 300′ tunnel, property as a whole having Equipment includes a Leyner air-compressor, in the mill, size, with a 20x30′ power-house adjoining. A 1,000′ ground e mouth of the Champion tunnel to ore-bins. Improvements ravity pipe-line, of 7″ spiral steel-riveted pipe. More steam d the company's advertising than back of mining work. Is ably. Idle.

PER MINING CO. **IDAHO.**

prague Ave., Spokane, Wash. Letter returned unclaimed office, Mullan, Shoshone Co., Idaho. Adam O'Donnell, ager; Wm. J. Coates, secretary; J. H. Wourms, treasurer; Patrick Sullivan and F. C. Robinson, directors. Capitaliza- ares $1 par. Lands, 6 claims, south of the Reindeer mine,

3 miles from a railroad, near the head of Boulder Creek, on the
of Stevens Peak, 4 miles south of Mullan. Property is said to sh
ized zone of 75′ to 100′ width, with a vein ranging up to 25′, carr
rite and occasional bornite, said to average about 5%, with qua
gangue. Development is by 2 tunnels, lower of about 900′. Pr

CHAMPION COPPER MINING CO. NE

Dead. Was succeeded, circa 1907, by Maoriland Copper C
merly at Nelson, N. Z.

CHAMPION GROUP MINING CO.

Mine office: Yreka, Siskiyou Co., Cal. Property is the
just outside the city limits, held under bond and lease, from Se
on which some exploratory work was done for copper. Presumab

CHAMPION MINING CO.

Office: Utah National Bank Bldg., Salt Lake City, Utah.
Mackay, Custer Co., Idaho. Edw. R. Hall, president; C. T. Mi
dent; R. T. Badger, secretary and treasurer; preceding officers,
and J. E. Frick, directors; H. A. Brown, superintendent. Or
under laws of Utah, with capitalization $100,000, nonassessab
claims, unpatented, in the Alder Creek district, 6 miles from a ra
is developed by tunnel, with about 1,500′ of workings, showing
lead and copper ores.

CHAMPION MINING & MILLING CO.

Dead. Was a swindle, promoted from 608 Heist Bldg., Kan
and apparently never held any lands. Described Vol. VIII.

CHAMPLAIN MINING CO.

Dead. Formerly at Doniphan, Blaine Co., Idaho.

COMPAÑÍA ESPLORADORA DE CHAÑARAL.

Mine office: Tres Puntas, Chañaral, Atacama, Chile.
6,000,000 pesos. Lands, under development at last accounts, a
and Tres Puntas districts of Chañaral.

SOCIÉTÉ DES MINES ET USINES DE CUIVRE DE CHAÑARAL.

Office: 94 Rue de la Victoire, Paris, France. Mine and
Chañaral, Atacama, Chile. Eugène Renevey, chairman; preced
Bethmont, A. DuBois, A. Delattre, Georges Renevey and
directors. Organized July 17, 1906, under laws of France, with
f6,000,000, increased, circa 1910, to f7,000,000, shares f500 par.

Lands, 661 hectares, including 216 mines and mining claims,
portant being Los Pozos, Las Animas, El Salado and Pueblo Hu
tances of 25 to 52 kilometers from the smelter at Chañaral, with w
are connected by rail. Property includes lands bought 1906 of B
of Las Animas Copper Mining & Smelting Co., Ltd., circa 190
desert, and water is scarce. The mine water carries salts in solu
and water for domestic uses is secured by condensation from the m

Las Animas group, in the Sierra Aspera, includes the Fronton
mines, which are the principal properties, also La Fortunata mi
opened 1855, and La Elena mine. The Mina Fronton, worke
carries large ore bodies having 3 veins with parallel strike and
syenite, traceable circa 3 kilometers. Average width of the 3
5′, with ore occurring mainly in vertical shoots, sometimes 100′ in
dized ores, to depth of circa 150 meters, are succeeded by sulp
chalcopyrite, with a little chalcocite, of 6.6% average copper teno
is opened to a vertical depth of 1,837′, and horizontally for about
hoist is old, raising 1,000-kg. cars.

El Progreso mine, opened to depth of about 300 meters,
chalcopyrite, of about 7% average copper tenor. El Progreso a

about 50 meters of porphyry, quartz and limestone, t are to be developed by a tunnel, started from the 6th ward El Fronton.

ine at Los Pozos, 25 kilometers from Las Animas, has 2 porphyry and syenite, one carrying oxidized ores of per tenor, there being no sulphides, though chalcopyrite mine, nearby. There are shafts of 80 meters and 195 ving its first 65 meters vertical and balance at 50°, and The mine has extensive and erratic old workings, and ow grade ore, somewhat refractory. Production, 1909, tons monthly, secured with an average force of 90 men. foregoing mines, which are the principal properties, there e, formerly an important producer, abandoned at depth lacollo mine, with ore averaging about 12.6%; the Tres e; the San Agustin, with 3.5% ore; the Tulipan, with to Atacama, with 3% ore. With further development ompany can furnish a sufficient variety of ores to permit s.

ncentrator, with steam power, at the Fronton mine.

s, at Chañaral, known as the old and new, the old smelter, ng two 54″ circular water-jacket blast-furnaces, in poor sville and Böcker blowers, and 6 reverberatory furnaces, h a trapiche.

as 4 reverberatory furnaces and a 100-ton water-jacket blast, and 2 Connersville blowers, three 52-h. p. engines, lant. Distilled sea-water is used for the water-jackets oad enters the smelter over a wooden trestle. Slags are l out in wooden cars, by mules. Losses through fumes, y heavy, aggregating 1.2% copper. Fuel is Australian raging 13.06%, in 1908.

elter is matte, averaging 52% copper, which is shipped to on. The smelter has a complete converter department, production reaches 200 metric tons monthly. The con- ing crushed matte, has four 2x1.7-meter shells, with a Blake crusher and lining mill.

as Animas Copper Mining & Smelting Co., Ltd., taken ded a shipping pier, at Chañaral, with railroad line, cars

rca 2,500,000 lbs. in 1906; 3,324,536 lbs. in 1908, and for 000 lbs. fine copper. For 1911 production should be 200 metric tons fine copper monthly. Property consid- nagement good, though a number of improvements re- e mines and smelters.

AÑARCITOS. CHILE.

d de Minas i Fundiciones de Carrizal.

E STAR MINE. AUSTRALIA.

, Queensland, Australia. Mine office: Orient Camp, E. C. Wright, secretary; T. Bermingham, mine man- en, on development work, in 1907. Presumably idle.

PPER MINES, LTD. BRITISH COLUMBIA.

lated March 26, 1908. Formerly at Encampment, Car- ibed Vol. VI.

PER CO. ARIZONA.

on, Graham Co., Ariz. Clarence K. McCornick, presi- surer; S. S. Campbell, manager; Isaac N. Stevens, super- tion $5,000,000. Lands, 52 claims, area 1,040 acres,

circa 8 miles west of Clifton, having a 1,750′ tunnel, 6x8′, c
the Longfellow mine, cutting the Longfellow ore body, of co
at a distance of 493′, having a back of about 900′, showing l
copper ore. Tunnel practically reaches the Coronado railro
vantageous shipments. Property considered promising. Pr

CHATHAM COPPER CO.

Dead. Formerly at Silver City, Grant Co., N. M. De

CHATTERTON MINING CO. COLORADO

Dead. Was a bad egg. Formerly at Pearl, Larimer
described Vol. VIII.

CHATTERTON MINING CO.

Dead. Formerly at Tapalpa, Sayula, Jalisco, Mex. De

CHAUTAUQUA MINING CO.

Dead. Formerly at Manvel, San Bernardino Co., Cal.

CHELAN CONSOLIDATED COPPER CO.

Office: 180 Broadway, New York, N. Y. Operating o
Block, Seattle, Wash. Mine office: Leavenworth, Chelan C
Jos. A. Goulden, president; Frank D. Wilsey, vice-president;
secretary and treasurer; preceding officers, Henry D. Bristol
Albert T. La Vallette and Louis Arndt Stein, trustees; Mic
assistant secretary and treasurer; Henry G. Krollpfeiffer, ac
ent. Organized May, 1906, under laws of Washington, w
$12,000,000, shares $10 par, nonassessable; issued, $5,779,140.
Company, New York, registrar. Annual meeting, first Tuesd

Lands, 144 claims, area 2,880 acres, including 14 claims,
Index, Snohomish Co., Wash., and 130 claims in the forest r
County. Original promoters were dislodged, 1907, manag
hands of shareholders who invested cash. Property was s
promoters as 101 producing mines, which was a colossal lie. T
property is 48 miles northwest of Red Mountain, with a fair w
18-mile railway of the Lamb-Davis Lumber Co. connecting.

The Index property, between the Ethel and Bunker Hi
has a 6′ vein, opened by tunnels of 600′ and 700′, with about 2
showing bornite and chalcopyrite, claimed by promoters to ave
which was a serious overestimate, with small silver and gold va

The Red Mountain lands, circa 4 miles west of Phelps C
claims owned outright, and 58 additional claims held throug
Mining Co., which is controlled through stock ownership. D
a 2,000′ main tunnel, supplemented by 600′ of diamond drill
a 5′ vein carrying good assay values in copper and gold, an
Equipment includes gasoline power and an Ingersoll air-comp
are 6 or 7 buildings. Company was akin to a swindle, as pr
F. Albers, but present management is innocent of the rascalit
ters. Company plans doing further diamond drilling, and de
erous mispickel deposit, on the Nora and adjoining claims.

CHELAN COPPER CO.

Dead. Formerly at Chelan, Chelan Co., Wash. Descr

CHELAN TRANSPORTATION & SMELTING CO.

Dead. Formerly at Chelan, Chelan Co., Wash. Descril

CHEMAINUS COPPER MINE CO., LTD. BRITI

Office: Chemainus, B. C. Mine office: Ladysmith, V
B. C. Samuel Erb, president; Chas. Erb, manager; preced
Chapman, Samuel Erb, Jr., C. Burings and H. Cecil, director
secretary. Organized Nov. 28, 1906, under laws of British
capitalization £200,000, shares £1 par, fully issued. Lands,
as the Victoria group, in the Bright district, well timbered, 2

fall available for power development. Mine, opened by ve 3,000′ of workings, on 3 fissure veins carrying 2 to 5% arrow paystreak of chalcocite and bornite, ranging up to gh grade ores being both auriferous and argentiferous. 8 Broad Street Ave., E. C., was closed, 1908. Idle and

CO. NEW MEXICO.

chesney Bldg., Pittsburg, Pa. Mine office: Tyrone, o. E. Tener, president; preceding officer, John C. Oliver, . J. Crump, C. D. Frazer and Chester A. Congdon, di-, superintendent. Organized May, 1907, under laws of alization $3,000,000, shares $10 par; issued, $2,000,000, astruction of Tyrone Development Co. Was said, June, 00,000 cash on hand. Lands, 55 claims, area 953 acres, ountain, Savanna and Mangas properties, 10 to 15 miles y. Property is in 3 groups, known as the Houston group cres, the Mutual group of 16 claims, area 247 acres, and of 15 claims, area 237 acres.

6 shafts, all in ore, of 300′ to 600′ depth each, with several ing a small amount of high grade ore, of 6 to 20% copper ns or upward of low grade concentrating ore, of probably

es steam power and air-compressors. A 1,000-ton con-d, 1908, to put 7 tons into one. Idle, but plans resump-erty, though low in grade, is considered decidedly prom-e amount of ore developed, and the prospects of develop-unt, and management is good.

PPER MINING CO. WASHINGTON.

at Fairfax, Pierce Co., Wash. Described Vol. VIII.

R CO. MICHIGAN.

, Mich. Mine office: Lake Mine, Ontonagon Co., Mich. dent; Linus Stannard, first vice-president; Deen L. Rob-ident; Wm. D. Calverley, secretary and treasurer; pre-tice, B. M. Chynoweth and R. M. Edwards, directors; uperintendent. Organized April, 1910, under laws of zation $2,500,000, shares $25 par; issued, $1,750,000, of re given for lands, 5,000 shares went to the promoters, sold to the public at $5.

being Section 2 and SE. ¼ of Section 3, T. 51 N., R. 57 een the Bohemia and King Philip, one to two miles south-erly were owned by the Penn Mining Co., and later by nes Co., Ltd. Property, entirely on the mineral belt, is now the Lake mine of the Lake Copper Co., and car-f the copper bearing formation, presumably carrying the are old shafts of 70′ and 90′, and a little work was done work is by diamond drilling, begun in the southeast, the northwestern part of the tract. No. 6 drill hole cut idal bed of 32′ width, of which 5′ carried good copper.

R MINING CO. WYOMING.

at Encampment, Carbon Co., Wyo.

NES CO. ARIZONA.

rry, Yavapai Co., Ariz. H. A. Ingalls, superintendent, at haft, 115′, shows a vein with a 3′ paystreak giving assays 4 oz. silver and $9.60 gold per ton. Presumably idle.

GEORGIA.

claimed from former mine office, Villa Rica, Carroll Co.,

circa 8 miles ... bedded vein of
the Longfello ... either wall, outcro
at a distan ... but probably avera
copper ore.
vantageou ... CO.
CHATHA ... Bank Bldg., Philadelphia,
De ... H. N. Brown, president: J. W
CHATT ... secretary and treasurer; preceding of
D ... Thos. Irving and R. L. Muir, directors; E
descri ... Apr. ... under laws of Arizona, w
CHA ... Annual meeting. Ap
... 1910, a ... bond issue.
CH ... including the Tiger
... developed by the 487′ C
CH ... Tiger No. 11 incline
... silver-lead ore assaying a
... there are tunnels of 40′, 6
... p. gasoline hoists. M
... shipment of silver-lead

... N. S. Mine office: C
... John W. Regan, se
... at last accounts.
... capitalization $3,000,0
... Co., Ltd., and th

... mill and smelte
... with a government
... micaceous schist, of
... which 3 are dev
... by company
... to 3.5% copper,
... is 38 miles
... promising,
... years and appa

... from fo
... president and g
... E. Shepar
... accounts.
... $1,000,00

... and 2
... ore bodi
... average wid
... bornite a
... with $4.
... tunne
... show
... which fig

... nearest ra

R CO. WASHINGTON.
at Chewelah, Stevens Co., Wash. Described Vol. VIII.

R KING MINING CO. WASHINGTON.
St., Spokane, Wash. Mine office: Chewelah, Stevens Long, president; H. H. Herbert, vice-president; Walter retary and treasurer; John M. Long, general manager; S. P. Domer, directors. Organized 1898, under laws of italization $100,000, shares 10 cents par, changed 1909, to par, nonassessable; fully issued. Bonds, $30,000 author-8,500. Annual meeting, third Thursday in May.
fractional, area 50 acres, surveyed for patent, and a 3-acre s miscellaneous lands, 6 miles east of Chewelah, showing n 2, under development, have estimated widths of 25′ to halcopyrite and gray copper, both argentiferous and aurif-values of 2 to 15% copper, 4 to 10 oz. silver and $2 to $10 pment is by shafts of 35′ and 325′, and tunnels of 900′ and management to show 100,000 tons of ore. Company has ngine, hauling 5 to 10 ton loads, and planned a railroad Production, 1907, was reported by company as 5,000 tons y carried about 250,000 lbs. fine copper. Was tied up by driven a tunnel 600′ on lands of others. Property con-

ER MINING & SMELTING CO. WASHINGTON.
ewelah, Stevens Co., Wash. W. H. Brownlow, president; lent; J. R. Pritchard, secretary; Geo. H. McCrea, treasurer; R. Giles and A. H. Anderson, directors. Lands, 7 claims, the Alberta group, opened by incline shafts of 50′ and 100′, reported to average 2.5% copper, 2 oz. silver and $5 gold t. Equipment includes a 250-h. p. steam plant, and an ruary, 1909, company was trying to raise money to install be built in two 50-ton units, at estimated cost of $25,000.

CO., LTD. MÉXICO.
idated voluntarily, August, 1904. Formerly at Salto de Described Vol. V.

PLORATION CO., LTD. MÉXICO.
hall Ave., London, E. C., Eng. Mine office: Pichucalco, . G. Hale, chairman; preceding officer, F. C. D. Haggard e, directors; S. Hutchinson, secretary. Organized Oct. 31, reat Britain, with capitalization £250,000, shares £1 par; nds are claimed to be mining rights covering about 100 cinity of Pichucalco, and surrounding the Santa Fé mine, iapas Mining Co., Ltd. Idle many years and apparently

NICKEL CO. ONTARIO.
, slightly developed, circa 1901, was claimed to carry liferous pyrrhotite, similar to the ores of the Canadian y at Sudbury, Algoma, Ont.

MINING CO. MONTANA.
rbin, Jefferson Co., Mont. Lands, 2 claims, area 40 acres, the north, and lying east of the Boston & Corbin. Mine rtment shaft, and a 700′ tunnel, latter said to show string-but not in commercial quantities.

NA COPPER CO. ARIZONA.
at Willcox, Cochise Co., Ariz. Described Vol. VIII.

CHICAGO-BRITISH COLUMBIA MINING CO. BRITISH

Dead. Formerly at Greenwood, Boundary district, B.C. D

CHICAGO COPPER CO.

Dead. Former office was Chicago, Ills. Chas. Peck was m
erty was 7 claims, adjoining the Columbine mine, said to show
assays in copper. Formerly at Salida, Chaffee Co., Colo.

CHICAGO COPPER MINING CO. N

Office and mine: Oscuro, Lincoln Co., N. M. E. G. Raff
treasurer and general manager; H. H. Miller, vice-president;
secretary; preceding officers, H. R. Rafferty and M. Loquis, dir
ized Jan. 31, 1906, under laws of New Mexico, with capitalizat
shares $100 par, nonassessable. Lands, 22 claims, unpatented,
a railway, in the Oscuro Mountains, also real estate in Oscuro.
shaft, and tunnels of 60′, 120′, 222′ and 1,550′, with about 3,00
from which former owners shipped several carloads of ore, said t
$270 per ton. Has steam power and a 2-drill Sullivan air-comp

CHICAGO COPPER REFINING CO.

Office: Kesner Bldg., Chicago, Ills. Mine office: Red
Co., Cal. Wm. Wrigley, Jr., president; A. G. Cox, vice-presiden
secretary and superintendent; Edw. Dickinson, treasurer; preced
Chas. P. Whitney, directors. Organized August, 1908, under la
with capitalization $2,000,000, shares $5 par, nonassessable.
tion with the other Chicago Copper Refining Co., of Illinois.

Property is a 99-year lease on the property of the Californi
setts Copper Mines Co. Lands, 72 claims, area 1,600 acres, u
timbered and watered, on Tom Head Mountain, 25 miles wes
known as the Tom Head mine. Property shows schists, cut by
carrying 3 veins, with gossans of 90′ to 300′ width, one vein, o
average width, carrying chalcopyrite, associated with pyrite, esti
2 to 3% copper, 0.5 oz. silver and $1.40 gold per ton. Propert
reported to carry bornite and native copper, and No. 3 tunnel
given ore assaying up to 18% copper, with small gold values. M
of 45′, 355′ and 460′, with about 2,000′ of workings, estimated
to show 250,000 tons of ore.

Equipment includes an 80-h. p. steam plant, with a small
Sullivan air-compressor. Lands carry undeveloped water pow
3,200 h. p. There is a 4,000′ sawmill, and 10 buildings. Man
to plan a smelter. Property, though low in grade, gives evid
large ore bodies.

CHICAGO COPPER REFINING CO.

Office: 310-138 Jackson Blvd., Chicago, Ills. Works office
Cook Co., Ills. W. G. Coolidge, president; F. A. Simmons, s
Foster, superintendent; Winthrop Coolidge, metallurgical
Property is a refinery, of 40 tons daily capacity, treating miscell
per, copper mattes and by-products, with a chemical department
facture of barium hydrate and salts. Employs circa 100 men.

CHICAGO DIXIE MINING CO.

Dead. Formerly at Fallon, Churchill Co., Nev. Describe

CHICAGO & KOOTENAY MINING CO. BRITISH

Dead. Formerly at Nelson, Kootenay district, B. C.

CHICAGO-LA SAL GOLD & COPPER CO.

Dead. Formerly at La Sal, Grand Co., Utah.

CHICAGO-LATOUCHE MINING & POWER CO.

Office: 1 Board of Trade, Chicago, Ills. Letter returned
former mine office, Latouche, Latouche Island, Alaska. Robt.
dent; Walter Fitch, vice-president and treasurer; Wm. E. O'

07, under laws of Maine, with capitalization $1,500,000. luding water-rights, at the head of Wilson Bay, held under tunnel of circa 1,400′ length, hoped to cut an extension body of the Beatson Copper Co. There is a small hydro- Presumably idle.

N CONSOLIDATED MINING CO. **MÉXICO.**

y at Cusihuiriáchic, Iturbide, Chihuahua, Mex.

& MILLING CO. **UTAH.**

y at Milford, Beaver Co., Utah. Described Vol. VIII.

CO. **ONTARIO.**

office was Chicago, Ills. Lands, in Drury township, circa 1903, were said to show nickelferous copper ores. gton, Algoma, Ont.

GONIA COPPER & GOLD MINING CO. **ARIZONA.**

y at Nogales, Santa Cruz Co., Ariz. Described Vol. VIII.

OPPER MINING CO. **UTAH.**

nclaimed from former office, Salt Lake City, Utah. Mine gan Co., Utah. Lands, in Weber Cañon, 7 miles southeast thern Wasatch Mountains, are developed by a tunnel and owing stringers of high grade oxide and carbonate ores of of 20% copper and 20 oz. silver per ton. Was developing

E MINING CO. **WYOMING.**

y at Encampment, Carbon Co., Wyo. Described Vol. VIII.

INING CO. **QUEBEC.**

oberval, Chicoutimi Co., Que. Peter McKenzie, general pparently undeveloped, are in the Lake St. John region, h of Roberval, the nearest railroad point. Idle.

PER-GOLD MINING CO. **WASHINGTON.**

rged in New Century Exploration & Investment Co. For- Snohomish Co., Wash.

ATED MINING CO. **UTAH.**

on, Mich. Mine office: Eureka, Juab Co., Utah. Walter general manager; Frederick W. Denton, vice-president; Wm. nd treasurer; preceding officers, J. H. Rice, J. H. Hodgson, Deen L. Robinson, directors; Cecil A. Fitch, superintendent; sistant superintendent; Howard Fitch, engineer. Organ- nder laws of Arizona, with capitalization $1,000,000, shares e; issued, $871,384. Is controlled, through ownership of American Mines Syndicate. Houghton National Bank, e Deposit & Trust Co., transfer agent. Has about 1,800 is listed on the Boston curb. Annual meeting, first

ls, through ownership of 93% of stock issue, the Eureka l latter probably will be wound up, having served its pur- ef having been given for 5 shares of Eureka City stock. ning & Milling Co., succeeded by the Chief Consolidated, April, 1910. From organization to Dec. 31, 1910, total 2.04, and disbursements were $392,572.61, company end- ,569.43 cash on hand.

aims, including holdings of the Eureka City Mining Co., acres, being the largest group in the Tintic district. Prop- ings of the Matilda Mining Co., bought 1910, and also the kbird and Granite claims, in which formerly fractional , and in which the outstanding interests were bought,

1910. Company also holds various options on adjoining lan adjoins the Eagle & Blue Bell on the north and east.

The lands, including the Eureka City holdings, carry about strike of the Victoria ore channel, which has an extreme width of a Victoria ore channel being on the Mammoth-Grand Central ore z allel to the Centennial-Eureka zone. The Victoria ore channel ha NS. strike, with irregular dip. Lands also carry 2 other ore c developed, but worthy of careful investigation later.

Mine is opened by a 1,775′ vertical shaft, having 2 compart 900′ level, and 3 compartments below, to be cut down, 1911, to 3 ments. At the end of 1910 the mine had 9,507′ of workings, v development on the 1,400′ level, including a drift under the City that level, and 4,016′ of openings were made in the 13 months en 1910. The mine has 5 productive stopes, 3 on the 1,400′ level, 1 sub-level and 1 on the 1,600′ level. In March, 1911, some ore carr silver per ton was shipped. Mr. Fitch estimates that the present o insure 20 years of productive life. The mine has an undergrou system.

The new plant, installed 1910-1911, has two 150-h. p. boilers, v cal stokers, 2 hoists and 15-drill and 10-drill Nordberg air-comp 20x48″ double cylinder Wellman-Seaver-Morgan hoist has 6′ bal with 42″ face, taking 1⅛″ steel cable, and can operate 2 triple- balance, carrying 1-ton cars, to depth of one-half mile. The new ruples the hoisting capacity of the mine, and will increase same 8 cutting down of the shaft. There also is an auxiliary geared do hoist good for 1,700′. Buildings include a 45x112′ power plant, boilers, hoists and air-compressors; a 25x30′ machine-shop, 25x4 shop, and a 12x20′ smithy, all of steel frame, the new building nery costing $60,000.

Total ore shipments, from organization, Feb. 16, 1909, to D were 8,273 tons, giving net smelter returns of $208,371.37, and yie lbs. lead, 509,700 oz. silver and 560 oz. gold, an average return, ments, of 3.6% lead, 54.6 oz. silver and 0.06 oz. gold per ton, givi net smelter return of $25.19 per ton. Ore returns actually exceed underground development and operation, a record made by few development stage. The company's plans and methods of financi opment has been unusually clear, direct and satisfactory, there bei within wheels. Property considered valuable and management e

CHIHUAHUA COPPER CO.

Office: 267 Central St., Lowell, Mass. Mine office: Moctez Chihuahua, Mex. C. M. Dickey, president; Joseph Jackson, v Clarence W. Hoyt, secretary and treasurer; Jas. Parker, gene Organized Nov. 9, 1905, under laws of Maine, with capitalizati shares $1 par. Annual meeting, second Tuesday in November.

Lands, 100 hectares, in the Sierra Mojena, 20 miles west of showing numerous contact veins between limestone and porphyry undergoing development, range 2′ to 40′ in width, giving average copper, 3 oz. silver and $1 gold per ton, from cuprite, malachite, and occasional chrysocolla. Has several shallow shafts, deepest 75 tunnels, longest 120′, with 650′ of workings, estimated to show 2,50 Has a 25-h. p. hoist, good for 500′, a small Gardner air-compressor, mine buildings. Property was a small producer in the past, but w litigation for some time, before secured by present owners. Com sufficient ore, in the first quarter of 1906, to pay for the small ma on hand, and all development work. Property is under bond to o and practically reorganized. Lands are being tested by churn dri

R MINING CO. MÉXICO.
Bldg., Saginaw, Mich. Operating office: Apartado
Mine office: Santa Bárbara, Hidalgo, Chihuahua, Mex.
ident; Ross D. McCausland, vice-president and general
p, secretary; E. G. Rust, treasurer; preceding officers,
W. McCausland and F. R. Messinger, directors; Roy T.
nt; E. N. Funston, mill superintendent. Organized
ona, with capitalization $1,500,000, shares $10 par; fully
g, third Tuesday in February.
s, in the Chorreros, Santa Bárbara and Carizalillo dis-
Property was said to include the Justicia y Anexas, in
ns, bought of Madero Hermanos for 40,000 pesos, but
1908, that bond on the Justicia y Anexas had been for-
. Properties show 8 ore bodies, of which 3, under de-
l as 3′ to 8′ wide and traceable circa 4 miles, carrying
d nickeliferous pyrrhotite, averaging 5% copper, 5 oz.
The Justicia mine has a 200′ shaft, other shafts being
ces of 400′, and the Carizalillo shafts of 75′ and 100′, mine
orkings, claimed to show 100,000 tons of ore, with 75,000

e, 18 miles south of Santo Domingo and 12 miles south
he Kansas City, México & Orient Ry., has 2 small but
g rich copper sulphides.
at Santa Barbara, in the Chorreros Mountains, has no

s a 25-h. p. steam plant, a 120-h. p. Otto suction gas pro-
Otto gas engines, having a fuel consumption of less than
.-hour. Equipment includes 25-h. p. and 35-h. p. hoists
essor.
stone carpenter-shop, stone smithy, power plant, store,
and 40 dwellings.
f about 30 tons daily capacity, built of stone and timber,
r and 2 jigs, producing concentrates of about 20% copper

e has old smelter, of antiquated design and equipment,
uses.
sinking 3 new shafts, deepening present shafts, driving a
r plant and concentrator, and possibly a small smelter.
producing circa 16 tons daily of concentrates of 15%
cted to reach a daily output of about 40 tons by 1909.

ER. MÉXICO.
n Smelting & Refining Co., at Chihuahua, Chih., Mex.
OPPER CO. ALASKA.
vere Chas. E. Hogg, J. S. Spencer, Dr. Cassius Hogg,
ffenbarger and John L. Whitten, all residents of West
16 claims, on the Big Salmon River, including placer
$1.50 gold per cubic yard, which undoubtedly was an
installing a 2,000 cubic yard dredge, circa 1904, but
y at Haines, Alaska.
TD., BOLIVIA.
as sold, Aug. 20, 1909, to Corocoro United Copper
0 fully paid shares in latter, and company was liqui-
rmerly at Coro Coro, La Paz, Bolivia. Described

JUAN K. CHILD y CIA.

Dead. Firm was succeeded, 1905, by J. K. Child & Co., Ltd Coro Coro, La Paz, Bolivia.

SOCIEDAD UNIÓN MINERA CHILENA.

Dead. F. D. Aller was manager. Lands, which were 5 hec the Condesa and Unión mines, were operated, circa 1903, but pro doned later. Formerly at Cobija, Tocopilla, Antofagasta, Chile

SOCIEDAD CHILENA DE FUNDICIONES.

Office: Valparaiso, Chile. Mine office: Tamaya, Oval Chile. Works offices: Guayacán, Coquimbo, Chile, and Tong quimbo, Chile. Property includes the Tamaya mines, opened ci were the principal ore producers, also mines at Punitaqui and La L ince of Coquimbo. La Teresa mine, at Mantos Blancos, produc tons of 9% ore in 1909. Property also includes the Portezuelo m a whole are said to have an abundance of ore of 5 to 6% cop able for leaching.

Property includes 2 smelters, known as the Tongoy and G leaching plant at Guayacán, built 1907, with a capacity of 100 m daily.

The Fundición de Guayacán is one of the largest copper smelt formerly had 20 very small calcining furnaces and 14 very smal furnaces, 4 of latter being used for casting ejes, or matte, of abo tenor, 8 for Chile bars of 97% average tenor, and 2 for ingots slags averaging only 0.4% copper. In 1909 this plant was in building of a large reverberatory furnace. Fuel is domestic coal, a limited amount of Australian coke. Forces, 1907, were 365 me age wages of 1.2 pesos daily.

The Fundición de Tongoy has 5 calcining furnaces and 2 smelting furnaces, 16x22′ in size, making matte of about 57% ave Chile bars of 97% tenor, matte being sent to Guayacán for s treated average 15.4% copper, with slag losses of only 0.5%. works employed 236 men, at average wages of 2.1 pesos daily, bu coal, but this smelter has been idle since 1907.

Production, mainly from custom ores, was 23,968,609 lbs. 1903; 14,453,688 lbs. in 1907; 15,328,323 lbs. in 1908, and 16,296,3

CHILI COPPER SULPHATE SYNDICATE, LTD.

Dead. Former office was 101 Leadenhall St., London, E. C., Brückner, A. Gumprecht, H. O. Sillem and E. Story were dire Hadath, secretary. Organized July 28, 1899, under laws of Grea capitalization £5,000, shares £1 par, increased, October, 1901, to £1 par. Property was first leased and later sold to Copaquire C Co., Ltd. Formerly at Huatacondo, Copaquire, Tarapacá, Chile

SOCIÉTÉ CHILIENNE.

Mine office: Coro Coro, La Paz, Bolivia. Property is a sm ing native copper in conglomerate strata. Was a very small p accounts.

CHILLAGOE BLOCKS, N. L.

Dead. Formerly at Herberton, Cardwell Co., Queensland, A scribed Vol. VI.

CHILLAGOE COMPANY, LTD.

Office: 39 Queen St., Melbourne, Australia. English offic House, London, E. C., Eng. Mine and works office: Chillagoe, Ly land, Australia. Jas Smith Reid, chairman; D. W. Harvey P chairman; preceding officers, V. J. Saddler, H. F. C. Keats and Col. directors; C. L. Hewitt, secretary; Edwin Habben, London secr

dent; Jos. Horsburgh, smelter superintendent; Fred
dent.
1905, under laws of Queensland, with capitalization
to £500,000, shares 10s. par; fully issued, 9s. paid. The
td., organized June 16, 1898, was reorganized as the
ines, Ltd., again reorganized 1902 as New Chillagoe
and reconstructed for the third time under the present
,000, being £500,000 at 5%, and £200,000 at 4½%.
ding March 31, have been as follows: £64,900 in 1908;
nd £88,348 4s. 1d. in 1910, earned entirely by the rail-
540 was paid as interest on debentures, and £56,016
ent and depreciation. Deficiency coupons for deben-
wns 75,000 shares in the Mungana (Chillagoe) Mining
910, the Mosquito Prospecting & Options Co., which
Etheridge district.
including 2,016 acres, fifty-year leasehold from the
r conditions under special act of the Queensland parlia-
elter site, all in the Walsh & Tinaroo district, concessions
eases, expiring Jan. 1, 1948, held at annual rental of £1
from labor conditions, and 6 original leases. Property
sperandum, Havelock and Queenslander mines, worked

Silurian limestone, sandstone and conglomerates, with
contact deposits, carrying auriferous copper ores giving
copper and 2 oz. silver per ton, with traces of gold, and
r about 20% lead, 8% zinc and 2 oz. silver per long ton.
Ruddygore and Zillmanton, minor properties being the
nder or Morrison mine, latter worked under option.
ne apparently has a stockwerk, and is worked largely
300′, being bottomed in low grade ore. Production,
s of ore, yielding 337,276 lbs. fine copper and 10,411 oz.
of 3.63% copper and 2.5 oz. silver per ton. Equipment
nd a 6-drill air-compressor.
e has a vein of 17′ to 20′ width, opened by old shafts of
ew Reid shaft sunk, 1910, to 223′. Ore produced, 1907,
nd 1.6 oz. silver per long ton, and mine is estimated to
000 long tons. Mine was flooded, 1908, and reopened,

d Cap mine has a 200′ shaft, but is worked mainly open-
of ore of 2 to 6% copper tenor and circa 2.5 oz. silver

r Morrison mine has a 255′ main shaft, with Cornish
ow grade sulphide fluxing ore, and, in 1907, produced
elding 142,260 lbs. fine copper. Reserves are estimated
aging circa 3% copper and 3 oz. silver per ton. Owing
ment, work was suspended on the bottom levels, March

include the Hensey, having a 200′ shaft, which, in 1907
the Dargalong mine, which shows auriferous copper and
, which has proven disappointing in development; the
0′ shaft, which is idle; the Victoria, having a 600′ shaft,
, which has a 368′ shaft and is idle; also the Hobson and
Fluxing properties include the Boomerang and Mount
imestone quarry at Mount Lucy.
steam plants at the principal mines, with 6 hoists, good
air-compressors. Buildings include a 50x70′ wood and

iron machine-shop, 50x70′ carpenter-shop and smithy, a small i
other mine structures, and 11 dwellings.

The smelter, at an average distance of 4 miles from the diffe
ceiving ore by rail, is a very complete plant, costing circa £60,00
extensive custom business, treating Mungana, Einasleigh and otl
plant is on a hillside, and is terraced. There are 3 Edwards calci
140-ton blast-furnaces, 3 for lead and 5 for copper, also a reverber
The lead smelter uses the Huntington-Heberlein sintering proces
The lead furnaces treat Mungana and other custom ores, the copp
being matted, and afterwards smelted in the copper furnaces.
sulphides are divided into 3 lots, as straight copper ore, copper-l
the copper is practically discarded, and silver-lead-copper ore, wi
all 3 values in latter. The converter department has 1 stand, with 6
35% copper matte from the blast-furnaces, and turning out bliste
aging 98% copper and circa 100 oz. silver per long ton. The con
ment has an electric crane, and pneumatic tamper for linings. Fue
and coke, and water is taken from a 1,500,000-gallon dam, across Cl
which has a minimum flow of 4,000 gallons hourly. The smelter has
and in connection there is a small sampling mill, with crusher a

The Mareeba to Chillagoe railway, owned by the company, h
main track, with branch lines and sidings giving a total of 270 r
ently it is planned to turn over this railway, which is the only pro
of the business at present, to the Queensland government.

The following figures of production include the Mungana, N
and other custom ores, which supply the bulk of the product. I
fiscal years ending June 30th was as follows: 1,526,394 lbs. fine c
3,391,360 lbs. fine copper, 4,399 tons lead and 478,478 oz. silver in 1
lbs. copper, 2,042 long tons lead and 421,178 oz. silver in 1909.
late 1910, was about 90 long tons of fine copper weekly, or
10,000,000 lbs. yearly. The Chillagoe has had an uphill fight fron
but, with the aid of the railway, has made substantial progress
results; apparently the loss of the railway will leave the compar
precarious condition, with low metal prices ruling.

CHILLAGOE COPPER PROPRIETARY, LTD.

Dead. Was dissolved Dec. 26, 1902. Formerly at Chillag
Queensland, Australia.

CHILLAGOE RAILWAY & MINES, LTD.

Dead. Was reconstructed June 5, 1905, as Chillagoe C
Formerly at Chillagoe, Lynd Co., Queensland, Australia. Very f
Vol. VI.

CHINESE MINING EXPLORATION CO.

Mine and smelter office: Chang-Sha, Ho-Nan, China. Dr
general manager. Is owned and managed by the government, a
present, is on lead ore, but the property includes promising co
which are reserved for later development.

CHINIPAS COPPER CO.

Office: 1531 Railway Exchange, Chicago, Ills. Mine offi
Arteaga, Chihuahua, Mex. H. M. McIntosh, manager; Fred W
intendent. Organized Oct. 8, 1906, under laws of Maine. Lands
western corner of the state of Chihuahua, include El Vencidor
a ledge or dike of circa 300′ estimated width, with an ore shoot t
one-third mile, showing considerable native copper, the ore, after e
native metal, giving average assays of about 7% copper. Presu

CHINO COPPER CO. NE

Office: 87 Milk St., Boston, Mass. Mine office: Santa Ri
N. M. Chas. M. MacNeill, president; Col. Daniel C. Jackling, vice

ding officers, Chas. Hayden, J. G. Hopkins, A. Chester
hschild, Henry M. Whitney, Sherwood Aldrich, Hon.
er Penrose, W. Hinckle Smith and Samuel Sloan, direct-
retary; Keith Stewart, treasurer; Kurnal R. Babbitt,
M. Sully, general superintendent; Louis E. Foster, chief
uff, construction engineer; C. W. Boise, mine engineer;
clerk; Horace Moses, general foreman; P. H. Williams,

ugust, 1909, under laws of Maine, with capitalization
par. Charter contains a provision that for 2 years the
rease its capitalization, incur debts, issue bonds or have
ss of $1,000,000. Company began business with $250,000
1910, had $1,277,893 cash on hand, and was said to have
750,000 cash. Is controlled by the Guggenheim interests,
ed in management and ownership with the Utah Copper
ated Copper Co. Annual meeting, in June.
an business owning 75,000 shares of the capital stock of the
and is said to have given 375,000 shares for the property
ing Co. Whether the Santa Rita Mining Co. gave full
per Co., or whether the Santa Rita is retained as direct
is merely a holding company, has not been determined,
ideration the fondness of the Guggenheim interests for
would not be surprising were the Santa Rita still the direct
perty is described under this title.
es, including 96 patented claims, area 1,977 acres, and
adjoining, in the Central mining district. The property
del Cobre mine, which is the oldest copper mine in New
e oldest in the United States, having been opened, 1804,
rked 1828-1835, by a Frenchman, who was reported to
of $500,000 therefrom. In the early days only the rich
d ore was sent by pack-trains to México. The mine was
, owing to the Mexican revolution, and reopened, 1828,
5, and again reopened, 1860, since which time it has been

upies a basin at the foot of the Santa Rita Mountains,
e and andesite-porphyry. Diorite forms practically all of
n the east, north and west, dipping in a generally south-
r the extrusive flows which constitute the south and south-
entaries consist of a quartzite bed, overlying a series of
he andesite-porphyry is a later intrusion than the diorite,
nd the sedimentaries, and the ore bodies are associated
y, both intrusives and sedimentaries having been much
conditions for secondary enrichment. The old workings,
eveloped considerable high grade ore, and include No. 8
wo compartments; the 300′ two-compartment No. 9 shaft;
howing ore ranging from chalcocite and native copper to
rincipal values being developed in the latter, but having a
f high grade ore to serve as a sweetener for the low grade
he old dumps contain about 150,000 tons of ore, of circa
e copper tenor, heretofore unworkable, but which can be
fit, with a large modern concentrator suited to this class

a belt of horseshoe form, some 7,000′ in length, with aver-
0′, carrying disseminated ores in the shattered country-
s, ore being mainly disseminated sulphides, largely chalco-
copper, in andesite, porphyry and quartzite. Property

is being proven by churn-drilling, with 9 Cyclone drills, boring s holes per acre, checkerboard fashion, holes averaging about 300 occasionally being much deeper, ore proven as a rule being low with occasional streaks of high grade ore. The average thickness veloped is estimated at 197′, and capping at 76′, the latter varyin to 200′ in depth. The disseminated ore of commercial grade run than in other mines of the porphyry class that have been develo apparently about half of the ore developed can be mined opencas 5 steamshovels engaged in removing the capping. For the May 31, 1910, churn drills bored 74,494′ of holes, estimated to 12,000,000 tons of disseminated ore, and the mine was said, early about 40,000,000 tons of ore blocked out, averaging 2.35% coppe acres have been prospected, more or less thoroughly, with stro considerable ore remaining in the unexplored portions of the terri ently about half of the ore developed is available for opencast wor sibly a larger proportion will be so available with deeper stripp been found to a depth of 1,600′ by borings, in the Hearst-Carasco

For purposes of development the mine has been divided in zones.

The Hearst-Carasco mine, in the southwestern part of th opened by the 400′ Hearst shaft, and shows the largest quantity ore, also the deepest ore bodies. It is planned to operate the H by the caving system.

The Romero mine, west of the Hearst-Carasco, and practica ation, is part of the old mine, and was the first to be opened. O native copper, and lies near the surface, giving average assay retur holes, of 2.16% copper. This mine is planned to be stripped and wo

The Montoya mine practically is a continuation of the Hearst is to be mined opencast.

The Sata Rita mine, north of the Romero, is an old mine, wit compartment shaft, having considerable development on the 200′ a

The Chino mine, which is being stripped for opencast wo mainly chalcocite, with occasional cuprite and native copper, and tities of carbonates.

The Texas Flat mine, northwest of the Romero and west of t carries ore values mainly below the 300′ level, and was developed the past through the Santa Rita shaft. The ore lies deep and s extracted by quarrying.

The Whim Hill mine, west of the Texas Flat, and at the cres shoe, shows some very high grade chalcocite, from which more or le mined, by lessees. This also must be worked by mining, rather th

The Yosemite apparently is a small and shallow deposit, w stripped for opencast working.

The mine has 16,000-ton ore-bins, and electric power is to be There are nine 45-ton locomotives, and about sixty 40-ton car of the latter to be increased largely when production is begun. ground, holes averaging about 30′ are bored by Cyclone drills fired by blasting machines.

There is an old 100-ton mill, built by lessees, which has been used for extensive tests, putting about 16 into 1, with a reported to 70% of the assay values, and it is estimated that a mill speciall this ore should make an extraction of about 70%.

The new mill is at Hurley, 9 miles from the mine, on the Sant of the Santa Fé railway. Concrete footings were completed, wi erection, early 1911. The plant should start during the latter The mill is to have three 1,000-ton units and may be increased

ıew mill is essentially the same as that of the mill of
ınd equipment will include 1 set of 72x20″ rolls, 6 sets
arfield Chilean mills, 9 smaller Garfield Chilean mills,
Garfield tables, 18 Wilfley tables and 450 Frue vanners.
lude three 1,250-kw. generators, direct-driven by three
s. Water will be secured from the underflow along the
th an 85′x200′ reservoir near Apache Tejo, and with
key and Cameron Creeks. The company is said to
ther water supply, on the Central City draw, 8 to 10
ing water therefrom into a central station, and thence
voir.
mill includes an office building, store, shops and dwell-
ld town built up around the mines.
a small production, from the test mill, shipped to the
and concentrates from the new mill will go to the El
ract. The Chino should be a producer before the end
ent hopes to recover about 35 lbs. of copper per ton
ca 9 cents per pound, with a production of about
rom the present mill, and should have a productive
000 lbs. yearly, if given a 5,000-ton mill. The manage-
horoughly capable men, who have been the pioneers in
ssful low grade country-rock mines, and the property
nise.

MINING CO. **WISCONSIN.**

sold, October, 1902, for debt, passing to Corona Copper
t West Superior, Douglas Co., Wis. Described Vol. II.

OPMENT CO. **ARIZONA.**

ed, Jan. 9, 1907, by San Simon Copper Co. Formerly
, Ariz. Very fully described Vol. VI.

ANEXAS. **MÉXICO.**

bán, Hidalgo, Mex. León Lamaire y Ca., owners.
a, La Pretoria, La Mutua and El Moro mines, carry-
d copper ores, and there is a small smelter. Employed
ounts.

ED MINES CO. **ALASKA.**

e St., Chicago, Ills. Mine office: Landlock, Alaska.
s. Kreis, vice-president and general manager; Chas.
asurer; Dr. E. T. Griffith, superintendent; preceding
Shaka and A. B. L. Gellermann, directors. Organized
of Washington, as successor of Central Alaska Gold &
zation $5,000,000, shares $1 par, nonassessable; issued,

patented, in 4 groups, on Landlock Bay, near Valdez.
a 50′ shaft, formerly reported to be in a vein 150′ wide,
l now claimed to be 225′ wide, 4,500′ long, and to carry
% copper, 4 oz. silver and $1.66 gold per ton, which
aggerated. Ore is highly silicious, and development is

a Pelton wheel, direct-connected to a 60-h. p. dynamo,
e are several buildings, and a small sawmill, also hav-
nagement reports that contracts are to be let, early 1911,
mpany hopes to become a shipper by September, 1911.
romoted by Geo. L. McKay, a shark who was put out of
ent postal authorities, April, 1909. Many abominable
, but the present management apparently had no con-

nection with the promoters. Claims of present management are aggerated, but property is considered promising.

CHITINA EXPLORATION CO.

Dead. Formerly at McCarthy's Creek, Copper River d Described Vol. V.

CHOIX CONSOLIDATED MINING CO., LTD.

Office: 516-355 South Broadway, Los Angeles, Cal. Min Fuerte, Sinaloa, Mex. R. A. Thomas, president; A. E. Pome president; C. J. Heyler, second vice-president; J. R. Thomas, se McDermott, superintendent; preceding officers, Leslie F. Key, W W. B. Simmons and Francis L. Robbins, directors. Organized M laws of Arizona, with capitalization $5,000,000, shares $1 par, issued, $3,055,000. Is protocolized under laws of México. Ow stock issue of Los Platanos Development Co. Annual meeting, fi October.

Lands, 479 hectares, including several mill and smelter sites, from a railway, on both sides of the Rio Fuerte, in El Fuerte dist and the Urique district of Chihuahua. Part of the holdings wer Los Platanos Development Co. Ore bodies are claimed to meas in width, occurring as contact deposits between diorite and limesto veins in granite and quartzite carrying gold. Property includes se

Management states that an order was placed, November, Mill & Smelter Engineering Co., New York, for a steel frame sm 100-ton 42x72′ matting furnace plant, to be in operation early 191 Los Platanos ores also.

Shipments, 1900-1902, of 1,062 tons of ore, to the Aguascal gave returns of 19.5 to 28% copper, with gross values of $127, values of $47,940.61.

COMPAÑÍA MINERA y BENEFICIADORA DE METALES DE CHOIX, S. A.

Dead. Formerly at Choix, Fuerte, Sinaloa, Mex.

SOCIEDAD EMPRESA MINERA y DE FUNDICIÓN DEL MINERAL DE CHOQUELIMPE.

Mine office: Choquelimpe, Tacna, Arica, Chile. Carlos B manager. Organized circa 1908, as successor of Conpañía Be Metales. Mine is an irregular ore body in rhyolite, carrying cup with quartzose gangue, and the company apparently is operating m sive old dumps of low-grade copper ore, employing 120 men, 1909.

The reduction works, 160 kilometers from the port of Arica, freight charge of 50 pesos per metric ton, include a small mill and mill, built 1909, has 2 Blake crushers; a 40″ Huntington mill, 1 tables and 1 Ferrari table. The smelter has 2 calciners, and a water-jacket blast-furnace, with 2 blowers and a 50-h. p. boiler. and domestic coke, and yareta is burned under the boilers. Pr bars carrying good gold and silver values. Production, 1909, was copper, with considerable gold and silver values.

FUNDICIÓN DE CHORRILLOS.

Owned by Compañía de Minas i Fundición de Calama.

CHOTA NAGPUR MINES.

Mine office: Chota Nagpur, Bengal, India. Ore occurs a disseminated in schistose rocks. Mines were worked in very anc a local company did some development work in 1903; since idle.

CHRISMAN & GLOBE MINING CO.

Mine office: Globe, Gila Co., Ariz. Isaac Chrisman, presid manager. Lands are variously reported as 7 claims and as 25 clai the Arizona & Michigan and one-half mile east of the Superior &

cation known as Cameron, with about 15 buildings. Mine
g ore carrying a little copper, with good silver values.
evelopment, by lessees, at last accounts.

CONSOLIDATED COPPER CO. **NEVADA.**

S. D. Mine office: Sulphur, Humboldt Co., Nev. W. E.
ent; Hon. Fred H. Whitfield, secretary. Organized circa
evada, with capitalization $1,000,000. Lands, 24 claims,
watered, in the Jackson or Antelope Mountains, 65 miles
ucca, formerly owned by Nelson Consolidated Copper Co.
nd 180' of old tunnels, with some surface trenching, showing
copper, and 60 cents to $2 combined gold and silver values
estone carrying epidote and garnet, near a granitic intru-

IG CO. **ARIZONA.**

eeded, 1907, by Baltimore Copper Co. Formerly at Pres-
z.

CIADORA DE CHUQUICAMATA. **CHILE.**

at Tarapacá, Tarapacá, Chile. Described Vol. VIII.

TADORA DE CHUQUICAMATA. **CHILE.**

so, Chile. Mine office: Calama, Antofagasta, Chile.
0, under laws of Chile, with capitalization £40,000, and re-
04, with capitalization £100,000, shares £2 par. Property
said to have produced about 6,000,000 pesos worth of rich
er, and employed 15 men, 1909.

A CHURRUCA. **PERÚ.**

was sold to Peruvian Mining, Smelting & Refining Co.
cha, Junín, Perú. Described Vol. VIII.

PER CO. **MÉXICO.**

Broad St., New York, N. Y. Mine office: Minas de
, Sonora, Mex. Geo. Beebe, president; John B. Carring-
B. Boice, secretary; R. C. Davenport, treasurer; Frank Fitz,
eding officers, August Gauch, Richard Bryer, Geo. A. Sand-
, A. P. Boller, E. R. Enbody, Edw. Brush and Samuel Car-
nett E. Marks, receiver.

companies of this same title, due to devious financing, or-
under the laws of Arizona, Nevada, and México. A com-
May 18, 1901, under the laws of Arizona, with capitalization
10 par, and was reorganized Dec. 8, 1905, under laws of
apitalization. The Cieneguita Copper Co., S. A., organ-
of México, was the original company, holding direct title to
pany transferred all its stock to the Cieneguita Copper Co.,
pany is said to be controlled, through ownership of 80% of
ita Securities Co., reason for existence of which is not ap-
ly is some sort of an essay in high finance. The company
the Sonora Central Railway Co., with G. A. Sanderson as
uild a 40-mile narrow-gauge railway. As a result of litiga-
ed that the transfer from the Arizona to the Nevada cor-
d the former was decided to be the only legal corporation,
property. As a result of this litigation, Barnett E. Marks
er, June, 1910. Apparently the Cieneguita Securities Co.
nother reorganization. The company's methods have been
vith proper information not furnished shareholders, and
tion given to stockholders and the general public.

ctares, circa 40 miles southeast of Sahuaripa, and about
ng land, fairly watered and timbered. Country rocks are
, of rhyolitic nature, rhyolite tuffs and rhyolite breccias,

with diabase dykes. Property is in 4 groups, the Chipiona group c 800′ of the strike of the vein system. The Cargona group is near with slight development. The Ostimuri group, circa 2 miles sou Chipiona, was worked in early days, and the Tayapa group, west of has several antiguas, carrying silver, lead and copper ores.

The mine has shafts of 125′ and 136′, but development is mai nels, of 35′ to 1,200′ length, with circa 3 miles of workings. In 19 ings of 3,919′ were made. Veins are of practically vertical dip, and have been located, with 5 under development, these being reported width, with one, traceable 3 miles, opened to extreme depth of 80 Ores are sulphides, first claimed to carry average values of 5% c silver and $3 gold per ton, which figures were grossly exaggerate later to run 4% copper and 61 oz. silver, but average assays De gave 2.5% copper and 45 oz. silver. Company, in 1906, claimed 2 of ore in sight, with 300,000 tons blocked out for stoping, which w untrue, as the company never had any considerable amount of or for stoping.

Equipment at the mine includes a 100-h. p. steam plant, with compressor. Buildings include a 30x60′ stone machine-shop, store, miscellaneous mine buildings, and 120 dwellings for employ

The smelter, at Chipiona, 1,500′ from the portal of the main t ceiving ore therefrom by tram-line, has Blake crushers and rolls, a ing furnace and 2 small wood-burning reverberatory furnaces, of daily capacity each. Fuel is inferior wood, costing $3 per cord. blown in, 1906, and has been worked erratically, but has proven a production, 1908, was said to have netted $29,000. Transportati h. p. auto-truck.

The company is bankrupt, as the natural result of the crooked management. The property, while not entirely devoid of prom located for transportation facilities, and under such a managem been cursed with, cannot, by any possibility, ever become a succes

COMPAÑÍA MINERA DE LA CIENEGUITA, S. A.

Is the Mexican incorporation of the Cieneguita Copper Co.

CIMA COPPER CO. C

Dead. Office was Searchlight, Nev. J. E. White was man were explored for copper, 1907, by diamond drill boring. Form San Bernardino Co., Cal.

CIMARRON MOUNTAIN MINING CO. NE

Office: 13 Dodge Blk., Lansing, Mich. Mine office: Cim Co., N. M. Hon. Justus S. Stearns, president; C. C. Hopkins, v F. S. Porter, secretary and treasurer. Organized Oct. 24, 1904, New Mexico, as successor of Consolidated Verde Mining & Mill capitalization $2,000,000, shares $1 par; issued, $1,800,000.

Lands, 65 acres, patented, in the Cimarron district of the N grant, 35 miles from Springer, the nearest railroad station, with goo connecting. Property shows gossans of decomposed limonite an quartz carrying gold values and copper stains. Has circa 1,500′ mainly tunnels. Practically no work has been done by present c property has been idle some years.

CINCO DE MAYO MINING & SMELTING CO.

Office: San Antonio, Tex. Letter returned unclaimed from office, Descubridora, Mapimi, Durango, Mex. Alfred van der S ident; E. Harms, vice-president and general manager; G. C. Carothe Douglas Muir, general manager; Geo. B. Smith, superintendent, at [illegible] ds include the Parandera and Mimbre mines, both copp [illegible] ha [illegible] d 300′ shafts, developing high grade oxi

average 8%, in a limestone-porphyry contact. To February, d shipped 50 carloads of ore, from development work, to the which was said to have paid costs. Presumably idle.

GOLD & COPPER MINING CO. **ARIZONA.**

Nelson was superintendent. Property was a prospect only, nited amount of development work was done, 1904. Formerly i Co., Ariz.

INING CO. **UTAH.**

old Bldg., Houghton, Mich. Mine office: Alta, Salt Lake Edwards, president; Jas. P. Edwards, secretary and treasurer; istant secretary and manager; preceding officers, Hon. N. W. ch, directors; Robt. L. Edwards, general manager. Organized of Utah, with capitalization $1,000,000, shares $5 par. Has ible bonds.

250 acres, near the Continental-Alta, and one-half mile from idated, showing a 12′ main fissure vein, with 2 ore bodies has 4 tunnels, including the 1,800′ Topeka or upper tunnel; ocks or lower tunnel, first 300′ a crosscut and balance drift, ′; the Edwards crosscut tunnel, planned to be driven 6,000′, l of 1,500′. Ores are argentiferous lead and copper sulphides, iferous lead carbonates, returning 12.5% copper, 16 oz. silver , with 30% lead and 10 oz. silver per ton from lead carbonates, Klepetko reported, circa 1910, $229,000 worth of net ore e the tunnel level, with present crude facilities, or net ore If given adequate transportation, and a mill.

cludes gasoline power and a short aërial tram, connecting with ram of the Continental-Alta. Extensive ore dumps remain A proposal to merge the City Rocks with a number of ad- in one large corporation, and secure the milling and trans- badly needed, was under consideration, early 1911.

CO. **IDAHO.**

Montpelier, Bear Lake Co., Idaho. G. C. Gray, president D. Young, secretary. Organized Sept. 16, 1902, under laws italization $200,000, shares 50c. par. Lands, 3 claims, area ures in sandstone, and contact deposits between limestone ing ores assaying 4.6% copper, 10 oz. silver and about $1 ein carrying cuprite, melaconite, dioptase and chrysocolla, of 100′ and 200′. Idle several years.

MINE. **MONTANA.**

Delpine, Meagher Co., Mont. S. Southworth, manager. The eek, 20 miles from the Chicago, Milwaukee & Puget Sound ′ shaft, with stoping in progress on the 400′ level. In 1908 chalcopyrite averaging about 20% copper, presumably after by wagon to the railway station, for transportation to the Works. Presumably idle.

DATED GOLD & COPPER MINING CO. **ARIZONA.**

radbury Bldg., Los Angeles, Cal. Mine and works office: o., Ariz. Geo. Mitchell, president and general manager; e-president; E. D. Elson, secretary and treasurer; preceding hell, Robt. E. Morrison, Rev. Alfred Quetu and O. W. Strodt- L. Browne, general superintendent; J. J. Williams, smelter Organized August, 1908, under laws of Arizona, with capital- as a merger of the Clara Gold & Copper Mining Co., Signal Princess Mining Co., Crown Queen Mining Co. and Morrow ment, of date circa July, 1910, gave cash assets of $102,721.75

and accounts payable of $86,751.43, including $25,000 due the pres
pany operates the Arizona & Swansea railroad, but does not own

Lands are variously reported as 132 claims, area 3,300 acres, an
about 10 miles from Planet. Property includes a number of old mi
with very limited development, and shows a vein system with s
and dip of 45° SE., apparently in a shear-zone, with extensive faul
system of faults giving a series of step-faults, with throws of 10′
ore zone has a gneiss footwall, and altered limestone hanging, ore
mainly lenses of a few feet up to several feet in width, and varying
cally barren patches up to ore of 10 and occasionally 15% copper
are mainly carbonates and silicates, with some oxides, lower le
some chalcopyrites, bornite, chalcocite and native copper, gangue
and occasional altered limestone. Ores as mined are estimate
about 4.5% copper, carrying small gold and silver values. There
of high grade hematite, carrying up to 10% native copper.

The mine has 6 shafts all shallow. No. 1 shaft, 400′ deep, h
Fairbanks & Morse gasoline hoist, raising ore with a bucket. No.
deep, is sunk on an incline, and has a 50-h. p. Western gasoline hoi
a 2-ton skip. No. 3 shaft, 200′ deep, has no equipment, ore going th
No. 4 shaft, the largest and deepest, having 3 compartments, is 50
a hoist. No. 5 shaft, 340′ deep, has a 75-h. p. steam hoist, and No.
deep, has a 25-h. p. steam hoist. The mine as a whole has about 6,
ings, and is said to show a large body of chalcopyrite on the 300′
drilling was done, 1908, with a Keystone churn drill.

The power plant has two 250-h. p. boilers, a 300-kw. D. C.
motor, and a 150-kw. belt-driven Ideal motor, latter operating p
Bill Williams Fork River, supplying water to the mine and works th
6″ pipelines. Buildings include a machine-shop, sawmill and othe

The reduction works include a 300-ton sampling mill and 600-
The smelter, built at Swansea, then torn down and rebuilt, and bl
1910, is a peripatetic affair, formerly located, more or less imper
Naco, Arizona; La Cananea, Sonora, México, and Globe, Arizona.
has a 44x292″ Mitchell water-jacket blast-furnace of 750 tons rated
ity, with a 125′ stack, 7′ in diameter. The power-house has a
foot Nordberg air-compressor, and a Connersville blower direct-co
Hamilton Corliss compound engine. Slags are handled by a Je
locomotive. The smelter building is of structural steel. The conv
ment has 2 stands and 9 shells, rotated electrically, with a 40-ton e
having 2 auxiliary hoists, and a silica-mill, with electric motor, for

The Arizona & Swansea Railroad Co., with capitalization vario
as $500,000 and $3,000,000, completed February, 1910, has a 21-m
Swansea to Bouse, and is equipped with three 65-ton Baldwin loco
twenty 20-ton cars. Apparently this line is operated by the Clara C
but is not owned, an independent source stating that control of t
held by Mrs. Geo. Mitchell.

Much of the stock of the Clara Consolidated was placed in nor
and Belgium, originally through Father Quetu, and stock was sol
$3, and even at the sinful price of $3.50 per share, when selling lo
a fraction of those figures. Some of the European agents, when s
claimed a sure dividend of $1 per share, in 1910. It has been rumo
that parties connected with the management controlled the boar
saloons, moving picture show, and practically all other establishm
opportunities for the joyous expenditure of wages. The prope
circa 200 men, when in full operation, and the smelter was in blast int
1910, ostensibly owing to the lack of sulphide ores for fluxing, b
owing to a lack of ores available, the mine not being developed t

lf its capacity, for any great length of time. Apparently the 0 in very poor financial condition. Is not regarded favorably.

CO: UTAH.

erly at Thompsons, Grand Co., Utah.

COPPER MINING CO. ARIZONA.

nerged, circa August, 1908, in Clara Consolidated Gold & Formerly at Swansea, Yuma Co., Ariz. Described Vol. VI.

A COPPER MINING CO. AUSTRALIA.

uucceded, 1897, by New Clara St. Dora Copper Mining Co., t Hergott's Springs, South Australia. Described Vol. IV.

IDATED MINING CO. ARIZONA.

erly at Douglas, Cochise Co., Ariz. Described Vol. VI.

CO. CALIFORNIA & MÉXICO.

ged its name, which was badly smirched, 1909, to Oleum De- d quit the "copper" game. Formerly at Greenwater, Inyo escribed Vol. IX.

MICHIGAN.

f Dr. Léon Estivant, owner, 47 Ave. de l'Alma, Paris, France. per Falls, Keweenaw Co., Mich. Fred W. Nichols, agent. including mines formerly known as the Clark, Bell and Mon- miles south of Copper Harbor, between Lake Fannie Hooe on kfast Lake on the south, including Lake Manganese. Mine, opper, had a 16-stamp gravity mill, built 1874, run by water Manganese, mill now being dismantled. Property also carries of pyrolusite, average of assays, 1900, by Duparc, of Geneva, anganese and 1.36% copper. Has shipped circa 1,200 tons of ese ore. Was tested, 1905, and again 1910, by diamond drills. 1910, to United States Smelting, Refining & Mining Co. Idle. . II.

. CO. ARIZONA.

rly at Phœnix, Maricopa Co., Ariz. Described Vol. VIII.

ÜTTENAMT CLAUSTHAL. GERMANY.

Clausthal, Hanover, Germany. Herr Bergrat Boltze, man- a silver-copper smelter, operated under state auspices.

NG & SMELTING CO. IDAHO.

Clayton, Custer Co., Idaho. Lands, 18 claims, showing ar- and lead ores. Has water power, and a smelter rated at 50 years.

MINING & REDUCTION CO. COLORADO.

ly at Russell Gulch, Clear Creek Co., Colo. Described Vol. VI.

NE. MONTANA.

aconda Copper Mining Co., at Butte, Silver Bow Co., Mont.

OLD & COPPER MINING CO. IDAHO.

ce, Idaho. Mine office: Clearwater, Idaho Co., Idaho. nanager; J. P. Rogers, superintendent. Organized 1907, un- with capitalization $2,500,000, shares $5 par. Lands, 5 lode ial, and 3 placer claims, including the Cunningham group, on he Clearwater River, circa 20 miles south of Wallace, nearest wagon road connecting. Property shows a vein said to be mile on company's lands, carrying oxidized ores near surface, and chalcocite at depth, giving assays of 15 to 33% copper, er per ton. Development is by 3 tunnels, lower showing a 20′ f circa 400′. Equipment includes a hoist and air-compressor.

PPER CO. ARIZONA.

e: Jerome, Yavapai Co., Ariz. Hon. Geo. W. Hull, presi- l general manager; Mary A. Hull, secretary; H. M. Pender,

superintendent. Organized 1902, under laws of Arizona, with $4,000,000, shares $1 par.

Lands, 13 claims, 11 patented, area circa 200 acres, shortl United Verde, showing fissure and gash veins carrying ores assa copper and 1 to 500 oz. silver per ton, with fair gold values. Has to 150′ depth, and 9 tunnels, the Dillon tunnel, of circa 3,200′ len connect with the "1888" shaft, showing a 3′ vein of argentiferous copper sulphide, of good average tenor. The Dillon tunnel pass Cleopatra into lands of the Hull Copper Co., and latter has permi tunnel through the Cleopatra tract. Some good ore has been tak cuts driven from the Dillon tunnel, but apparently no commercial been developed thereby.

Equipment includes a steam and electric plant, with a 30-h. and 12-drill air-compressor. A 50-ton smelter, built 1906, was management stating on account of lack of iron fluxes. Managem mated 2,000,000 tons of ore developed, that having been done by wished to gain the benefit of this mythical tonnage for their own erties. A little copper has been produced, amounting to 98,000 lb probably about the same in 1910, from ore shipped to the Swans

CLEVELAND-ARIZONA MINING CO.

Dead. Lands were sold, 1907, to El Tiro Copper Co. Fo Rock, Pinal Co., Ariz. Described Vol. VI.

CLEVELAND MINING CO.

Office: 409 Hooper Bldg., Salt Lake City, Utah. Mine Juab Co., Utah. Samuel McIntyre, Jr., president; Samuel McI president and treasurer; R. M. Wilkinson, secretary. Organized under laws of Utah, with capitalization $500,000, shares $5 pa Two 1-cent assessments have been levied. Is controlled, throug ship, by Mammoth Mining Co. Lands, 3 claims, patented, showing argentiferous lead and copper ores, very slightly developed. Id

CLEVELAND-MONTANA MINING & DEVELOPMENT.

Dead. Formerly at Butte, Silver Bow Co., Mont. Descri

CLEVELAND-NEVADA MINING CO.

Dead. Was organized 1907, with capitalization $5,000,000, ated with Amalgamated Nevada Mines & Power Co., which was April, 1910. Was promoted by the Woolley Exploration Co., whic woolly methods of selling stock. Idle several years and apparent

CLIFF COPPER CO.

Dead. Was organized 1872, under laws of Michigan with $500,000, shares $25 par, and bought the old Cliff mine, when ne for $100,000. Largest annual production was 1,162,873 lbs. fine Suspended operations 1883. Property was sold later to Tamara and set off by latter, January, 1910, as Cliff Mining Co. Former Keweenaw Co., Mich.

CLIFF MINING CO.

Office: 12 Ashburton Place, Boston, Mass. Operating o Mich. Mine office: Phœnix, Keweenaw Co., Mich. Rodolph president; Quincy A. Shaw, vice-president; Geo. A. Flagg, secret urer; Jas. MacNaughton, general manager; preceding officers, Fra son, Francis W. Hunnewell, Thos. N. Perkins and Clarence H. B Organized January, 1910, under laws of Michigan, with capitalizat shares $25 par; issued, $1,500,000, $13 paid in. Is controlled, thro of 19,400 shares, by Calumet & Hecla Mining Co. Ended 1910 cash, and accounts payable of only $2,242.66. State Street Tru registrar; American Trust Co., Boston, transfer agent. Annual Wednesday in April.

he Cliff mine proper, and the South Cliff, connected under-
el. The Cliff mine, 2 miles northeast of the Ojibway, is the
ake Superior district, having been opened 1846, closed 1870,
2, and abandoned 1878, paying dividends, 1849–1879, of
l mine was opened on a fissure vein crossing the bedded for-
right angles, and was pretty thoroughly worked out before
ndoned. The main fissure vein of the old mine had several
ber of independent fissure veins, including the West vein,
pper near surface, and the East Cliff vein, about an eighth
main vein. The old Cliff was notably rich in native silver.
s the Kearsarge amygdaloidal bed for about 2 miles, and for
l depth, the shaft being a trifle less than 2 miles from the most
he Ojibway, which is the nearest opening on the Kearsarge
ck Mining Co., which owned the Cliff until 1910, secured a
cross-section of the tract, by diamond drilling, 1903–1907,
being located by 12 drill holes, the majority of which were
ercial values, and, in addition, the property carries about 20
beds, under the greenstone bluff, which is such a prominent
cape, rising to a height of several hundred feet. A tempo-
with a single compartment, started August, 1910, was 103′
entering the bed near the hanging-wall of the Kearsarge,
nsiderably disturbed at this point.
he first mine ever opened on native copper, and production,
., which was the first commercial output of copper from Lake
oduction, 1845–1882, was 38,054,340 lbs. fine copper.
-burrows of the Cliff, which are extensive, were leased, on
Warren, who built an 8-stamp gravity mill, but failed to make

de a power-house, with boilers, duplex hoist, and a 5-drill air-
buildings are a smithy, changing-house, combination office
rding-house and a number of dwellings. The mine is reached
Central railway.
f is some distance northeast of any proven mine on the
e is no question of its lands carrying this stratum, and as
rong and capable hands, it has prospects of making a mine.

IA COPPER CO., LTD. **ARIZONA.**

cceeded, June 6, 1901, by Clifton Consolidated Copper Mines
o dead. Formerly at Clifton, Graham Co., Ariz.

IA COPPER CO., LTD. **ARIZONA.**

Clifton, Graham Co., Ariz. Benj. M. Crawford, manager.
1907, under laws of Arizona, with capitalization $750,000,
sessable; fully issued. Was a reconstruction of the Calumet-
, organized the preceding year. Lands, 5 claims, area 100
e Calumet-Clifton group, northeast of the Shannon mine,
in a vein claimed by former company to be 15′ wide and to
r throughout, which was absolutely untrue, with 2 shorter
w pits. Mine has given ore assaying 4.6 to 27.6% copper,
gold per ton. Is not regarded favorably. Idle and pre-

LIDATED COPPER MINES **ARIZONA.**
, LTD.

bsorbed, 1903, by New England & Clifton Copper Mines of
at Clifton, Graham Co., Ariz.

R BELT MINING CO. **UTAH.**

West Second South St., Salt Lake City, Utah. Mine office:
Utah. Clyde H. Wilson, president; Frank L. Wilson, secre-

tary, treasurer and general manager. Capitalization $25,000, shares 5 ce
Lands, in the Deep Creek district, are traversed by a big porphyry
which a shaft is sinking, showing argentiferous galena assaying up to
silver per ton. Property carries several veins of argentiferous copper a
ores, with quartz gangue, and has secured ore assaying up to 35.5% copp
silver and $1.20 gold per ton. Property also shows ores carrying nickel,
bismuth, values of property as a whole apparently being mainly in silver-l
auriferous bismuth.

CLIFTON COPPER CO. NEW MI

Dead. Lands were owned, 1910, by Chino Copper Co. Formerly a
Rita, Grant Co., N. M. Fully described Vol. VIII.

CLIFTON COPPER MINES, LTD. ARI

Office: 52 Wall St., New York, N. Y. Mine office: Clifton, Graha
Ariz. Organized July 29, 1903, under laws of New York, with capital
$1,000,000, shares $5 par. John K. Erskine, Jr., president; Geo. H. L
manager. Is controlled, through ownership of 70% of stock, by Standar
solidated Copper Co., and owns about 26% of the capital stock of the Co
Mining Co. Lands, 8 claims, patented, area 160 acres, lying east of the St
mines. Production was 37,517 lbs. fine copper in 1905, and 125,760 lbs. i

CLIFTON COPPER MINING CO. ARI

Dead. Was a stockjobbing scheme, promoted 1898, by Julius Lesz
Formerly at Clifton, Graham Co., Ariz.

CLIFTON GOLD & COPPER CO. ARI

Office and mine: Clifton, Graham Co., Ariz. A. S. Rosecrans, ma
LaMar Cobb, consulting engineer. Organized circa August, 1907.
include the Oregon group, having a shaft showing ore of 5 to 8% copper
with some 15% ore cut, 1909, on the 150' level.

CLIFTON-MORENCI COPPER CO. ARI

Letter returned unclaimed from former office, Calumet, Mich.
office: Morenci, Graham Co., Ariz. Willard J. Smith, president; F. H.
vice-president; W. J. McCormick, secretary; Edw. F. Cuddihy, treasure
ceding officers, Theo. Dengler, R. D. Blackburn, Geo. J. Maas, Martin Vo
M. J. Harrington, W. R. Vivian and E. McCormick, directors. Org
1909, under laws of Arizona, with capitalization $1,000,000, shares $
Company gave 40,000 shares to apply on the purchase price of the pro
and offered, Nov. 22, 1909, for public subscription, 100,000 shares at $1 per
A $38,000 payment on bond, due Dec. 4, 1909, was extended 6 months.

Lands, 150 acres, patented, known as the Keating group, held under
and lease, in the Copper Mountain district, 2 miles from Metcalf, 4 miles
Morenci and 8 miles from Clifton. Property carries a fissure vein, kno
the Keating, near the Coronado workings of the Arizona Copper Co.,
Development is by a 620' tunnel, in ore for 350', with winzes of 10', 33
110', said to be bottomed in ore averaging 16.2% copper and 7.3 oz. silv
ton, but apparently the average value of the ore, outside of rich shoots, is
1.25% copper or less. Presumably idle.

CLIMAX GROUP MINING CO. WASHING

Office: 1205 Maxwell Ave., Spokane, Wash. Letter returned uncla
from former mine office, Baring, King Co., Wash. J. J. Browne, preside
W. Douglas, vice-president; Frank P. Smith, general manager. Orga
under laws of Washington, with capitalization $1,500,000, shares $1 par. L
9 claims, area 180 acres, also a 20-acre millsite, in the Index district. Co
rocks are granite and diorite, showing several contact veins, of which tw
developed by a 35' shaft, two short tunnels and a 345' tunnel not yet in
Ores are bornite and chalcopyrite, giving assays of 3 to 34% copper, 20
oz. silver, and from a trace to $6 gold per ton. Idle some years and appar
moribund.

CO. **COLORADO.**
Granite, Chaffee Co., Colo. B. H. Pelton, president, at last
y is the Spondulix mine, opened by a shaft showing aurifer-
us copper ore. Idle.

CO. **COLORADO.**
rly at Ouray, Ouray Co., Colo. Described Vol. V.

G CO. **WASHINGTON.**
rly at North Bend, King Co., Wash. Fully described Vol. VII.

LESTIAL COPPER & OPTIONS CO. **AUSTRALIA.**
rly at Cloncurry, Beaconsfield Co., Queensland, Australia.
I.

PPER & GOLD EXPLORATION CO., LTD. **AUSTRALIA.**
gh's Bldgs., Queen St., Brisbane, Queensland, Australia.
claimed from former English office, 39 Lombard St., London,
office: Cloncurry, Beaconsfield Co., Queensland, Austra-
ır, J. Blanc, G. Whittington, F. G. Exell and W. R. Keith,
row, secretary; F. H. Hockings, mine manager. Organized
er laws of Queensland, with capitalization £50,000, shares
and fully paid. Lands, apparently are 160 acres, and prop-
rospect, designed apparently for British consumption. Is
ly, as a stockjobbing scheme.

PPER & SMELTING CO., LTD. **AUSTRALIA.**
ucceeded Oct. 29, 1895, by New Cloncurry Copper & Smelt-
nerly at Cloncurry, Beaconsfield, Co., Queensland, Australia.

PLORATION SYNDICATE, LTD. **AUSTRALIA.**
rly at Cloncurry, Beaconsfield Co., Queensland, Australia.
I.

ELTING & RAILWAY CO., LTD. **AUSTRALIA.**
ollins St., Melbourne, Australia. Mine office: Cloncurry,
ustralia. Hon. William Knox, chairman; preceding officer,
and A. Robinson, directors; E. H. Shackell, secretary. Or-
under laws of Victoria, with capitalization £200,000, shares
00,000. Is controlled, through ownership of 60% of issued
lliott, Ltd., and 40% by Hampden Cloncurry Copper Mines,
erty is a railroad, under construction, from Mount Elliott to
npden, on which grading was completed for nearly 70 miles,
ing about 300 men. It is planned to build a smelter later.

RPRISE COPPER & **AUSTRALIA.**
NG SYNDICATE.
ane, Queensland, Australia. Mine office: Cloncurry, Bea-
ensland, Australia. Property was under exemption from
ugust, 1909, with the British Wonder lease let on tribute.

NDICATE, LTD. **AUSTRALIA.**
alisbury House, London, E. C., Eng. Mine office: Clon-
Co., Queensland, Australia. Lord Ernest W. Hamilton,
g officer, F. C. D. Haggard, A. B. Dealtry and F. B. Duns-
rs; F. A. Labouchere, secretary. Organized June 14, 1906,
t Britain, with capitalization £50,000, shares £1 par; issued,
Paid a 5s. dividend, December, 1907. Property is 49,967
sland Exploration Co., Ltd., and a loan of £24,086 due from
ch was floated by this corporation.

RURADORA DE COBRE. **CHILE.**
ucceeded by Société des Mines de Cuivre de Naltagua. For-
, Santiago, Chile. Described Vol. VIII.

CLUIN COPPER DEVELOPMENT SYNDICATE, LTD.

Dead. Was liquidated voluntarily May 22, 1908. Formerl
County Cork, Ireland. Described Vol. VIII.

CLUSTER MINING CO.

Mine office: Bingham Canyon, Salt Lake Co., Utah. Lan
tween the Bingham Consolidated and United States mines, were
developed by a 1,000′ tunnel. Was in litigation with Ernest Ba
title to apex of vein, at last accounts. Has produced circa 1,000 to
grade ore. Idle several years.

COAHUILA MINING & SMELTING CO., LTD.

Office: 614 Penobscot Bldg., Detroit, Mich. Operating offi
72, Monterey, N. L., Mex. Mine office: Jimulco, Viesca, Co
H. T. Ambrose, president; Frank J. Llewellyn, vice-president; Walt
secretary and general manager; Archibald Cattell, treasurer; prec
J. Kirby, Jr., Sidney B. Cohn and C. F. Jennings, directors; J.
superintendent; Alex. McCormick, mine superintendent; Harry Re
intendent. Organized January, 1902, under laws of Mexico, wi
tion $500,000 gold, shares $1 par, nonassessable; fully issued. Di
been as follows: 10% in 1902; 6% in 1904; 29% in 1905; 30% in
1909 and 16% in 1910, a total of 101%, or $505,000. Annual
Wednesday in February.

Lands include holdings in the Mapimí, Viesca and San Jua
lupe districts. Properties include the Santa María, Sultana and o
Jimulco, carrying auriferous and argentiferous copper and lead or
a 700′ main shaft, and a 1,000′ main tunnel, with steam and el
The Alberto mine, in the Mapimí district, was said to have made
ments of high grade ore to the Mapimí smelter, 1910. Apparent
nas group, at San Sóstenes, Coyame, Iturbide, Chihuahua, Méx
abandoned. A 250-ton smelter, with steam and electric power, co
the mines by rail, was blown in, early 1903, but has not been operat
and was idle, 1909-1910. Latest reported production was 178,865
per, 1903.

COAST LINE COPPER CO.

Dead. Formerly at Caborca, Altar, Sonora, Mex. Describ

COAST RANGE COPPER CO.

Office and mine: Roseburg, Douglas Co., Ore. Organized J
under laws of Oregon, with capitalization $25,000, shares $50 par.
parently never operative.

COBAR CHESNEY COPPER & GOLD MINING CO.

Dead. Lands were sold to Great Cobar, Ltd. Formerly at
inson Co., N. S. W., Australia. Fully described Vol. VI.

COBAR COPPER CO., LTD.

Dead. Was reorganized Nov. 16, 1909, as Cobar Copper, Lt
at Cobar, Robinson Co., N. S. W., Australia. Described Vol. VII

COBAR COPPER, LTD.

Office: 308 Winchester House, Old Broad St., London, E. C.,
office: Cobar, Robinson Co., N. S. W., Australia. A. E. Barto
preceding officers, C. J. McMahon and F. H. Aarons, directors; H.
secretary. Organized Nov. 16, 1909, under laws of Great Britain
struction of Cobar Copper Co., Ltd., with capitalization £30,000, s

Lands 150 acres, including the Mount Pleasant and You
mines, lying between the Cobar-Chesney and Oriental. A vein,
width, carries mainly manganiferous quartz, with patches of cop
of fair grade. The middle vein is about 8′ wide, and there is a b
in width, of slate and quartz, carrying copper impregnations.
Pleasant mine has a 340′ shaft, planned to be deepened to 530′,

the Young Australia mine has a 270′ shaft. Properties were
mines, on the gossans, returning about 6 dwts. per long ton,
of oxidation, copper increased gradually, rendering the cya-
gold difficult. Under former ownership a little copper ore
1901, to the Great Cobar smelter.

ATION, LTD. **AUSTRALIA.**

07 experimented with an electrical ore finder, and was liqui-
nerly at Cobar, Robinson Co., N. S. W., Australia.

LD COPPER MINING CO., N. L. **AUSTRALIA.**

Cobar, Robinson Co., N. S. W., Australia. Organized 1907,
South Wales, with capitalization £15,500, shares 10s. par.
half mile from the Great Cobar, are slightly developed by
owing malachite and azurite. Presumably idle.

ONE MINING CO. **AUSTRALIA.**

Cobar, Robinson Co., N. S. W., Australia. Mine is opened
, and makes occasional shipments to the Great Cobar smelter,
assaying about 35% copper, second grade ore assaying 15.2%
grade ore assaying 5.9% copper. Property also carries gold.

MINES, LTD. **AUSTRALIA.**

erty was sold July 12, 1910, to Great Cobar, Ltd., for 20,000
stock. Formerly at Cobar, Robinson Co., N. S. W., Australia.
II.

OO MINING CO., N. L. **AUSTRALIA.**

htsville, N. S. W., Australia. Mine office: Canbelego, Can-
W., Australia. Organized early 1907, under laws of New
capitalization £3,000, shares £10 par. Presumably idle.

OW COPPER MINING CO., N. L. **AUSTRALIA.**

ine: Cobar, Robinson Co., N. S. W., Australia. Organized
laws of New South Wales, with capitalization £3,000, shares
ably idle.

S CO., N. L. **AUSTRALIA.**

Cobar, Robinson Co., N. S. W., Australia. Lands, about
Cobar, apparently have the continuation of the ore body of the
e of the Great Cobar, and the East Cobar lode. Property
wn as the Ivanhoe and also as the East Cobar Copper Mine
lopment is by a 350′ shaft, showing a little low grade silicious
ercial tenor. Work was suspended November, 1906. Idle
oribund.

COPPER CO., N. L. **AUSTRALIA.**

ney, N. S. W., Australia. Mine office: Cobar, Robinson Co.,
a. Mine, opened by a 450′ three-compartment vertical shaft,
nsiderable sulphide ore, assaying up to 12.5% copper. First
d by the Great Cobar, Ltd., under contract, and second grade
ed, for concentration or other treatment later.

PPER CO. **ARIZONA.**

absorbed, circa 1910, by Tank Pass Consolidated Mining Co.
ne, Yuma Co., Ariz. Described Vol. VIII.

NERA EL COBRE. **MÉXICO.**

e de Santa Teresa 6, México, D. F. Mine office: Jungpeo,
acán, Mex. Alfred Stoffel, president; M. Herrle, secretary;
, treasurer. Organized March 7, 1907, under laws of México,
n 95,000 pesos. Property is El Cobre y Anexas mines, carry-
d copper ores. Presumably idle.

ANDE MINING CO. **MÉXICO.**

nerly at Sahuaripa, Sonora, Mex. Described Vol. VI.

COBRE GOLD MINING CO.

Mine office: Illahe, Curry Co., Ore. Lands, 12 claims, circa of the Rogue River, having several opencuts and a 39′ shaft. A to the Tacoma smelter returned 33% copper. Was developing, force, 1910.

COBRE GRANDE COPPER CO.

Mine office: La Cananea, Arizpe, Sonora, Mex. Only asset against Col. Wm. C. Greene. Fully described Vol. VIII.

COBRE GRANDE COPPER CO.

Office: Dallas, Tex. Mine office: Fronteras, Arizpe, Sonor T. Shumate, general manager. Lands, 6 miles from the Cabullon 18 miles south of Douglas, Arizona, have 4 single-compartment sh 165′, all showing ore. A sample shipment, 1909, to the Douglas turned up to 45 oz. silver per metric ton, with good copper values, $40 per ton. Presumably idle.

COBRE GRANDE MINE.

Mine office: San Carlos, Graham Co., Ariz. Albert F. S. Coop Lands, 23 miles west of Ft. Thomas, are said to be held under a $ and lease, calling for $75,000 cash and $25,000 in stock, final payme March 16, 1913. Development is by the 375′ Iron tunnel, the 380′ I and a 90′ vertical shaft. Tunnels are said to cut a 35′ vein of assaying about 4% copper and $1.50 to $4 per ton in combined go values, and the shaft is said to cut another ore body at depth of 79′, age assays of 5.5% copper and $1.50 to $2.50 per ton in combined go

COBRELOMA CONSOLIDATED COPPER CO.

Dead. Was consolidated, circa 1907, with Middlemarch Copp merly at Middlemarch, Cochise Co., Ariz. Fully described Vol. V.

COBRE MINING CO.

Mine office: Silver Bell, Pima Co., Ariz. Lands, 15 claims, l Copper Prince group, circa one mile south of the Copper Giant, veloped by a two-compartment shaft. Idle.

COMPAÑÍA MINERA LA COBRIZA.

Dead. Formerly at Santa Bárbara, Hidalgo, Chihuahua, Mex. Vol. VIII.

COMPAÑÍA MINERA LA COBRIZA.

Dead. Property, near San Dimas, carried argentiferous an copper ore, developed by tunnel, and employed circa 25 men, 1904 at San Dimas, Durango, Mex.

COMPAÑÍA MINERA LA COBRIZA y ANEXAS.

Mine office: Alamos, Sonora, Mex. D. Manuel Salazar y P dent and general manager; Dionisio Acosta, secretary. Organized of México, with capitalization 250,000 pesos; issued, 24,000 pesos. hectares, including La Cobriza mine, having a 75-meter main shaft meter main tunnel, showing ore with values mainly in copper. L ción de la Cobriza and La Magdalena are virgin properties.

MINA COBRIZAS.

Office and mine: Lirca, Potosi, Bolivia. Is a small produc copper, making more or less silver as a by-product, both metals native, and in association. Property is the largest Bolivian produc copper outside of the Corocoro district.

COCHISE CONSOLIDATED COPPER CO.

Office: 1440 Arrott Bldg., Pittsburg, Pa. Mine office: Paras Co., Ariz. H. F. Fisher, president; W. C. Hagan, vice-president; G general manager. Capital [illegible] $1,500,000, shares $1 par.

Lands, 17 claims, [illegible] miles northwest of Paradise, including lated townsite called Pittsburg. Mine has the 150′ Ainsworth sh

ure shaft showing a 4′ vein of medium grade chalcopyrite, o give average assay values of circa $75 per ton in copper, now claimed to average $45, both of which are overestimates. t 180′ Duplex shaft shows mixed sulphides carrying good ilver and gold, with heavy percentages of zinc. There also

cludes a 150-h. p. Webber gasoline engine and a small elec- The 50-ton mill is 62x100′, having a crusher, 3 sets of rolls, 3 2 settling tanks. Water is supplied from 2 wells, and pumped on tanks.

was in financial straits and litigation, for some years, culmi- e sale of the property, by the sheriff, for $23,350, to Madison f Scranton, Pa., but this sale was set aside, and the property sheriff, June 27, 1908, to the Gibson Abstract Co., as trustee, aving Mr. Larkin the principal creditor. Company is hope- h remote prospects of escaping with either its property or life.

ER CO. **ARIZONA.**

d unclaimed from former office, Tucson, Ariz. Mine office: Co., Ariz. Kirk L. Hart, general manager; Geo. M. Brown, last accounts. Lands carry the extension of the Peabody eastward. Mine has a shallow 2-compartment shaft, with ngs, and equipment includes a gas engine. Idle since 1909.

ER MINING CO. **ARIZONA.**

eorganized, August, 1905, as Cochise Development Co. For- ochise Co., Ariz. Described Vol. V.

LOPMENT CO. **ARIZONA.**

ne: Bisbee, Cochise Co., Ariz. Lemuel C. Shattuck, presi- es, vice-president and general manager; Roy Morfoot, secre- eim, treasurer. Organized Aug. 1, 1905, under laws of Ari- zation $1,000,000, shares $10 par, succeeding the Cochise . Annual meeting, second Tuesday in January. Lands, 16 cres, abutting on the Holbrook mine of the Copper Queen ying north of the Dividend fault and Dubacher gulch. The ee-compartment shaft, a drift on the 300′ level showing small e ore. Machinery includes a 100-h. p. boiler, a 10x30″ first- m hoist, good for 1,200′, and a 6-drill Sullivan straight-line uildings are an engine-house, boiler-house, 20x40′ carpenter- y, and a coal-trestle. Property considered promising. Idle

RATION & DEVELOPMENT CO. **MÉXICO.**

erly at Fronteras, Arizpe, Sonora, Mex. Described Vol. VIII.

G & MILLING CO. **ARIZONA**

r office was Colorado Springs, Colo. Officers were J. M. ; H. M. Mason, secretary and treasurer. Organized under ith capitalization $1,500,000, shares $1 par, nonassessable. cluded copper claims in Cochise and Pinal counties, Arizona. Grande, Pinal Co., Ariz., and Tombstone, Cochise Co , Ariz.

PECTING, MINING & DEVELOPMENT CO. **MÉXICO.**

ucceeded, Jan. 25, 1906, by Brooks Consolidated Copper Co. eras, Arizpe, Sonora, Mex. Fully described Vol. V.

ING CO. N. L. **AUSTRALIA.**

Cockburn, South Australia. Mine, formerly known as the rca 2 miles west of the Mutooroo mine, has a vein with nearly sharply to the west, and 2 shafts, about 200′ apart, the No. 1 50′ deep, showing a vein of about 22′ width, carrying patches e, and large quantities of pyrite, with scanty quartz gangue.

No. 2 shaft, 157′ deep, shows ore of only about 1% copper tenor. includes a good hoist. To end of 1909 company had received subs 18s. 5d. from the South Australian government, of which no p repaid. Presumably idle.

COCONINO COPPER CO.

Dead. Formerly at Ryan, Coconino Co., Ariz. Property Buckskin Mountain Copper Co. Very fully described Vol. III.

COCOPAH COPPER CO. C

Office: 1014 Central Bldg., Los Angeles, Cal. Mine and Ivanpah, San Bernardino Co., Cal. Dan. Murphy, president; Dr shall, vice-president and general manager; G. Holterhoff, Jr., s treasurer.

Lands, on Clear Mountain, 20 miles from Ivanpah, the nearest include the Copper World and Mohawk mines, formerly operated by Consolidated Smelting Co. The Copper World group shows a br ized zone, up to 300′ in width, with a silicious iron outcrop carryin chite and occasional oxides. Mine has a 180′ vertical shaft, wit half a mile of workings, on a 5′ vein, carrying mainly copper ca oxides, in irregular masses.

The Mohawk mine, circa 2 miles south of the Copper Worl ore body with nearly vertical dip, between a porphyry foot and lim ing, similar to that of the Copper World, but carrying more s Mohawk has several hundred feet of workings, and is idle.

The smelter, at Valley Wells, about 5 miles southwest of the m the old company, was not a success, slag losses being excessive, giv tion of circa $750,000 worth of copper, produced at a loss. Ore copper tenor is hauled by teams to Ivanpah, and shipped to the Ne

C. O. D. LEASING CO. NE

Office and mine: Lordsburg, Grant Co., N. M. Thos. A. dent, treasurer and general manager; D. W. Briel, vice-president; R secretary. Organized Aug. 13, 1909, under laws of Arizona, with c $1,000,000, shares $1 par, nonassessable; issued, $664,700. Ann first Monday in December.

Lands, 5 claims, area circa 90 acres, in the Pyramid district, of Lordsburg, showing 5 ore bodies, of which one, of about 18″ av developed by 4 pits, and a 55′ shaft, carries auriferous and argen and copper oxidized ores.

CŒUR D'ALENE CONSOLIDATED MINING CO.

Office: Spokane, Wash. Mine office: Osburn, Shoshone Louis Bolduc, president; E. M. Cornelius, vice-president; C. G. Jo tary; Chas. Williams, treasurer; preceding officers and W. G. Par Lands, 4 claims, 2 to 3 miles from Wardner, having 500′ of tunnel crosscuts, developing a vein of 5′ to 6′ width, carrying copper ore lead. Equipment includes a 2-drill compressor, run by water powe Creek.

CŒUR D'ALENE EAGLE MINING CO.

Dead. Was reorganized, circa March, 1910, as Idaho Eagle M

CŒUR D'ALENE-MONTANA MINING CO.

Mine office: Trout Creek, Sanders Co., Mont. A. G. Some Capitalization $500,000, shares 50 cents par. Lands, 8 claims ar 2 miles southwest of the Northern Pacific railroad at Trout Creek, c Montana divide. Development is by a 900′ tunnel, showing a vei mated width, carrying assay values in copper, lead and silver. includes a 2-drill air-compressor. Presumably idle.

CŒUR D'ALENE PACIFIC MINES CO.

Office: Saltese, Missoula Co., Mont. Dr. Jas. Sutherland

president; M. N. Stratton, secretary and treasurer; preceding
hardt and N. E. Jesseph, directors. Organized under laws
th capitalization $1,000,000, shares $1 par, nonassessable.
ea 40 acres, near the Silver Cable mine, giving fair surface
and copper ore, with a short tunnel.

OLD & COPPER MINING & MILLING CO. COLORADO.

ester, Ills. Mine office: Salida, Chaffee Co., Colo. M. E.
T. T. Foster, vice-president; George Sullivan, secretary; E.
; Thomas Penrose, general manager; preceding officers are
anized May, 1908, under laws of Colorado, with capitaliza-
es $1 par. Lands, 4 claims and a tunnelsite, unpatented,
Cleora Mountain, northeast of Salida. Development in-
shaft and a 165′ vertical shaft left by former owners, also
and 110′. Property shows ore giving assays of $10 to $63
ues from copper, gold and silver.

PPER MINING CO. COLORADO.

West Cedar St., Kalamazoo, Mich. Mine office: Pearl,
. Z. L. Baldwin, president; E. S. Drury, vice-president;
tary and treasurer; Burr Lobdell, general manager. Organ-
under laws of Wyoming, with capitalization $1,000,000, shares
claims, area circa 50 acres, also 20 acres miscellaneous lands,
ct of Larimer county, Colorado. Property, known as the
as 3 fissure veins in granite and diorite, of which 1, of 20′
hows oxidized ores and native copper, with sulphides at a
ed to carry an average of 10% copper and 8 oz. silver per
ts of 80′ and 170′, bottom of principal shaft showing massive
tle disseminated chalcopyrite, of high average grade. Has
perty was leased, for a 3 to 5 year term, to the Wolverine
Co., composed of Coldwater shareholders. Idle and officers
ine litigation at last accounts.

OSPECTING ASSOCIATION, N. L. TASMANIA.

meron St., Launceston, Tasmania. Mine and works office:
u Co., Tasmania. J. S. Clemons, M. P. P., chairman; pre-
M. King and A. Simson, directors; E. Sheargold, secretary.
inally was £57,600, increased, 1908, to £67,200, shares 14s.
acres, circa 1 mile south of Rosebery, showing 3 ore bodies,
lode, of 18′ width, carrying chalcopyrite very sparingly,
rite, in a schistose gangue. Mine was worked opencast,
d a 1,000′ gravity tram.

elter, costing £7,000, has a 200-ton water-jacket blast-fur-
blast only 120 hours. Ore was claimed by management to
, after careful sampling, but smelter returns were under 1%
g tons of ore smelted yielded only 6¾ tons of copper. Mr.
er smelter superintendent, condemned the mine as worthless,
y the directors, for telling the truth. Idle since May, 1908,
reputation gone, and bankruptcy looming ahead.

MENT CO. ARIZONA.

e: Globe, Gila Co., Ariz. P. J. Cole, president; P. J. Cole,
easurer. Organized September, 1909, under laws of Arizona,
$300,000, shares $1 par. Lands, 17 claims, known as the
oup, were bonded, 1910, to the Little Miami Copper Mines
s described under that title.

GOLD MINING CO. COLORADO.

rnest & Cranmer Bldg., Denver, Colo. Mine office: Alice,
olo. Wm. Coleman, manager. Mine, having a 250′ tunnel,
pper ore, and was developing, with a small force, 1910.

COLLAHUASI SYNDICATE, LTD.

Dead. Was organized Feb. 23, 1904, under laws of Chile, an Apr. 4, 1905, as Compañía Minera Poderosa de Collahuasi. Form huasi, Tarapacá, Chile.

COLLIER CREEK COPPER CO.

Office and mine: Gold Beach, Curry Co., Ore. Frank Be and general manager; Geo. W. Curry, vice-president; Geo. W. Smi Alfred S. Miller, treasurer; preceding officers, W. W. Wrenn and directors. Organized 1905 under laws of Washington with $2,000,000, shares $1 par; fully issued. Annual meeting, first Tue ary. Lands, 12 claims, unpatented, area 240 acres showing reported to lie between granite and serpentine, with width of 6′ to argentiferous and auriferous cuprite and chalcocite, giving assays copper, 20 to 30 oz. silver and $12 to $20 gold per ton, developed b and 80′, and a 180′ tunnel. Has 2 mine buildings.

COLLISON BAY MINING CO. **BRITISH**

Mine office: Jedway, Queen Charlotte Islands, B. C. W. superintendent. Lands, 5 claims, area circa 250 acres, includin Leaf group. Mine has a 15′ tunnel, in a vein assaying about 4% small gold and silver values, and a 90′ tunnel with a 140′ drift a showing chalcopyrite, associated with pyrite and pyrrhotite, assay copper. Management plans continuing the crosscut tunnel to Maple Leaf group, on Collison Bay, has a shallow shaft and tunnel hundred feet of workings.

COLOMBIA GOLD & COPPER CO.

Dead. Was a stockjobbing scheme, claiming to have minera Republic of Colombia. Described Vol. VIII.

COLONIAL COPPER CO.

Office: 14 Kilby St., Boston, Mass. Mine office: Ajo, Pi Geo. H. Morrill, Jr., president; Adna T. Denison, vice-presid Moseley, secretary, treasurer and general manager. Organized under laws of Maine, with capitalization $3,000,000, shares $10 pa ble; issued, circa $1,750,000. Was a reconstruction of the Growle Bonds, $500,000 authorized, at 5%; issued, $18,000. Annual Monday in June.

Lands, 30 claims, area 600 acres, in two groups, also a 10- apparently held under bond and lease, in the Growler Mountains, 1 of Ajo and about 60 miles southeast of Gila Bend, the nearest rail s Copper Hill group, of 18 claims, shows an ore zone up to 300′ w diabase and limestone, with a gossan traceable 1½ miles, reported b carry 3 veins, of 2′ to 7′ width, having oxidized ores, silicates, bor cocite, giving assays of 2 to 46% copper, 1 to 66 oz. silver and 0.12 per ton. Development is by the 100′ Daisy shaft, 260′ Copper H 320′ Yellow Hammer shaft, and the 185′ Copper Hill tunnel, wi 1,600′ of workings, estimated by management to show about $1,0 of ore. The company proposes deepening the main shaft to 600′ a 100-ton matting furnace. A little ore of good average tenor has to Douglas.

Equipment includes a 170-h. p. steam plant, with 8-h. p., 70-h. p. hoists, and a 2-drill Ingersoll-Rand air-compressor. Buil a 16x26′ assay-office and 26x40′ adobe commissary, frame boardi 14x16′ frame smithy, with 6 tent-houses.

Donald Smith, et al., shareholders, sued Morrill and Moseley, and treasurer of the Growler Copper Co., who are also president of this company, the Growler's successor, alleging that they delive selves 75,000 shares of stock and about $5,500 cash, latter being pa

well, a promoter who endeavored, 1909, to interest English
ng shareholders asked to have transfer of the property set
the petition was denied. Property considered promising,
very poor transportation facilities.

R CO. **NOVA SCOTIA & ONTARIO.**

y Bldg., Baltimore, Md. Mine office: Cape D'Or, Çum-
David H. Carroll, president; W. J. Sneeringer, vice-presi-
Beacham, secretary; Fletcher B. Speed, treasurer; R. W.
t, at last accounts. Organized Jan. 19, 1899, under laws of
capitalization $5,000,000, shares $1 par; issued, $3,973,206.
thorized, at 6%; issued, $140,000. Has a debt of about
eeting, first Tuesday after first Monday in February.
00 acres, well timbered, and about 500 acres miscellaneous
bodies, reported as fissure veins in Triassic trap, and con-
nd conglomerate, with nearly vertical dip, 3 deposits being
d, one, of 25′ reported average width, said to be traceable
a 500′ incline shaft and 2 vertical shafts, showing native
orted as of 2.5% average tenor, but now reported by com-
% copper only, and actually averaging much less.
ge and 6 small hoists, 3 small Rand air-compressors and
buildings. There is a 300-h. p. equipment at the mine,
mill.
ntrator, about 100x300′ in size, has Blake crushers, rolls
nnected with the mine, 1½ miles distant, by a 36″ narrow-
rest railway is 30 miles, but property is located on the Bay
shipping facilities by water.
wns the New Annan mine, carrying sulphide ore in lenses,
ne, in Peterboro county, Ontario, latter showing a 4′ vein,
per, both idle for some years.
′, was 1,971 tons of ore mined and concentrated, yielding
or about 6 lbs. per ton, an unmercifully hopeless figure.
February, 1910, as an attempt at reorganization was not
onsidered worthless, and bankruptcy inevitable.

R CORPORATION, LTD. **AUSTRALIA.**

bury House, London, E. C., Eng. Mine office: Lithgow,
Australia. Geo. Hardie, chairman; C. P. Oswald, secre-
manager, at last accounts. Organized March 29, 1899,
Britain, with capitalization £125,000, shares £1 par; issued,
43 acres, freehold, including the Cow Flat mine, 20 miles
some years, and presumably moribund.

G CO. **ARIZONA.**

renburg, Yuma Co., Ariz. Clifford G. Dennis, manager.
d cupriferous cinnabar, assaying up to 7% copper, 30%
ilver per ton. Has gasoline power and a 30-ton Scott fur-

RA DE COLÓN y LIBERTAD, S. A. **MÉXICO.**

at Zacualpam, Sultepec, Mex. Described Vol. VIII.

MIA MINING & **COLORADO & OREGON.**

am St., New York, N. Y. Mine office: Bohemia, Lane
awkins, president; S. B. Henzer, secretary and treasurer.
of Colorado, with capitalization $1,250,000, shares $1 par.
undry gold and copper claims, located in various districts
ado. No trace of operations secured. Is not regarded

COLORADO & CONNECTICUT GOLD MINING CO.

Office: Meriden, Conn. Mine office: Lake City, Hi Geo. S. Willcox, president; Wm. C. Corves, vice-president; R tary; B. F. Barnes, treasurer. Organized 1902, under laws with capitalization $400,000, shares $5 par, changed later to $1 par. Lands, 3 claims, area 21 acres, known as the Dolly the Galena district, carrying three 2′ fissure veins, opened by a 738′ tunnel, with circa 1,900′ of workings. Ore is chalcopy and occasional argentite, giving assays of 9 to 19% copper, wit values, and test shipments have given good returns. Comp quotes the late Edwin J. Hulbert as predicting, in 1879, that th equal the Calumet & Hecla as a dividend-payer. Mine is wor is idle winters, owing to heavy snows.

COLORADO CONSOLIDATED MINING CO.

Dead. Lands carried suriferous and argentiferous cop developed, and company employed, 1903, circa 20 men. Equi 10-stamp mill. Formerly at Cochetopa, Saguache Co., Colo.

COLORADO COPPER CO.

Mine office: Eureka, San Juan Co., Colo. Organized 1909. Lands include the Mineral Queen group, in Porcupi northern slope of Galena Mountain, an old location, patented for $35,000, said to have a good surface showing of ore. Presu

COLORADO COPPER CO.

Dead. Formerly at Clayton, Union Co., N. M. Describe

COLORADO COPPER MINING CO.

Dead. Was a bad egg. Formerly at Copperfield, Fré Described Vol. VIII.

COLORADO-DIABLO CONSOLIDATED MINING CO.

Office: 14 Eagle Blk., Salt Lake City, Utah. Letter re from former mine office, Milford, Beaver Co., Utah. R. F S. M. Gray, secretary and treasurer. Organized 1907, under l capitalization $125,000, shares 25 cents par, assessable. H ments of $5,000. Lands, 5 claims, patented, 35 miles from a 3 shallow shafts.

COLORADO-ELY COPPER CO.

Dead. Capitalization was $1,000,000, shares $5 par. work ever was done, and company presumably was one of the of Ely flotations, of 1906-1907 that was promoted to sell sto Ely, White Pine Co., Nev.

COLORADO GOLD-COPPER MINING & TUNNEL CO.

Dead. Was organized 1901, and was succeeded by Ou Mining Co. Formerly at Ouray, Ouray Co., Colo.

COLORADO MINE.

Owned by Davis-Daly Copper Co., at Butte, Silver Bow C

COLORADO MINING & DEVELOPMENT CO.

Dead. Title was changed, 1904, to Wickes-Corbin Copper M merly at Corbin, Jefferson Co., Mont. Described Vol. IV.

COLORADO MINING & SMELTING CO.

Dead. Formerly at Cañon City, Frémont Co., Colo. Des

COLORADO MINING & SMELTING CO.

Dead. Was succeeded, 1905, by Trenton Mining & D Formerly at Butte, Silver Bow Co., Mont. Fully described Vo

COLORADO RIVER COPPER & GOLD MINING CO.

Mine office: Las Vegas, Clark Co., Nev. Developme and 2 short tunnels, showing ore giving good assays in copper sumably idle.

& ELY COPPER CO. **CALIFORNIA.**
y at Klinefelder, San Bernardino Co., Cal. Described

GOLD & COPPER CO. **CALIFORNIA.**
dbury Bldg., Los Angeles, Cal. Letter returned unclaimed
fice, Mellen, San Bernardino Co., Cal. Geo. E. Bouton,
is, vice-president; E. S. Gannon, secretary and treasurer;
ral manager; preceding officers, C. F. Gray, J. P. Elms and
s. Organized July 1, 1901, under laws of Arizona, with
,000, shares $1 par; issued, $1,230,000. Annual meeting,
ary.
s, area 200 acres, and a 5-acre smelter site, in the Monu-
iles from the Arizona & California railway, showing 12
as fissures in altered granite, quartz-porphyry and lime-
' to 30' width, traceable circa 6,000', being opened by 7 pits,
0', and 4 tunnels, of 15' to 310' length, with 1,400' of work-
ow 20,000 tons of ore, with 12,000 tons blocked out for
lized for shallow depth, succeeded by chalcopyrite said to
f 8% copper, 1 oz. silver and $15 gold per ton. Has river
camp. Idle.

MINING & DEVELOPMENT CO. **CALIFORNIA.**
y at Needles, San Bernardino Co., Cal.

TER CO. **COLORADO.**
Colo. Mine office: Ironton, Ouray Co., Colo. Jos. H.
Property is the old works of the Saratoga Pyritic Smelting
of Ouray. Management, July, 1910, planned remodeling
melter for a custom business.

NORA COPPER CO. **MÉXICO.**
office was Colorado Springs, Colo. Officers were G. W.
M. Wheelock, assistant secretary; Benj. M. McCloskey,
ganized under laws of Arizona, with capitalization
par, nonassessable; issued, $4,600,000. Lands, held through
on with 10,000 shares, were 300 hectares. Company ex-
on the property, and accumulated an indebtedness of
of which all stock in the Mexican corporation was turned
, leaving this company merely a husk. Formerly at La
nora, Mex.

IGS COPPER MINING & TUNNEL CO. **COLORADO.**
ere sold, January, 1906, to Michigan-Colorado Mining &
ly at Florissant, El Paso Co., Colo.

& COPPER CO. **UTAH.**
y at Milford, Beaver Co., Utah. Described Vol. VIII.

MINING & MILLING CO. **MONTANA.**
y at Whitehall, Jefferson Co., Mont. Described Vol. VIII.

ER CO. **NEW MEXICO.**
aranty Trust Bldg., El Paso, Tex. Mine office: Santa
M. Colonel Lewis, president and general manager; Martin
lent; Samuel W. Biggs, secretary and assistant manager;
urer; preceding officers, Jas. A. Carroll, Winchester Cooley
ger, directors; F. O. Wills, mine superintendent, at last
d 1906, under laws of New Mexico, with capitalization
par. Rio Grande Bank & Trust Co., El Paso, registrar.
nd Monday in July.
s, area 700 acres, in 4 groups. The Gallinas group, 10
miles from Gallinas, in the Gallinas Mountains, has a 200'
orkings, showing argentiferous copper and lead ores.

The Clearwater group, 4 claims, 2 patented, near Santa I
a two-year bond and lease, includes the Clearwater mine, havi
ment shaft, with circa 1,000′ of workings, showing considerable
copper tenor, and a hoist good for 1,000′.

The Columbia group, 9 claims, in Good Fortune Cañon, Sa
tains, circa 10 miles north of Three Rivers, has a 300′ tunnel
showing oxidized ores giving average assays of 6.45% copper
per ton, and several carloads of ore have been shipped.

The Iron Mask group, 10 claims, in the White Mountains
calero Indian reservation, shows a limonite gossan, apparently
grade for iron ore, carrying traces of copper and silver.

Mine shipped, 1907, a little ore, from the Santa Rita p
owing to lack of cash, but hopes to secure funds to permit resu

COLUMBIA COPPER CO.

Dead. Lands were sold, under judgment, for $4,000. For
Gila Co., Ariz. Described Vol. V.

COLUMBIA COPPER MINING CO.

Dead. Former office was 68 William St., New York, N
tion was $1,500,000, shares $10 par. Officers were C. F. Cook,
Stevens, manager; preceding officers, John M. Fornes, H. C. Well
and Warren W. Loss, directors. Lands included the Copper Be
outright, and the Baltimore group, held under bond and leas
opened by shafts and tunnels, showing ore mainly of concentrati
merly at Clifton, Graham Co., Ariz.

COLUMBIA COPPER MINING CO.

Dead. Was merged, circa 1903, in Consolidated King
Columbia Copper Mining Co. Formerly at Jerome, Yavapai C

COLUMBIA COPPER MINING CO. BRITISH

Dead. Formerly at Princeton, Boundary district, B. C. De

COLUMBIA COPPER MINING CO.

Office: 510 Chamber of Commerce, Detroit, Mich. Min
Sound, Parry Sound district, Ont. Dr. A. H. Côte, president; D
vice-president; S. S. Southerland, secretary; Dr. W. P. Dick,
Dick, consulting engineer. Capitalization $3,000,000, shares $1
able. Authorized, 1910, a $10,000 bond issue. Lands, 200 acre
McGowan claim of the Parry Sound Copper Co., 1 to 2 miles fro
having shafts aggregating 150′.

COLUMBIA COPPER MINING CO.

Dead. Lands were sold, 1903, to Ohio Copper Co. Forme
Canyon, Salt Lake Co., Utah. Fully described Vol. III.

COLUMBIA COPPER MINING CO. BRITISH COLUMBIA & W

Office: 1014 Spofford Ave., Spokane, Wash. Mine office
Okanogan Co., Wash. E. P. Wheeler, president and general m
Scott, vice-president; R. L. Campbell, secretary; J. L. Spoth,
ceding officers and A. S. De Reimer, directors. Organized
under laws of Washington, with capitalization $1,000,000, sh
half preferred and half common stock; issued, $650,000. Annu
ond Tuesday in September.

Lands, 100 acres, well timbered, in the Yale district of Br
showing 2 ore bodies, larger of 9′ estimated average width, also a
of 300′ estimated average width, former carrying ore, mainly bo
by company to average 4% copper and $2 to $18 gold per ton.
of 30′ and 40′, and tunnels of 60′, 110′, 150′ and 300′, estimated
to show 50,000 tons of ore, with 15,000 tons blocked out for s
$15,000 has been expended on the property. Presumably idle.

MINING CO. WYOMING.
re lost, after litigation, to Duchess Mining, Milling &
3. Apparently little or no mining work was done. For-
ny Co., Wyo.

COPPER MINING WASHINGTON.
O.
lia, Whitman Co., Wash. Idle and apparently moribund.

NEVADA.
dsprings, Lincoln Co., Nev. Lands, 6 claims, formerly
ining Co., said to show a 30′ vein averaging 15% copper,
ate all around, the carbonate and oxide ores carrying
up to $10 gold per ton. The Extension vein, 3′ wide, is
230′. Mine has about 1,800′ of workings. Property
Presumably idle.

CO. CALIFORNIA.
at Needles, San Bernardino Co., Cal. Described Vol. VI.

CO. NEVADA.
at Goodsprings, Lincoln Co., Nev. Described Vol. VI.

GOLD MINING CO. WASHINGTON.
le Falls, Stevens Co., Wash. Col. J. M. Fish, president
Lands, 9 claims, on Gold Hill, opened by a tunnel and
t 2,000′ of workings. Shaft shows a vein 5′ wide at sur-
epth and 43′ wide on the 350′ level, at latter depth carry-
idth. Company is said to have expended about $65,000
ent includes a 50-h. p. gasoline engine and a 3-drill air-
t shipments, 1905, gave returns of 22% copper, 3 oz.
r ton. Presumably idle.

RD MINING CO., LTD. IDAHO.
nclaimed from former office, Arco, Idaho. Mine office:
Idaho. Porter Stevenson, manager. Capitalization
ar, nonassessable. Lands, 6 claims, on Copper Moun-
the White Knob mine. Manager states that Columbia
1 and 2 are owned by the Mackay Idaho Mining Co.
ein, traceable circa 2,000′, giving assay values in copper,

MINING CO. MONTANA.
n, 1906, on Jennie Dell mine and adjoining claims. For-
Bow Co., Mont. Fully described Vol. VI.

LIDATED MINING CO. UTAH.
e Bldg., Salt Lake City, Utah. Mine office: Alta,
Chas. A. Walker, president; Tony Jacobson, vice-presi-
ger; S. A. Whitney, secretary and treasurer; preceding
hie and Lewis A. Jeffs, directors. Organized 1902, under
italization increased, 1904, to $1,500,000, shares $5 par.
ds, January, April and July, 1907, aggregating 55 cents,
50, and has levied 4 assessments, including No. 3 of 25
d No. 4, of 10 cents, November, 1910. Shares are listed
exchange.
rea 275 acres, on both sides of Little Cottonwood Cañon,
ff hill, carrying 9 fissure veins and contact deposits, 6
width. Principal ore bodies are contacts between lime-
th highly mineralized shoots of 30′ to 100′ width, several
carrying concentrating and smelting ores, latter ranging
lead, 15% zinc, 60 oz. silver and $4.50 gold per ton. Ores
near surface, succeeded by sulphides. Ore is pockety,
mainly below payable tenor.

The principal ore body, known as the Braine fissure, of width, has 2 tunnels, 1,250′ apart, on practically the same lev 5 shallow shafts and 4 tunnels, including a drainage tunnel, s 4,000′ down the cañon, planned to unwater the Columbus an erties, with about 3 miles of workings. The Holland and Col connected on the Braine fissure and the Holland tunnel has Ore produced is divided into 3 classes, first being copper ore, sec and third concentrating ore. The mine is wet, and has a 600-g

A Pelton water-wheel works under a head of 494′, taking 20″ and 22″ steel pipeline, of 4,500′ length, developing 660 h. formed into electricity by two 300-kw. dynamos, and carried 4½-mile transmission line. Foundations were laid, several second wheel of the same size. At the mine there are four 25- for 600′ each, 10-drill Nordberg and 5-drill Ingersoll-Sergeant a machine-shop and a sawmill.

The 150-ton concentrator was built of material taken fr ton mills. Equipment includes a Gates gyratory crusher, 2 se six 3-compartment jigs and 7 Wilfley tables, the mill putting into 1.

Ore and concentrates are shipped by the Continental-Alta the mine to Tanner's Flat, thence by a 16-mile wagon haul, having deep snows in winter, and heavy muds in summer and f station at Sandy.

Production, 1907, was 6,689 dry tons of first-class ore, an average of $38.77 per ton, and 10,569 dry tons of milling o returns of $11.38 per ton. Production was suspended, late 1 1908. Production, 1909, was only 1,530 tons of smelting ore, and 483 tons of concentrates, netting $10,469. A little ore w and about 20 miners were working, early 1911.

COLUMBUS COPPER MINING CO.

Dead. Former office was Mullan, Idaho. Organized cir W. P. Flood, D. O. Hessian, M. J. McHugh, F. S. Houg Bedard; T. W. Clayton, consulting engineer. Lands, south mine, showed a vein said to carry 2 to 5% copper ore at zone 200′ in width, traceable 4,000′, developed by a 150′ tun Thompson, Sanders Co., Mont.

COLUMBUS EXTENSION MINING CO.

Office: Salt Lake City, Utah. Mine office: Alta, Salt A. O. Jacobson, president; Tony Jacobson, general manager. 1906, with capitalization 300,000 shares Lands, circa 300 Columbus Consolidated, having an old 140′ tunnel and a n jointly with the Columbus Consolidated, giving a vertical dept and about 3,000′ depth on the dip of the vein. First ore bod 3,500′ from the portal, was the Flagstaff vein, about 8′ wide ore said to assay 2 to 10% copper, and a vein of about 10′ August, 1910, shows black sulphide ore, presumably dissemi giving assays of 6% copper, 15 oz. silver and $1.80 gold per t were begun September, 1910, from this ore body. Tunnel is d old Toledo fissure, from which considerable rich ore was taken

COLUMBUS-WEDGE MINING CO.

Dead. Was succeeded, 1908, by Superior & Montana M was merged, circa October, 1908, in South Columbus Consoli Formerly at Alta, Salt Lake Co., Utah.

COLUSA-LEONARD EXTENSION COPPER CO.

Office and mine: Butte, Silver Bow Co., Mont. Dr. president; Meyer Gensberger, vice-president; J. A. Talbot,

ganized Oct. 1, 1906, under laws of Arizona, with capital-
ares $5 par. Trust Company of America, New York,
agent.
al claims, patented, area 47 acres, forming practically a
a mile east of the Colusa and Leonard mines, and about
ie Healy, being near the Pittsburg & Montana. There is an
nt shaft, on the Little MacQueen claim, lying about the
nat has cut several small stringers of ore assaying up to
f commercial size, and there is a 7′ vein of 2% ore carrying
to range 8 to 10% in copper tenor, with small gold and
ne lead and zinc. Judging from neighboring properties
e found at considerable depth, if at all.
les a good air-compressor, a temporary hoist, and a 400-
Was promoted by same people who put out the Emma
nt Co., which was a failure; the Reins Copper Co., which
Butte & London Mining & Development Co., which also
mpt to place shares in London was not successful. Idle

MONTANA.

nda Copper Mining Co., at Butte, Silver Bow Co., Mont.

MINING & SMELTING CO. MONTANA.

503 Miner Bldg., Butte, Silver Bow Co., Mont. Hon.
ent; Arthur H. Wethey, vice-president and general man-
, secretary; Fred Pratt, mill superintendent. Organized
laws of Washington, with capitalization $500,000, shares
nds, to end of 1906, of $2,080,000. Property, the Butte
s sold, 1910, to Anaconda Copper Mining Co. Company
usiness, its only present property being some ranch lands,
to the city of Butte. Company has a lease on the mill of
Works, and is concentrating zinc ore for the Elm Orlu
ly described Vol. IX.

OLIDATED COPPER CO. NEW MEXICO.

ska Bldg., Seattle, Wash. Mine office: Fairview, Sierra
ggerty, president; P. D. Johnson, vice-president; Marcus
Maurice D. Leehey, secretary; preceding officers, J. B.
tosh and J. C. Arkard, directors; Harry B. Johnson, gen-
ized 1906. Lands, 14 claims, 10 miles from Fairview.

MONTANA.

nda Copper Mining Co., at Butte, Silver Bow Co., Mont.

G & SMELTING CO. NEW MEXICO.

by sheriff, October, 1909, to Savanna Copper Co., for
y at Silver City, Grant Co., N. M. Very fully described

A DE COMBARBALÁ. CHILE.

nclaimed from former office, Valparaiso, Chile. Mine and
rbalá, Coquimbo, Chile, and Illapel, Coquimbo, Chile.
6, under laws of Chile, with capitalization 400,000 pesos,
Smelter, known as the Fundición de Valdivia, makes
% average copper tenor. Production, 1907, was 184,291
umably idle.

LD & COPPER CO. CALIFORNIA.

at Ingot, Shasta Co., Cal. Described Vol. VIII.

OPPER MINING CO., LTD. IDAHO.

Idaho. Letter returned unclaimed from former mine
ne Co., Idaho. Archibald McCullom, president and gen-

eral manager; Jos. L. Whelan, secretary. Capitalization $1
cents par. Lands, 4 claims, adjoining the Springfield, east of
vens Peak, and near 2 railroads. Property shows 2 veins, of 10′
width, about 150′ apart, carrying chalcopyrite and bornite, wit
gangue. Development is by tunnel, cutting a hematite vein,
of workings.

COMET MINING & MILLING CO.

Office: Cœur d'Alene, Idaho. Mine office: Whitefish
Mont. Dr. Max A. Dorland, president; Fred Eppinger, vic
Wiggert, secretary; Louis J. Michaud, manager. Organized 1
ization 1,000,000 shares. Development is by a short tunnel.

COMMERCE GOLD & SILVER MINING CO.

Dead. Formerly at Duncan, Graham Co., Ariz.

COMMERCIAL CORPORATION, LTD.

Office: 4 Union Court, London, E. C., Eng. Operatin
2, Barcelona, Spain. Mine office: Huercal-Overa, Almería
F. Calvert, chairman; preceding officer and W. Stuart Lane,
N. Gardiner, secretary. Organized May 10, 1897, under laws
with capitalization £500,000, shares £1 par, in £6,000 def
£494,000 ordinary shares; issued, £4,100 deferred and £302,00
Property is the Huercal mine, carrying copper, cobalt and nick
company apparently has done a little development. Presuma

COMMERCIAL MINING CO.

Office: 99 John St., New York, N. Y. Mine office:
Co., Ariz. Maj. A. J. Pickerell, general manager; A. B. Peach
Is controlled by Phelps, Dodge & Co., Inc.

Lands, 18 claims, patented, in the Copper Basin, about 6
way. Some lands, sold years ago to the Geo. A. Treadwell
foreclosed, under mortgage, November, 1910. Development
compartment shaft, bottomed in good ore. Mine formerly
which was burned some years ago. Production was 694,126 l
1906, and 125,598 lbs. in 1907, secured by lessees. Mine was
by the company.

COMMODORE COPPER MINING CO.

Dead. Formerly at Encampment, Carbon Co., Wyo. D

COMMODORE MINE.

Mine office: Warroo, Bentinck Co., Queensland, Austr
clude gold and copper tracts, the gold mine having a 74′ shaft
carrying up to 1 oz. 11 dwts. gold per long ton. Shipped, 1
grade ore of about 20% copper tenor, with small silver valu
men, and, early 1908, planned a smelter and incorporation.

COMMODORE MINES, LTD. BRITIS

Letter returned unclaimed from former office, Vancouv
office: Van Anda, Texada Island, B. C. Bruce Kirk, chairma
secretary; W. Thos. Newman, manager. Organized June
laws of British Columbia, with capitalization $750,000, shares

Lands, near the Marble Bay mine, show 3 veins that can
the same set of openings, there being a 2-compartment 200′
about 2,000′ of workings. Development is on the main or c
tween limestone and eruptive rocks, showing argentiferous and a
pyrite, associated with sphalerite and galena, of good averag
ment includes a 16-h. p. Jenckes hoist, Cameron sinking pum
station pump and several mine buildings. Employed 12 men,
considered promising. Presumably idle.

COMMONAGE COPPER SYNDICATE, LTD.

Office: 8 Bain's Bldgs., Johannesburg, Transvaal. Min

svaal. H. Southcott, secretary; Chas. O. Bain, David J. Pullinger and W. J. Holmes, directors. Organized July, ransvaal, with capitalization £3,000, shares £1 par. Lands, 2 equal tracts, with privilege of 99-year lease on the basis e of output, also 2 options, of 7,750 morgen each, on the ng 7 miles of frontage on the Orange River, showing a vein traceable circa 1,000′, giving samples of ore assaying 15% silver per long ton. Presumably idle.

I MINES CO. **UTAH.**

rald Bldg., Salt Lake City, Utah. Mine office: New- Utah. Wm. M. Bradley, vice-president; W. T. Aiken, sec- Newton A. Dunyon, general manager; preceding officers, Jas. H. Paterson, directors. Organized November, 1906, ng, with capitalization $600,000, shares $1 par.

n the Star district, adjoining the Hub property on the east, g Moscow mine, supposed to carry the extension of ore mine. Considerable lead ore was produced from surface and the Nellie claim has copper sulphides in its bottom shows a broad contact zone, between granite and porphyry, s-fissures, showing ores assaying well in copper, lead and claim has ores giving average assays of 13.2% copper r ton, with more or less lead. Mine is developed by a tun- bout 300′, and has secured ore assaying up to 4% copper, silver per ton.

MINING CO. **MÉXICO.**

Mass. Letter returned unclaimed from former mine ca, Mex. Lands, 23 acres, known as the Humboldt mine, shaft cutting a 12′ vein giving assays up to 6% copper, silver and 6 grams gold per metric ton. Presumably idle.

CO. **IDAHO.**

y at Almo, Cassia Co., Idaho. Described Vol. VIII.

R CO. **ARIZONA.**

y at Casa Grande, Pinal Co., Ariz. Described Vol. VIII.

ER MINING CO. **IDAHO.**

, Idaho. Mine office: Burke, Shoshone Co., Idaho. E. ; Allen J. Olsen, treasurer; John H. Nordquist, manager. s of Idaho, with capitalization $1,500,000, shares $1 par. Mountain, east of Burke. Presumably idle.

ER MINING SYNDICATE. **AUSTRALIA.**

loucester, Gloucester Co., N. S. W., Australia. W. J. Capitalization £30,000. Has received a government grant Lands, circa 30 miles from Gloucester, show a 6′ vein, t and a 100′ tunnel, exposing high grade carbonates, with w depths, giving assays up to 23.61% copper, 21 oz. silver r long ton. At last accounts was supposed to be building sumably idle.

TASMANIA.

ormanston, Montagu Co., Tasmania. Chas. E. Coote, ne, on the western slope of Mt. Lyell, has 2 tunnels, in gnations of chalcopyrite. Was developing with a force

NG CO. **WYOMING.**

y at Encampment, Carbon Co., Wyo. Fully described

A LA CONCEPCIÓN y ANEXAS. **MÉXICO.**

Catorce, San Luis Potosí, Mex. Organized under laws

of México, with capitalization 300,000 pesos, shares 100 peso
has ore carrying values in copper, lead and silver. Idle severa

COMPAÑÍA MINERA CONCEPCIÓN DEL ORO.

Letter returned unclaimed from former mine office, Con
Mazapil, Zacatecas, Mex. Santiago Chamberlain, president
secretary and general manager; Santiago Chamberlain, Jr.,
Juan Sanchez, mining captain. Organized 1902, with capita
shares $30 par. Lands, 32 pertenencias, area circa 80 acres
district. A 4′ vein carries copper oxides assaying 30%, with
values. Shaft is 33 metres. Ore is shipped 336 miles to smel
Potosí. Has gasoline power. Idle and apparently moribund.

CONCONULLY COPPER CO.

Mine office: Conconully, Okanogan Co., Wash. Organ
1908. Lands, 11 claims, adjoining the Wellington mine, about
Conconully, on the eastern side of the Salmon River. Propert
traceable circa one mile, estimated at 12′, 20′, 30′ and 40′ i
carrying copper and silver values in about equal quantities, v
in lead and gold. Development includes about 800′ of tunnels,
planned, December, 1908, making shipments to the Granby sm
ently no ore has been shipped. Presumably idle.

CONCORD CONSOLIDATED COPPER CO.

Office: Marion Bldg., Seattle, Wash. Mine office: Skyk
Wash. Wm. S. Barnes, president; John N. Perkins, vice-pr
Divers, secretary and superintendent; Jos. Silver, treasurer; p
Philip I. Schick, Walter Metzenbaum and Louis Jacoby, direc
Barnes, general manager. Organized Dec. 11, 1908, under law
with capitalization $2,000,000, shares $1 par, nonassessable;
Annual meeting, February 1st, each year.

Lands, 9 claims, area 180 acres, in the Beckler River di
ore bodies, carrying argentiferous and auriferous chalcopyrit
management to average 18% copper and 16 oz. silver per ton.
shaft and tunnels of 45′, 100′, 125′ and 400′. There are 3 buil

GEWERKSCHAFT CONCORDIA.

Office: Eiserfeld, Germany. Mine office: Herdorf, Rhe
sia, Germany. Adolf Dresler, chairman; preceding officer,
Jacob Kreutz and Karl Schroers, directors; W. Jung and Albre
superintendents. Organized under laws of Germany, wit
584,300 marks. Lands include former holdings, 18 claims, of t
Harteborn, acquired circa 1909. Mine has 2 shafts, of about 3
each, and employs circa 450 men, producing about 180,000 tons c
ores annually, copper production being trivial.

COMPAÑÍA MINERA CONCORDIA DE COLLAHUASI.

Letter returned unclaimed from former office, Iquique, Chi
Collahuasi, Tarapacá, Chile. Organized March 17, 1906, und
with capitalization 120,000 pesos, shares 100 pesos par. Prope
cordia mine, undergoing development at last accounts.

CONCRETE GOLD MINING CO.

Letter returned unclaimed from former office, 324 Cooper
Colo. Mine office: Central City, Gilpin Co., Colo. Samuel
intendent, at last accounts. Mine has auriferous and argent
copper ores, with steam power. Idle several years and apparen

COMPAÑÍA MINERA CÓNDOR DE COLLAHUASI.

Office: Iquique, Chile. Mine office: Collahuasi, T
Organized July 4, 1906, under laws of Chile, with capitalization
£5 par. No trace of operations secured, and presumably morib

RA DE CONDORIACO. **CHILE.**
Serena, Coquimbo, Chile. Has steam power and employed
ime. Presumably idle.

NING CO. **ARIZONA.**
ton, D. C. Letter returned unclaimed from former mine
a Co., Ariz. Col. Lee Crandall, president; Maj. D. W.
treasurer; Carl Crandall, manager. Organized Sept. 6,
izona, with capitalization $1,000,000, shares $1 par. Prop-
a group, on Reno Mountain, about 45 miles from Mesa,
50′ and 64′, said to show a 12′ vein of copper ore, carrying
assays of 20% copper. Idle some years and apparently

MINING CO. **MICHIGAN.**
y at Delaware Mine, Keweenaw Co., Mich. Exhaustively
Oneida, Vol. II.

MINING CO. **UTAH.**
unclaimed from former office, Denver, Colo. Mine office:
lt Lake Co., Utah. G. Lavagnino, manager; A. P. Hanson,
at last accounts. Idle several years and presumably mor-

IÈRE DU CONGO FRANÇAIS. **FRENCH CONGO.**
de Bonnel, Lyons, France. Mine office: Mindouli, par
Congo. Organized June 20, 1905, under laws of France,
70,000, increased, 1909, to f4,000,000, shares f500 par, and
es carrying the right to 35% of profits. Property is 6
a 14,500 hectares, covering the Mindouli, M'Passa, Tchi-
sigunga mines and prospects, also the right to explore in
i River, between Brazzaville and the coast.
ty, known as the Mindouli mine, is in the Bouenza district
basin, about 300 kilometers from the coast. The property
ndstone overlying limestone, surface ores being mainly
e cuprite, both argentiferous, and at little depth property
es of chrysocolla and dioptase, succeeded by chalcocite, all
rgentiferous. These deposits were worked by the natives,
r centuries, and a considerable trade once existed in copper
out this became extinct with French occupation.
railway was completed December, 1910, from Brazzaville
permitting development and extraction of ore under favor-
Transportation of ore or matte will be by rail from the
thence down the Congo River in batteaux to Léopoldville,
y to Matadi and the coast. The ore deposits are extensive
value. Property considered promising.

CO. **WYOMING.**
, Wyo. Mine office: Dillon, Carbon Co., Wyo. L. C.
ands, 5 claims, patented, north of Dillon, having a shallow
nel, showing a vein of 40′ claimed width, said to carry about
e, and said to have also a 25′ body of medium grade copper
ars and apparently moribund.

COPPER MINING CO. **UTAH.**
erbach Bldg., Salt Lake City, Utah. Letter returned un-
mine office, Bingham Canyon, Salt Lake Co., Utah. Glen
nt and general manager; R. C. McConaughy, vice-presi-
e, secretary; preceding officers, E. F. Jenkins and C. G.
pitalization increased, 1907, from $200,000 to $1,000,000,
ds, 10 claims, area circa 150 acres, adjoining the Dalton &
ut 400′ of workings, showing copper sulphides. Idle,

CONGRESO COPPER (MÉXICO), LTD.

Dead. Was liquidated voluntarily Oct. 30, 1908. Formerl in Sonora, México. Described Vol. VIII.

CONGRESS COPPER MINING CO.

Dead. Formerly at Red Mountain, Ouray Co., Co Vol. VII.

CONGRESS GOLD & COPPER CO.

Office and mine: Silverton, San Juan Co., Colo. J. B. Ros general manager; Guy W. Mallon, vice-president; Frank L. Ros treasurer; preceding officers are the directors; M. E. Rumery, n dent. Organized Apr. 16, 1908, under laws of Colorado, witl $500,000, shares $10 par. Bonds, $100,000 authorized, at 6%;

Lands, 3 claims, area 30 acres, being the Congress and Arli San Juan county, and the Midway in Ouray county. Property 5 ore bodies. Principal mine is the Congress, worked 1884-189 produced about $400,000 worth of ore, averaging circa 18% co silver per ton, with small gold values. The Congress, idle f through litigation, has a 270′ shaft, with about 1,500′ of wo chalcocite, reported by company to average about 16% copper, $1 gold per ton. Ore is zinciferous and slightly plumbiferous. h. p. steam plant. Presumably idle.

CONGRESS GOLD & COPPER MINING CO. W

Letter returned unclaimed from former office, Spokane, office: Keller, Ferry Co., Wash. Joseph Roslow, president; J. retary. Lands, circa, 80 acres, opened by shafts and tunnels, on good assay values in gold, silver and copper, with a little nicke years and apparently moribund.

CONKLING MINING CO.

Office: 520 Atlas Block, Salt Lake City, Utah. Mine offic Summit Co., Utah. Col. Nicholas Treweek, president; Wm. president; Geo. A. Lund, secretary; J. Leonard Burch, treas officers and Margaret Treweek, directors. Organized Sept. 1 laws of Utah, with capitalization $500,000, shares $1 par, assessa corporation, with 25% of stock owned by Silver King Coalition has litigation pending, in the Federal courts, against the Silver Ki of illegal extraction of $800,000 worth of ore.

Lands, 2 claims, 2 miles from a railroad, carrying aurifer lead ores, developed by a 1,000′ tunnel on the lands of the Silver ently no work has been done by present company.

CONQUEST CONSOLIDATED MINING CO. W

Office: 253 Broadway, New York, N. Y. Mine office: Ne Co., Wash. Wm. Coverly, president; Robert Caddock, vice-pr Ingalls, secretary; A. W. Lindsay, treasurer. Organized under ington, with capitalization $5,000,000, shares $1 par, as a merg Copper & Gold Mining Co. and American Eagle Gold Minin meeting, second Tuesday in November.

Lands, 15 claims, area 300 acres, circa 6 miles north of Ne 7 ore bodies, of which one, under development, 1′ to 6′ wide and 2,000′, is opened by a 186′ shaft and by tunnels of 200′, 700′ and 3,000′ of workings, showing slightly auriferous and argentifer phides of concentrating grade, with considerable ore blocked o dump. Has steam power, with hoist good for 1,000′, and several

CONQUEST GOLD & COPPER MINING & MILLING CO. W

Dead. Was reorganized, circa 1902, as Conquest Conso Co. Formerly at Newport, Stevens Co., Wash.

LIDATED MINE. **AUSTRALIA.**
ucceeded, 1906, by Conrad Stannite Mines, Ltd. Formerly
ge Co., N. S. W., Australia.

ITE MINES, LTD. **AUSTRALIA.**
ustin Friars, London, E. C., Eng. Operating office: 16
ney, Australia. Mine office: Howell, Hardinge Co., N. S. W.,
Davies, chairman; preceding officer, Mark Attleborough
, English directors; Walter C. Watt, chairman; Dr. H. C.
lso King and A. R. Minter, members local Australian board;
etary; R. N. Kirk, local secretary; B. C. Besley, manager.
4, 1906, under laws of Great Britain, with capitalization
1 par; issued, £375,000.
es, area 294 acres, including the Conrad and King Conrad
sh of Mayo. The geology is unusual, country rock being
fissure vein of 20″ to 30″ width, without faults, so far as de-
n intimate mixture of copper, lead and tin sulphides, prin-
in tin. The ores include slightly argentiferous galena, chal-
nd pyrite, with small quantities of sphalerite, stannite being
ber of the pyrite family, carrying circa 27.5% tin, 29.5%
and 29.9% sulphur. Ore body also is peculiar in that it is
ged from surface to depth of 900′. Mine has 5 shafts, with
ned for a horizontal distance of 4,400′. Ground stands well,
bering, and mine was estimated, 1908, to have 200,000 tons

rted, at surface, and sent to a mill using the Wetherill mag-
ing 2 classes of concentrates, the first being silver-lead, easily
g, carrying about 60% lead and 112 oz. silver per long ton,
y. The other class of concentrates consists of a mixture of
hides, with small quantities of galena and sphalerite, values
. Considerable arsenic has been produced, and shipped to

s a Merton calciner, which reduces ore to about 6% sulphur
ch roasted ore is smelted in a reverberatory furnace, pre-
to the slag, and yielding a matte of about 40% copper tenor,
e slag, containing about 10% tin, is resmelted, and tin pre-
e of green poles and metallic iron, leaving final slags carrying
This process was invented by Mr. J. Howell. The smelter
vater-jacket blast-furnace, in which the tin and copper sep-
g a white metal carrying mainly copper, with small percent-
, bulk of the tin being thrown off in the slags. Smelter also
in-lead matte, of about 45% tin tenor. The copper-lead
out 40% copper, 30% lead and 450 oz. silver ore per ton.
e employed.
07, was circa 250,000 lbs. fine copper, 2,500,000 lbs. lead and
At last accounts company planned reorganization.

ERA LA CONSECUENCIA DE SANTA ROSA. **CHILE.**
ue, Chile. Mine office: Santa Rosa, Tarapacá, Chile.
1904, under laws of Chile, with capitalization, 64,000 pesos,
r. Presumably idle.

MINING CO. **WASHINGTON.**
rly at Silverton, Snohomish Co., Wash. Fully described

AFRICAN COPPER TRUST, LTD. **RHODESIA.**
econstructed, Oct. 4, 1910, as South African Copper Trust,
Bulawayo, Rhodesia. Fully described Vol. VIII.

CONSOLIDATED ARIZONA GOLD & COPPER CO.

Office: Phœnix, Ariz. Mine office: Troy, Pinal Co., is the Lucky Boy mine, carrying gold and copper ores. Pres

CONSOLIDATED ARIZONA SMELTING CO.

Office: 1206–71 Broadway, New York, N. Y. Mine off Yavapai Co., Ariz. Works office: Humboldt, Yavapai C Schall, Jr., president; Frank A. Dillingham, chairman execu Frank W. Thompson, secretary and treasurer; preceding of Kittle, Victor Cumnock, Julius Kessler, Edwin S. Hooley and directors; B. H. Bennetts, general manager; Arthur S. Dwigh gineer; E. H. Hamilton, general superintendent; Chas. Carma tendent.

Organized 1906, under laws of New Jersey, with capitalizat shares $10 par, with $16,000,000 issued, and was reorganized, under laws of Maine, with capitalization $9,200,000, shares $5 p through bankruptcy, and being sold for $200,000 and the assu gages aggregating $600,000, to Edwin S. Hooley and Thos. Ac outstanding, at last accounts, was $8,000,000. Company has a of thirty-year 5% convertible bonds, and a $255,000 mortgage. ing, first Wednesday in December.

The company, before reorganization, owned practically t issues of the Arizona Smelting Co., Arizona Exploration Co. and Co., and apparently practically the entire stock issue of the c Arizona was controlled by the Consolidated Arizona Smelting & poration, the financial relations between these different compa intricate and devious character. The original Consolidated A Co. was organized with a capitalization of $15,000,000, of whic was actually paid in, presumably in real and not stage mone Elliott, presumably acting for the other promoters, received $1 in consideration of 1,500 shares of Arizona Smelting Co.; 510 sh Mining Co. and 520 shares of Arizona Exploration Co., the co which might be, on a very liberal estimate, about 1% of the p stock so generously furnished him—by himself. Chas. W. M W. Lawson, both frenzied financiers of high renown, became in deal, having fine noses for carrion, and J. Kearney Rice, receive for the old company, brought suit, December, 1909, against Joh former president, Chas. W. Morse, Hon. Geo. W. Middelton, John F. Carroll and Capt. Jas. R. DeLamar, to recover $870,000 scriptions to the stock of the old company, which they had issue The court appraisement of the combined assets of the Conso Smelting Co. and Arizona Smelting Co., August, 1908, was $1,16 ors holding liens for ore, labor, etc., had much difficulty in sec finally receiving two dividends in bankruptcy, aggregating 2 dollar, and apparently will get nothing further. The manne affairs of the old company were handled was disgraceful.

A statement, dated Nov. 10, 1909, gave cash assets of $30,176 in accounts receivable, and a statement of date Feb. 28 a balance of $225,409 working capital on hand. Apparently th managed to put out a large amount of income bonds for a small

The Blue Bell mine is a group of 3 claims, carrying 3 fissu gonkian slates, with quartzite footwall and granodiorite han by 6 shafts, deepest 300′, and 2 short tunnels. Property carries chite and chalcopyrite, all slightly argentiferous and auriferou and promising ore body on the 300′ level. Mine is connected shaw Mountain railway by a tramline, and has electrical machin rent over an 18-mile transmission line.

lant, well located for custom business, includes sampling, ng, smelting and converting departments, with a machine- ll buildings are of structural steel frame, with brick walls eathing, floored with cement. The three-story assay office urned, May, 1910. The yards have 4 miles of 65-lb. rail-

centrator, size 160x200′, known as the De Soto mill, has ch having one 10x20″ and two 7x10″ Blake crushers, 1 elevators, 2 sets of rolls, one 25′ Hancock jig, 10 Wilfley ables, 8 vanners, 4 trommels, 8 Callow tanks and Richards, la classifiers. The mill has a large slum-pond, and over- to the mill for reuse.

000 tons rated daily capacity, was planned to be increased red. There are three 100′ Edwards mechanical roasters, ch with 2 series of rabbling arms, rotated in opposition, h furnace, each making one revolution per minute, except ich make two revolutions per minute. There are three rnaces, of the Anaconda type, rated at 400 tons daily roleum. Matte from the reverberatory furnaces is tapped delivers it to a ladle in the converter room.

e department has both lead and copper stacks, with a urnace, and a 250-ton water-jacket blast-furnace for cop- lated. The stack is of reinforced concrete, 180′ high, 18′ e, and 11′ at the top.

partment has 2 stands, with shells of barrel type, rotated ent includes a 40-ton Whiting electric crane with a 15-ton s also taking hot slag from the converters, and pouring ratories, and delivering shells.

has four 345-h. p. Stirling water-tube boilers, burning reverberatories, steam being sent therefrom through a 10″ . pressure. Machinery includes 2 Connersville blowers, ross-compound air-compressor, with 40x42″ air cylinder cylinders. There are two 300-kw. 480-volt 3-phase 60- t-connected to two 16x32x36″ Nordberg cross-compound ic turbine pump. Electric power is furnished the Blue stant, current being transmitted at 15,000 volts, stepped he Blue Bell transformer station.

last-furnaces and petroleum for the reverberatories, with 0 gallons capacity, for oil. A pump station on the Agua tage centrifugal electric pumps, and one steam pump, with the works.

2,250 lbs. fine copper, 3,055 oz. silver and 59 oz. gold in ace was blown in Apr. 29, 1910, but the plant does not vigorously. The old company was a rank swindle, from is traded in on the New York curb, and is much manipu- excellently located for custom business, and is sufficiently a strong bid for business, if operated as a smelter, and not jobbing operations.

G LEAD & CALUMET MINING CO. ARIZONA.

re sold March, 1909, to Ray Central Copper Mining Co. Pinal Co., Ariz. Described Vol. VIII.

NTRAL BUTTE COPPER MINING CO. MONTANA.

at Butte, Silver Bow Co., Mont. Described Vol. VIII.

OPPER CO. BRITISH COLUMBIA.

ffice was Minneapolis, Minn. Property was the Gold ng argentiferous lead and copper ores, which was under

development, circa 1903, with a force of about 20 men. Formerly at
Kootenay district, B. C.

CONSOLIDATED COPPER CO. NEVADA

Dead. Name was changed, April, 1908, to Coppermines Co. F
Ely, White Pine Co., Nev. Described Vol. VIII.

CONSOLIDATED COPPER CO.

Dead. Formerly at Homestead, Baker Co., Ore. Described V

CONSOLIDATED COPPER CO., LTD. CORSICA &

Dead. Formerly at Charcas, Moctezuma, San Luis Potosí,
Bastia, Corsica. Fully described Vol. VIII.

CONSOLIDATED COPPER CO. OF LOWER CALIFORNIA.

Dead. Formerly at San Quintín, Norte, Baja California, M
described Vol. VIII.

CONSOLIDATED COPPER CO. OF PARRY SOUND. C

Office: 705 Palladio Bldg., Duluth, Minn. Mine office: Par
Parry Sound district, Ont. Robt. Forbes, president; Robt. Millard,
dent; J. G. Harris, secretary and treasurer; preceding officers, A. C. L
Frank Cox, M. A. Ryan, Dr. J. D. Budd, F. L. Young, and C.
directors. Organized February, 1902, under laws of Ontario, with cap
$5,000,000, shares $1 par; issued, circa $3,100,000.

Lands, circa 1,500 acres, practically all patented, carrying co
standing timber, in Foley, McDougall, Haggerman and Conger
Part of property formerly was held by Hattie Belle Gold, Copper & I
which claimed 4,000,000 tons of ore in sight, of $10 to $15 average val
which was untrue. Ores occur as contact deposits between slate and
and as fahlbands, ore being mainly chalcopyrite, with occasional b
chalcocite, mainly low in grade, but with occasional seams of high
There are 18 different ore bodies, shown by test pits and stripping, of v
somewhat developed. The fahlbands are said to show a width of
1,000', carrying 7 bands of fairly good ore, of 200' estimated aggreg
between which is low grade ore, part of which may be amenable to cone
Ores assay 1.5 to 12% copper, circa 3 oz. silver, and from a few cent
gold per ton. Property has a 180' vertical shaft, and about 25 pits of
depth.

The Spider Lake mine has a shafthouse, and steam hoist good for
necessary mine buildings, and a considerable ore body has been e
trenching.

The Leflex mine has shafts of 90' and 40', showing nothing of
promise. The Leflex has an iron gossan, carrying up to 2% copper
$3 gold per ton. A 600-lb. test shipment, from the 65' level, returned
copper, and various samples have shown from 0.5% to 3% nickel, and f
ing to $20 gold per ton. Company plans no mining. Idle and lands ar

CONSOLIDATED COPPER CREEK MINING CO. A

Office: 707 Shubert Bldg., Kansas City, Mo. Letter returned
from former mine office, Mayer, Yavapai Co., Ariz. E. J. White,
treasurer and manager; F. E. Dobbins and I. W. Dumm, fiscal agen
Lightburn, superintendent. Organized 1906, under laws of Arizona,
talization $1,000,000, shares $1 par. Controls the Consolidated Copp
Colorado, which holds the Delmonico gold mine at Cripple Creek.
Lands, 15 claims, known as the Sunset group, adjoining the Rosalie Co
carrying slightly argentiferous copper ores, with a 100' two-compartm
equipment including a 125-h. p. boiler, 8x10" hoist and 8-drill air-co
Advertising, largely in the cheap mail order monthlies, was of the brazen
sort, calculated to catch the dollars of the ignorant. Advertised, 190
was altogether likely to become as famous as Amalgamated. The Aris
erty is idle, and the Delmonico mine, which apparently is of some promi

nt, was leased, 1910, to J. McGinnis & Co. Frank H. Horn, noter, is now in jail for fraudulent mining stock deals. Com- ape financially, and is regarded with suspicion.

D COPPER DEVELOPMENT CO. **NATAL.**

nerly at Vryheid, Natal. Described Vol. VIII.

D COPPER-GOLD MINES CO. **CALIFORNIA.**

nerly at Quincy, Plumas Co., Cal. Fully described Vol. VIII.

D COPPER MINING CO. **IDAHO.**

succeeded, circa 1904, by Ladd Metals Co. Formerly at ton Co., Idaho. Described Vol. IV.

D COPPER MINING & MILLING CO. **MONTANA.**

lan, Idaho. Letter returned unclaimed from former mine Missoula Co., Mont. F. D. Willard, secretary. Company ng the Black Traveler vein by a 500′ tunnel, but no trace of d. Idle and presumably moribund.

D COPPER MINING, MILLING & CO. **COLORADO.**

Temple Court, Denver, Colo. Mine office: Eldora, Boulder Johnson, president and general manager; W. A. Poynter, vice- Givens, secretary; W. W. Jones, treasurer. Organized Oct. 21, of Colorado, with capitalization $3,000,000, shares $1 par. second Tuesday in September.

e claims, partly patented, area circa 150 acres, known as the oup, 3 additional tunnel claims, a placer claim and a 160-acre ng total holdings of 350 acres, at the southern base of Arapahoe d Island district. Property is said to have 4 contact deposits, one wall, of which one, under development, 1906, was said to in width, and to carry up to 60′ of sulphides, of concentrating galena, chalcopyrite, bornite and chalcocite, all auriferous and med, 1906, to give average assays of 15% copper, 15% lead, 20 gold per ton, which figures are entirely too high to be cred- nt is by 3 shafts, deepest 369′, in 1906, and the Fourth of July 2,700′ length, late 1907. Has steam power, a 6-drill Leyner pressor and necessary buildings, and was said, 1909, to plan

D EUREKA MINING & TUNNEL CO. **COLORADO.**

nerly at Eureka, San Juan Co., Colo. Described Vol. VIII.

D FLAGSTAFF MINES CO. **UTAH.**

succeeded, Apr. 22, 1908, by Flagstaff Copper Mines Co. For- lt Lake Co., Utah. Fully described Vol. VI.

D GEM MINES CO. **COLORADO.**

Idaho Springs, Clear Creek Co., Colo. Wm. E. Renshaw, nclude the Gem, Freighter's Friend and Silver Age mines, carry- nd auriferous copper ores, with a little silver-lead, copper being uct. Equipment includes electric power and a concentrator stamps. Property employed circa 50 men, at last accounts.

D GOLD, COPPER & **COLORADO & WYOMING**

ged title, circa July, 1908, to Northern Colorado Coal Co. , Larimer Co., Colo. Described Vol. VIII.

D GOLD & COPPER CO. **ARIZONA.**

a swindle, put out by Douglas, Lacey & Co. Formerly at Co., Ariz. Described Vol. III.

D GOLD & COPPER CO. **MÉXICO.**

merged, circa August, 1908, in Kansas-Cananea Copper Co. nanea, Arizpe, Sonora, Mex. Described Vol. VI.

CONSOLIDATED GOLD & COPPER MINING CO.

Dead. Was a bad egg. Formerly at La Sal, Grand Co., U
Vol. VIII.

CONSOLIDATED GOLD & COPPER MINING & MILLING CO.

Dead. Formerly at Encampment, Carbon Co., Wyo. D

CONSOLIDATED GOLD & COPPER QUEEN MINING CO.

Letter returned from former office, 613 Pioneer Blk., Seatt
office: Mayfield, Lewis Co., Wash. W. H. Springfield, preside
vice-president; J. S. McKenzie, treasurer. Capitalization $
$2.50 par. Lands, 9 claims, having open cuts on a dyke of 40'
showing ore giving average assays of about $8 per ton in gold.
ently moribund.

CONSOLIDATED GOLD MINES CO. **BRITISH COLUMBIA & W**

Office: 409 Crary Bldg., Seattle, Wash. Mine offi
Boundary district, B. C. Geo. W. Furry, vice-president; N
consulting engineer; W. H. Sherrod, manager. Property includ
ington, Oregon, Nevada and British Columbia.

The Washington lands are 2 claims, known as the Una gro
vens mine, on Miller River, 5 miles from Berlin, King Co., Was
have about 1,800 tons of ore blocked out for stoping, giving assa
3 oz. silver and $4 gold per ton. This property is idle.

Company owns a half interest in the Tip Top mine, near Gr
a vein up to 60' in width, carrying slightly auriferous copper o
Small shipments, 1910, were said to have given net returns of $6

CONSOLIDATED GREENE COPPER CO.

Dead. Formerly at Kirkland, Yavapai Co., Ariz. Desc

CONSOLIDATED GREEN MOUNTAIN ST. LOUIS MINES, LTD. **BRITIS**

Office: Peoria, Ills. Letter returned unclaimed from for
Rossland, Trail district, B. C. Chas. D. Clark, treasurer.
$3,000,000, shares $1 par. Mine has a 400' shaft. Idle some y
ently moribund.

CONSOLIDATED GREENWATER COPPER MINING CO.

Dead. Formerly at Greenwater, Inyo Co., Cal. Descr

CONSOLIDATED JEFFERSON GOLD & COPPER MINING

Dead. Was succeeded, October, 1908, by Wasatch-Ut
Formerly at Brighton, Salt Lake Co., Utah. Fully described V

CONSOLIDATED KANSAS CITY SMELTING & REFINING

Office: 165 Broadway, New York, N. Y. Works office:
Co., Tex. Frank C. Earle, manager; Jas. J. Ormsbee, superinte
trolled, through ownership of entire stock issue, by Am
& Refining Co., and property is described under that title.

CONSOLIDATED KING DEVELOPMENT & COLUMBIA COPPER MINING CO.

Office and mine: Jerome, Yavapai Co., Ariz. Hon. Geo.
ident; Mary A. Hull, secretary. Organized under laws of Arizo
ization $6,000,000, shares $1 par. Lands, 9 claims, area 150 ac
United Verde mine, showing several bodies of oxidized and sulp
ing fair values in copper, gold and silver. Mine has a 100' shaft a
About $10,000 has been expended upon the property. Idle sin

CONSOLIDATED LA SAL MINING & SMELTING CO.

Dead. Formerly at Cashin, Montrose Co., Colo. Fully de

MINES & DEVELOPMENT CO. **ARIZONA.**
y at Globe, Gila Co., Ariz. Described Vol VIII.

MINES, SMELTER & **ARIZONA.**
TION CO.
Exchange Place, New York, N. Y. Geo. A. Beatson, pres-
art, secretary; John W. Prout, Jr., manager. Organized
struction and merger of Alto Copper Co. and Mowry Mines
s, area 420 acres, 8 miles from Patagonia, in the Santa Rita
Mexican border, developed by tunnels of 187′ and 400′,
fts of 30′ to 70′, and by 3 new shafts of 73′, 100′ and 150′,
orkings, estimated by the former company to show 500,000
out for stoping, which was very much too high. Ores are
and sphalerite, giving assays of 8 to 12% copper, 10 to 20%
er and $3 to $20 gold per ton. The ore, from its complex
in reduction.
ides a steam plant, with 3 hoists, good for 600′ each, and an
ompressor. There is a 20x40′ machine-shop, smithy and
ngs, including dwellings, and company is reported to have
or and a 100-ton smelter.

MINING & SMELTING CO. **NEW MEXICO.**
office: Cerillos, Santa Fé Co., N. M. R. B. Thomas, man-
erintendent. Ores carry gold, silver, lead, zinc and copper,
ities, as a by-product. Property includes the Tom Paine,
nes, extensively developed, and well equipped with gasoline
The company also has a 120-ton lead smelter.

MINING & SMELTING CO. **UTAH.**
y at Brigham, Box Elder Co., Utah.

MINING & SMELTING **BRITISH COLUMBIA.**
DA, LTD.
lington St., Toronto, Ont. Mine office: Rossland, Trail
ks office: Trail, Trail district, B. C. W. D. Matthews,
ner, vice-president; preceding officers, Walter H. Aldridge,
. Hosmer, H. S. Osler, W. L. Matthews, J. C. Hodgson and
; Robt. Holden Stewart, general manager; Selwyn H. Blay-
ger; A. J. McNab, smelter superintendent; J. F. Miller,
nt; M. E. Purcell, superintendent Rossland mines; Chas.
t Phœnix mines; Angus W. Davis, superintendent Rich-
John M. Turnbull, engineer.
as Canadian Consolidated Mines, Ltd., with capitalization
e changed, Jan. 1, 1906, to present title, and capitalization
1909, to $7,500,000, shares $100 par; issued, $5,555,200.
ar ends June 30th. Annual meeting, fourth Tuesday in

ally was mainly a securities holding corporation, but has
Star Consolidated Mining Co. and the War Eagle Consoli-
elopment Co., Ltd., formerly subsidiary corporations, and,
ul mining companies, is inclined to simplify, rather than
rate relations with affiliated and subsidiary companies.
1909, net profits were $309,945.08, and surplus account
$671,011.09. Dividends for fiscal years were $234,940 in
07; $66,940 in 1908, with total dividends, to end of 1910, of
shoe company has paid back the money formerly advanced.
s and heavy development have somewhat cramped the
but substantial progress has been made, in all directions,
cessarily have been discontinued.

Subsidiary corporations include the St. Eugene Consolidated Ltd., and the Rossland Power Co. Properties owned outright ar Star group, including the War Eagle mine, at Rossland; Crown Po Rossland; Richmond-Eureka group, at Sandon; Phœnix-Amalgama Phœnix; Number Seven group, at Boundary Falls; Molly Gibs Kokanee. The Snowshoe group, at Kimberley, is held under lease also owns and operates the Trail smelter.

The Centre Star group, on the eastern slope of Red Mountain, is the principal property. Country rock is a series of Carbonifero aries, mainly slates, intruded by an elongated mass of monzoni This monzonitic mass, with its rim rocks, has been intruded by a of nearly vertical dykes, from a few feet to 250′ wide, with generall the dykes being basaltic, and occasionally slickensided, larger dyk the veins completely, with the more important ore bodies occurring of intersection, and having a series of faults, mainly parallel to the occurs in shoots of 3′ to 50′ width, and 50′ to 500′ length, widening at of veins with dykes. Ore is strongly auriferous and fairly argentif pyrite, associated with pyrite, with gangue of silicious altered coun ranging 0.7% to 2% copper and $10 to $20, and occasionally up t per ton. Pay shoots extend, in some cases, from wall to wall, an enrichments, walls in some cases being very indistinct, and ore sha country rock. There are several veins, the more important being Star and War Eagle, on which the mines are opened mainly, these zones, carrying chalcopyrite disseminated mainly in pyrrhotite, with and occasional arsenopyrite.

The Rossland group includes the Centre Star, War Eagle, Iro Idaho mines, which are practicaly one, all connected by drifts an and the group has about 25 miles of workings. For fiscal year 191 ings were 12,566′, with 27,698′ of diamond drilling. Drifts are dri the rate of 120′ to 180′ monthly. Ore reserves of the Centre Star estimated, June 30, 1910, at 245,640 tons. Mines are worked b stoping, and timbered with 12x15″ square sets. The Centre Sta electric haulage, with three 12-ton Jeffery electric locomotives, h side-dumping cars, to the underground ore-pockets of the Centre The ore-pockets are on the hanging-wall side of the shaft, 2 on e directly behind the other, the front bin, of 70 tons capacity, being fo the 150-ton back bin for ore. The Centre Star mine has a 250-ga pump, and the Iron Mask mine has a centrifugal pump. The mine tric signals throughout.

The Centre Star mine has a 2,300′ three-compartment shaft, su 68°, with 16 levels opened, at intervals of 125′ to 175′, this being shaft in Canada. The Centre Star has 8 or 10 different ore bodies, is principally from the Centre Star vein, the ore of which averages 0 0.3 oz. silver and $8 to $10 gold per ton. A new ore shoot, opened 1 up to 3.24 oz. gold per ton, over a width of 5′, between the 12th and

The War Eagle mine, including the War Eagle, Richmond, C and other claims, adjoins the Centre Star, and carries 3 veins, 2 of w as the War Eagle and Josie, are nearly parallel, and are intersected at practically right angles. The surface plant has been dismantl mine is now operated through the Centre Star shaft, the 1,650′ thr ment War Eagle shaft, sunk at 50°, now being used for handling men, supplies. The War Eagle mine has 11 levels opened.

The Idaho mine, just east of the Centre Star, and practically a latter, has ore of good grade, averaging better than that of the Centr proper.

mine, at Rossland, is an occasional small shipper of fluxing

ine has a 106′ wooden shafthouse, with 11′ sheave-wheels. A 24x36″ Jenckes-Farrel crusher, of 100 tons hourly 25-h. p. alternating motor, delivers ore to a link-belt rges into bins, there being one large bin for waste, 2 bins r fine ore, waste being sold for railway ballast. The Centre an 1,100-h. p. 28x60″ Nordberg hoist, with two 10′ drums on loads to depth of 3,000′, at a speed of 2,000′ per minute, l hoisting rope, and there is a 14x18″ Wellman-Seaver-iary hoist. These hoists, now operated by steam, are reheated. The main hoist takes cages 10′ high, boxed on ront, having hinged bottoms that are turned back when n skips swung under.

haft has a 300-h. p. geared hoist, run by compressed air, re using. The War Eagle shafthouse is connected by an ving a 300′ drop, with railway ore-bins, but is no longer

used exclusively, the mine taking current at 60,000 volts Falls plant of the West Kootenay Power & Light Co., 20 down at the mine to 2,000 volts for distribution and use. has a 120-kw. direct current generator, driven by an alter-supplying current at 250 volts for electric motors on sur-, and for lighting. The Centre Star plant has two 40-a Canadian-Rand Corliss duplex compound 2-stage com-40″ steam cylinders and 48″ stroke, with 28x32″ air cylin-linders have been discontinued, and compressor is rope-Westinghouse induction motor. The other compressor from an Ingersoll straight-line into a duplex machine hav-cylinders, rope-driven by a 600-h. p. Canadian Westing-tor.

Centre Star group include a large carpenter-shop, a well a good machine-shop doing all ordinary repairing.

en mine, 8 claims, area 300 acres, 8 miles southeast of miles east of Boundary Falls, has a fissure vein of 18″ to riferous and argentiferous lead and zinc sulphides, with ut $10 per ton average value, with circa 20,000 tons de-ad a 300′ main shaft, with 3,357′ of workings, June 30, ludes electric power, with a hoist and 10-drill air-com-s a 4-mile aërial tram to Boundary Falls, and a 5-mile , and employs about 50 men.

algamated group at Phœnix, Boundary district, B. C., 909, from the Phœnix Amalgamated Copper Mines, Ltd. rea circa 450 acres, and the mine had a half-mile of work-o which date $55,840.82 had been expended on develop-e begun circa February, 1911.

ureka mine, at Sandon, B. C., has argentiferous lead and tunnels, and employs about 50 men.

n mine, bought 1910, is a silver-lead property, formerly on Mining Co., Ltd., and later by La Plata Mines, Ltd. f workings, June 30, 1910, and is equipped with a 100-ton

ine, at Moyie, is a very fine property, and is the largest having produced 170,645 tons of ore, yielding 29,391,391 oz. silver, in 1907. The St. Eugene mine has about 18 is equipped with a 500-ton mill, employing circa 200 men.

The reduction works, known as the Trail smelter, include lead departments, and an extensive custom business is done, in ing the company's ores.

The sampling mills are 3 in number, equipped with cru samplers. No. 1 mill, for copper ores, has 1,250 tons daily ca lead ores, has 500 tons daily capacity, and No. 3, for either co has a daily capacity of 750 tons with fine crushing, or 1,000 crushing.

The smelter has a calcining department, and blast-furn for copper and for lead. Ore, coke and fluxes are delivere drawn by three 10-h. p. electric locomotives, from the samplin charge-bins, and from the charge-bins to blast-furnaces. The ing upwards of 40,000 tons of ore monthly at the close of 1910

The copper smelter, of 1,800 tons daily capacity, has t 42x263", and two 42x300" Brückner blast-furnaces, taking a Ore is treated crude in the blast-furnaces, making a first-fusion 15% copper tenor, which is granulated and given a preliminary furnaces of 9x97' and 12x97', with 85 tons daily roasting ca duces the low-grade matte from 25% sulphur to 10%. Final in 9 Huntington-Heberlein sintering pots that are used for co giving a matte containing only about 3% sulphur. The matte ing department is resmelted with low-sulphur crude ore, in anot yielding a matte of about 40% copper tenor, which is shippe conversion.

The lead smelter, of 350 tons daily capacity, has 45x140" a furnaces, with mechanical feed, taking mainly calcined ores, being roasted in seven 26' Godfrey furnaces, which reduce the original tenor of 16% to only 8%, and these calcines are rero Huntington-Heberlein sintering pots, yielding a product carryin sulphur. The fully sintered ore, carrying 30 to 50% lead, is sm furnaces, each making 50 to 85 tons of lead bullion daily, with a fall. This matte is roasted, and again put through the blast-fu are granulated.

In connection with the smelter is an electrolytic lead re silver-lead bullion. This plant, of 75 tons daily capacity, was th lead refinery ever built, and uses the Betts process. There are an electric crane for handling anodes and cathodes. The lead purity, with average assay of about 99.997%, which means th lead carries only about one ounce of impurities, which is marve work.

The silver refinery, taking silver sludge from the electro has a water-jacket reverberatory furnace for the production of the necessary kettles, tanks and bluestone plant for parting th with sulphuric acid, also furnaces for melting and casting the bullion. Products are silver .999 fine, and gold .995 fine.

Power for the reduction works is electric throughout, brou Bonnington Falls, on the Kootenay River, received at the trans 32,000 volts, and there stepped down to 550. The installed is about 3,000 h. p.

The works have a central heating station, and well equipp penter and boiler shops. Ths assay office, which handles an of work, in great detail, is exceptionally commodious and well

For the fiscal year ending June 30, 1910, the works treate ore, including concentrates from the St. Eugene mine. Recen been as follows: 3,433,310 lbs. fine copper, 20,380,083 lbs. le silver and 69,186 oz. gold in the fiscal year 1907; 4,004,

,224,888 oz. silver and 121,380 oz. gold in 1908; 4,637,631
77 lbs. lead, 2,443,475 oz. silver and 114,920 oz. gold
s. copper, 42,368,816 lbs. lead, 2,162,406 oz. silver and
10. Total production of the company, from its inception,
0, was 43,453,814 lbs. fine copper, 220,872,555 lbs. lead,
and 952,056 oz. gold. Considering that the Centre Star
were reported worked out, when taken over, the company
ccess. The management is enterprising and thoroughly

OUNT LYELL COPPER MINES, LTD. TASMANIA.
at Gormanston, Montagu Co., Tasmania.

ONORA MINES CO. MÉXICO.
ux, La. Operating office: Douglas, Ariz. Letter re-
m former mine office, Fronteras, Arizpe, Sonora, Mex.
; Chas. P. Shaver, secretary and treasurer; Chas. Mc-
t. Capitalization $3,500,000, shares $1 par. Is a close
1,140 hectares, slightly timbered, on both sides of the
t 25 miles southeast of Douglas. Property shows numer-
rrying lead, silver and gold, and has a 350′ crosscut tunnel.
s have been made, to the Copper Queen smelter.

TANLEY MINING & MILLING CO. COLORADO.
ceeded, circa 1906, by Stanley Mines Co. Formerly at
Creek Co., Colo. Described Vol. VI.

NITED VERDE JUNIOR ARIZONA & COLORADO.
ORATION.
nard, Me. Letter returned unclaimed from former mine
ai Co., Ariz. Daniel L. Dean, president; F. A. Sidelinger,
er. Capitalization $2,000,000, shares $1 par. Lands are
he Wisconsin district of Gilpin Co., Colo. Arizona lands
dle some years and apparently moribund.

ERDE MINING & MILLING CO. NEW MEXICO.
anized Aug. 23, 1899, and reorganized Oct. 24, 1904, as
Mining Co. Lands were 65 acres, having about a quarter-
ormerly at Cimarron, Colfax Co., N. M.

HITE BEAR MINING CO., LTD. BRITISH COLUMBIA.
nclaimed from former mine office, Rossland, Trail district,
superintendent, at last accounts. Ore is auriferous and
yrite, carrying values mainly in silver and gold, friable and
entration. Equipment includes a 150-h. p. Jenckes elec-
ill Rand compound air-compressor, driven by a 300-h. p.
a mill with 30 gravity stamps, having double-discharge
bles and a 4-unit Elmore oil concentrator. Production,
concentrates and 2,641 tons of ore, carrying circa 100,000
e since October, 1907, and apparently moribund.

COPPER MINES CO. ARIZONA.
ion Trust Bldg., Los Angeles, Cal. Mine office: Swan-
Thos. J. Carrigan, president; Frank Robbins, vice-presi-
nager; Jas. W. Wilkinson, secretary and treasurer; preced-
gers, T. H. Carrigan, J. W. Breiner and Edw. S. Osborne,
Parrish, superintendent. Organized circa 1909, under
capitalization $5,000,000, shares $1 par.
s, area 2,800 acres, said to be surveyed for patent, in 11
e Ciénega district, in the western part of Yuma county,
2 miles between Swansea and Parker, from the Revenue
the Copper Dome on the west. Property includes the
claims, and Echo group of 29 claims, shortly west of the

Clara Consolidated; the Crescent, 1 claim; El Molino, 12 claims; 4 claims; Comet, 3 claims; Hottentot, 30 claims; Ogden, 8 claim claims; Mineral Zone, 10 claims, and Copper Dome, or Dome City

The properties have numerous old pits and shallow shafts, s and opencuts, but apparently none have permanent improvem claimed that about $150,000 was expended by former owners on properties. The Revenue mine, which apparently has the most d has a 200′ incline shaft and a 250′ tunnel. The Hottentot group is smelting ore developed. The Copper Dome group has a NW. se fissures, in schist and limestone, carrying auriferous oxidized Equipment includes gasoline power only. Company was said, 1 putting 50 men at work, and doing churn drilling on the Echo, El Copper Dome groups.

CONSTANTINE COPPER MINING CO.

Dead. Formerly at Encampment, Carbon Co., Wyo. Describ

CONSTELLATION CONSOLIDATED COPPER MINES.

Dead. E. J. Berger was superintendent. Property included mines on which apparently but little work was done by this compa ment included steam power. Formerly at Campo Seco, Calaveras C

CONSTELLATION GOLD MINES CO.

Dead. Formerly at Sumpter, Baker Co., Ore. Described Vol.

CONSTITUTION CONSOLIDATED COPPER MINES.

Office: care of Boody, McLellan & Co., 57 Broadway, New Mine office: Lucero, Mora Co., N. M. Jas. R. Pitcher, president; Woodward, vice-president and secretary; F. M. Andrus, treasure officers, Hon. Frémont Cole and A. H. Hall, directors; S. W. Tyler engineer. Organized Apr. 24, 1906, under laws of Maine, with c $3,000,000, shares $1 par.

Lands, 400 acres, showing 3 parallel beds of slate or arenaceous s an approximately NS. strike, with 3 minor ledges, main beds bein thickness, carrying impregnations of malachite, chalcocite and bo sionally weighing pounds, but occurring more commonly in mass grains up to several ounces in weight. Veins extend nearly vertically, with limestone and arcose sandstone, the cupriferous shales containi cium carbonate and organic matter in appreciable quantities, probab ing for precipitation of the copper ores. Apparently igneous rocks on the property, though these should exist, if impregnations are to ciently rich to constitute ore of commercial grade. Ore is said to ass copper, with net claimed average of at least 5% copper and $1 to ton, this estimate probably being too high. Development is by nu and trenches, and by shafts of 230′ and 325′. Management is c men of good business and professional standing, but lacking mining New Mexico has thousands of square miles of Permian red beds, car percentages of copper, mainly of unworkable tenor. Idle.

CONSTITUTION MINE.

Office and mine: Campo Seco, Calaveras Co., Cal. C. Bo Lands, 3 claims, also mineral rights to sundry adjoining property. D is by a 400′ shaft, on the Constitution claim, showing patches of good 45′ shaft, showing a 4′ vein of ore similar to that of the Penn Che pany's mine, assaying 15% copper, with small values in silver and

CONTACT CONSOLIDATED COPPER CO.

Office and mine: 11 Bailey Blk., Helena, Lewis & Clark Co., M Hoffman, president; E. T. Kemper, secretary; H. Topel, treasurer. Aug. 19, 1907, under laws of Nevada, with capitalization $500,000 par, nonassessable. Lands, 3 claims, in Colorado Gulch, having ab workings, showing gold and copper ores. Presumably idle.

ER CO. MICHIGAN.
ate St., Boston, Mass. Mine office: Winona, Houghton Co., Fay, president; C. J. Morrisey, vice-president; preceding offi- on, Stephen R. Dow and John G. Stone, directors. Organized laws of Michigan, with capitalization $5,000,000, shares $25 Company was formed to take over the Elm River Copper Co., areholders were given the privilege of exchanging their stock ontact Copper Co. on the basis of share for share, on condition ed for additional shares, at $2 each, to the extent of 50% of lm River. Mr. Fay states that a sufficient amount of Contact changed to insure the success of the plan.
o this stock interest in the Elm River, the company has an es in Sections 12 and 13, adjoining the Elm River tract on the holes were bored, 1910, on Section 13, and drilling continues. is heavy, No. 1 hole passing through 250′ of sand and gravel No. 1 hole, drilled vertically, in the extreme southeast quarter as stopped after penetrating the Eastern sandstone for 500′. ut 1,500′ northwest of No. 1, and No. 3 is near the center of hing of value has been disclosed in the territory overlying the e, and it seems evident that the so-called Lake and Adventure the Elm River tract, unless at very great depth, as the last Elm River exploratory shaft to the Eastern sandstone did beds.

PER CO. MONTANA.
nerly at Helena, Lewis & Clark Co., Mont. Described Vol. VIII.

ELOPMENT CO. NEVADA.
ghton, Mich. Mine office Contact, Elko Co., Nevada. Jas. nt; M. E. O'Brien, vice-president; Frank W. Haas, secretary . C. Getchell, treasurer; preceding officers and M. J. O'Brien, ized March, 1910, under laws of Arizona, with capitalization 10 par, assessable; $2 paid. Lands, 10 claims, area 200 acres, ver district, showing 3 ore bodies, as a fissure vein in porphyry sits between limestone and granite. One vein, of 8′ estimated traceable 200′, developed by pits of 10′, 12′ and 20′, showing hide ores giving assays of 15% copper, 15 oz. silver and $4 gold cept for annual assessment work.

ING CO. OREGON.
Lostine, Wallowa Co., Ore. Lands, on the south fork of er, connected by wagon-road with Lostine, show auriferous copper ore, with quartz gangue, also free gold in quartz. Was small force, May, 1910.

MINING CO. COLORADO.
Silverton, San Juan Co., Colo. Ores carry gold, silver and Has steam and water power. Idle.

CONSOLIDATED MINING CO. ARIZONA.
. Blanchard was manager. A little work was done, circa ompany presumably came to grief about the same time as promotions. Formerly at Salome, Yuma Co., Ariz.

COPPER CO. MÉXICO.
reorganized, April, 1905, as Continental Mining Co. Formerly lova, Coahuila, Mex. Fully described Vol. VI.

COPPER CO. SOUTH DAKOTA.
succeeded, circa 1907, by Continental Copper Mining & Smelt- y at Hill City, Pennington Co., S. D.

COPPER CO. WYOMING.
nerly at Battle, Carbon Co., Wyo. Described Vol. VI.

CONTINENTAL COPPER & GOLD MINING CO.

Office: 221 Security Bldg., Los Angeles, Cal. Mine office: Co., Ariz. Jas. R. Haddock, president; Coyle J. Tracy, vice-presi T. Muzzy, secretary; Fred Knobloch, treasurer; Edw. S. Osborne, ager; preceding officers and J. F. Halsted, directors. Organize under laws of Arizona, with capitalization $1,000,000, shares $1 p able; issued, $900,000. Annual meeting, first Saturday in Noven

Lands, 13 claims, unpatented, area 260 acres, in the Seneca di slates, schists and limestones, with igneous intrusives, said to c veins and contact deposits, of which one, of 6′ estimated average âble 1,500′, has been developed by an 80′ shaft, a 330′ crosscut tu and 165′ drift tunnels, with circa 600′ of workings, showing occas ores, estimated to average 10.87% copper and $4 gold per ton plans continuing the main drift tunnel.

CONTINENTAL COPPER MINING CO.

Dead. Was merged, 1908, in Continental-Morris Mining C at Battle, Carbon Co., Wyo. Described Vol. VIII.

CONTINENTAL COPPER MINING & SMELTING CO. SOUT

Office: Lima, Ohio. Mine and works office: Sheridan, Pe S. D. A. C. Baxter, president; W. L. Mackenzie, vice-president; secretary; Geo. Feltz, treasurer; preceding officers, W. W. Hibbs Kinter, J. M. Rutter and C. J. Buell, directors; A. C. Overpeck, su Organized March, 1907, under laws of South Dakota, with $3,000,000, shares $1 par, nonassessable, as successor of Contin Co. and Dakota-Calumet Co. Bonds, $600,000 authorized, at tible into stock after company has been placed on a paying basis." $150,000. Annual meeting, second Tuesday in August.

Lands, 52 claims, area 179 acres, patented, and a 20-acre total holdings of 1,008 acres, adjoining the Blue Lead mine. Min the Dakota-Calumet, or Lilian. Lands show schists and quartzite, dykes, carrying 4 ore bodies, with 3 under development, main ve mated by company to be of 125′ average width, and traceable 4,(malachite, cuprite, chalcocite and chalcopyrite, estimated to averag 0.2 to 1 oz. silver and $1 to $15 gold per ton, which figures are exces opment includes 9 pits and shafts, of 10′ to 40′ depth, and an 825′ t ment main shaft, with tunnels of 32′, 45′, 25′, 315′, 35′, 75′, 70′, 13 1,170′ crosscut connecting with the main shaft for ore transporta

Equipment includes steam and electric power, with 300 h. p 160 h. p. at the smelter. There is a 250-h. p. Corliss hoist, good fo h. p. auxiliary hoist, and a 7-drill Sullivan straight-line air-compr are 15 buildings, including a 16x50′ frame machine-shop, 30x40′ fra shop, and 16x30′ smithy.

The smelter, of wood on stone foundations, having a 150-ton Works blast-furnace, was built some years ago, but not blown May, 1909, and was blown out after a three weeks' campaign. before the mine was developed to feed it, is 4 miles from limeston from a railroad, and scarcity of fluxing ore necessitated securing o tana. Management plans active smelting, early 1911.

CONTINENTAL COPPER SYNDICATE, LTD.

Dead. Was liquidated, Apr. 20, 1906. Floated the Mitte Co., Ltd. Formerly at Innsbruck, Tyrol, Austria. Described Vo

CONTINENTAL GOLD MINING CO.

Mine office: Nugget, Douglas Co., Ore. W. B. Stewart, general manager, at last accounts. Ore is an auriferous iron-cop with values principally in gold. Equipment includes an Elspass mi plant.

MINES, POWER & REDUCTION CO. **COLORADO.**
Equitable Bldg., Denver, Colo. Mine office: Yankee, Clear
Henry I. Seeman, president and general manager; Frank R.
lent; Wm. H. Warriner, secretary and treasurer. Organized
ler laws of Colorado, with capitalization $5,000,000, shares $1
e; issued, $4,200,000. Annual meeting, first Wednesday in

aims, area circa 2,000 acres, 7 millsites, and 160 acres of mis-
n the Lincoln district, showing gneiss, schist and granite, with
claimed to carry 75 fissure veins and contact deposits, with
th reported width of 3′ to 300′, the vein system being said to
les. Ores are sulphides, reported by management to carry 1
to 35% lead, from a trace to 6% zinc, 1 to 300 oz. silver nad
er ton. Development is by shafts of 135′, 150′ and 200′, and
nnels, of 100′ to 500′, and the Seeman tunnel of 3,367′, which
he longest crosscut tunnel in Colorado, to give a 5,000′ back.
ut 4 miles of workings, with about one mile in ore, estimated
o show 300,000 tons of ore blocked out for stoping.
ncludes steam power and a hydro-electric plant, with 150 h. p
n. p. at mill. Machinery includes a 25-h. p. hoist and 7-drill
pressor. There are about 20 buildings, including a 16x25′
mithies, 3 boarding-houses and 12 dwellings.
rame mill, with iron roof and siding, has 20 quick-drop gravity
′ Blake crusher, 3 Card tables, 3 Wilfley tables and 2 sizers.
ontinuous development, and selling commercial current.

MINES & SMELTING CORPORATION. **UTAH.**
52 Broadway, New York, N. Y. Operating office: 409 Dooly
ity, Utah. Letter returned unclaimed from former mine office,
o., Utah. Wm. J. Robinson, president; Henry M. Crowther,
l managing director; G. C. Van Alstyne, secretary and treas-
July, 1903, under laws of New York, with capitalization
$10 par. Is controlled, through stock ownership, by Unity

ims, partly patented, area 460 acres, and a 20-acre millsite,
ntact deposits, between limestone and porphyry, of 1′ to 40′
ys of 2 to 35% copper, 10 to 48% lead, circa 7.5% zinc, 15 to
60 cents to $5 gold per ton, from oxidized copper ores, galena
ands formerly were held by the Lavinia, Grizzly Consolidated,
egular mining companies, claimed to have produced upwards
th of ore. Mines were first opened circa 1864.
nafts, deepest 200′, and 9 tunnels, of 300′ to 2,000′, with total
18,000′, claimed by company to show 742,000 tons of ore, with
re blocked out for stoping, which estimates were grossly un-

let aërial tram, from the mine to Tanner's Flat, is under lease
Consolidated. A 100-ton mill, built 1905, puts about 4 into 1.
kes water from Little Cottonwood Creek.
id, to end of 1905, eleven 2% dividends on issued treasury
to $24,000, which apparently came from stock sales. Is re-
cion. Idle and apparently moribund.

MINING CO. **IDAHO.**
ace, Idaho. Letter returned unclaimed from former mine
noshone Co., Idaho. Organized May, 1908, under laws of
alization $1,250,000, shares $1 par, by John P. Gray, Jas. T.
Flohr, A. H. Comer and Therres Towles. Lands, 1 claim.
tions secured. Idle and apparently moribund.

CONTINENTAL MINING CO.

Office: San Antonio, Tex. Mine office: Mineral de P
Coahuila, Mex. Otto Koehler, president; Otto Wahrmund, v
general manager; N. G. Newton, secretary; Arthur L. Tuttle
tendent. Organized April, 1905, as a reconstruction of Co
Co., with capitalization $1,000,000, shares $10 par. Is clos
ownership and management with the Jimulco Mining Co.

Lands, 65 hectares, being the Mina Pánuco, an antigua, o
1700, and worked at intervals since, bought of the Pánuco C
which was badly mismanaged. Ore body is a chimney in
mainly slightly argentiferous chalcopyrite, and a little chalco
gangue, averaging about 3.5% copper.

Property includes a 67-kilometer railway, from Monclova
ing $350,000, having 3 locomotives. Company has invested ab
the property and improvements. Largest production, under f
was 1,466,059 lbs. fine copper in 1902, and a small production v
November, 1907, by present company, estimated at 1,250,000
when the mine has been idle, and will remain idle until the pr
proves, when it is planned erecting a concentrator or leachi
considered promising, though low in grade, and management g

CONTINENTAL MINING CO.

Office: 20 Metropolitan Opera House Bldg., St. Paul,
returned unclaimed from former mine office, Encampment, C
A. L. Cox, president; A. Messer, vice-president; Kerr D. Dunl
treasurer. Organized November, 1898, under laws of Wyomi
ization $800,000, shares $1 par. Lands, 7 claims, 6 patented
also a 20-acre millsite, in the Battle Creek district, carrying sev
of which two, opened by tunnels of 105′ and 820′, show a vein
average width, claimed to give average assays of 13.5% copp
and $5 gold per ton, which figures are too high. Mine is served
Wyoming tramway, the third power station being located on
property. Idle since 1905, except for annual assessment work.

CONTINENTAL MINING CO.

Dead. Was merged in Continental-Morris Mining Co.
campment, Carbon Co., Wyo. Fully described Vol. VII.

CONTINENTAL MORRIS-MINING CO.

Office: 111 East Main St., Morris, Ills. Letter returned
former mine office, Encampment, Carbon Co., Wyo. S. H.
dent; J. H. Rogers, vice-president; Dr. G. A. Leach, secretar
J. T. Brown, general manager; preceding officers, J. R. Collin
E. R. Joyce and A. Hollenbeck, directors. Organized March
laws of Wyoming, as a merger of the Continental Mining Co. an
Co., with capitalization $2,250,000, increased later to $5,000,00
nonassessable; issued, $1,750,000. Annual meeting, first Tues

Lands, 7 claims, patented, area 120 acres, in the Battle La
ing about 50 acres of good pine timber. Property shows schi
of 2′, 20′ and 120′ estimated average width, traceable 1,500′ to
carbonate and sulphide ore, estimated to average 3%, 4% and
the various veins, with small gold and silver values. Devel
discovery shafts of 30′ to 50′ depth on each claim, a 165′ shaf
200′ and 1,000′. The shorter tunnel, on the Gossan Lead,
tions of copper carbonates. Equipment includes a steam hois
and 2 buildings. Idle, but plans resumption, 1911.

CONTINENTAL SMELTING & REFINING CO.

Dead. Succeeded the Saratoga Smelting & Refining Co.;
June 5, 1907. Formerly at Ironton, Ouray Co., Colo. Fully d

MINING CO. **MONTANA.**
t Cooke, Park Co., Mont. Described Vol. VIII.
& COPPER MINING & MILLING CO. **WYOMING.**
ed, 1907, to Emerald Mining Co. Formerly at Wheat-
.
PER & GOLD MINING CO. **OREGON.**
Ills. Letter returned unclaimed from former mine
Union Co., Ore. Mine, opened 1905, has a 180′ shaft,
s of copper at bottom. Equipment included gasoline
. Idle several years and apparently moribund.
ING CO. **WASHINGTON.**
ng was superintendent. Former office was Seattle,
n as the Mono mine, had auriferous and argentiferous
was said to employ 20 men. Had water power. For-
Co., Wash.
ING & MILLING CO. **WYOMING.**
t Encampment, Carbon Co., Wyo. Described Vol. V.
LS, LTD. **IRELAND.**
Winchester St., London, E. C., Eng. Mine office:
Ireland. Robt. Snare and Thos. Williams, directors;
retary. Organized May 10, 1906, under laws of Great
ion £25,000, shares 5s. par; issued, £20,000, fully paid.
ase, from March, 1906, at yearly rental of £30 and 30%
the Coosheen mine, area 329 acres. Property, formerly
reported upon favorably by J. Andrew Wauchope. Is
Idle and apparently moribund.
NE. **AUSTRALIA.**
amundra, Bland Co., N. S. W., Australia. Property,
Mount Felstead copper and silver mine, is 7 miles north-
Country rock is quartz-felsite, much crushed, carrying
inous jointings, with an ore body of 1′ to 6′ width, about
e, including cuprite, melaconite, azurite, malachite and
carbonates and sulphides, and sphalerite. Ore is de-
lected ore ranging about 50 oz. silver per long ton, with
pment is by shafts of 25′, 52′ and 145′. Production,
of ore, shipped to Swansea for reduction, giving an es-
00,000 lbs. fine copper, with considerable silver values.
SULPHATE CO., LTD. **CHILE.**
House, Basinghall St., London, E. C., Eng. Letter re-
ormer operating office, Casilla 266, Iquique, Chile. Mine
paquire, Tarapacá, Chile. J. E. G. Hadath, H. O'Reilly
tors; H. Crewdson Howard, secretary; Richard Stanton,
Gillmore, clerk. Organized May 19, 1900, under laws of
talisation increased from £300,000 to £494,000, shares
2. Debentures, £20,000, first mortgage, at 6%, con-
lders into shares at par, and £3,580 second mortgage
ilarly convertible. Has issued no financial statement
is in a bad way.
area circa 50 hectares, in 2 groups. The Huiquintipa
Huatacondo, carries dioptase and chrysocolla, these sili-
g as the cementing material in a conglomerate bed up to
timated 6,000,000 long tons of 3.25% ore exposed.
up shows granite country rock, carrying an abundance of
s, mainly copper sulphates and sub-sulphates averaging
or. The management of the company always has stated
natural bluestone, with some impurities mechanically

mixed therewith, but, as a matter of fact, the ore deposits co
of three different salts, very difficult of separation. Company'
estimated that the Copaquire deposits show upwards of 100,(
of ore, worth £20,000,000. Development is by a 150' shaft an
opencuts and trenches.

Equipment includes a 45-h. p. steam plant, warehouse, offic
of stone, to withstand numerous and severe earthquake shocks.
plant, covering about 1 acre, is rated at 500 tons daily cap
hydrator for drying crystals of bluestone. Mine and leache
by a 4,000' tramline. Nearest railway is 70 miles distant, t
being on the backs of mules, over rough mountain roads. Soft
per ton, delivered, and, this price being prohibitive, yareta is
for fuel. This is a gigantic club-moss, having a lob of resin,
occasionally weighing more than a ton.

At last accounts, 1905, company had circa £30,000 ind
proposed reorganization was voted down by shareholders. Th
devoid of promise, but requires ample funds and technical ab
to be secured. Idle since 1903, and moribund.

SOCIEDAD MINERA COPAYCOCHA.

Mine office: Morococha, Junín, Perú. Organized 1894, u
Is controlled, through ownership of practically entire stock is
Pasco Mining Co.

Lands, 4 pertenencias, including the San Miguel, Victoria a
mines. Main ore body is a fissure vein in diorite, with NE. s
mile, property also having other ore bodies of less importance, s
workable. The San Miguel mine, opened 1894, has a 550-me
a back of about 90 meters, with portal 2' above the level of L
Principal ores are enargite, tetrahedrite and chalcopyrite, wi
metric tons of high grade ore, averaging circa 17% copper an
ton, in sight. The pumping station is about 200 meters from t
The San Miguel mine produced, 1894-1907, circa 40,000 metric to
average copper tenor. Production, 1904, was 4,416 metric ton
1,947,102 lbs. fine copper, and, 1905, was 5,497 tons of ore ave
per and 2,166 grams silver per metric ton, secured at a cost o
yielding 1,450,554 lbs. fine copper. Employs about 300 men.

COPELAND MINING & DEVELOPMENT CO. BRITIS

Mine office: Bridesville, Boundary district, B. C. Lan
Le Roi group, on the West Fork, near Bridesville, are held und
and lease. Property has a vein of 90' claimed width, develope
showing auriferous and argentiferous copper ore. Was devel
scale, at last accounts, 1910.

COPETE CONSOLIDATED COPPER CO.

Office: 1104-27 William St., New York, N. Y. Mine
Ures, Sonora, Mex. Col. Britton Davis, vice-president and m
Myra B. Martin, secretary and treasurer; preceding officers, Ho
"Prof." Geo. A. Treadwell, directors. Organized 1906, under l
ginia, with capitalization $1,000,000, shares $1 par.

The company was organized to "finance" (or fleece) the Co
under contract, and was to have one-half the net earnings there
tically an underwriting corporation for the Copete Mining Co.
entire stock issue of Melczer Mining Co., which corporation
to the mines of the Copete Mining Co., this stock having been t
Copete Mining Co., the former owner. The Copete Consolid
failed to comply with the consideration named in the transf
ently was fraudulent, and suit was instituted to set the matter r
the company are said to be creditors to the extent of $20,000,

rtin gang. Further particulars regarding the company
ion of the Copete Mining Co. in Vol. VIII. Is a swindle,
eadwell-Martin promotions.

MINING CO. **MÉXICO.**

ce was 27 William St., New York, N. Y. Was promoted
-Martin gang, and was succeeded, 1900, by the Copete
f the weak links in a weak chain of crooked promotions.
see Copete Mining Co. and Melczer Mining Co. For-
s, Sonora, Mex.

. **MÉXICO.**

illiam St., New York, N. Y. Mine office: Pesqueira,
Iyra B. Martin, secretary; Chas. S. Spraker, general
900, under laws of West Virginia, with capitalization
r.
a deliberate and intentional swindle, promoted by the
Logan, and Miss Myra B. Martin, and apparently has
sset by the action of its officers and promoters. Fully

O., LTD. **CHILE.**

hall St., London, E. C., Eng. Mine and works office:
. John H. Cordner-James, chairman; preceding officers,
nrich Loeffler, directors; W. S. Bartlett, secretary; L. C.
ganized June 21, 1836, under laws of Great Britain, and
, March, 1899, to £250,000, and later increased to
; issued, £225,000. Debentures £50,000, in denomina-
le into shares at par. Last dividend, 1903, was 1s. 6d.
une 30, 1909, losses on operations were £25,893. Mr.
00 personally, without security, to keep the company
nerous act is entitled to the sincere thanks of all share-

s at Púquios on the Rio Copiapó, and also a half inter-
ine, and a large hacienda near Copiapó. The principal
laims, area 122 hectares, forming practically a parallelo-
ne of the first British mining corporations to operate in

, 12 kilometers from Púquios, was opened 1854, and is
le. The mine has a fissure vein in diorite, occasionally
erage width, with a footwall paystreak called the East
paystreak called the West vein, separated by 15′ to 20′
e is quartz, and calcite, with some iron oxide, and the
t 1,000′ and even to 1,500′ in depth, the oxidized zone
ut 300′ of secondary bornite and chalcocite, followed,
of about 1,350′, by chalcopyrite. Ores carry both gold
he mine shows almost everything from native copper
pyrite at depth, the changes being gradual. Only ore
r tenor is extracted, and ore smelted averages approxi-
standing its great depth, the mine produces only small
l water is brought to the mine by aërial tram, from
deeper workings are very warm. Electric light is used
e has met with many accidents, and has suffered twice
The management endeavors to develop reserves equal
es were estimated, June 30, 1910, at 56,425 long tons
reduction from former figures. The Fletcher or main
nd has not been deepened since circa 1904. The Weir
′ deep. A 1,070-meter drift tunnel has its portal 250
nd 410 meters from the Fletcher shaft. The Dulcinea

employs an average of 120 men, and produces about 1,000 met monthly.

Equipment at the Dulcinea includes a Fraser & Chalmers shaft, and a hoist at the Fletcher shaft raising 1,000-kg. car Ropeways aërial tram, from the Dulcinea mine to Llanos d with a light railway running to the smelter. The aërial tram towers, with longest span of 112 meters, and capacity of 5 me The 22mm. cable has lasted 9 years. Tram requires only 12-k ation, and cost of transport is about 3 pesos per metric ton.

The Descubridora mine, in the Checo district, opened 18 pany's original property, and yielded 10,160 metric tons of or been idle since circa 1906.

The Ojancos group, at Ojancos, Atacama, includes the C Francisco and Antonia mines. As a whole, this group has p ing, and is now idle. The Carmen Alto has a 400′ main shaft cisco has a 350′ main shaft, and ore produced, 1905, averaged 1 Antonio is yet in the development stage. The Republicana, was showing poorly when closed down.

The mines have no mechanical concentration, but some w picked for good ore, the dumps being estimated to carry 6 averaging 4.61% copper.

The smelter, at Púquios, near the Mina Dulcinea, built c ently has been worked with interruptions, owing to lack of or a 90-ton 36x120″ Fraser & Chalmers water-jacket blast-furn rotary blower, dust-chamber and steel chimney. The works h and make a limited use of electric power. Slags are hauled out Fluxes are limestone and iron ore, and coke charges are abou loss of coke in transit. Product is matte, exported to Eur August, 1909, averaged 0.7%. The smelter employs about 4 year ending June 30, 1910, the works smelted 12,752 metric to 1,582 tons of matte, of 52.04% average copper tenor.

Production was largest in 1902, with output of 4,594,240 Recent production, by fiscal years, has been as follows: 975,6 1907; 1,006,230 lbs. in 1908; 1,524,801 lbs. copper, 9,766 oz. s gold in 1909, and 1,814,987 lbs. fine copper in 1910, secured fr tons of ore smelted. Notwithstanding the financial and phy the property, it has been an important producer in the past, increasing its present output, with somewhat improving prosp

COPPER ACRES MINING CO.

Office: Salt Lake City, Utah. Letter returned unclain mine office, Bannock, Humboldt Co., Nev. Jas. T. Hammond Margetts, superintendent. Lands, near Battle Mountain, circa Bannock, show a vein of 40′ claimed width at surface, said to of ore averaging about 8% copper and 10 to 15 oz. silver per t are entirely too high to be credited. Ore has given assays up t and 22.2 oz. silver per ton. Mine is opened by a short crosse

COPPER AGE & EDISON MINING CO.

Office: 721 First Ave., Spokane, Wash. Letter returned former mine office, Saltese, Missoula Co., Mont. Chas. J. H dent; Morton Webster, secretary and treasurer; L. N. Hyde, Organized 1906, under laws of Washington, with capitalization 12 claims, 4 miles south of Saltese, just east of the Monito mines, carrying extension of ore zone of latter. Mine has a tunnel, with back of circa 600′, and a 4′ vein of sulphide ore, chalcocite, assaying up to 30% copper and $14 gold per ton. T 6′ vein of chalcopyrite giving assays up to 29.1% copper, with

MINING & SMELTING CO. **WYOMING.**
Rambler, Carbon Co., Wyo. Michael Kalyar, superintend-
claims, circa 2 miles north of Battle, on the Penn-Wyoming
300′ Copper Blossom shaft, sunk on a quartz vein, showing a
near surface, is said to have a fair showing of concentrating ore
0′. Equipment includes several mine buildings. Was develop-
force, 1910.

MINING CO. **UTAH.**
s merged, 1909, in Scott Hill Mining Co. Formerly at Park
o., Utah. Described Vol. VIII.

MINING CO. **NEW MEXICO.**
nerly at Organ, Dona Ana Co., N. M. Fully described Vol. VI.

MINING CO. **WYOMING.**
Burr Blk., Lincoln, Neb. Mine office: Saratoga, Carbon
J. Crane, president; H. M. Stratton, vice-president; Geo. E.
y and general manager; Fred Williams, treasurer; preceding
Schoettger, August Hagenow and Ernest Hoppe, directors; J.
e manager, at last accounts.
de the original holdings, now idle, on Cow Creek, near Rudefeha,
Oak group of 14 claims, 5 patented, on California Creek, circa
st of Saratoga, bought 1908.
Oak mine has incline shafts of 65′, 317′ and 352′, with 6 levels
a 2,200′ of workings. Development under former owners was
main shaft having been sunk at right angles to the vein, which
The mine has a shallow zone of oxidation, succeeded by sul-
stose gangue, latter claimed to average 12% copper, several
nd $6 gold per ton, with upward of 300,000 tons of ore blocked
gures, made by the former owners, were grossly exaggerated.
said to plan a new shaft, and has been credited, in the press,
o build a smelter, but should open a mine first. Equipment
ower, and a little ore was shipped, 1907. Property considered

N GOLD & COPPER MINING CO. **ARIZONA.**
nerly at Mayer, Yavapai Co., Ariz. Described Vol. V.

N MINING CO. **ARIZONA.**
nerly at Mayer, Yavapai Co., Ariz. Described Vol. VIII.

N MINING CO. **ARIZONA.**
ds were 10 claims, in the Copper Basin district, 12 miles from
es from the Colorado River. Mine, variously reported as having
150′ of drifts on a 5′ vein, giving ore assaying 16% copper and
and as having 2,000′ of workings, was a small producer, circa
exported to Swansea, via the Colorado River. Formerly at
o., Ariz.

N MINING CO. **COLORADO.**
ned unclaimed from former office, Chicago, Ills. Mine office:
Miguel Co., Colo. Milton Evans, superintendent, at last
s, 15 claims, opened by shaft. A carload smelter shipment
pper and $2.50 gold per ton. Idle some years and moribund.

N MINING & SMELTING CO. **NEVADA.**
a bad egg, promoted by Eleanor Rawls-Reader. Formerly
e Pine Co., Nev. Fully described Vol. VIII.

E MINE. **ARIZONA.**
eonard Copper Co., at Gleeson, Cochise Co., Ariz.

E MINING CO. **ARIZONA.**
me bankrupt, 1903, under suspicious circumstances; property
under mortgage; former lands are now held by Leonard Copper

Co. Formerly at Gleeson, Cochise Co., Ariz. Fully described
VIII.

COPPER BELLE MINING CO. WA

Dead. Lands were sold, 1901, to Bunker Hill-Sullivan Mini
merly at Index, Snohomish Co., Wash.

COPPER BELL MILL & MINING CO.

Dead. Lands were sold by sheriff, Jan. 10, 1905, afterward
met & Montana Mining Co. Formerly at Clinton, Missoula Co
Red Rock, Beaverhead Co., Mont.

COPPER BELL MINING CO.

Office: 120 West Second South St., Salt Lake City, Utah. L
unclaimed from former mine office, Brown, Box Elder Co., Utah.
president; J. W. Duffield, vice-president; Wm. Crabbe, secre
Young, treasurer. Organized, 1907, under laws of Utah, with
$50,000 shares 10 cents par. Lands, 8 claims, unpatented, in the
Mountains, 7 miles from a railroad, having a 100′ tunnel. Idle an
moribund.

COPPER BELL MINING & SMELTING CO.

Office: Springville, Utah. Mine office; Ibapah, Tooele Co., U
Anderson, president; Robt. Hutchinson, vice-president; T. R. K
and treasurer; preceding officers, Jas. Oakley and C. D. Palfreyn
Organized 1906, with capitalization $50,000, shares 25 cents p
claims, patented, in the Deep Creek district, with principal develo
Paragon and Venus claims Mine has a 150′ shaft, showing ore a
3% copper, 16 oz. silver and $4 gold per ton, and also has gold-b
silver-lead ores and ores of tin, nickel and molybdenum.

COPPER BELT MINES CO.

Office: 407–135 Adams St., Chicago, Ills. Mine office: Lusk,
Wyo. Edwin Hall, president and general manager; E. S. Averill, v
J. L. Harris, secretary; preceding officers, B. L. Paine and H. C. S
ors. Organized June 25, 1906, under laws of Wyoming, with
$2,000,000, shares $1 par. Company owns a controlling interest
Strike Mining & Smelting Co. Lands are held under a $50,000 b
extended, two years, to Oct. 25, 1912.

Lands, 35 claims, area circa 600 acres, well watered, with ab
timbered, in the Rawhide Buttes district, 12 miles south of Lusk, t
point. Property shows 4 parallel veins, 2 traceable nearly a mile.
620′ shaft, the deepest in the state, several other shallow shaft
tunnel, with about one-half mile of workings, showing copper ca
sulphides, latter including chalcocite, disseminated in limonite, gi
3 to 60% copper, with small silver values and $1.40 to $12 gold pe
agement estimated ore to average circa 7% copper, mainly from
depth of nearly 600′, but the main shaft lost the ore at 280′, cutting
at 600′.

Equipment includes a 54-h. p. Fairbanks & Morse gasoline en
1,500′, and a 5-drill Franklin air-compressor, with machine-shop, s
house and several other small mine buildings. Mine is said to h
little sulphide ore, 1909.

The advertising done by this company, at the time of its
grossly exaggerated and highly misleading. Company is still ped
the unwary, having advertised, July, 1910, that it was nearing
period. Notwithstanding Mr. Hall, the president, having been s
of Wyoming, the company is regarded with strong suspicion.

COPPER BELT MINING CO.

Dead. Formerly at Marysvale, Piute Co., Utah. Fully deseri

MINING & MILLING CO. **WYOMING.**
ed unclaimed from former office, Corn Exchange, Omaha, Neb.
e was Lusk, Converse Co., Wyo. Edw. M. Weston, president;
, vice-president; A. H. Merchant, secretary and treasurer;
ager. Property was sold to Copper Belt Mines Co., and appar-
set remaining is a balance of $50,000, on the purchase price,
25, 1910, from the Copper Belt Mines Co.

H MINING CO. **COLORADO.**
Jamestown, Boulder Co., Colo. S. C. Bashor, president. Lands,
ill, show milling ores claimed to carry stringers of high-grade
Presumably idle.

COPPER CO. **NEVADA.**
nerly at Ely, White Pine Co., Nev. Described Vol. VIII.

CONSOLIDATED MINING & **WASHINGTON.**
CO.
Valley, Stevens Co., Wash. Lands, 20 claims, showing ore
% copper and $5 to $20 gold per ton, with gross average values
on. Was said to plan a 50-ton mill. Presumably idle.

ION MINING CO. **ARIZONA.**
nerly at Pearce, Cochise Co., Ariz. Fully described Vol. VI.

ION MINING CO. **UTAH.**
ned unclaimed from former office, Provo, Utah. Mine office:
Co., Utah. J. N. Christensen, president; Robt. Anderson,
Hindmarsh, treasurer. Organized 1907, with capitalization
s $1 par. Lands, 13 claims. Presumably idle.

MINING CO. **COLORADO.**
North 7th St., St. Louis, Mo., and Lock Box 507, Pueblo, Colo.
lsenburg, Huerfano Co., Colo. Chas. R. Mason, president;
secretary and treasurer; Chas. O. Unfug, general manager;
superintendent. Organized 1901, under laws of Arizona, with
000,000, shares $1 par. Lands, 32 claims, said to be patented,
Copper Bull Mountain, showing five 7′ fissure veins, carrying
laimed values of 10% copper, 2 oz. silver and $80 gold per ton,
o high. Has shafts of 202′ and 238′, and tunnels of circa 300′
mine buildings, and was said to be erecting an 80-ton smelter.
deceptive and company is not regarded favorably. Idle and
ound.

E MILLING CO. **IDAHO.**
nerly at Weiser, Washington Co., Idaho. Fully described

E MINES. **ARIZONA.**
16 Northwestern Bldg., Minneapolis Minn. Operating office:
letter returned unclaimed from former mine office, Ray, Pinal
P. Abell, president; Wm. H. Lucia, vice-president; Frank A.
Henry A. Blums, treasurer; preceding officers and Capt. Harry
s; P. P. Parker, agent. Organized July 21, 1900, under laws
e Arizona Copper Mountain Mining Co., and name changed,
esent title, with capitalization $6,000,000, shares $10 par.
aims, 8 patented, area circa 320 acres, about 4 miles north-
Consolidated, in the Walnut Grove or Mineral Creek district,
of the Gila River, with a good wagon-road to the Phœnix &
The property was worked, 1879-1881, on a small scale, for

a mountainous tract, east of the Florence Valley, and, while
nsolidated, property more closely resembles the form of copper
by the Moctezuma Cooper Co. at Nacozari, Sonora, Mex.

Property shows rhyolite and later dacitic lavas, rested on a surface of imentary rocks and granite, the granite being part of a broad r miles in extent, cut through by the Gila River, the Copper Butte pro on the border of this granite batholith. The favorable ground is a mas of schist fragments, capped by dacite tuffs resembling sandstone, being cut by necks of dacite, against which the tuffs are upturned, being an old volcanic throat, having an abrupt contact with Ray gra east and west, and a nearly vertical contact with dacite. Aplitic dyk mon and conspicuous, but of slight importance from a mining standp breccia consists mainly of schist, varying from dark and light g seriticic schist, to silicious schist, with fragments of quartz, diab and limestone. The surface deposits are peculiar, being part of the b that has been altered and mineralized, the only known counterpa surface ore being found at the Arizona-Hercules mine, 5 or 6 miles to th and at the Black Warrior mine, near Globe. Property shows extensi similar in physical character of the ore, save that they carry no copper ably are the result of oxidation of the sulphides. The eastern red of breccia shows rude bedding, with a dip of about 25° E., away from tain. The most promising portions of the property are an eastern tra 20 acres, on Copper Butte claims Nos. 2, 6 and 12, and a western tra 10 acres on the Junebug and Carlisle claims. The schist areas exp traces of copper at many points. Silicate ore is exposed at numer on the property, by discovery shafts, pits and trenches. Assays, r by disinterested parties, gave from 1.5% copper in lean breccia, up copper from the ore dump, at the Black Oxide pit.

Development consists of about twenty 15′ pits, 3 shallow shaft 60′ depth, and 2 main shafts, with 6 tunnels, 2 longest being 175 mine having a total of about 2,000′ of workings. There also is a sm Principal shafts are the 175′ James incline, and the 500′ two-co vertical Wallace shaft. The oxidized and silicate ores at and near su be mined economically and cheaply.

Equipment includes a 60-h. p. steam plant, a 20x30′ machine-s bunkhouses.

Production, 1907, was 42 carloads of carbonate ore, ranging copper tenor with small silver values, and with an average of about Idle since 1907.

COPPER BUTTE MINING CO. SOUTH

Mine office: Custer, Custer Co., S. D. Idle and apparently

COPPER BUTTE MINING CO. WASH

Mine office: Orient, Ferry Co., Wash. J. D. Gumpper, presid Miller, secretary; Willis Townsend, general manager. Organized 1905, under laws of Washington, with capitalization $1,000,000, sha Lands, 4 claims, patented, in the Pierre Lake district, south of Orie by 4 pits and shafts of 10′ to 75′ depth, with about 700′ of working a little low-grade ore, with some ore giving good assays. At last 1910, was driving a 100′ crosscut on the Toulon property.

COPPER BUTTES CONSOLIDATED MINING & SMELTING CO. CAL

Dead. Formerly at Bagdad, San Bernardino Co., Cal. Fully Vol. VII.

COPPER CAÑON MINING CO. NEW

Mine office: Abiquiu, Rio Arriba Co., N. M. J. E. Irvine, super Lands, 100 acres, undeveloped. Idle some years and apparently

COPPER CANYON MINING CO.

Dead. Formerly at Mayer, Yavapai Co., Ariz. Described

INING CO. **WYOMING.**
aratoga, Carbon Co., Wyo. J. F. Crawford, manager. Idle
arently moribund.

R MINING CO. **IDAHO.**
e, Idaho. Mine office: Mullan, Shoshone Co., Idaho. Idle.

RY MINE. **ARIZONA.**
Patagonia, Santa Cruz Co., Ariz. Geo. A. Lonsberry, super-
e argentiferous copper, lead and zinc sulphides. Has gaso-
veral years.

EXTENSION MINING CO. **ARIZONA.**
Sumpter St., Brooklyn, N. Y. Letter returned unclaimed
office, Jerome, Yavapai Co., Ariz. R. A. Williams, presi-
secretary and treasurer. Organized under laws of Arizona,
$1,500,000, shares $1 par. Lands, 7 claims, area circa 140
est of the Copper Chief and about 8 miles south of Jerome,
carrying ores assaying 2 to 10% copper, slightly developed
presumably moribund.

MINING CO. **ARIZONA.**
Jerome, Yavapai Co., Ariz. Arthur Hendey, superintendent.
on King mine of the Equator Mining & Smelting Co., circa
rome, show parallel veins carrying oxidised copper ores, and
n carrying chalcopyrite. Development is by a 380′ shaft
planned to be driven 820′, with back of 350′. Management
of oxidised ore and 100,000 tons of sulphide ore blocked out,
ng about 1% copper and $10 gold and silver, and sulphides
r with gold and silver, giving gross values of $11 per ton.
ates upwards of $3,000,000 worth of ore blocked out, but
nagement are said to be excessive. Mine timbering is said
Equipment includes an air-compressor and a good hoist.
uilt some years ago, proved a failure. Property was said,
been bonded to R. A. Keith. Property considered promising.

MINING CO. **MONTANA.**
e, Idaho. Letter returned unclaimed from former mine
soula Co., Mont. J. H. Taylor, secretary and treasurer.
0,000, shares $1 par. Lands, 11 claims, in the St. Joe dis-
ure vein in quartz, supposed to be an extension of the Bullion
gossan showing a little copper. Property has been tested
ospect tunnels of 20′, 30′ and 40′, and management planned
700′ by a crosscut tunnel.

MINING CO. **NEW MEXICO.**
bad egg. Was succeeded, 1903, by Sater Copper Co. For-
Union Co., N. M. Described Vol. VIII.

MINING CO. **WASHINGTON.**
ly at Index, Snohomish Co., Wash. Described Vol. VIII.

MINING CO., LTD. **MONTANA.**
ceeded, circa 1909, by Highland Copper Co., Ltd. Formerly
ad Co., Mont. Fully described Vol. VIII.

INE. **ALASKA.**
e: Coppermount, Prince of Wales Island, Alaska. Lands
beach, at Cordova Bay, 6 miles south of Coppermount.
ings, and shipped some good ore to the Crofton smelter,

INES OF MONTANA, LTD. **MONTANA.**
y at Elliston, Powell Co., Mont. Fully described Vol. VIII,

COPPER CLIFF MINING CO.
Dead. Lands were sold, 1902, to Catalina Copper Mini
Formerly at Tucson, Pima Co., Ariz.

COPPER CLIFF MINING CO. BRITI
Letter returned unclaimed from former office, Seattle, Wa
Heriot Bay, Nanaimo district, B. C. Wm. Simison, president
ager; C. W. Carter, secretary. Organized 1906, presumably un
ington, and registered under laws of British Columbia as ar
company, with capitalization $10,000, shares $1 par. Propert
Valdes Island, has a strong ledge, with a paystreak of about
rite, of smelting grade, mine having considerable development.
120 tons of ore, 1906, to the Tyee smelter. Idle and apparentl

COPPER CLIFF MINING CO.
Dead. Was succeeded, Sept. 11, 1903, by Copper Cliff M
Ltd., also dead. Formerly at Elliston, Powell Co., Mont.

COPPER CLIFF MINING CO. SC
Dead. Formerly at Rochford, Pennington Co., S. D. D

COPPER COBRE MINING CO.
Dead. Was succeeded by Bradshaw Mountain Copper M
Co., also dead. Formerly at Middelton, Yavapai Co., Ariz. D

COPPER COMPANY OF ARIZONA.
Dead. Succeeded Arizona Amalgamated Copper Co., an
circa 1907, by Coppermines Company of Arizona. Formerly at
Co., Ariz. Described Vol. VIII.

COPPER CONCENTRATING CO.
Dead. Was succeeded August, 1907, by Mason Manufac
merly at Houghton, Houghton Co., Mich. Very fully describ

COPPER CORPORATION OF CHILI, LTD.
Dead. Was liquidated voluntarily, December, 1906. La
Las Animas Copper Mining & Smelting Co., Ltd. Formerly
Chañaral, Atacama, Chile. Described Vol. III.

COPPER CREEK CONSOLIDATED COPPER CO.
Dead. Formerly at Big Bug, Yavapai Co., Ariz. Descri

COPPER CREEK CONSOLS, LTD. BRITI
Dead. Formerly at Ashcroft, Yale district, B. C. Descril

COPPER CREEK DEVELOPMENT CO.
Dead. Property was transferred, 1909, to Arizona-Nev
Formerly at Hillside, Yavapai Co., Ariz. Described Vol. VII

COPPER CREEK MINING CO.
Office: 470 Guaranty Bldg., Minneapolis, Minn. Operat
son, Ariz. Mine office: Copper Creek, Graham Co., Ariz. Col
president and general manager; Chas. H. Robinson, vice-pres
housen, second vice-president; John B. Wright, secretary;
treasurer and superintendent; preceding officers and J. Emil N
E. W. Walter, mine superintendent; C. S. Gelser, engineer.

Organized June 18, 1903, under laws of Arizona, wit
$2,000,000, shares $1 par, nonassessable. Original preferred
practically all exchanged for common stock, after payment, 19
terly dividends on the preferred stock amounting to $1,735.69.
preferred stock was wise, as no mining company has any busi
dends, except from earnings. Annual meeting, second Tuesda

Lands, 130 claims, unpatented, area 1,500 acres, also 400
smelter sites, and 400 acres timber lands, giving total holding
in the Bunker Hill district, in Graham and Pinal counties, prope
Copper Creek basin, on the western slope of the Galiuro Moun
direct line between Bisbee and Globe. Property includes the

nberland, American Eagle, Prince, Old Reliable and Bonanza
vided in 3 groups, known as the Upper, Central and Bonanza.
orite, with porphyry intrusions, showing a large number of ore
several different breccias and oxidized zones carrying mineral,
being elliptical, but sometimes occurring in chimneys. Out-
minent. The theory of the management apparently is that
l from diorite magma, the unaltered diorite showing traces
ed ores, including chrysocolla, are found at and near surface,
nercial quantities, giving place, at shallow depth, to sulphides,
rite, bornite and chalcocite, associated with pyrite, in altered
rite, some native copper showing in flakes and grains along
pany reports that one ore body 230′ wide and 300′ long has
200′ depth, in porphyry breccias. Property includes a water-
n the mines, estimated to be capable of developing 500 h. p.,
ater.

up, of circa 800 acres area, near the apex of the Galurio Moun-
ite and basalt, with fissure veins carrying oxide, carbonate
copper, and has about a mile of workings. The Middle Basin
as an area of circa 500 acres, containing some small old silver
ver group shows mainly chalcopyrite, with small quantities of
rite. The Bonanza group, at the western end, has the largest
ground.

oup, 20 claims, includes the Prince, Globe and Giant mines,
The Prince mine has a 300′ two-compartment shaft, with 3
rvals, opening 2 ore bodies, and is said to develop 150,000 tons
ment includes a single-drum electric hoist and an air-compres-
ne has a 125′ vertical shaft, equipped with steam power and a
a tunnel. The Globe mine has a 600′ two-compartment verti-
evels opened, and a tunnel, and has been estimated to have
ked out 300,000 tons of commercial ore, in 3 ore bodies.
ble mine, lying between the Prince and American Eagle, has
ith the largest outcrop in the district, said to have a sectional
cres. Development is by an upper tunnel, with back of 340′,
unnel.

Eagle group has 3 prospect tunnels, a 1,026′ working tunnel,
ompartment shaft, showing oxidized ores at surface, with an
to be developed for about 50x100′. This mine has been esti-
elcped about 60,000 tons of ore, averaging 3.78% copper and
trace of gold. The mine has electric light underground, and
of an 80-h. p. electric hoist, good for 1,000′, and 3-drill and
compressors.

ief shaft was 220′ deep, late 1909. The Gray Copper shaft,
9, shows chalcocite, and it is claimed that several carloads
lded 26% copper and $10 per ton in combined gold and silver
iously having been carefully selected.

a whole were reported by the company, Nov. 8, 1909, to have
s, with 600,000 tons of ore in sight, and 200,000 tons blocked
re developed is now claimed, in the press, to be much greater.
p is at the Central group, which also carries iron ore and lime-
urposes. Equipment includes two 150-h. p. boilers, one gaso-
c hoists and a 150-kw. General Electric generator, with 3 air-
pany reported, 1909, having 2 Leyner, 12 Rand, 15 Sullivan,
mple electric drills.

e reported, 1909, as about 75 in number, including a 24x30′
32′ carpenter-shop, 24x40′ boiler-house, 40x60′ engine-house
latter said to carry a $20,000 stock.

The 100x160′ mill, of wood, with iron roof, has one 9x15″ Bl
3x16″ rolls, 1 Richards jig, 4 Wilfley tables, 8 Card tables, Callow sc
4′ six-compartment Richards pulsator classifier. This mill, rated by t
at 250 tons, but obviously not of that capacity, was planned to be th
a 1,000-ton mill, and ran several months, 1909, but was idle at the
Test runs were said to have given returns of 72 to 81% assay values
81 cents per ton.

The smelter, on Sycamore Flat, under construction, 1910, is plan
a 75-ton water-jacket matting furnace, a 75-ton reverberatory furn
petroleum, and a converter, but it is difficult to understand why a
such ore reserves as are claimed should trifle with such a small s
a converter plant cannot possibly prove economical with such sm
capacity.

Nearest railway is the Phœnix & Eastern, at Winkelman, 30 m
but partial survey was made, 1908, for a railway line, and compa
1909, that the survey had been completed, and that a contract w
immediately for a bridge across the Gila River, and that funds were
subscribed for grading and the entire construction. Nothing has been
way of building this road.

Forces employed were reported, November, 1909, as 175 men,
ently a considerable part of the force was composed of Apaches, mak
mobile road, and doing similar labor.

Company gives estimated costs of $2 per ton for mining, 70 ce
centrating and $3.50 for smelting, with an average grade of ore of
copper tenor. Allowing for fume and slag losses of 0.5%, this esti
give a recovery of 80 lbs. fine copper per ton, at a cost of only 7¾ c
for copper in the form of matte.

Production, 1905, was 49,000 lbs. fine copper, and company estim
that 1909 production probably would be about 5,000,000 lbs. fine
Nov. 8, 1909, the company estimated that 1909 production woul
1,000,000 lbs. fine copper, and stated that sulphide ore of 15% and u
being shipped to Douglas at the rate of 3 to 4 cars weekly, and that
of concentrates daily was being shipped to Douglas, yet the official re
Territory of Arizona, which are among the most complete and accur
gathered by any state, make no mention whatever of any product
company in 1909, though one copper product as small as 37,724 lbs. w
by the Territorial auditor, from a mine in the same county. If shipme
were being made, November, 1909, as reported by the company, in
language, it seems strange that no record of production should be sec
territorial authorities, especially as the Arizona law of 1907 provides
facilities for collecting this information, with penalties for withh
returns. As a matter of fact, the management of the Copper Cr
Co. lied about the production of 1909. Actual shipments to Dougl
"3 to 4 carloads of ore per week and a carload of concentrates dail
tually amounted to the paltry total of 46 tons 2 cwts. for the entir

It was stated in a special article, appearing in the press, early 19
mines of this company had developed 1,410,000 tons of ore, avera
copper, with three times that amount of probable ore, but these
doubted, though the property unquestionably has developed a c
tonnage of low grade ore. The smelter under construction is totally
to earn profits from a low grade property, and no mine, even with t
and values claimed, can be operated at a profit 30 miles from rail c
the average price of three years past. Becaus
its inflated estimates, and its generally dubi
with much suspicion.

MINING CO. BRITISH COLUMBIA.
r office was Seattle, Wash. M. K. Rodgers was manager. July, 1910, to have a 1,500′ tunnel and 2,000′ of drifts, showof ore assaying 3 to 3.5% copper with excess of iron. Mine 2,000′ gravity tram and an electric tram, to take ore to water tland Canal. Formerly at Stewart, Skeena division, Cassiar

MINING CO. CALIFORNIA.
rly at Kaweah, Tulare Co., Cal.

MINING CO., LTD. TASMANIA.
lverstone, Devon Co., Tasmania. Lands, 40 acres, freehold, rstone, near Gunn's Plains, with water power available from butary of the Leven River. Company apparently holds 240 lands. The property shows a series of parallel bands of with slaty gangue, occurring in slate, with gossan outcrops. des trenching, a small opencut and 2 tunnels, lower of 280′. el cuts obliquely a vein of about 5′ width, of brecciated sili- g covellite and chalcopyrite, associated with pyrite, and ciated with hematite also. Ore samples have assayed 25% wts. silver per long ton.

MINING CO. CALIFORNIA.
r office was Los Angeles, Cal. G. W. Branthoover was presi- zed 1905. Property was the Milton mine and the Copper hich apparently little or no work was done. Formerly at o., Cal.

MINING CO. IDAHO.
ed repeatedly from former office and mine, Mullan, Shoshone bert Massing, president; John Hendrickson, secretary. Or- 907, under laws of Arizona, with capitalization $1,250,000, a reconstruction of the Iron Crown Mining & Milling Co. ne mile from a railroad, just west of Lookout, on the head Regis River. Property shows, at surface, a 4′ vein carrying ntiferous copper ore, with iron and quartz gangue. Mine 2 tunnels, lower, of 1,100′, cutting a 5′ vein, estimated to carry d a 15′ vein, estimated to average 15 to 20% copper, which ntirely too good to be true. The mine has circa 700′ of work- mall buildings.

MINING CO. OF MICHIGAN. MICHIGAN.
Eastern Ave., St. Louis, Mo. Mine office: Matchwood, ch. Jacob Maurer, president; Dr. M. J. Hopkins, vice-pres- treasurer; preceding officers, B. L. Brown, Geo. Bridenbach, V. Byers, directors; H. B. Kirkpatrick, secretary. Organized er laws of Michigan, with capitalization $2,500,000, shares neeting, second Tuesday in July.

500 acres, 6 to 8 miles west of the Victoria, and 8 miles north nearest railroad point, including a number of old mines on work was done, 1850-1860, principal properties being the vich mines. The Lafayette mine, formerly owned, was sold, 000.

of the present company was on the Hamilton, where a 602′ nd a 270′ shaft sunk on the Meads vein, the tunnel of 602′ only circa 300′, and a shaft was sunk mistakenly on a drift ne. Later work was on the Norwich, which, next to the st extensively developed and promising mine west of the The Norwich tunnel is 950′ long, with circa 1,000′ of drifts raging copper showing. The Norwich mine, worked 1850-

1865, produced 993,360 lbs. fine copper, securing masses of native
10 tons in weight. The bed is bunchy, but shows considerable promi
rock. The Meads bed was located by a series of prehistoric pits al
crop, the 270′ shaft thereon showing a strong bed, up to 25′ in width,
drift to the westward, on the fourth level.

Equipment includes a power-house, pumphouse, toolhouse, s
and 9 dwellings, with 250-h. p. and 120-h. p. engines, 40-kw. dynam
boiler, and 6-drill and 5-drill air-compressors.

The company began life as a wildcat, doing some remarkably
advertising, and the early mining work was very badly planned.
company gave satisfactory evidences of genuine reform, and for s
worked along legitimate lines, especially after Mr. Enoch Henderson
of the property, when the mining practice was vastly improved, and
done that should have been begun years earlier. Operations were
January, 1908, through lack of funds. Property is considered pro
the company has no particular prospects of success unless thorough
ized and given adequate working capital, and sensible management
tical lines.

COPPER CROWN OF ARIZONA MINING CO.

Dead. Lost lands Jan. 1, 1905, through failure to do annual
work. Formerly at Pearce, Cochise Co., Ariz. Fully described V

COPPER CROWN OF NOVA SCOTIA MINING CO. NOV

Dead. Formerly at Pictou, Pictou Co., N. S. Fully described

COPPER CZAR MINING CO.

Dead. Former office was 516-126 West Third St., Los An
Officers were J. F. Hubbard, president; F. W. Vogelin, vice-presi
McDonald, secretary; preceding officers, A. L. Warring, J. J. Dono
M. Bailey and H. G. Muffin, directors; Loyal A. Osborne, mana
McClave, superintendent. Capitalization was $1,000,000, shares $1 p
in the Weaver district, apparently were but slightly developed.
included gasoline power. The former management left the compan
Formerly at Mayer, Yavapai Co., Ariz.

COPPER DOME MINING CO. M

Dead. Former office was Missoula, Mont. J. O. Burns was
John Metz, superintendent. Lands were 6 claims, south of Saltes
to carry the extension of the Monitor vein, having a 205′ tunnel cut
of 18′ reported width, carrying ore giving good assay values in coppe
gold. Formerly at Saltese, Missoula Co., Mont.

COPPER EAGLE MINING CO.

Mine office: Merlin, Josephine Co., Ore. R. J. Ginn, presid
Hansen, secretary; J. C. Mattison, superintendent. Lands, in
district, show a 10′ quartz vein giving assays of 10 to 30% copper, o
tunnel of circa 300′. Presumably idle.

COPPER EAGLE MINING & SMELTING CO. M

Office and mine: 23 Silver Bow Block, Butte, Mont. A. W
president; M. W. Cook, vice-president; Arthur V. Corry, secretary
and general manager; preceding officers, Dr. M. C. Smetters and D.
directors. Organized March, 1907, under laws of Montana, with cap
$500,000, shares 50 cents par; issued, $250,000. Was a reconstruc
Eagle Mining & Smelting Co. Statement of Jan. 1, 1910, showed
debtedness.

Lands, one claim, patented, area 17 acres, known as the Eagl
Walkerville, and about a quarter-mile north of the Alice. Mine
two-compartment shaft, with levels at 200′, 250′ and 300′, showin
assaying about 1.2% copper, with a stope that yielded 276 tons of ore
smelter returns of $9,416. Mine was worked until 1889, when shaft

nt includes a 10x10″ hoist and a 3-drill air-compressor, with a
, 1907, a little ore, assaying up to 90 oz. silver and $6.50 gold
work 1908; idle since 1909.

ES OF WESTERN AUSTRALIA, LTD. **AUSTRALIA.**

Leadenhall St., London, E. C., Eng. Mine office: North-
Australia. Jas. Barrie, chairman; John McLaren, secretary.
4, 1903, under laws of Great Britain, as a reconstruction of a
e name, which in turn succeeded the Derby Syndicate, Ltd.,
on £15,000, shares 5s. par; issued, 25,974 shares, fully paid.
s, freehold, opened by shafts, said to have a 30′ vein with 10″
on both walls, carrying high grade black copper, presumably
e was discovered 1882, and worked for several years. Idle
and presumably moribund.

ORERS, LTD. **AUSTRALIA.**

dissolved Feb. 26, 1909. Formerly at Cobar, Robinson Co.,
ia. Described Vol. VIII.

MINING & POWER CO. **IDAHO.**

W. H. Hoefenger, Spokane, Wash. Letter returned unclaimed
e office, Mullan, Shoshone Co., Idaho. Organized 1907, with
,500,000. Lands, 14 claims, between Saltese and Mullan,
Has a short tunnel, planned to cut the main vein at a distance
Idle several years and apparently moribund.

MINING CO. **MICHIGAN.**

absorbed, 1898, by Arnold Mining Co. Formerly at Copper
Co., Mich. Fully described Vol. I.

CONSOLIDATED COPPER CO. **COLORADO.**

Sixteenth St., Denver, Colo. Mine office: Copperfield, Fré-
J. B. Conger, president and general manager; E. G. Bettis,
W. Miller, secretary and treasurer; Edw. H. Cook, superin-
atton, mine superintendent; Jas. T. Stewart, engineer; W. W.
mechanic. Organized Nov. 1, 1909, under laws of Colorado,
n $7,500,000, shares $10 par, nonassessable; issued, $4,500,000.
the Red Gulch Gold-Copper Mining & Milling Co., Frémont
o., and Queen Princess Copper Co. Continental Trust Co.,
and transfer agent. Annual meeting, second Wednesday in

laims, partly in process of patenting, area 1,050 acres, and 250
s, in the Red Gulch district. Property includes the Red Gulch
as, area 83 acres, in the Ilse district of Custer Co., Colorado,
Monarch district of Chaffee County, Colorado. Property is
6 contact deposits between limestone, quartzite and porphyry,
e zone up to 150′ in width, traceable 13,000′. The company
alachite, azurite and chalcocite, with a claimed average tenor
1 oz. silver and 50 cents gold per ton. The Red Gulch group
ont shaft, developing silver-lead ore, and shipped, 1907, some
. The Queen Princess group of 14 claims, area 147 acres, in
strict, shows a main ore body said to average 2.5% copper, and
of 40 to 60% copper, from high grade streaks, and former
hat trial shipments returned 18% copper, also claiming the
00′ wide, but it is now reported as half that. Development is by

Prince group, from which several shipments have been made,
e an ore body 146′ wide, with neither foot nor hanging-wall
claimed that ore shipped from this vein never ran lower than
3.5 oz. silver, in carload lots, and up to 31% copper and 12.5
well selected ores. Lands also include the Copper Anchor,

in a big machinery plant and concentrator, and to plan shipping
to the Comanche smelter, at Silver City, but these statements app
merely the vain imaginings of one C. T. McElroy, of Milwaukee,
promoter of more than dubious "mining" schemes. Idle, moribur
egg.

COPPER GULCH MINING CO. CA

Office: 723 Boston Bldg., Salt Lake City, Utah. Letter
claimed from former mine office, Cima, San Bernardino Co., Cal.
cent, president; Carl Wing, vice-president and manager; A. B. Irvi
and treasurer. Organized 1907, under laws of Arizona, with
$1,000,000, shares $1 par, nonassessable. Lands, 5 claims, unpat
Cape Cañon district, developed by a 165′ shaft. Idle.

COPPER GULCH MINING & REDUCTION CO. C

Letter returned unclaimed from former mine office, Ironton,
Colo. A. G. DeGolyer, superintendent, at last accounts. Lands, 6
600 acres, in Gray Copper Gulch, on both Red and Brown Moun
has 3 tunnels, including the DeGolyer, showing chalcopyrite, giving
14% copper and 41 oz. silver per ton. Idle and presumably moribu

COPPER GULF DEVELOPMENT CO. NE

Dead. Was reorganized, circa February, 1908, as Copper Gul
Formerly at Tyrone, Grant Co., N. M.

COPPER GULF MINING CO. NE

Dead. Was merged, circa, 1908, in Savanna Copper Co.
Tyrone, Grant Co., N. M. Fully described Vol. VIII.

COPPER HILL COPPER MINING CO. A

Dead. Was organized 1907. Property, about 2 miles sout
opened circa 1845, was worked, 1847, by an incorporated company,
Samuel as managing director, sinking shafts of 70′ and 146′, and bui
smelter, ceasing operations circa 1851, during the gold excitement.
numerous dykes, traversing felsite and porphyry, and the 189′ Hood
malachite and azurite with some cuprite and a little native coppe
unwatered and prospected, and nothing workable being discovere
was removed. Formerly at Molong, Wellington Co., N. S. W., Au

COPPER HILL MINE.

Owned by Arizona Commercial Copper Co., at Globe, Gila Co

COPPER HILL MINE. C

Office and mine: Jackson, Amador Co., Cal. W. F. Dete
manager. Lands, circa 2,500 acres, patented, on the Consumnes R
quartz-porphyry dyke, of 500′ to 600′ width, carrying chalcopyri
with pyrrhotite, and surmounted by a heavy gossan. Mine has a
of and parallel with the Consumnes River. The mine has the
shaft, the 130′ Blind Pigeon shaft, showing zinciferous iron and cop
with quartz gangue, the 150′ Little Oak shaft; the 100′ Zinc sh
Air shaft, and the 500′ Main shaft, latter on a 50′ vein east of and
the Consumnes River, this carrying a 2′ to 4′ paystreak of fine-gr
chalcopyrite, assaying 20 to 30% copper, with appreciable value
silver. The shaft has an 8x12″ double-cylinder steam hoist.
about 3,000′ of workings. Buildings include several shops and dw
was worked, 1861–1881, securing a considerable production, as is
extensive slag-dumps. Idle since 1881.

COPPER HILL MINES CO. NE

Office: St. Joseph, Mo. Letter returned unclaimed from form
Orogrande, Otero Co., N. M. Dr. Jacob Geiger, president; R. M.
president; Sterling Price Smith, secretary and treasurer; M. H.
manager; John Christ, local agent; preceding officers, Dr. J. C. J
W. Freeman, directors; Geo. W. Stagner, superintendent, at

ls include the High Five and Red Hill groups, latter, of
a fair surface showing of auriferous and argentiferous cop-
0′ shaft. Idle.

ING CO. **ALABAMA.**

at Stone Hill, Cleburne Co., Ala. Described Vol. VIII.

ING CO. **ARIZONA.**

was sold, July 29, 1910, to John J. Jackson, for $5,788.71,
f that amount in his favor. Lands were 14 claims, known
group, adjoining the Commercial Mining Co., having a
auriferous copper ore, and equipped with hoist and other
at Jerome, Yavapai Co., Ariz.

ING CO. **NEW MEXICO.**

re sold, November, 1903, to A. B. Renehan, for $7,600.
a, Rio Arriba Co., N. M. Described Vol. II.

ING CO. **UTAH.**

Fork, Utah. Mine office: Lucin, Box Elder Co., Utah.
esident; W. H. Gardner, vice-president; J. W. Storrs,
dner, treasurer. Organized Feb. 23, 1909, under laws of
on $50,000, shares 5 cents par, increased, Nov. 19, 1910,
1 par. Lands, 12 claims, unpatented, about a mile from
mine, and 7 miles from a railroad. First work was done
show several strong veins of copper ore, and has a shaft
d argentiferous copper and lead ores, giving assays of 7

ING CO. **UTAH.**

eeded, circa 1907, by Bingham-Butte Copper Mining Co.
Canyon, Salt Lake Co., Utah.

ING CO., LTD. **MONTANA.**

Idaho. Letter returned unclaimed from former mine
la Co., Mont. Morton Webster, president; A. T. Ryan,
Eberhardt, secretary and treasurer; preceding officers,
Jas. Howarth, directors. Organized March, 1908, under
n capitalization $250,000, shares 25 cents par, nonassess-
s, area circa 125 acres, in the Sunrise district, on the Mon-
ana-Idaho divide, showing an altered zone of highly sili-
′ width, carrying fine disseminations of copper carbonates
nas a 75′ tunnel, showing ore said to be somewhat similar
rm, and assaying about 4% copper. Presumably idle.

ING CO., N. L. **SOUTH AUSTRALIA.**

na, Daly Co., South Australia. Mine, known as the Kul-
lays, is about 12 miles from Kadina, showing a vein about
lules of malachite, and ferruginous streaks, with a gritty
gue. The 250′ main shaft is sunk vertically for 90′, and
There are a number of old pits and shafts. Equipment
and a hoist good for 400′. The government did some dia-
nd to end of that year company had received subsidies of
outh Australian government, of which no part had been
lle.

ING & MILLING CO. **IDAHO.**

ere John Schulte, president; Samuel Harvey, vice-presi-
secretary and treasurer; preceding officers, Nellie Harvey
ctors. Lands were on Deadman's Gulch, adjoining the
, having a 65′ tunnel. Formerly at Mullan, Shoshone Co.,

ING & MILLING CO. **WASHINGTON.**

e Bldg., Spokane, Wash. Letter returned unclaimed from

former mine office, Newport, Stevens Co., Wash. F. J. Heller Nettleton, secretary. Organized 1899, with capitalization $75, par. Lands, 4 claims, area 80 acres, opened by a 230′ shaft showing an 18′ vein carrying chalcopyrite, disseminated in some years and apparently moribund.

COPPER HILL MINING & SMELTING CO.

Dead. Formerly at Jerome, Yavapai Co., Ariz. Descrit

COPPER INDEPENDENT CONSOLIDATED MINING CO.

Dead. Bondholders foreclosed, circa 1907. Paid divi sales. Formerly at Silverton, Snohomish Co., Wash. Fully

COPPER JACK MINING CO.

Office: Eureka, Utah. Mine office: Erekson, Tooele Jensen, president; J. T. Williams, vice-president; Geo. A. D. D. Hanks, treasurer; Prof. J. H. Webber, general manage 31, 1905, under laws of Utah, with capitalization $75,000, sh assessable; levied a one-half cent assessment, early 1911.

Lands, 24 claims, 10 patented, area 480 acres, 4 miles west West Tintic district. Property has a 30″ fissure vein in granite carrying oxidized ores, and sulphides, associated with pyrite, giving assays of 13 to 35% copper, with small gold and silver shafts of 30′ and 240′ and a short tunnel. Property was ur to the Uncle Joe Mining Co., which did some drilling on a 2, hope of making a country-rock mine, but option apparently has

COPPER JIM MINING & MILLING CO.

Office: 417 Quincy Bldg., Denver, Colo. Letter returne former mine office, Central City, Gilpin Co., Colo. A. G. R Fred C. Wagner, vice-president; John Stewart, treasurer; secretary; J. A. McCracken, mine superintendent; preceding ors. Organized June 15, 1906, under laws of Arizona, w $1,500,000, shares $1 par. Lands, 6 claims, on Gray Copper Wisconsin district, showing a 4′ vein with 22″ paystreak of s good assays in copper, with fair gold and silver values, opened pits and shafts and a 70′ tunnel. Idle and presumably moribu

COPPER KEY MINING CO.

Office: Spokane, Wash. Mine office: Republic, Ferry Prickett, president; G. D. Russell, vice-president; E. L. Tat urer and manager; preceding officers, T. E. McBroom, E. L Jones, directors. Organized under laws of Washington. L fractional, on Belcher Mountain, adjoining the Oversight gr having a 145′ shaft and 3 tunnels, longest 571′ showing lo chalcopyrite, of 1 to 3% copper tenor, associated with pyrite, tite and magnetite. Equipment includes a 7-drill air-compr though low in grade, is considered promising.

COPPER KING GOLD & COPPER MINING CO.

Mine office: Mizpah, Elko Co., Nev. Made a few shipm and argentiferous copper ore, claimed to average about $100 during latter half of 1907. Idle.

COPPER KING, LTD.

Mine office: Letcher, Fresno Co., Cal. Geo. W. Ade Leavitt, superintendent. Company, organized under laws was said to have been liquidated, 1903, but the estate rem adjustment, and considerable dividends have been paid to cred tions under the receiver. It was expected, 1908, that recei charged shortly, and company take possession.

Lands, 90 acres, circa 20 miles from Fresno, having a 2

ened, with about one-half mile of drifts. Property has a circa 100′ width, carrying a 2′ to 20′ paystreak, with oxidized phides below, of about 7% average copper tenor.
n plant included a concentrator and smelter, at Martinez, Point smelter, which was sold in 1907. Ore produced later acoma smelter.
gement squandered about £250,000, ending with a net indebt-0, but, under the able management of Mr. Ade, this debt was mpany restored to solvency. Idle since October, 1907.

MINE. **ARIZONA.**

ed unclaimed from former office and mine, Bisbee, Cochise , 10 claims, adjoining the Copper Queen, Calumet & Arizona , now known as the Arizona King group, held jointly by Union owns about a 60% undivided interest, and R. E. Bretherton, d C. M. Henkle, et al. Property was first held by Copper which abandoned same, circa 1902, and was relocated, 1903. y a 625′ shaft, in porphyry, with some lateral workings, which r of small stringers of copper ore, and it is believed that dis- be found in the fault and shear-zones traversing the porphyry n the dump, taken from the shaft, is altered and slightly min- , carrying considerable pyrite. Idle since 1902, and no work the immediate future.

MINE. **BRITISH COLUMBIA.**

Kamloops, Yale district, B. C. Lands, 16 miles west of Kam- ing assays of 5 to 20% copper, 1 to 6 oz. silver and $10 to $20 hipped 500 tons of ore to the Crofton smelter, May, 1904.

MINE. **CALIFORNIA.**

f Wm. Purdue, Spokane, Wash. Mine office: Hutton, Siskiyou ein of about 75′ width opened by a 659′ tunnel giving a back of ng auriferous copper ores, ores and nature of their occurrence g the Blue Ledge property, in the same district. Was claimed, 25,000,000 worth of ore in sight, which, of course, was a gross e.

MINE. **IDAHO.**

Landore, Washington Co., Idaho. Is said to have a 15′ vein treak of bornite. Idle several years.

MINE. **MONTANA.**

Parrot, Madison Co., Mont. Lands, 1 claim, 2 miles southeast ; ores assaying up to 12.5% copper, 0.85 oz. silver and $2.80 some years.

MINE. **OREGON.**

Comer, Grant Co., Ore. Property, slightly prospected, is known district. Idle several years.

MINE. **PHILIPPINES.**

Benguet, Luzon, Philippines. Hanson & Meade, owners. ed River, show refractory ores carrying fair copper and gold amp mill was planned, at last accounts, to treat ores for their umably idle.

MINING CO. **ARIZONA.**

s, in the Tucson Mountains, were but slightly developed. n, Pima Co., Ariz.

MINING CO. **CALIFORNIA.**

Hutton, Siskiyou Co., Cal. Lands, 4 claims, 2 fractional, known roup, near the Joe Creek Copper Co., and north of the Blue ng a vein of 40′ estimated width, paralleling the vein of the

Blue Ledge Mining Co., and markedly similar. Developmen upper tunnel and 180′ lower tunnel, showing copper ore carryi values.

COPPER KING MINING CO.

Dead. Formerly at Boulder, Boulder Co., Colo.

COPPER KING MINING CO.

Dead. Was succeeded, circa 1904, by Pearl Copper Minin P. B. Coolidge was superintendent. Mine, employing circa previous to sale of property, had slight development, showin argentiferous copper ore. Formerly at Pearl, Larimer Co., Colo

COPPER KING MINING CO.

Office and mine: Shoup, Lemhi Co., Idaho. Earl Gilbrea a limited partnership, not an incorporation. Lands, 11 claims also 260 acres miscellaneous lands, on Beaver Creek, in the M showing numerous fissure veins in quartzite, of which three, wi of 10′ to 12′, are opened by 2 shallow shafts and 7 tunnels, of each in length, with a total of about one-half mile of openings, and malachite giving average assays of 7% copper, up to 30% silver; and $1 to $3 gold per ton, ore, as shipped, averaging abo total values. Presumably idle.

COPPER KING MINING CO.

Dead. Formerly at Pendleton, Umatilla Co., Ore.

COPPER KING MINING CO.

Dead. Lost lands in 1902. Formerly at Brighton, Salt

COPPER KING MINING CO.

Letter returned unclaimed from former office, Farmingto office: Draper, Salt Lake Co., Utah. W. J. Huselton, man Hendricks Cañon, circa 11 miles east of Salt Lake City, show a width, giving assays up to 32% copper, 58 oz. silver and $300 little work was done, 1909. Idle.

COPPER KING MINING CO.

Mine office: Sumas, Whatcom Co., Wash. Long idle and ibund.

COPPER KING MINING CO.

Dead. Formerly at Rawlins, Carbon Co., Wyo.

COPPER KING MINING CO.

Mine office: Whitehorse, Yukon. Henry Baxter, mana ruish, superintendent. Lands apparently have shrunk to th claim, area 50 acres, crown-granted, in the Wheaton district, r The mine has several shallow trenches and shallow shafts, and The 243′ main crosscut tunnel cutting ore 150′ from the portal, h a vein of 5′ to 8′ width, in garnetiferous limestone, near a granit ing slightly auriferous and argentiferous chalcopyrite and bo shows high grade ore, in small quantities, at numerous points. cludes a 60-h. p. boiler, 20-h. p. hoist and a small air-compressor bonded, 1908, by Col. W. S. Thomas, of Pittsburg, Pa. Produ 1906, shipped to British Columbia smelters, was circa 400 tons c about 15% copper and $1 to $2 per ton in combined gold and has been shipped since, but several thousand tons have been erty considered promising, but requires further development t Presumably idle.

COPPER KING MINING & MILLING CO.

Office and mine: Ilo, Nez Perce Co., Idaho. Jesse L. Ki ent. Lands, 6 claims, on the west side of Mission Creek, abo Jack Spur, and 7 miles from Culdesac. Mine, opened by tunn 18′ estimated average width, carrying ore of good copper teno

developing, early 1909, with a small force. Presumably idle.

IINING & MILLING CO. **WASHINGTON.**

: Vancouver, Clark Co., Wash. Organized January, 1904, $1,000,000, shares $1 par. Idle several years.

IINING & MILLING CO., LTD. **IDAHO.**

rly at Iron Springs, Idaho Co., Idaho. Fully described Vol.

IINING, MILLING & **MONTANA.**
NT CO.

Cooke, Park Co., Mont. J. Nelson, president; R. M. Mander-; B. R. Holland, secretary and treasurer. Organized De- laws of Montana, with capitalization $150,000, shares 15 4 claims, in process of patenting, in the Goose Lake basin, rench of 18′ depth, showing ore of low to medium grade. Idle.

IINING & SMELTING CO. **IDAHO.**

e: Mullan, Shoshone Co., Idaho. J. B. Elliott, president; e-president; Hon. Henry W. Ingalls, secretary, treasurer and Organized Aug. 28, 1901, under laws of Idaho, with capitali- hares $1 par. Has raised money for development by 1-cent onth intervals.

ns, 2 fractional, on the West Fork of Deadman's Creek, near Missoula mines, in the Hunter and Leland districts, having in in Burke quartzite, with paystreak of 6″ to 2′, carrying yrite assaying circa 5% copper, 28% lead and 18 oz. silver 2 tunnels on the Copper King vein, on the Burke side of the 3, the lower tunnel, on the West Fork of Deadman Gulch, at the Middle tunnel, driven 3,400′, at a total cost of $16.23 tual driving cost of $12.12 per foot, which figures are very pper workings show argentiferous lead and copper ore, and ade ore have been cut in the lower tunnel.

ludes 12″ and 24″ Pelton wheels, taking water under a 500′ ll Franklin air-compressor and a small electric light plant. 30x60′ engine-house, 30x60′ boarding-house, 27x42′ bunk- barn. About 15 men are employed. Property considered agement good.

IINING & SMELTING CO. **NEVADA.**

ty, including the Mayflower group, slightly developed, was to be under option to the Nevada-Pacific Copper Co., which same. Formerly at Luning, Esmeralda Co., Nev.

IINING SYNDICATE. **WASHINGTON.**

a, Wash. Mine office: Fairfax, Pierce Co., Wash. R. E. nt; C. L. Judd, vice-president; E. Areith, secretary and Guiley, superintendent, at last accounts. Capitalization s, 64 claims, including the old Eastlick mine, opened by a el, with a small amount of drifting, which produced some District is said to be promising, but not easily accessible. presumably moribund.

F ARIZONA. **ARIZONA.**

bad egg. Lands were sold, under foreclosure, Aug. 28, 1905, ers, who reorganized under title of Arizona Copper Syndicate merly at Pearce, Cochise Co., Ariz. Fully described Vol. V.

F ARIZONA MINING CO. **ARIZONA.**

bad egg. Was reorganized, 1903, under title of Copper King d. Formerly at Bisbee, Cochise Co., Ariz. Fully described

COPPER KINGS MINING CO.

Dead. Property was sold by sheriff, 1902, later going to Mining & Smelting Co., also dead. Former office was Summit Toledo, Ohio. Henry C. Baker was president, and the company in its prospectus. Organized January, 1901, under laws of Arizo talization $5,000,000. Lands were 4 claims, with doubtful title, north of Brigham, claimed to have a shaft and considerable develo pany claimed to have shipped 18 tons of ore to the De Vieux c at Ogden, which refinery was non-existent. Formerly at Brigha Co., Utah.

COPPER KNOB MINE. NORTH

Office: Salisbury, N. C. Mine office: Hopkins, Ashe Co., ard Eames, Jr., owner. Lands, 160 acres, freehold, also 90 acres lands, showing a 30″ fissure vein in hornblendic slate, carrying sulphide ores, mainly bornite, estimated to average 6 to 8% coppe and $12 gold per ton. Property was opened circa 1880. Has with hoist and 2-drill air-compressor, and a 5-stamp mill. Man further development by an adit cutting Copper Knob Mountain.

COPPER KNOB MINING CO. NORTH

Dead. Was succeeded, 1902, by Blue Ridge Copper Mining ized 1881, under laws of New York, and apparently reorganized laws of North Carolina. Lands were at Gap Creek, 30 miles fr having a 30″ fissure vein, carrying a considerable variety of auri ores. Mine was last worked for gold. Formerly at Hopkins, As

COPPER LEAD DEVELOPMENT CO.

Letter returned unclaimed from former mine office, Swanse Ariz. Geo. Bernard, general manager; preceding officer, Frank Ba Greene, directors. Capitalization $200,000, shares $10 par. Santa Maria district, adjoining the Clara Consolidated, have 10 pi shafts, showing a 3′ vein of good ore, giving assays of about 9% fair gold values. Idle.

COPPER-LEAD SMELTING CO. WA

Dead. Was abortive. Formerly at Seattle, King Co., Wash Vol. VI.

COPPER LEDGE MINING CO.

Dead. Former office was Salt Lake City, Utah. E. F. Mars ident; Jas. Courtney, secretary and treasurer. Organized 1907, ization $125,000, shares 25 cents par. Lands were 9 claims, in t trict. Formerly at Richfield, Sevier Co., Utah.

COPPERMINES CO.

Office: 37 Wall St., New York, N. Y. Mine office: Ely, W Nev. O. J. McConnell, president; H. F. J. Knobloch, vice-presid Herrmann, secretary; Frank W. Holmes, treasurer; L. Timmerma treasurer; preceding officers, Ralph C. Lupton and E. N. Skinn Arthur Smith, superintendent.

Organized June, 1907, under laws of Delaware, with $50,000,000, as Consolidated Copper Co. and name changed, 190 title, and capitalization increased, April, 1908, to $60,000,000, a Dec. 31, 1909, to $5,000,000, shares $5 par.

Lands, 33 claims, area circa 550 acres, in the Robinson distric Aug. S, 1907, from Ely Mines Co., also 3,085 acres of ranch lands in the Steptoe Valley, and a number of water-rights. Equipm steam power. Idle.

COPPERMINES CO. OF ARIZONA, LTD.

Dead. Was succeeded, Apr. 1, 1910, by Arizona Morenci

Formerly at Clifton, Graham Co., Ariz. Fully described

F MOUNT LYELL WEST, LTD. AUSTRALIA.
ceeded, Oct. 2, 1907, by West Mount Lyell, Ltd. For-
n, Montagu Co., Tasmania. Described Vol. VI.
SMELTERS CORPORATION CALIFORNIA.

tically a swindle. Formerly at Vontrigger, San Bernardino
water, Inyo Co., Cal. Fully described Vol. VIII.
& DEVELOPING CO. CALIFORNIA.
at Kaweah, Tulare Co., Cal. Described Vol. VIII.
& SMELTING CO. OF ONTARIO, LTD. ONTARIO.
ceeded, 1908, by Bruce Mines, Ltd. Formerly at Bruce
Very fully described Vol. VIII.
IN CONSOLIDATED MINING CO. CALIFORNIA.
Redding, Shasta Co., Cal. John Pillius, president; F. G.
Fred Grotefend, secretary, treasurer and superintendent.
mediately northeast of the Mountain Copper Co., Ltd., on
, showing an ore zone, in rhyolite, with NS. strike, carrying
n width. Mine has 12 tunnels, aggregating 4,365′, which
ll detached pockets of sulphide ores. Equipment includes
air-compressor. Presumably idle.
IN COPPER CO. ALASKA.
me, Alaska. Property is near the head of the Nome River.
ork was done, 1907. Presumably idle.
IN DEVELOPMENT CO. CALIFORNIA.
ceeded by Copper Mining & Developing Co., also dead.
, Tulare Co., Cal.
IN MINING CO. CALIFORNIA.
at Victor, San Bernardino Co., Cal. Described Vol. VIII.
IN MINING CO. COLORADO.
Boulder Co., Colo. Geo. W. Barnhardt, superintendent.
orth of Ward, have a 50′ tunnel, showing a 6′ vein, assaying
r. Presumably idle.
IN MINING CO. IDAHO.
nsey Bldg., Washington, D. C. Mine office: Montpelier,
. Organized under laws of South Dakota, with capitaliza-
s $1 par. Marc F. Whitman, president; F. E. Graham, vice-
ebner, secretary; P. J. McDermott, treasurer; Frank E.
t; preceding officers, A. C. West, Theo. A. Mayer, W. P.
artin, R. S. Knapp and Hon. Thos. L. Glenn, directors.
atented, area 100 acres, known as the Blacksmith group,
near the Bonanza Mining Co., in Montpelier Cañon, about
elier. Mine has a short tunnel, said to show copper ore
er values. Is not regarded favorably.
IN MINING CO. NEVADA.
passed to Salt Lake Copper Co. Formerly at Tecoma,
ribed Vol. IV.
IN MINING CO. UTAH.
F. Walker Bldg., Salt Lake City, Utah. Letter returned
r mine office, Milford, Beaver Co., Utah. Lands, 6 claims,
Copper Mountain Mining & Milling Co., having opencuts
5′ to 60′, and a main shaft, of peculiar construction, about
g an iron ore vein of 4′ to 14′ width, giving assays of 18 to
e vertical for about 100′, thence drops 100′ at an angle of

75°, thereafter has 50′ sunk at an angle of 70°, which is excelle
ing. Has gasoline power. Idle and presumably moribund.

COPPER MOUNTAIN MINING CO.

Dead. Formerly at Big Horn, Sheridan Co., Wyo., and
Co., Wyo. Described Vol. VI.

COPPER MOUNTAIN MINING & DEVELOPMENT CO. BRITISH COLUMBIA &

Office: 5406 Union Ave., South Tacoma, Wash. Mine
Atlin district, B. C. Letter returned unclaimed from former
Stevens Co., Wash. B. S. Cowles, president; Jos. Hutchinson,
Holcomb, general manager; A. T. Macaulay, superintendent
$200,000, shares 10 cents par. The Washington group has
acres, with 3 ore bodies, one lens 75′ wide being opened by a 30
tunnel. The June group, at Quatsino Sound, includes 5 claim
showing an ore body said to be 100′ wide, with measured lengt
assays of 6 to 8% copper, 3 oz. silver and $2 gold per ton, from
large amount of ore is shown on surface, and the deposit has b
cast. British Columbian group considered promising. Both g
years, and company apparently moribund.

COPPER MOUNTAIN MINING & DEVELOPMENT CO.

Office and operating office: Mullan, Idaho. Letter returne
former mine office, Thompson, Sanders Co., Mont. Jas. I. Die
Patrick McNeff, vice-president; Thos. Kennedy, secretary
Tonnes Nielsen and Knute Rosdahl, directors. Organized 19
Idaho, with capitalization $1,500,000, shares $1 par. Annual
Tuesday in December.

Lands, 5 claims, one fractional, area 95 acres, with 3 adjoi
option, at last accounts, at the head of Copper Creek. Mine
upper a crosscut, deflected for 56′ along the vein, said to be 2
pockets and seams of copper carbonates, with gold and silver v
tunnel, of circa 950′, has a back of about 350′.

COPPER MOUNTAIN MINING & MILLING CO.

Office and mine: Mullan, Shoshone Co., Idaho. C. D.
preceding officer, Katheryn Green, E. B. Crawford, W. Cluff,
Hutchinson and U. Fillio, directors. Lands, 8 claims, adjoini
and Maryland, on Copper Mountain, west of Mullan, showing
under development, of about 6′ width at surface, said to be 50′
450′. The 250′ upper tunnel shows a vein of 25′ claimed width
1 to 4% copper, with 8% copper and 20 oz. silver per ton from
oxidized ores. The 1,050′ lower crosscut tunnel has a back of
showing chalcopyrite and bornite.

COPPER MOUNTAIN MINING & MILLING CO.

Dead. Was bankrupted, 1904, by bad management. For
Beaver Co., Utah. Fully described Vol. IV.

COPPER MOUNTAIN MINING & SMELTING CO.

Office: Phœnix Bldg., Butte, Mont. Letter returned
former mine office, Corbin, Jefferson Co., Mont. I. N. Simons
Cohen, secretary; J. H. McCabe, manager. Organized, 1907,
tion $1,000,000. Lands, about 50 claims, area circa 1,000 acres,
ing 5 claims on Valparaiso Hill that were also claimed by Butt
solidated Mining Co., and title was vested in latter, by judgme
7, 1908. Mine has a shallow shaft, showing numerous stringe
about 6% copper, with small silver values, and is said to have
15″ paystreak. Idle several years.

COPPEROPOLIS COPPER CO.

Dead. Formerly at Prairie City, Grant Co., Ore. Fully de

MINING CO. NEVADA.
ly at Searchlight, Clark Co., Nev. Described Vol. VIII.
MINING & LEASING CO. WASHINGTON.
on Blk., Indianapolis, Ind. Mine office: Keller, Ferry Co., nan, president; Geo. P. Garwood, secretary and manager; F. E. Stone, G. D. McClain and M. Hibschman, directors. 7, under laws of Washington; with capitalization $3,000,000, nds, 6 claims, 3 fractional, area circa 90 acres, 5 miles west a 60′ tunnel, showing low grade chalcopyrite. Presumably

OPPER CO. ARIZONA.
n, Tex. Mine office: Vekol, Pinal Co., Ariz. Organized Wagner, superintendent, at last accounts. Equipment in- er and an air-compressor. Mine is said to have produced ore, since 1890, and production, 1907, was 72,698 lbs. fine said, December, 1908, to have been sold to residents of Idle since 1907.
& ARIZONA MINING CO. ARIZONA.
ly at Metcalf, Graham Co., Ariz. Described Vol. VIII.
MINING CO., LTD. IDAHO.
Mullan, Shoshone Co., Idaho. Development, at end of 1908, 0′ of tunnels. Presumably idle.
E CONSOLIDATED MINING CO. UTAH.
ke City, Utah. Letter returned unclaimed from former mine ke Co., Utah. Anthony O. Jacobson, president; Clarence K. esident; Chas. H. Post, secretary. Organized 1904, with 000, shares $1 par. Lands, 3 groups, near the Continental- Consolidated, from which $900,000 worth of ore is said to n the past. Idle several years and apparently moribund.
CONSOLIDATED MINING & MILLING CO. IDAHO.
Commonwealth Bldg., Pittsburg, Pa. Mine office: Cœur Co., Idaho. Saml. B. Helbert, president; Saml. R. Hite, vice- surer; J. LeMoyne French, secretary; preceding officers, E. Dale Field, directors; Daniel Davis, general manager; ine superintendent. Organized July 30, 1910, under laws of zation $4,000,000, shares $1 par, nonassessable; issued, circa l meeting, first Monday in September.
ns, unpatented, area 580 acres, in 2 groups, at the mouth of e north bank of the St. Joe River, 6 miles above the head of ty includes water-rights. The Copper Prince group, formerly Prince, has 12 claims, and the Idaho-Virginia, or Gold Ridge laims, is about 6 miles east of the Copper Prince, and circa 3 et Sound railway.
rince group shows contact ore bodies, between granite and f 20′ to 50′ estimated average width, carrying chalcopyrite, pper, giving assays of 3 to 41% copper, and 8 to 13 oz. silver ent is by drift tunnels, of 40′, 125′, 137′ and 200′, driven from ons. The ore body has been traced, by trenches and crosscut m, for the entire length of property, a distance of 7,800′.
ginia group is reported to have a 15′ to 20′ contact deposit, d slate, carrying argentiferous galena giving assays of 8 to 46 oz. silver. Development is by a 250′ shaft, with a hoist ildings include a smithy, boarding-house and a stable.
utilising water power from Prince Creek, by 6 miles of 3′ of 3′ flume, also installing 4 boilers, 2 hoists, 2 six-drill air- awmill. Property is considered promising, but the company's

advertisement, estimating that in five years the silver-lead mine w 3,000 tons of high grade ore daily, or twice as much as the Bunker H is taking entirely too much for granted, and the company's esti depth of 200′ there will be $23,204,000 of ore values developed i shine, of a sort not healthy for foolish investors who are on the look things."

COPPER PRINCE MINING CO. C

Office: Ukiah, Cal. Mine office: Middletown, Lake Co., Cal president; J. C. Ruddock, secretary. Lands, 3 claims, 4 miles Middletown, carrying a vein of 6′ to 8′ width, in limestone, with a s developed by 2 trenches and a short tunnel, latter showing malach lte, said to assay 5% copper, 1 oz. silver and $3 gold per ton. Idl and presumably moribund.

COPPER PRINCE MINING CO. C.

Dead. Formerly at Crackerjack, San Bernardino Co., Cal Vol. VIII.

COPPER PRINCE MINING CO.

Dead. Was merged, July 30, 1910, in the Copper Prince Mining & Milling Co. Formerly at Cœur d'Alene, Kootenai Co., scribed Vol. VIII.

COPPER PRINCE MINING & SMELTING CO. C

Dead. The company's mine, in the Red Gulch district, on Re shipped a little ore, 1907, of 31% copper tenor. Formerly at Cop mont Co., Colo.

COPPER QUEEN CONSOLIDATED MINING CO.

Office: 99 John St., New York, N. Y. Mine office: Bisbee, Ariz. Operating and works office: Douglas, Cochise Co., Ariz. Dr. president; Arthur Curtiss James, vice-president; Geo. Notma and treasurer; Stuart W. French, general manager; Gerald Sher mine superintendent; Parker L. Woodman, superintendent; Geo. B superintendent; Forest Rutherford, assistant smelter superinten Crane, comptroller; E. E. Ellingwood, chief counsel; W. H. Broph superintendent; Dr. F. E. Shine, medical superintendent; Alc master mechanic.

Organized August, 1885, under laws of New York, with $2,000,000, shares $10 par. Is controlled, through practically entire ship, by Phelps, Dodge & Co., Inc., company having only about 15 Owns 100,000 shares of Greene Cananea. Balance sheet, of Dec. 3 assets of $15,047,646.58, in which the mines, machinery, real estat other equipment were listed at $3,340,857.03, and ores, general supp chandise on hand inventoried $5,447,644.07, leaving $6,329,145.48 mortgages, bills and accounts receivable, and cash, with cash of $ Liabilities were scheduled at $4,905,026.17, of which only $1,21 accounts and drafts payable, balance being for capital stock, co pense, and an item of $1,680,000 for renewal of plant. Surplus on $10,142,620.41. Net earnings for 1909 were $5,271,278.20, exceede earnings of $5,609,486 in 1905 and $7,625,855 in 1906. Dividend or $3,000,000, in 1908, and $4,025,000 in 1909. The company was many years as a close corporation, without making its figures pu company is said to have paid, 1888–1907, inclusive, dividends rangi 115%, with an aggregate of $30,000,000 or upwards.

Forces are about 4,000 men, of whom approximately 2,500 are and 1,500 at the smelter.

Mineral lands in the Warren district are 135 claims, area 1,4 in addition, the company has various properties in other distric hereinafter.

ueen mine was opened, 1880, on a solid outcrop of oxidised anganese, opposite the Copper Queen hotel in Bisbee. The since removed, leaving a large artificial cave, gave average per, smelted in a 30″ water-jacket furnace, with English coke, rancisco, but was exhausted in three or four years, and the nany vicissitudes, until additional and far larger ore bodies following seams and stringers of ore wherever occurring, these eading to further large and rich ore deposits.

of the Copper Queen, and other mines of the district, consists dolomitic limestone beds, of Carboniferous age, the upper r blue, dipping to the southward and flanking a granite-por- rusive porphyritic dykes. Until 1902 the principal ore bodies base of the upper limestone bed, which is much broken and pathic igneous intrusive rocks, that evidently have a strong n the ore deposits, which occur in pockets, lenses, chimneys, ins, stringers and seams, the larger bodies being connected, nall veins, or mere knifeblade seams. The limestone and its have a general pitch to the southeast, somewhat sharper Tombstone Cañon, necessitating deeper shafts as distance is utheast. Extensive bodies of high-grade ore have been found, underlying limestone strata, and developments prove these es to be persistent to great depth. The mines show numerous ed with calcite crystals and stalactites, some of these caves le size, and frequently found in close association with good he shafts are bottomed in disseminated sulphide ores of high r the depth of the ore bodies while already proven great, w ore bodies are developed yearly, and the ultimate lateral e are unknown. The diamond drill is used underground, to

res are found on the lowest level, with chalcocite and bornite ite, malachite, cuprite and even considerable bodies of native nasses of native metal, ranging up to several hundredweights, e been found mainly, not in the upper levels, as might have at considerable depth. There is much talc and hematite, rences of manganese, in connection with the ore bodies. Only vorked, until 1893, when converters were added to the smelt- ich time the furnaces are charged with a mixture of oxide, hide ores, perhaps one-third of the charges being sulphide ed giving average returns of better than 7%. The system of he mine gives no figures regarding ores richer than 15%, and ence of the figures "15+," on the assay books of every shaft, derful richness of the ore bodies.

ened ahead for several years, but not so extensively as for- ies being so soft that it is difficult to secure the openings, ire hill above the mine is creeping, and serious crushes can be eavy timbering and the exercise of great care. The mine ile monthly of new openings, or at the rate of 1 linear foot of s of ore extracted, which figure is proven, by past experience, ally constant ore reserves, while avoiding excessive advance re useless maintenance cost. The shafts draw more or less, shifting ground, requiring occasional retimbering. Many of headed throughout, and the mine is timbered with square sets 8″ timber, mainly Washington fir, an average of 30′ of timber, ng required for each ton of ore won. Experiments were made, ete and steel for timbering, 6″ steel I-beams weighing 8 ng tried for posts and caps, but these strong beams were soon

twisted and eventually broken. All ore is hand-sorted, und breaking, and culls are used for filling in worked-out stopes, this ing remarkably well. Notwithstanding numerous disadvantag and menaces to life, the Copper Queen is one of the safest of r ground workmen, because of experienced and careful manageme

The mine is troubled by occasional fires, but these usually control promptly, the last fire having occurred August, 1910, b and 400′ levels of the Holbrook shaft.

The mine has electric pumps, there being three 300-gallo Czar shaft, two of 100 gallons each at the Holbrook, two 50-gall Silver Spray, and two of 100 gallons each at the Lowell. L columns are used, to obviate excessive corrosion from acid mi are strongly charged with copper sulphate and dilute sulphuric as a whole, is not especially wet, the district being drained largely & Pittsburg.

The entire system of mine operation was changed, radically merly each of the principal shafts was operated as a separate mi shafts are now used for men, waste, timber and supplies, all ore through the Sacramento shaft.

The underground haulage plant, installed 1908, resulting i omy, is very extensive, with 17 miles of tracks, on every secon fourth to the sixteenth, inclusive, ore from the intermediate level through chutes, and all ore hauled to the Sacramento shaft fo haulage system includes Goodman electric locomotives and sid cars. Chutes have been installed throughout the mine for l which discharge into large storage-bins at the Sacramento shaft all ore is hoisted. In order to complete the underground tractio necessary to open many new drifts and crosscuts, which were ground, wherever possible, as the electric tramlines are the arter

Figures of mining costs for 1909 showed that of the total 38. extraction; 31.31% for exploration, development and repai tramming, hoisting and loading; 11.14% for taxes and miscella and 4.04% for freight on ore to the smelter.

The Czar shaft, which is the oldest, is 400′ deep, with an el produces about 300 tons of ore daily. The old shops and smel on a narrow bench of ground, made by grading the steep hillside The old smelter has been dismantled, but some of the shops rem

The 540′ four-compartment Holbrook shaft, located circa of the Czar, replaces the old Holbrook shaft, lost, 1906, by fire a shaft was retimbered, early 1911. The Holbrook, formerly the p the Copper Queen, having large and numerous bodies of exceptio ore, is now second as a producer to the Lowell. The shaft ha gear, and a 750-h. p. hoist, actuated by compressed air.

The Hayes shaft, between the Holbrook and the Silver Spra of commission for many years, and has no equipment.

The Silver Spray shaft, commonly known as the Spray, cir east of the Holbrook, and near the Irish Mag shaft of the Calu is 954′ deep, with 3 compartments. This shaft shows rich ores level to the bottom, the upper workings carrying mainly ch changes to bornite on the fifth level, with oxidized ores and a sulphides on the sixth and seventh levels, ores being mainly eighth level. The ore bodies are very extensive and persistent, l in nature, with frequent porphyry dykes. A considerable body was cut on the 700′ and again on the 800′ level, thus setting a deeply cherished geological theories regarding ore deposition.

been removed, and the Spray is now worked from the Hol-
afts.

aft, 1,450′ southeast of the Silver Spray, with 3 compart-
as large bodies of high grade ores, mainly sulphide, and is
ingly important producer. Surface equipment includes a
and a 750-h. p. 20x60″ Nordberg hoist, actuated by com-

t, next southeast of the Gardner, was 1,600′ deep, early
nows no important ore bodies above the 900′ level, but has
on the lower workings, the 1,000′ level showing high grade
ulphides. The Lowell has developed into a great mine, and
producer of the Copper Queen. This shaft makes circa
ater daily, which is forked to surface by a Prescott station
0′ level. Equipment includes a steel headgear, and a
st, actuated by compressed air, raising 3-deck cages.
e shaft, about 1,400′ west of the Silver Spray, is connected
he Czar. No large ore bodies have been located by this
uld find the extension of the ore bodies of the Shattuck-

mine has an old shaft, and a new shaft, sunk 1908, of circa
ine is connected with the Czar, Holbrook and Sacramento
a small amount of high grade oxidized ore.
Deer shaft is not connected with the main workings, lying
of the principal mines, and being reached by wagon-road,
several miles. There is an old 100′ incline shaft, sunk circa
as shipped, 1904, by lessees, that carried 12 to 15% copper.
une, 1910, had some drifts on the 150′ level at the end of the
ws a large body of low grade ore, with prospects of develop-
le. The equipment is temporary, with a gasoline hoist.
t has given tentative consideration to sinking a shaft of
tween the Lowell and Superior & Pittsburg mines.
nent Sacramento shaft, 1,700′ deep, handles the entire
There are loading bins on the even-numbered levels from
d by the electric haulage lines from all other workings of the
s sunk in rock for practically its entire depth, insuring as
munity from drawing as is possible in this district. The
g some rich ore, and some exploratory work was done, 1910,
k of Sacramento Hill, which is the geological keystone of
ts.
e Sacramento is a powerful Nordberg tandem-compound
ns with 5′ face, operated by steam, with 6 auxiliary engines,
er 150 pounds pressure. Hoisting is done in 3-ton skips,
se a skip each minute, giving the shaft a capacity of fully

shaft has perhaps the most elaborate and ingenious system
g ores to be found at any copper mine. On reaching sur-
e, ore is dumped automatically upon a Stephens-Adamson
carries the ore about 150′ down the hill to the loading
shed is 42x800′, of steel frame, with 4 railroad tracks run-
eing loaded from 2 conveying belts running lengthwise
ore being scraped off the belts by dumping carriages mov-
and forth, the motion mixing the ore thoroughly. Every
automatically, and 10% is loaded into a special car, for
g.
plant, built 1906, at the Czar shaft, on the site of the old
d was replaced, 1909, the timbers being put together with

wooden pegs, as the nails in the old plant disintegrated, and br
fall. The leaching plant has a series of vats and launders, tak
from the Holbrook and Czar shafts, heavily charged with copp
solution.

Two monstrous slag-dumps near the Czar shaft, remainin
smelting plant, originally contained about 1,000,000 tons, of abo
copper tenor. These are being broken up and shipped to the
from time to time, for resmelting, as opportunity offers.

The central power plant, at the Sacramento shaft, built 1
given additional machinery, replaces the independent plants forr
each shaft. The buildings, of steel frame, are a boiler-house, ha
h. p. Stirling water-tube boilers, furnishing steam direct to the hoi
by Sacramento and Gardner shafts, the hoists at the other shafts
by compressed air. Equipment of the engine-house includes
Curtis turbo-generators, 3 Ingersoll-Rand air-compressors, of ab
aggregate capacity, and a 70-drill Nordberg air-compressor that
in the southwest. Fuel is Texas and California petroleum, with
oil storage. The 66x150′ steel-frame mine machine-shop includes
boiler-shop. There also are several other shops, warehouses, ch
and offices. All of the shafts, and the principal mine buildings, a
spurs of the El Paso & Southwestern railway.

In addition to the Copper Queen mine, at Bisbee, the compan
in several other districts. A bond on the property of the West Ca
Co., at La Cananea, Arizpe, Sonora, México, was surrendered, 19

The mine at Courtland, in the northern part of Cochise Cou
miles north of Bisbee, has 2 shafts, deepest 650′, with an electric
owned jointly with the Great Western Copper Co. Operations, 1
couraging, and work was stopped, February, 1910, the working
and most of the machinery shipped out. It is understood that co
has been developed, which probably will be available for later ext
warranted by a better price for copper.

The Maverick mine, N. C. Nelson, superintendent, at Superi
Ariz., is held under a $100,000 bond and lease, expiring circa July

The company holds mineral lands under bond and lease in the
trict, near Silver Bell, Pima Co., Ariz., and 2 tunnels have been dr
The company also holds the Hanover mine, at Fierro, Grant Co.,

The smelter, known as the Douglas reduction works, is at Dou
28 miles from the mine and 1 mile from the Mexican border. T
central smelter for the mines of Phelps, Dodge & Co. in Arizona
these including the Copper Queen at Bisbee, the Detroit at Mor
Dominion at Globe, and the Moctezuma at Nacozari. These pr
duce a great diversity of copper ores, including those of practically
and character found in the American southwest and northern Mé
possible, by means of this central reduction plant, to take advantage
nature of the ores, in mixing furnace charges. The plant also does
custom smelting of copper, gold and silver ores.

The works occupy a site of 320 acres, and are served by a v
Y-track railroad system, of standard gauge, that reaches every
department of the plant, there being about 15 miles of railroad tra
the main line and sidings. Construction of the plant was begun M
the first stack was blown in March, 1904, since which time there ha
continuous enlargement, and the works, costing fully $4,000,000,
size only to the mammoth Washoe works, having a daily smeltin
about 4,000 tons, and this is direct smelting capacity, there being
to eliminate part of the tonnage from the final furnace charges.
for the works is secured from artesian wells, of circa

ng nearly to the surface, with one well, of about 1,000′ depth,
per minute. A large reservoir and cooling tower have been
with the water supply.
; system consists of 5 pits, each 40x800′ in size, and 11′ deep,
storage capacity of circa 90,000 tons. Ore, received from
nping steel cars, is discharged into the pits, which are lined
he pits are filled with the different grades of ore required to
furnace mixture, and the ores mixed by a mechanical plow.
required at the furnaces, by steam-shovels, running on per-
pon the floors of the pits.
urnace building is a steel trestle, 48′ high and 1,343′ long,
, with storage bins for coke, fluxes and silica.
ill, 65x235′ in size, of steel and brick, has 3 crushers, 6 rolls
tic samplers.
etion of the new calcining and reverberatory plant, 1911, the
will cover a tract 150x900′ in length, with an ell 100x850′,
t of one solid block 125x1,750′ in size.
ce building, twice enlarged, is 150x900′ in size, of steel frame,
he converter department. Three 60-ton 5-motor Morgan
60′ span, run the entire length of the building. There are
naces, each 44x240″ with forty 4″ tuyeres, and 16′ in height
the charging floor. The 10 furnaces are set 15′ apart, in a
settling tank between each pair, settlers being 10′ wide and
alf lined with chrome brick and the upper half with ordinary
harged on either side, alternately, charging being done from
500-lb. cars, hauled by 13-ton electric locomotives. Slags
rs, through 2 spouts from each, into 18-ton slag-cars, hauled
ves. The slag-dump is 1,700′ long, and is kept trim by a
chine, operated by electric power. The blast-furnaces con-
s of coke daily.
st-chamber, of steel frame, with brick walls, roofed with rein-
orted by steel trusses, was given an addition, 1910, of 6,000
f tiling. The entire dust-chamber has a bottom of tiled

taken from the blast-furnace to the converters by two 60-
traveling cranes, each having two 15-ton auxiliary hoists.
rtment has 8 stands, operated hydraulically, with 36 shells,
opper Queen barrel type, 96x126″ in size. Copper is poured
machine, and product is blister copper of about 99% tenor,
old and silver values. The converter plant has a new flue,
n the 8 stands to a dust-flue 11′ in diameter at the hoods and
mber. The lining department has 3 grinding pans, with
machinery.
of the blast-furnace building, 30′ in diameter at the base and
200′ high, but a 60′ extension was added, 1906, by the Wis-
n Co. The new section, weighing 40 tons, was built upon
p of the old stack, upon the windward side, and rolled into
on within a few hours after completion, without the sus-

a large reverberatory furnace in the slag-yard, south of No.
several years, which has been run experimentally, and, as a
ning and reverberatory department is being added to the

ng and reverberatory plant is of 100′x850′ in size, of steel
l to the former blast-furnace and converter building. Ore
er an elevated railway track on steel trestles, 400′ in length,

and dumped into concrete storage-bins, and drawn from bins t
belt-conveyors. The new smelter will start with two 100′ re
naces, with room for 2 more of the same size, and with six 7
calciners, planned to be increased to 16 eventually. A slag tun
deep and 276′ long, will have electric cars, connecting with the
tunnel will be lined with 4′ concrete walls, with a 2′ separating-v
The new building will have the reverberatory furnaces first,
building, succeeded by the slag-tunnel, on top of which will be
400-h. p. water-tube boilers, followed by a dust-chamber, an
roasters will occupy the extreme northern end of the building.
tory smelter will have a separate stack, 300′ high, of 22′ inside
special hollow brick, with walls 42″ thick at the bottom, and
requiring 1,250,000 brick, and standing on a base of 60′ diamete
cubic yards of concrete. The new reverberatory and calcinir
planned to go into commission before the close of 1911.

The power-house, of steel and brick, 120x379′ in size, wa
1910–1911, to provide power for the new reverberatory depa
transmit electric energy 72 miles to El Tigre mine, in northe
power plant has about 20 units, of various sizes and types, a
than 6,000 h. p. Equipment includes 4 Nordberg cross-compo
gines, each direct-connected to a 400-kw. 250-volt direct-curren
9 and 10 Connersville blowers, set staggering; a cross-compo
densing air-compressor, with piston capacity of 2,000 cubic fe
minute, at 100 lbs. pressure, for running the pneumatic tampi
ating charging-doors of the blast-furnaces and pumping water;
driven pumps, delivering water into compression tanks, at 350
square inch, with automatic regulation; four 400-kw. 250-vo
generators, supplying power for cranes, slag-locomotives and ele
750-kw. turbo-generators, added 1910, and a number of minor
namos. The power plant is equipped with a complete set of ga
keeping exact record of the distribution of power to every depa
department.

The 85x205′ steel boiler-house has six 500-h. p. and four 1,
water-tube boilers, with a Green fuel economizer, and a Foster
capacity of 90,000 lbs. of steam per hour. The stack of the
brick, 177′ high and 13′ in diameter at the base. Boilers are
either coal or petroleum, but latter is used exclusively, consump
and Texas petroleum, at the mine and works, amounting to abou
monthly. Oil for fuel is cheaper in first cost, easier and cleanli
effects a great saving in the wages of 3 daily shifts of stokers, for
every boiler plant.

The machine-shop, 80x204′, of steel and brick, is fitted with
line of shop tools, capable of handling the heaviest work.

The boiler-shop, 85x120′, of steel and brick, is exceptionall
and can repair locomotive boilers.

The smithy, 90x120′, of steel frame, is equipped as thorou
shops, and is capable of handling forgings of large size.

The foundry, 80x90′ in size, of steel frame, has both iron a
turning out iron castings up to many tons in weight. The shop
works can do, not only any ordinary or extraordinary repair w
capable of manufacturing heavy machinery.

Miscellaneous shops at the smelter include a combination s
ing mill, 95x120′ in size, well equipped with wood-working tool
of minor shops.

Buildings at the Douglas works include an office and warel
siderable number of neat dwellings, for employés.

arry, at Lee station, 7 miles east of Douglas, has a large bins, the smelter requiring 400 to 500 tons of limestone daily,

erated, in the Chiricahua Mountains, though the bulk of the requirements of the mine and works are met by the importa- the Pacific coast.

department has, at Bisbee, a modern 2-story store, and at arehouse, carrying a stock larger than can be found in most e. There are big branch stores at Lowell and Naco, but there pulsion of employés, who are at perfect liberty to buy goods ous and flourishing independent mercantile establishments of s. Profits of the mercantile department were $276,995 in in 1908.

maintains reading rooms for employés at both Bisbee and sbee there is a handsome 3-story gymnasium, having baths, a large auditorium in which scientific and popular lectures . The company also owns, at Bisbee, a fine 4-story hotel. partment has a staff of 9 physicians and surgeons, 6 at Bisbee maintained largely by monthly contributions from the em- of maintenance cost being made up by the company. The ee was removed and modernized, 1909–1910.

benefit association was inaugurated, 1909, and has exclu- embership, open to any employé, regardless of grade. Em- % of their monthly wages, in return for industrial and life ances are administered by a joint board, composed of officers company subscribing $15,000 annually if half of the employés annually if three-fourths join. Beneficiaries are given half red, with one year's wages to heirs if the employé dies through ears' wages if death is met accidentally, with other payments al disability, etc. The employés' benefit association had 2,067 910, and before the close of the year more than 75% of the y-holders, almost 94% of the miners having taken advantage which is much appreciated.

e Copper Queen with its employés have been notably cordial ugh some trouble was had, 1906–1907, through a strike called deration of Labor. Efforts were made, at different times, to e camp, but, early in 1906, a referendum vote of the mine- on this point, no bosses or other salaried employés being he polling was conducted on the Australian system, with com- ectors and guards, and was absolutely fair, resulting in a vote against forming a union of the Western Federation of Miners, hich the Federation promptly organised, in violation of the and immediately thereafter called a strike. This was main- nths, backed by all the power of a strong labor union, but re or less trouble, resulted in a disastrous defeat for the Fed- is now an open camp. The mine workers have not suffered, have been maintained at the high level set by the Copper ago, and the 8-hour system continued. The attitude of the y the Copper Queen is that, inasmuch as they are obtaining anded by the miners' union, without any of the strikes and lly attendant upon the existence of the union, they are satis- s as they have been for more than twenty years past.

d copper delivered, 1909, was about 7 cents per pound, after ed gold and silver values, and including the reduction in cost hrough the profits from the very considerable custom business his figure renders the Copper Queen the lowest-cost producer

of any American mine of the first rank, with perhaps the Rio Ti competitor among the largest copper mines of the world in the ma of finished copper, the Copper Queen benefiting largely from g values in the copper, while the Rio Tinto benefits to an even great the sulphur values in its ore.

Detailed figures of copper production by years will be found in statistical department of this book. Recent production has be 79,536,416 lbs. fine copper, 332,723 oz. silver and 7,573 oz. 66,916,972 lbs. copper, 338,723 oz. silver and 4,197 oz. gold in 19 lbs. copper, 182,677 lbs. lead, 530,492 oz. silver and 8,352 oz. gold 84,802,147 lbs. copper, 437,601 lbs. lead, 601,828 oz. silver and 8,6 1909, and production for 1910 was circa 94,000,000 lbs. fine cop production, including custom ores, was 108,542,964 lbs. copper lead, 2,579,810 oz. silver and 32,152 oz. gold in 1909, and circa 11 fine copper in 1910. The mine is one of the best in existence, and w decade has been given thoroughly adequate mining and reduction management is exceptionally capable and far-sighted, and deserv mendation for the friendly and helpful spirit shown in dealings w neighbors and the general public.

COPPER QUEEN CONSOLIDATED MINING CO.

Dead. Formerly at Dillon, Carbon Co., Wyo.

COPPER QUEEN CONSOLIDATED MINING & MILLING C

Office: 604 Boston Bldg., Salt Lake City, Utah. Mine offic Canyon, Salt Lake Co., Utah. S. D. Ross, president; E. O. Lee, treasurer. Organized 1892, under laws of Utah, with capitalizat shares $1 par, assessable. Lands, 47 acres, 3 miles from a railroa having little or no development. Idle some years.

COPPER QUEEN & CRESCENT MINING & SMELTING CO

Dead. Was merged, circa 1908, in Copper Queen Mining & Emerson Hill was superintendent. Lands, known as the Queen mine, 7 miles west of Salmon City, were developed by a 400′ tunnel a considerable ore body, carrying values mainly in gold.

COPPER QUEEN DEVELOPMENT CO.

Dead. Sold lands, 1909, to Nevada-Arizona Copper Co. For side, Yavapai Co., Ariz.

COPPER QUEEN GOLD MINING CO.

Office: Mayer, Yavapai Co., Ariz. J. F. Johnston, gene at last accounts. Lands, across the Agua Fria River from the mine, carry argentiferous and auriferous copper ores, developed planned to cut the vein to give a back of 625′. Idle since circa 19

COPPER QUEEN GROUP MINING CO. C

Dead. Was a poor outfit. Formerly at Crystal, Gunniso Described Vol. VIII.

COPPER QUEEN, LTD. BRITISH

Dead. Was dissolved, August, 1904. Formerly at Nelson, B trict, B. C. Described Vol. V.

COPPER QUEEN, LTD. CAP

Office: 29 Goodman's Bldgs., Commissioner St., Johannesbur Letter returned unclaimed from former mine office, Hay, Griqu Cape Colony. W. P. Taylor, W. Bleloch and F. J. Quintin, direct ized circa October, 1908, under laws of Transvaal, with capitaliz shares £1 par. Property is a 2-year option on a 99-year mineral l Nieuwvlei and Zwaartveld farms, with a total area of 6,170 morg of Bultfontein and northwest of Prieska. Ore apparently is ass diabase dikes cutting through the Griquatown beds, and proper show ore of 30 to 35% copper tenor, after dressing. Develop

onfined to trenching, but management planned sinking a umably moribund.

MINE. BRITISH COLUMBIA.
Anda Copper & Gold Mines Co., Ltd., at Van Anda, Texada

MINE. COLORADO.
Silverton, San Juan Co., Colo. Miss Nettie Hornbeck, ts. Lands, 8 claims, area 160 acres, on Sultan Mountain, el showing ore assaying 15% copper and $25 gold per ton, es. Presumably idle.

MINE. NEW MEXICO.
kert Bldg., Kansas City, Mo. Mine office: Orogrande, m. Wade, manager, at last accounts. Lands, in the north- la Mountains, show numerous fissure veins and contact being highly ferruginous near surface, carrying auriferous idized ores of copper. Mine has several shallow shafts, ut 300′ of workings, in a contact deposit of about 14′ aver- cupriferous pyrite, assaying about 2% copper, with small . Idle several years.

MINING CO. ARIZONA.
Ariz. Mine office: Superior, Pinal Co., Ariz. W. D. . Thompson, vice-president; J. W. Bandhauer, secretary eming, treasurer. Organized June, 1906, under laws of alization $5,000,000, shares $1 par. Lands, 18 claims, ilver ores. Mine formerly was a silver producer. Presum-

MINING CO. SOUTH DAKOTA.
eadwood, Lawrence Co., S. D. Capt. John Donaldson, the Custer Peak district, known as the Donaldson group, to show a 20′ vein of copper ore, of fair assay tenor. Man- rly 1910, deepening the shaft and adding a steam hoist.

MINING CO. WASHINGTON.
ewelah, Stevens Co., Wash. Lands, 6 claims, held under ease, said to show a considerable ore body. Company was for several years, but suits were said to have been settled,

MINING CO., LTD. ONTARIO.
ceeded, 1905, by Calumet & Algoma Mining Co. For- , Algoma, Ont. Fully described Vol. V.

MINING & MILLING CO., LTD. IDAHO.
Mullan, Shoshone Co., Idaho. E. B. Crawford, presi- nager; Tonnes Nielsen, vice-president; C. B. Boyden, sec- reasurer. Organized 1906, with capitalization $1,000,000,

known as the Stevens Peak group, at the head of Willow supposed to be the eastern extension of the Reindeer ore is by a 500′ tunnel, planned to be driven 1,800′, cutting a e, variously reported as 30′ to 100′ in width, carrying a 12′ rite and bornite, giving assays of 20 to 30% copper, with nce of vein being spathic iron ore, impregnated with low stimated at 2.5% copper tenor. Buildings, burned by 1910, are to be replaced.

MINING & SMELTING CO. IDAHO.
dale Bldg., Duluth, Minn. Mine office: Salmon, Lemhi Crosby, president and general manager; Emerson Hill,

vice-president and superintendent; A. J. McLennan, secreta
preceding officers, Dr. C. W. McFadden and Wm. Harrison
Walker, mill superintendent; Alex. H. Hamfield, consulting eng
June 12, 1905, under laws of Arizona, with capitalization $
par, nonassessable; issued, $282,000. Absorbed, circa 1908,
& Crescent Mining & Smelting Co., giving 1 share for 8. Sh
the Duluth stock exchange.

Lands, 17 claims, area 320 acres, in the Eureka district, c
of Salmon, known as the Queen of the Hills mine, having 7
granite and schistose quartzite, with a generally NE. strike, an
of 18″ to 30′, carrying auriferous chalcopyrite, with values ma
mated to average $6.40 per ton. Ore has been secured giving
copper, 5 to 10 oz. silver and $15 gold per ton. Developme
105′ and 140′, and by 7 tunnels, longest 450′, with 700′ of worki
management to give 3,600 tons of ore blocked out for stoping

Equipment includes a 100-h. p. electric plant, a 24-h. p. ho
and a 5-drill Rand air-compressor. There are 10 buildings, incl
mill, having 15 Allis-Chalmers stamps, a gyratory crusher, an
Mill went into commission Apr. 1, 1909. In January, 1908, s
of ore, assaying circa 45% copper, 8 oz. silver and $20 gold
down 1910, on account of inability to obtain electric power, bu
1911, deepening main shaft to 500′ and adding a larger
considered promising.

COPPER RANCH GOLD MINING & MILLING CO.

Office: 1711 Tremont St., Denver, Colo. Mine office:
Co., Colo. W. E. Alexander, president; T. E. Fisher, vice
Fielding, secretary. Organized under laws of Colorado, wi
$1,000,000, shares $1 par. Lands, 170 acres, patented, in t
district of Boulder County, Colorado, opened by a 218′ shaft
of drifts. In May, 1903, advertised that there was no risk in
as dividends would be paid in a few months. Was still sel
advertising its property as a tungsten mine, with no dividends
pects of dividends. Is not regarded favorably. Idle.

COPPER RANCH MINING CO.

Office: 323 D. F. Walker Bldg., Salt Lake City, Utah.
unclaimed from former mine office, Milford, Beaver Co., Utah.
president; C. L. Rood, vice-president. Organized under la
capitalization $500,000, shares 50 cents par.

Lands, 17 claims, area circa 340 acres, in process of patent
Jewel mine, between the Old Hickory and O. K. mines of the M
carrying circa 2 miles of the strike of a vein of about 100′ claim
at intervals for a mile, showing ores assaying up to 43% cop
and $8 gold per ton. Management estimates that entire vein
7% copper, with fair gold and silver values, which is a serious ov
carries 5 to 25% iron, rendering it desirable for fluxing purpose
but slight development, with a shaft, poorly planned, 32′ de
and 43′ farther vertically, mainly in ore. In 1910 shipped 8 ton
13.5% copper and 16.5 oz. silver per ton. Idle some years,
assessment work.

COPPER RANGE & ARIZONA MINING CO.

Office: 44 Pine St., New York, N. Y. Mine office: T
Ariz. Francis Flint, president; Hon. Wm. E. Ludden, vice-
S. Wright, secretary; Geo. S. Saville, treasurer; Francis M.
manager; preceding officers and Royal B. Young, directors. O
ber, 1904, under laws of Arizona, with capitalization $1,000,0
Lands, 15 claims, 5 patented, area 300 acres, with 3 millsites

Mountains, about 25 miles northeast of Tucson, the near-, known as the Homestake and Silver Reef, carry 5 contact estone and quartzite, with 2, under development, estimated , traceable 1,500′, carrying argentiferous chalcopyrite, , estimated by management to average 6% copper, 20% oz. silver per ton. Mine is developed mainly by tunnel, gs, and is said to have considerable ore blocked out. Idle

O. **MICHIGAN.**

onshire St., Boston, Mass. Mine office: Painesdale, Wm. A. Paine, president; Chas. A. Snow, vice-president; secretary and treasurer; Frederick W. Denton, general fficers and R. T. McKeever, directors.

under laws of Michigan, with capitalization $2,500,000, ontrolled, through ownership of 99,674 shares, by Copper Co. Owns 50,000 shares of Champion Copper Co., which is ue, and 26,051 shares of the Copper Range Railroad Co. ll from dividends on stocks held, was $502,913.97 in 1907; and $665,646.98 in 1909, company beginning 1910 with a 764.87. Dividend rate is $1.50. Dividends have been as $6 in 1906; $4.50 in 1907; $3 in 1908, and $6 in 1909.

es, in a compact tract south of the Baltic mine, in Town West, and Town 54 North, Range 35 West, upwards of the mineral belt. Miscellaneous lands include 441 acres, ontage on Lake Superior, near the mouth of the Graveraet st of the Champion mill, at Freda, sufficient to give sites to s. The mineral tract was explored, 1907, by 1,535′ of dia- t results.

mond drilling was done, 1908–1909, giving a complete cross- nprised of Sections 7 and 8, which were under bond from nd Co., but the lands were surrendered, Sept. 22, 1909, after holes, at cost of circa $27,500.

ONSOLIDATED CO. **MICHIGAN.**

shire St., Boston, Mass. Mine office: Painesdale, Hough- A. Paine, president; Frederick W. Denton, and R. T. Mc- ts; Frederic Stanwood, secretary and treasurer; preceding ne, Jr., Frank McM. Stanton, Samuel L. Smith, J. Henry K. McLaren, directors; John M. Wagner, purchasing agent; nical engineer.

nber, 1901, under laws of New Jersey, with capitalization 8,500,000, and again increased, 1907, to $40,000,000, shares 8,433,500. American Trust Co., Boston, transfer agent; ., Boston, registrar. Annual meeting, first Wednesday in N. J.

Dec. 31, 1909 included $557,379.98 cash assets, with lia- bills payable, and deposits, by the Michigan Smelting Co., Co., Copper Range Co. and Copper Range Railroad Co., 18. Stock assets were 99,659 shares Baltic Mining Co.; r Range Co.; 99,335 shares Trimountain Mining Co.; Range Railroad Co., and $870,000 of Copper Range Rail- sets included notes receivable, of the Baltic Mining Co., company held in its treasury 791 shares, unissued, to ding shares of Baltic Mining Co. and Copper Range Co. onsolidated Co. controls, through practically entire owner- ge Co., Baltic Mining Co. and Trimountain Mining Co., st in the Champion Copper Co.

Receipts were $4,384,315 and disbursements $4,128,502.82 in
$2,641,936.97 and disbursements $2,574,021.74 in 1908; receipts
and disbursements $2,347,330.65 in 1909. Taxes in Houghton
$131,395.41 in 1908, and $192,544.18 in 1909. Receipts for
$424,430 from a $10 dividend of the Copper Range Railroad Co.,
first. Dividends have been as follows: $1,536,086 in 1905; $2,30
$2,304,810 in 1907; $1,536,740 in 1908 and $1,536,930 in 1909, tots
end of 1909 having been $9,219,376.

The Globe mine, south of the Champion, was extensively
several years, to a depth of 900' at a cost of about $600,000. but w
1909. This property is separately described.

While the Baltic, Trimountain and Champion mines are f
under the titles of their respective owners, the consolidated figures
are as follows: Rock stamped, 1,914,331 tons in 1907; 1,893,749
and 1,891,576 tons in 1909, with average returns per ton, in fine co
lbs. in 1907, 21.94 lbs. in 1908, and 21.73 lbs. in 1909. Production
was 41,385,015 lbs. fine copper in 1907; 41,546,525 lbs. in 1908, a
lbs. in 1909.

Average cost of copper produced by the subsidiary companies
Range is about 9 cents, and the Baltic and Champion are two of
cost producers of the entire Lake Superior district, and among th
the world. Recent production, through subsidiaries, has bee
32,714,859 lbs. fine copper in 1905; 32,382,983 lbs. in 1906; 33,1
1907; 32,653,143 lbs. in 1908; 32,102,780 lbs. in 1909. The mines
Range are young and vigorous, having by no means reached their m
ductive capacity, and the management is highly progressive and ef

COPPER RANGE MINING CO.

Office: 52 Dearborn St., Chicago, Ills. Mine office: Purific
Mex. Chas. G. DuBois, president and manager; Robt. S. Swa
dent; Jas. W. Wilson, secretary; Dr. W. A. Gray, treasurer; pre
and W. A. Brendecke, directors. Capitalization $5,000,000, shares

Lands, 8 groups, area 566 acres, near Puerto Navidad, about 2
west of Manzanillo. The company stated in its prospectus that a
of work was begun, but this was "begun" only, and never finishe
pany claimed to have, in 4 groups, 3,690,000 tons of ore blocked o
15.17% copper, and carrying high gold and silver values, with an a
ing value of $50 per ton, which was a colossal lie. The company
stated that ample money had been provided to install a smelter,
blast, but the smelter, a toy 50-ton matting furnace, has been at Ch
coast, since early 1909, and a 50-ton furnace for a property having
worth of ore blocked out is about as appropriate as to equip a drea
popguns. Company's prospectus stated that this stock not only
vestment, but would pay large dividends, and that the managemen
pay a handsome dividend in 1909, but handsome is as handsome doe
pectus claimed that the mine could produce copper for 3 cents a
was a deliberate lie. President DuBois was sued by stockholders,
pany is a swindle, and the promoters should be jailed.

COPPER RANGE RAILROAD CO.

Office: 82 Devonshire St., Boston, Mass. Operating office:
Mich. Wm. A. Paine, president; R. Townsend McKeever, vi
general manager, assistant secretary and assistant treasurer; Freder
secretary and treasurer; presiding officers, John H. Rice, Frederick
Frank McM. Stanton, Thos. S. Dee, Wm. D. Calverley and Samu
directors; C. S. Fales, general superintendent.

Organized 1899, under laws of Michigan, with capitalization
shares $100 par; issued, $4,244,300. Debentures outstanding, $2,

Company is authorized to issue bonds to extent of $20,000
d main-line, and $15,000 per mile of completed branch-lines
ontrolled, through ownership of entire stock issue, by Copper
er Range Consolidated Co. Balance sheet of Dec. 31, 1909,
$5,705,537, with equipment inventoried at $760,274. Gross
52.86 in 1905; $860,434.84 gross and $111,298.51 net in 1907;
d $16,379.09 net in 1908; $754,393.75 gross and $170,261.80
rst dividend, of 10%, was paid 1909, company ending the
income account of $267,110.31. About 75% of the gross
om transportation of ore, mineral and freight.

s upwards of 100 miles of trackage, the 65-mile main line
et to McKeever, and connecting with the Keweenaw Central
uth, South Shore & Atlantic, Hancock & Calumet and Min-
at Hancock and Houghton, and the Chicago, Milwaukee &
McKeever. The company also has trackage rights over 19
, Milwaukee & St. Paul railway, between McKeever and
ates a daily passenger service between Calumet and Ontona-
trackage rights of 73 miles over the same line, over which
rated between Calumet and Channing, Mich. Trackage
n the Chicago, Milwaukee & St. Paul over the Copper Range
and Houghton, and a direct passenger service, with excep-
nent, is operated jointly by the Chicago, Milwaukee & St.
age lines, between Chicago and Houghton. Wooden bridges
; replaced with steel. Spurs connect the main lines with all
s along the right-of-way. Train dispatching is by telephone.
wns a half interest in a bridge crossing Portage Lake, be-
l Hancock. An extensive water frontage on Portage Lake,
of Houghton, is improved by a two-story stone and brick
g, shops, roundhouse, warehouses and wharves for merchan-
coal-wharf is equipped with modern unloading machinery,
alongside, capable of accommodating the largest freighters
. The Copper Range railway is a model small road.

NSOLIDATED MINES. **ARIZONA.**

ee Bldg., Pittsburg, Pa. Mine office: San Carlos, Gila Co.,
dy, president; Peter Boyd, vice-president; Renald Aires,
ers, Jr., treasurer; Spencer W. Clawson, general manager;
ancial agent; Edw. F. Pfister, superintendent; preceding
man, E. M. Groos, John W. Gillingham and Wm. H. Parks,
nnedy, engineer. Organized Feb. 19, 1910, under laws of
ization $5,000,000, shares $5 par.

, area 1,600 acres, in 6 groups, in the Stanley Butte district,
of Ft. Thomas, 12 miles south of San Carlos and 35 miles
Property shows granite, overlaid by 400′ of Cambrian quart-
boniferous limestone, the secondary rocks having a south-
35°, showing fissures and faults forming a network of veins,
W. trend, with 6 veins, traceable 4,000′ to 6,000′, said to
width, and the limestone contact shows copper impregna-
Ores are malachite, chalcopyrite and bornite, reported to
f 6% copper, 5 to 28 oz. silver and $4 gold per ton. Shallow
te assaying up to 30% copper.

started, about one-half mile apart, but the North Star
d at about 75′ depth, and the Jessie vertical shaft is being
rtment, as a prospect shaft, and was 241′ deep September,
carrying chalcopyrite giving assays of 8 to 10% copper.
ned to be driven 1,260′, to connect with the shaft, and a

lower tunnel has been planned, to cut the vein with a bac
Equipment includes two 40-h. p. gasoline hoists.

COPPER RIDGE MINING & DEVELOPMENT CO.

Letter returned unclaimed from former office, Colorad
Mine office: Magdalena, Socorro Co., N. M. Chas. Pelta,
Brown, vice-president; Geo. P. Hopkins, treasurer; Geo. Ke
ager; preceding officers and Alfred Grimshaw, directors. Org
under laws of Arizona, with capitalization $500,000, shares
10 claims, area circa 200 acres, of which 8 claims were bough
and $50,000 stock. Mine has a 152′ tunnel and a 65′ incline
bottomed in water. Property is said to show chalcopyrite and

COPPER RIDGE MINING & MILLING CO.

Mine office: Steamboat Springs, Routt Co., Colo. W. H
dent; Clinton E. Bivens, vice-president; W. C. Shaw, secrets
Burt Goldsworthy, general manager; preceding officers, Ben G
Mayberry and G. W. Bratton, directors. Organized 1907, un
rado, with capitalization $300,000, shares $1 par. Lands, 2 cla
Democrat and Republican, 5 miles north of Steamboat Springs,
vein opened by a shaft of circa 100′, showing ore assaying up
2.5 oz. silver and $10 gold per ton. Presumably idle.

COPPER RIVER COPPER CO.

Dead. Formerly at Copper Center, Copper River distr
scribed Vol. VIII.

COPPER RIVER MINING CO.

Dead. Was a swindle. Formerly at Copper Center, Copp
Alaska. Fully described Vol. IV.

COPPER ROCK GOLD MINING & MILLING CO. **COLORADO**

Office: 105 North Seventh St., St. Louis, Mo. Mine office
Co., Colo. Letter returned unclaimed from former mine offi
Carbon Co., Wyo. H. Lee Servoss, president; Dan G. Kirs
and manager; John Wessels, superintendent, at last accounts
$1,500,000, shares $1 par.

The Colorado property, known as the Lee S., area 60 acres,
district, near Sunset, has a 300′ shaft, claimed to show a la
occasional paystreaks up to 20″ in width, carrying high grade
ore. Some work was done on this property, 1908. The Wyo
claims, area 120 acres, known as the Copper Link, has shafts of
showing some leached copper ore carrying up to $4 gold per to
sumably moribund.

COPPER ROCK & GOLD QUARTZ MINING CO.

Dead. Lands were sold to Calumet & Boston Copper C
Bisbee, Cochise Co., Ariz. Described Vol. V.

COPPER SECURITIES CO.

Office: 42 Broadway, New York, N. Y. F. Augustus
manager. Organized July, 1905, under laws of Arizona, wit
$10,000,000, shares $10 par. Apparently is a subsidiary co
United Copper Co., property being $2,000,000 common stoc
Copper Co. secured in exchange for same amount of common
Securities Co. Company is merely one link in the weak chai
motions.

COPPER SHARE SYNDICATE.

Dead. Was dissolved June 8, 1909. Formerly at Encar
Co., Wyo. Described Vol. VIII.

COPPER SHIELD MINING CO.

Letters returned unclaimed from former office, Salt Lake Ci

Co., Nev. Dr. C. I. Douglas, president; U. U. Hiskey, DeValley, secretary and treasurer; preceding officers, C. R. ields, directors. Organized, 1907, under laws of Nevada, ,000,000, shares $1 par. Lands, 11 claims, in the Salmon g ore assaying 3 to 56% copper, with gold and silver values. noribund.

IONTANA MINING CO. **MONTANA.**

Diamond Block, Helena, Lewis & Clark Co., Mont. Edw. Sanford McKusic, vice-president; A. P. Heywood, secre- ach, treasurer; E. R. Purnell, general manager; preceding r, M. A. Kearney and Frank Bortos, directors. Organized laws of Montana, with capitalization $400,000, shares $1 sued, $300,000.

area 130 acres, adjoining the Lexington and Sacajewea, district, one mile from Great Northern railway and 5 miles roperty shows granite and monzonite, reported to carry s, 4 dipping NW. and 5 dipping SE., to the central veins. l mineralized at surface, carrying melaconite, azurite and a 320′ shaft, planned to be sunk to 500′, cutting, at circa to average 4.5% copper, 12 to 100 oz. silver, and $1 to $55 nent includes a 30-h. p. steam hoist and a gasoline engine. epening shaft to 500′ and crosscutting 6 veins, on the 500′ ng installing electric power. Presumably idle.

NING & MILLING CO. **MONTANA.**

nd St., Moscow, Idaho. Mine office: Lothrop, Missoula Schmitz, president and general manager; Benton S. Mer- Chas. E. Merwin, secretary and treasurer; preceding offi- Wm. Schmitz, directors; John Allen Black, mine super- l Jan. 23, 1909, under laws of Idaho, with capitalization par, nonassessable; issued, circa $2,200,000.

unpatented, area 160 acres, being the Coppersmith group verness group of 2 claims, also a water-right and millsite, y Creek from Lothrop. Property carries some good timber, ed the great forest fires of 1910. The Coppersmith claim irst located by John C. Frémont then a lieutenant in the s to the American Civil War. This group shows limestone stimated width of about 400′, and length of about one-half has given assays of 2 to 17% copper. Development is by nd 280′ crosscut tunnel said by management to cut 800′ one and quartzite, assaying better than 1% copper. Prop- er of opencuts and pits, and a 50′ shaft, bottomed in ore better than 6% copper, with small gold and silver values. formerly reported to show 3 main veins, one reported to rface, giving ore assaying 2 to 3% copper. The Exty vein, from the Coppersmith, is reported as 15′ wide.

oup, 3 miles from Lothrop, has a vein of 3′ to 4′ width, in carrying malachite, chalcopyrite and chalcocite, giving copper and $10 to $12 per ton in combined gold and silver 4 buildings, but no power plant, owing to development by 1908, has continued steadily, with exception of 3 months November, 1910, by reason of forest fires.

NING CO. **COLORADO.**

. Estes was president, and Edwin Wallace secretary. Was "dividends" while peddling stock. Formerly at Salida, Described Vol. V.

COPPER STAR MINING CO.

Mine office: Springville, Utah Co., Utah. T. Y. Sheph
T. L. Hatch, secretary and treasurer; T. T. Hatch, superin
officers and Jas. H. Okey, directors. Organized 1908, under
capitalization $25,000, shares 2½ cents par. Presumably id

COPPER STATE MINING CO.

Mine office: White Sulphur Springs, Meagher Co., Mo
president, and general manager. Lands, circa 15 miles nortl
phur Springs, have a 100′ two-compartment shaft, with cross
12′ vein of ore assaying 5% copper and 16 oz. zinc, with sm
values. Has a hoist and planned installing an air-compressor
with a small force, 1909.

COPPER STATE MINING CO.

Dead. N. B. Young was manager. Lands, on the sou
campment River, just north of the Bashore ranch, carried a
gossan, developed by tunnel, showing auriferous and argenti
chalcopyrite. Company blew up, circa 1903. Formerly at En
Co., Wyo.

COPPERTOWN MINING & SMELTING CO.

Dead. Formerly at Hornitos, Mariposa Co., Cal. Fully

COPPER & URANIUM MINING CO.

Office and mine: Rexburg, Frémont Co., Idaho. Henry
M. H. James, vice-president; Alfred James, secretary and tr
officers and James Shail, directors. Lands, in the Hamilton
county, Idaho, have a 125′ shaft on a 10′ contact vein betw
quartzite, said to show copper and uranium ores. Company
600′ tunnel. Presumably idle.

COPPER VEIL MINING CO.

Dead. Formerly at Index, Snohomish Co., Wash. Des

COPPER WELL MINING CO., LTD.

Office: Cobar, N. S. W., Australia. Mine office: We
Co., N. S. W., Australia. Organized September, 1906. L
Cliffs district, carry a vein of 24″ to 30″ width, with nearly ve
150′ shaft, with levels at 60′ and 100′, showing good carbon
quarter-mile north of the shaft there are 2 parallel veins, of
apart, presumably paystreaks of a single vein, carrying high
An old shaft, sunk circa 1880, has proven useful as a well f
Shipped 25 to 30 tons of ore of 25 to 30% tenor, 1907. Presum

COPPER WORLD EXTENSION MINING CO.

Office: 503 New Hayden Bldg., Columbus, Ohio. Mi
Okanogan Co., Wash. Walter A. Boyle, president; Edw.
president; Alfred F. Carman, secretary and treasurer; R.
intendent; preceding officers, Samuel Bachtell and Clarence
ors. Organized Jan. 11, 1904, under laws of Washington, v
$1,500,000, shares $1 par.

Lands, 8 claims, area 160 acres, on Palmer Mountain, in t
district, showing an ore body claimed by the company to be 10
but apparently actually only about 25′ to 30′ wide, opened b
partment shaft, with a crosscut on the 210′ level said to show
copyrite, assaying circa 8% copper, 4 oz. silver and $1.40 gold
claimed to have $1,000,000 worth of ore blocked out, whic
sidered excessive. Equipment includes a steam plant, with 2
5-drill air-compressor.

COPPER WORLD GOLD MINING & SMELTING CO.

Office: 401 Columbia Bldg., Spokane, Wash. Mi
Okanogan Co., Wash. Jerome L. Drumheller, president a

ident and superintendent; Wm. G. Mallory, secretary and
under laws of Washington, with capitalization $3,000,000,
sessable. Lands, 2 claims, patented, lying between the
sion on the east and the Leadville mine on the west, on
o 5 miles northeast of Loomis. Property shows a gossan
raceable 2,000'. The mine has several short tunnels and
135' two-compartment incline shaft, having a 125' cross-
ore, without reaching the hanging-wall, ore being reported
of circa 4.5% copper, 2 oz. silver and $1 gold per ton, with
at last accounts, but planned resumption.

MINING CO. ARIZONA.
me, Yavapai Co., Aris. Presumably idle.

MINING CO. CALIFORNIA.
at Manvel, San Bernardino Co., Cal. Described Vol. V.

MINING CO. NORTH CAROLINA.
rged, 1903, in Carolina King Mining Co. Formerly at
., N. C.

MINING CO. WASHINGTON.
ceeded by Copper World Mining & Smelting Co. Formerly
Co., Wash.

MINING & SMELTING CO. WASHINGTON.
ceeded by Copper World Gold Mining Co., also dead.
Okanogan Co., Wash. Described Vol. IV.

NING CO. NEW MEXICO.
ds. Formerly at Watrous, Mora Co., N. M.

A COQUIMBANA. CHILE.
Serena, Coquimbo, Chile. Property includes the Rosario,
ines. Idle some years.

CREEK MINING CO. MONTANA.
at Corbin, Jefferson Co., Mont. Described Vol. VIII.

DATED MINING CO. MONTANA.
unclaimed from former office, Butte, Mont. Mine office:
, Mont. G. T. Cousins, president; preceding officer, J. L.
D. M. Armstead, H. K. Welch and M. J. Jenkins, direct-
, with capitalization $500,000, shares $5 par. Statement
indebtedness of $5,450. Lands, 4 claims, one held under
lta Hill, adjoining the Boston & Corbin, having tunnels of
3 veins, one showing auriferous and argentiferous copper
tenor. Idle.

CO. MONTANA.
ress St., Boston, Mass. Mine office: Glenbeg, Jefferson
R. Dow, president; Albert Wyman, secretary; Richard M.
nager; preceding officers, Jos. C. Walker, Noah W. Jordan
directors; Alvin R. Bailey, treasurer; Frank E. Richards,
, superintendent; Fred Tregonning, engineer. Organized
laws of Michigan, with capitalization $3,750,000, share
ssued, $3,250,000, $5 paid. Company sold 15,000 shares
rly 1910, at $10. Federal Trust Co., Boston, registrar;
pany Boston, transfer agent. Stock is listed on the Boston
g, third Tuesday in April.

, area circa 1,000 acres, about 300 acres being timbered, at
Creek, about 2 miles east of Wickes. Company began
ims, area 566 acres. Lands lie on both sides of Clancey
the western side of a rhyolite hill, across from the Boston
ines, which are on the eastern flank. Property carries 10
ling the North Lead, outcropping for circa 3 miles on the

company's lands, and the property shows a system of 5 para practically EW. strike, of about 20′ average width, in a cross 800′, crossed by a diagonal vein, with an intrusive rhyolite 1,0

The mine has 15 tunnels, which, early 1910, aggregated o with nearly a mile of crosscuts and drifts, and the mine had workings at the end of 1910. Tunnels are known as the Anna, Dow, Kathleen, Bonanza, Dewey, Bessie H, Learnard, H Maggie D., Geraldine C., Black Rock No. 3 and Ba-ka-ma. 50′ shaft, left by former owners. Main tunnel is planned to giv Principal tunnels are the Dewey, Bonanza and Dow. The De 800′ long at end of 1910, is a diagonal crosscut to the vein, and on a vein of 12′ to 30′ width, carrying argentiferous copper an estimated average copper tenor, and assaying up to 1,575 o The Bonanza tunnel, 207′ vertically below the Dewey, has so late 1910, showed galena and gray copper. The Dow tunne Minah lead, was 771′ long, May, 1910. The Rosalie cros vertically below the Bonanza, was circa 1,600′ long at end o 1911 was in ore assaying 9.15% copper, 25.8 oz. silver and 90 c The Ba-ka-ma tunnel has a 6′ fissure, carrying a 6″ paystreak of and chalcopyrite, balance of ore being of concentrating grade. Montana tunnels also show ore giving good assays.

Equipment includes steam and gasoline power, but elect tuted, 1910, commercial current being taken from the Missouri Buildings include a general office, laboratory, warehouse, thr boarding-house, 6 bunkhouses and 6 dwellings.

The 100-ton mill, near the portal of the Bonanza tunnel, p unit of a larger mill, was completed July, 1910, treating circa during the balance of the year. The mill is planned to be run s the Bonanza and Dewey works are connected. Shipments w Washoe works, early 1911. About 25 men are employed. being developed vigorously and efficiently.

CORBIN COPPER MINING CO.

Dead. Apparently was succeeded by Corbin-Montana merly at Corbin, Jefferson Co., Mont.

CORBIN HIDDEN TREASURE COPPER CO.

Dead. Formerly at Corbin, Jefferson Co., Mont. Desc

CORBIN METAL MINING CO.

Office: Pittston, Pa. Mine office: Jefferson City, Jeff J. H. Foy, president; John Hoy, vice-president and general McLaughlin, secretary; M. W. O'Boyle, treasurer; preceding o McNulty, directors. Organized 1907, under laws of Mont Montana Copper Co., changing name, January, 1910, to p capitalization $1,000,000, shares $1 par, nonassessable; issued, pany apparently is a twin of the Jefferson-Montana Copper Mi Trust Co., New York, registrar and transfer agent. Stock is York curb. Annual meeting, second Tuesday in April.

Lands, 11 claims, area 220 acres, surveyed for patent, k the Baldwin mine, in the Colorado district, said to have prod silver and lead ore. Property shows granite, carrying 5 fissu 4, under development, are reported as of 50′ average width and but reported, independently, to be 10′ to 125′ in width. Ores bornite and galena, estimated by company to average 4% copp silver and $2 gold per ton. Development is by a 500′ two-com shaft, and tunnels of 80′, 200′, 290′ and 800′, with 1,500′ of wo said, August, 1910, to have a 30″ paystreak, on the 500′ le copper, 32% lead, 17 oz. silver and $1.40 gold per ton. Lowe

125′ width. Mine was opened 1886, closed 1893, and re-

ides an 8x10″ electric hoist, good for 1,000′ depth, and a r, taking current from the Missouri River Power Co. There ding a carpenter-shop, smithy and change-house. Com- shaft to 1,000′. Property considered promising.

A CQPPER CO. **MONTANA.**

as changed, January, 1910, to Corbin Metal Mining Co. City, Jefferson Co., Mont. Described Vol. VIII.

A MINES CO. **MONTANA.**

ably was succeeded by Corbin-Montana Copper Co. For- erson Co., Mont. Described Vol. VIII.

VANIA MINING CO. **MONTANA.**

rbin, Jefferson Co., Mont. Frank E. Richards, president; Gibson, vice-presidents; H. M. Brooks, secretary and treas- superintendent. Organized circa May, 1910, with capital- ands, 6 claims, 2 patented, shortly east of the Alta, includ- ne, which is an old property with a 120′ two-compartment crosscutting on the 100′ level, and the Alta Extension mine, Property is said to carry chalcopyrite assaying 6% copper ton.

ISO COPPER MINING CO. **MONTANA.**

rbin, Jefferson Co., Mont. A. G. Grosso, H. J. Dewey, Daly, Frank W. Richards and G. P. Paul, directors. Or- capitalization $1,000,000, shares $1 par. Mine, on Big , has tunnels of 600′ and 800′, latter with back of about 780′, wing ore assaying 3 to 8% copper, with average assays of to $9 gold per ton. Mine made small ore shipments, circa wnership. Presumably idle.

COPPER MINING CO. **MONTANA.**

Broadway, Butte, Mont. Mine office: Corbin, Jefferson Symons, president; W. C. Dierks, vice-president; J. L. dwin L. Mayo, treasurer; preceding officers, I. A. Heilbron- d H. A. Sullivan, directors. Organized September, 1904, ana, with capitalization $1,000,000, shares $1 par; issued, ly succeeded the Colorado Mining & Development Co. known as the Hidden Treasure and Copper King, supposed on of the Bluebird vein, across Picnic Gulch from the oston & Corbin, and circa one-half mile from the Alta mine. ld options on adjoining claims, giving a total area of 115 y has surrendered the options. Property was under option, he Corbin-Hidden Treasure Copper Mining Co. Mine has crosscut tunnel, cutting a number of veins showing good ore ein of chalcopyrite. An 18′ vein cut by the tunnel carries twall paystreaks, said to give average assays of 4% copper, ents gold per ton, with occasional assays up to 12% copper, cents gold per ton. A carload of ore, shipped to the Pitts- ed 14.1% copper, 19 oz. silver and 20 cents gold per ton.

NING CO. **BRITISH COLUMBIA.**

y at Van Anda, Texada Island, B. C. Described Vol. VIII.

ER CO., LTD. **SPAIN.**

Street Place, London, E. C., Eng. Operating office: Man- Sevilla, Spain. Mine office: Estación de Cerro Muriano, . Frecheville, chairman; Richard E. Carr, agent; preceding f Harrowden, J. E. Champney, J. Taylor, Edgar Taylor and , directors; F. H. Williams, secretary; John Taylor & Sons,

managers; W. H. Rundell, mine superintendent. Organised Au
laws of Great Britain, with capitalization £200,000, shares
693,780 shares, fully paid. Company is an amalgamation of th
Mines, Ltd., and North Cerro Muriano Copper Mines, Ltd.
ending Sept. 30, 1910, profits were £6,156.

Lands, 469 hectares, circa 10 miles from Córdoba, in the dis
and Obejo, held mainly under perpetual lease from the cro
served by the Ferrocarril Andaluces. The mine shows sundry ol
ing from the Roman era, and these were opened by the ancients
least 400′, notwithstanding their wetness. The property l
several small fissure veins, in mica-schist, diorite and quartzit
copyrite and pyrite, with gangue of calcite, quartzite and cou
being decomposed, rendering the ground treacherous, and req
of stopes with waste. Veins are reported to have widths of
proven lengths as follows: Calavera, 1,635′; Excelsior, 635′;
Isabel, 5,550′; Cerro Muriano, 8,500′. Some ore taken from
workings has assayed 28 to 34% copper. Main shafts are the
bottomed in the footwall at 726′ and the San Rafael, 1,080′ and
secting the vein at 870′. The San Rafael shaft, 300 meters fro
toria, shows a vein of 5 to 13 meters width, with the better port
by the Romans. The San Guillermo shaft, 300 meters from the
sunk only 42′. For fiscal year 1910, new openings were 7,919′,
were estimated, Sept. 30, 1910, at 133,000 long tons, averagin
reserves having been increased, slowly but steadily, with an inc
average estimated value of ore.

Equipment includes 3 hoists and a 10-drill Walker air-comp
Rafael shaft has a Hawthorne-Davey compound Cornish pu
high-pressure cylinder having a 96″ stroke, and a 94″ low-p
having a 16′ stroke, calculated to operate to depth of 1,680′.

The concentrator, costing £8,000, was remodeled, 1910. A
product is treated by the mill, and half by the smelter, and millin
2s. 7d. per ton, as compared with 6s. 8d. per ton in the old mag
with a slightly better extraction. Mill production, for fiscal ye
long tons of concentrates averaging 20.9% copper, which were
long tons of concentrates averaging 14.9% copper, which were se
ing plant. The mill has 2 small units, testing the Murex mag
process, that treat jig middlings, tailings, and some crude ore
preliminary roast. This test mill, treating 50 to 60 tons daily, is
good extraction, but the process is said to be expensive in renew
and not entirely efficient. Tests with the Elmore flotation proce
unsatisfactory, owing to the ore carrying much chalcocite.

The smelter includes a calcining plant that, in 1909, prod
tons of calcines averaging 12.69% copper. The blast-furnace, b
1908, makes matte only, and is in blast only alternate months, it
double that of the mine.

Production, 1909, from 61,486 long tons of ore treated, was
of 62% matte and 69 tons of bottoms, averaging 85 to 90% copp
practically 2,500,000 lbs. fine copper, and production for fiscal
53,554 tons of ore, estimated to have yielded circa 3,000,000 lb
property is one of the largest and most interesting of the old
mines, and was famous, before the Christian era, for the high q
and brass produced from its ore, but was entirely idle for 2,
reopened, 1903, by the predecessors of the present company.

CORDONERA MINING CO.

Mine office: Suaqui Grande, Hermosillo, Sonora, Mex.

ounts. Has argentiferous copper ores, with steam power and
e.

R CO. ALASKA.
y at Cordova, Alaska. Described Vol. VIII.

R CO. ARIZONA.
sdale Bldg., Duluth, Minn. Mine office: Globe, Gila Co.,
vland, president; R. B. Whitesides, vice-president; Harvey
preceding officers, Louis Rouchleau and Hoval A. Smith,
McCarthy, manager; A. Ball, superintendent. Organized
ws of Arizona, with capitalization $3,000,000, shares $10
Globe Consolidated Copper Co., which is controlled through
l is to be liquidated. The Globe stock was retired by 100,000
ll paid stock, exchanged pari passu for full paid Globe shares,
Cordova $2 paid stock were given in exchange for 20,000
lobe Consolidated, the public being offered 105,000 shares,
otal issue of 225,000 shares, leaving 75,000 shares in the

res, north of the Old Dominion and west of the Arizona
e Eureka group, area circa 130 acres, in the Miami district.
cludes the Mallory group of 16 claims, that was included in
oup of 21 claims, bought for $130,000. Suit was brought,
ely, by Mr. and Mrs. Wm. J. Mallory, against the Globe-
ng Co., to foreclose a $20,000 mortgage, at 6%, on the Mal-
ms. The Taylor group, lying between the Gem and Boston
red 1910. The Globe-Boston, or Mallory shaft, sunk 450'
owed a 4' vein carrying mainly leached ore, with some low
and occasional bunches of bornite, both with fair silver
hree-compartment Gem shaft has extensive crosscuts on the
cls, cutting the Gem and Future veins, which have shown a
, but nothing to make a mine.
up of 10 claims, area 130 acres, 7 miles northwest of Globe,
, was bonded circa January, 1909, for a price understood to
Old workings show considerable chrysocolla, of 5 to 10%
low depth, and shipments of silicate ore for fluxes were made,
e management of I. N. Kinsey, to the Old Dominion and
smelters. Production, 1907, was 528,000 lbs. fine copper,
of the Eureka is said to have been about $400,000 worth of
Eureka mine has the 125' Jennie shaft and the 475' three-
n shaft, showing, at 360', gray schist, carrying disseminated
ittle chalcocite of 1.5 to 2% copper tenor. Underground
, and churn drilling done, 1909–1910. No. 4 hole, of 530'
ll amount of chalcocite, disseminated in granite-porphyry,
'.

udes good hoists and air-compressors at both the Boston
tter a 12-drill machine. The management has struggled
mine, both east and west of Globe, but is out of funds,
e, since the middle of 1910, with rather poor prospects.

RATION CO., LTD. SPAIN.
y floated the Cerro Muriano Mines, Ltd. Was liquidated
merly at Córdoba, Sevilla, Spain. Fully described Vol. III.

A COPPER CO. ALASKA.
unclaimed from former office, Tacoma, Wash. Mine office:
Henry Hewitt III, manager, at last accounts. Mine, near
200' above sea-level, with a water power available. Ore is
ted to average 20% copper. Company was said, 1909, to
,000 plant, to operate on a new process, planned to turn out

electrolytic copper from raw ore in the four operations of cr
leaching and deposition. Presumably idle.

CORINTH COPPER CO.

Office: 703-68 William St., New York, N. Y. Mine office:
Co., Vt. Organized 1906, under laws of New York, with capi
Lands adjoin the Eureka mine. A small amount of developme
done by the present company. Presumably idle.

GEWERKSCHAFT CORIOLAN.

Mine office: Wissen-am-Sieg, Rheinprovinz, Prussia, G
Vorländer, agent; A. Schneider, superintendent. Capitalizatio
without assigned value. Mine, developed by opencuts, tunn
carries ores of lead, copper, cobalt and antimony, and is a ver
of these metals.

CORK MINERAL DEVELOPMENT SYNDICATE, LTD.

Dead. Formerly at Skibbereen, Co. Cork, Ireland. Descr

CORNELIA COPPER CO.

Dead. Was reorganized, circa 1909, as New Cornelia Copp
at Ajo, Pima Co., Ariz. Very fully described Vol. VIII.

CORNELL GOLD, SILVER & COPPER MINING CO.

Dead. Formerly at Silver City, Grant Co., N. M. Descri

CORNELL OPERATING CO. **BRITIS**

Dead. Formerly at Van Anda, Texada Island, B. C.

CORNUCOPIA COPPER CO.

Dead. Formerly at Cornucopia, Grant Co., Ore.

CORNUCOPIA GOLD & COPPER MINING CO.

Dead. Formerly at Cherry, Yavapai Co., Ariz.

CORNWALL MINES.

Mine office: Cornwall, Madison Co., Mo. Property was w
scale, circa 1860. Ores are greater in variety than in quantity, th
ing cuprite, melaconite, malachite, azurite, chalcocite, covellit
copyrite, chalcanthite and chrysocolla. Idle many years.

COMPAÑÍA COROCORO DE BOLIVIA.

Office: Santiago de Chile. Mine office: Coro Coro, La Pa
ganized Apr. 23, 1873, under laws of Bolivia, with capitalisation
ianos. Property was the largest copper mine in Bolivia, before
of the Corocoro United Copper Mines, Ltd. Mine, 460 meters
on conglomerate strata carrying native copper, with occasional
cocite. Silver, which occurs native, with copper, as in the Lake
is an important by-product. Mine has steam power, and a mil
exported as copper mineral, production ranging 600 to 800 quin
barillas de cobre of about 80% average copper tenor, estimated,
government, to cost 7.8 bolivianos per quintal. Production
1,700,000 lbs. fine copper in 1907, and 1,250,000 lbs. in 1909.
500 men.

COROCORO UNITED COPPER MINES, LTD.

Office: 151 Finsbury Pavement House, London, E. C., En
Coro Coro, La Paz, Bolivia. Baron René de Batz, chairman; p
G. T. Crane, E. F. Harrington, W. H. Hasler, J. L. Barber, A
Berthin, H. M. Kersey, C. Portalis, L. Monnier, G. Martin an
directors; G. B. Wolfe, secretary. Organized Aug. 6, 1909, und
Britain, with capitalization £700,000, shares £1 par; issued,
paid. Company took over the properties of J. K. Child & Co.,
Noël Berthin; Compañía Sud Americana de Cobre de Corocor
Hermanos.

Lands are 515 claims, in the Corocoro district, principal
Vizcachani, formerly owned by J. K. Child & Co., Ltd.; the S

as Hermanos, and the Guallatiri, formerly owned by the
The mines are opened on 2 successive conglomerate
ferent geological horizons, and similar only in their origin
. The older and underlying stratum, Las Vetas, is an
te of argillaceous tendencies, having a generally NE.
upon this stratum is another conglomerate, Los Ramos,
trend. The upper conglomerate is much like the lower,
nd mottled with red and white particles of gypsum and
untry rocks are eruptive, mainly dioritic, and the copper
and but rarely in the form of ores of commercial tenor.
range from 2′ to 6′ in thickness, with an extreme thick-
El Dorado, which has a minimum width of about 3′. The
tive copper averaging circa 3.5%, with small quantities
chalcocite and domeykite, scattered irregularly through
ver also occurs, sparingly. These mines are believed to
he Incas. The nearest water supply is the Rio Desagua-
down which copper is shipped, by way of Puerto de
nce to Mollendo, Chile, for export to Europe.
remely arid, without timber, and almost without shrubs,
ade of local fuel, which is coñiga, cagajon and taquia,
s per cwt. Taquia is used for firing boilers, and also for
s, and in the past even was used for smelting.
in the conglomerate strata stand fairly well, though with
els average 22 meters apart. Winzes are inclined, with
ering is used, except for shafts, owing to its great cost,
nainly from North America, and the workings are secured
o or dry-walling system. Dressed stone, mainly dacite,
al workings, and is bought from contractors.
ne is 270 meters deep, equipped with a steam plant and
roduction of this mine, 1907, was circa 700,000 lbs. fine
average force of about 250 men.
e, 2 kilometers from Coro Coro, has a 600′ circular shaft,
led from top to bottom, which is unique among the mines
e has been opened for a length of about 4,000′, with ma-
Production, 1903, was 2,282,032 lbs. fine copper.
ine, when under the ownership of Carreras Hermanos
o 8,000 long tons of mineral bruto, equivalent to circa
r, estimated by the Bolivian government to cost 7.5
30% barillas.
s named has mills, the Acourni plant, near the Guallatiri
and was estimated, by the Bolivian government, to make
barillas, or crude copper mineral, of 80% copper tenor,
tal. The Bella Vista concentrator is at the Santa Rosa
rmerly using trapiches, handled 30 to 40 metric tons of
with steam power, but a more modern reduction plant
). Formerly the mineral was dressed to 92 and even 96%
judging from the experience of the Lake Superior mills,
al, must have meant very heavy losses in the tailings.
te and almost inaccessible location of these mines, past
mall, compared with possibilities, but, under vigorous
any is capable of making, singly, an eventual production
r entire copper output of Bolivia, and the property is
omising.

ATED GOLD & COPPER CO. **ARIZONA.**

Prescott, Ariz. Letter returned unclaimed from former
avapai Co., Ariz. Geo. H. Schuerman, president and

Tampico and the City of México, about equidistant from Pach and circa 15 miles from Flojonales.

The property includes many antiguas, with several hund ranging from mere tajos, or broken down pits, of little depth, t of more than 600′ depth. These properties were considerable past, of gold, silver, copper and lead, as evidenced by 6 ruined of the mines were worked in a small way, as recently as 1898, by Upwards of four years was devoted to the careful examination by Mr. Wenstrom, before the flotation of the company.

The property shows Cretaceous metamorphic limestone and acid porphyries, and carries replacement deposits of argent erous lead-ore, along fissures in limestone; contact deposits c in limestone and porphyry, and contact metamorphic d ore, with lime-garnet rocks, between limestone and mo porphyry. Apparently barren vein matter in many opening upon assay, to carry frequently good, and sometimes high and, as a rule, all ores developed show good gold and silver va are numerous and extensive, as shown by many outcrops, and b of old workings, several of the old mines being 400′ to 600′ in 31, 1910, new openings aggregated 4,500′, all made during 191 during December. Most of the old workings are in such sha be useless to estimate their extent until fully reopened.

The property is on a development basis, and a number c been cleaned out, to a greater or less extent, some giving excelle thoroughly satisfactory results on the average, a number of developed in the old mines, and in new workings, with very and copper ores shown at a number of points. Work is do contract, at an average cost of about half that of similar wo States.

The Humboldt mine has strong outcrops, giving indicati body below, the average of 4 assays being 6.48% copper and combined gold and silver values. The 371′ Humboldt tunne under the outcrop, giving a back of about 200′, and is connect Humboldt air-shaft, the latter cutting high grade copper ore, 100′ depth.

The Santa Maria mine has a contact deposit of about 5 with strike of N. 60° W., and nearly vertical dip, with evidences ings. A tunnel has been started.

The Colón mine, east of the Humboldt, has a system of apparently converging at depth, with strong indications of goo of convergence, and has a new 117′ shaft. Seventeen samples of from the Colón dump, gave average assays of $11.79 per ton and silver values, 3 selected samples averaging $147.52 in gol 1.9% lead, but the chert ore is bunchy, and has not been deve considerable quantity.

The San José del Oro mine, sometimes known as the San eastward of the Prieta, is a traditional rich gold mine, show workings on a brecciated fault fissure of 60′ and upwards in mineralized. The old workings have been cleaned out to a dep Vein matter is low in average values, but selected ore contains $ silver per ton, and 2 to 20% lead, and a 12″ streak assayed 4 silver and $4.80 gold per ton.

The Maravillas tunnel, a new working, 224′ long, shows in limestone, with promising conditions, and, early 1911, a large ing veins and pockets of good ore, was cut by the tunnel.

The Rosario mine is an antigua, cleaned out to depth

gular workings, with a 12′ vein at the bottom. The vein is considerable limonite, hematite and pyrolusite. The Rosario by a 224′ shaft.

unnel, 394′ long, was discontinued May, 1910, pending a and sampling of the old workings of the Prieta mine, which eep. The mine shows a well defined and well mineralized issure of about 12′ average width, carrying auriferous and ore, and the ancient miners cleaned out the ore very thoroughly he old workings. Vein is similar to the Rosario, and probably The old Prieta tunnel, driven circa 1870, shows promising o ore, and this ground is to be explored more thoroughly, by the Cortés tunnel, which was 764′ long at the end of 1910, d breasted in caliche conglomerate, being the principal avenue of ore from the mines that may be developed around the Hum- ock. This tunnel is being driven at a remarkable, and, perhaps

unnel, 328′ long, in broken limestone, shows no ore, in a drift y along the contact.

nine, at a depth of 30′, shows a 2″ to 4″ streak of copper ore. ine, immediately south of the Huerta, has old workings, only th, showing a strong vein of 20′ and upwards in width, along a y contact, carrying a strong leached gossan, with frequent he Milpa is being reopened by the 210′ two-compartment , planned to be continued to the tunnel level, at an approximate serving to explore the Santa Ana, Huerta, Milpa, Estaca and at depth. The Milpa shows strong indications of copper and

ine is an old property that formerly produced a limited quan- ilver ores, and has a mineralized zone of good size, but rather er.

mine is a celebrated old property, last worked 1873, that pro- ore averaging about 40 oz. silver per metric ton. The contact and carries argentiferous manganese ore on the limestone side, copper ore next to the porphyry. The limestone carries some of oxidized manganiferous ore, and some oxidized copper ore. s have assayed $25 to $100 per ton, and gold ores have assayed . The Carmen, which was a considerable producer, and was ed to a depth of about 600′, is being reopened by the Carmen nnel, 462′ long at the end of 1910, and is a decidedly promising

za mine has conditions similar to those at the Carmen, but on ad is to be explored later.

na mine is to be explored by a vertical shaft. This property ntrusions, and is considered promising. Silver-lead ore was ut recent samples assayed only 2 to 4% lead, and 2 oz. silver

o the foregoing properties, all of which are in the Jacala group, ores, Tepozán Primero, Tepozán Segundo, San Rafael, Soledad es at Jacala.

olás group, 4 to 5 miles from Jacala, is of about the same area Jacala, and geological conditions are much the same, but past s were much less extensive. Principal properties of the San the Encino Largo, Providencia and Maravillas. Compara- s being done in the San Nicolás group, present operations being , which is wise, considering the large number of old mines, and ditions existing at such a large number of points.

The Encino Largo mine formerly produced rich gold ore, tha at San Nicolás and Pachuca. The new Encino Largo tunnel wa the end of 1910. This property shows a promising contact depo

The Providencia mine has an opencut, in decomposed porphy stained green by copper, and carrying impregnations of copper to 9%, in selected samples, with about 10′ of ore, 2′ to 3′ of which c nated carbonates averaging 10% in copper tenor. The limest some distance higher up the hill.

The San Nicolás group also includes the Mina Soledad, whic promising, and which will be developed by the Encino Largo tunn villas, which is being reopened by the San Felipe tunnel, 224′ long a the Crucero and Calabasas, showing shallow antigua workings, an aggregating nearly 1,100 acres, lying in a very rough country, li but showing favorable geological conditions.

In addition to the old mines previously referred to, the pr extensive area of monzonite-porphyry, carrying, at and near sur nated carbonates and silicates, markedly similar to the surface c monzonite-porphyry mines of Bingham and Ely. If commercial this monzonite, they will be found as disseminated sulphides, o tenor, but in enormous quantity, at an uncertain, but presumably depth, below the carbonates and silicates, as is the case at Bingham monzonite is so extensive, and its surface indications so promis company will depart from its original plan of confining work to reo mines, to the extent of making churn-drill tests of the porphyry.

Power is furnished by gasoline and mules, the principal dev tunnels, permitting a minimum use of mechanical power. Equip 5 hoists, and there is a hand power Terry Z core-drill. Additional h 2 additional core-drills are to be added, 1911, also a telephone syste include a considerable number of old structures, mainly of adobe stantial adobe administration building, with a patio, that house laboratory and living quarters for officials. A company store, wa chine and carpenter-shops are to be built, 1911.

Extensive surveys have been made for water power, and eventually to utilize this power for the entire operation of the min and possibly for the sale of commercial current and other purposes.

Labor has increased steadily in supply and efficiency, and ended 1910 with a force of 225 men. Wages are very low, permit tionally cheap living conditions.

The mine lacks a railway, which is not a serious matter in developing property, but would be a great handicap to a produc railway is now under construction, from México City to the port and is expected to pass through the neighborhood of Jacala, about

At the time of organization the management stated that a would be required to develop the property adequately, to the point production, and substantial progress has been made in this dir property is one of exceptional promise, with a good managemen ing handled with skill, vigor and remarkable economy, by Mr. W

CORTLAND GOLD & SILVER MINING CO.

Dead. Formerly at Ohio, Gunnison Co., Colo. Described V

CORUÑA COPPER CO., LTD.

Dead Was liquidated June 27, 1906. Formerly at Pino A Spain. Described Vol. VI.

CORY BROS. MINING CO.

Office and mine: Helena, Lewis & Clark Co., Mont. Lands, on B north of Helena, show gold-copper ores. Idle.

OPPER CO. ARIZONA.
stockjobbing scheme promoted by the Southwestern Securi-
geles. Formerly at Groom Creek, Yavapai Co., Ariz. De-

REEK COPPER CO. COLORADO.
dge Bldg., 34th St. and Broadway, New York, N. Y. Has
which is entirely unnecessary, as the company seems to
cept a damaged reputation. Organized circa March, 1907,
York, with capitalization $300,000, and reorganized later,
ona, with capitalization $3,000,000, shares $15 par. The
0 shares, at $5. Noah E. Barnes, the promoter and former
nced, April, 1910, to not more than 6 nor less than 4 years
e embezzlement of $20,000 of the company's funds. Barnes
dinand von Hofberg, who, out of gratitude, assumed the
inand Barnes. The wily Noah E. Barnes made his protège
urer, and paid his passage to Germany, providing him
rth" of the company's stocks and bonds, for German
Hans Ferdinand of New York, who was Count Ferdinand in
his entire amount to his friends among the German nobility,
n crown prince, who "invested" to a small extent. Accord-
e-half of the proceeds of the German invasion were to have
easury, and, of the balance, Count Ferdinand was to have
out 9%, as a commission, nine-elevenths going to Noah E.
er, president and adopted father. Count Hans Ferdinand
was arrested, charged with the misappropriation of $18,000,
an innocent, though a foolish participant, in the swindle.
s were brought against Noah E. Barnes, for various alleged
ow wearing a single suit, neatly ornamented with stripes, in

NING CO. ARIZONA.
unclaimed from former office, New York, N. Y. Mine
Cochise Co., Ariz. John Dignan, manager, at last accounts.
, 1909, with capitalization $5,000,000. Lands, 47 claims, in
ict, said to be near the Calumet & Arizona property, on
pment work has shown argentiferous and auriferous copper
umably idle.

INES, LTD. NEWFOUNDLAND.
ge Row, London, E. C., Eng. Mine office: Goose Cove, St.
oundland. W. J. Payne, chairman; preceding officer, J. W.
n Dodds, directors; W. H. Swannell, secretary; B. Symons,
ganized Dec. 24, 1907, under laws of Great Britain, with
0, shares 5s. par; issued, £6,500, fully paid.

PPER MINING CO. WYOMING.
ly at Encampment, Carbon Co., Wyo.

DEVELOPMENT SYNDICATE, LTD. AUSTRALIA.
n Wall Bldgs., London, E. C., Eng. Mine office: Goulburn,
., Australia. Max Michaelis and L. Breitmeyer, directors;
secretary. Organized March 27, 1907, under laws of Great
ization £45,000, shares £1 par; issued, £30,000, of which the
000, is fully paid, and £15,000 is 11s. 6d. paid. Lands, 120
Paddy's River. Apparently no work ever done. Idle and
d.

ICT COPPER (BEKKER'S KLOOF) CAPE COLONY.
LTD.
28 Market Square, Cradock, Cradock Co., Cape Colony.
tary. Organized Aug. 13, 1907, under laws of Cape Colony,

with capitalization £3,500, shares £1 par, and apparently wa
1909, with capitalization increased to £5,000, shares £1 par. La
the farm Bekker's Kloof, held under lease, expiring Apr. 2, 191
Muller. Property has several shallow shafts, and 4 tunnels, longest
ore said to give assays up to 36.08% copper, 52 oz. silver and 2 o
per long ton, with good assays from surface ores. A selected samp
copper, 11 oz. silver and 5 oz. 6 dwts. gold per ton. Property is sai
traces of nickel and cobalt, and to carry a deposit of potassium
which a test shipment was made, 1908. Presumably idle.

CRAWFORD COPPER CO.

Dead. Formerly at Prairie du Chien, Crawford Co., Wis. Descr

CRAWFORD GOLD MINING CO.

Office: Clifton, Graham Co., Ariz. Benj. M. Crawford, m
auriferous copper ores and steam power. Presumably idle.

CREEDE COPPER MINING CO.

Dead. Formerly at Rawlins, Carbon Co., Wyo.

CREO MINING & MILLING CO.

Dead. Former office was Pleasant Grove, Utah. Officer
Mecham, Jr., president; Jas. H. Kirk, vice-president; A. L. Cullim
and treasurer. Organized Nov. 17, 1909, under laws of Utah, with
$50,000, shares 5 cents par. Lands, slightly developed, were in th
trict. Formerly at Ibapah, Tooele Co., Utah.

CRESCENT COPPER CO.

Mine office: Patagonia, Santa Cruz Co., Ariz. Organized cir
1910, by California interests. Lands, in the Washington camp, Pat
tains, have a 122′ tunnel, showing copper ore.

CRESCENT COPPER CO.

Office: Edinboro, Pa. Letter returned unclaimed from forme
Boulder, Boulder Co., Colo. Organized under laws of Colorado, w
tion $1,000,000, shares $1 par. Company claims to have sundr
claims, somewhere on the line of the Moffat railroad. Is not regard
Idle and apparently moribund.

CRESCENT COPPER CO.

Mine office: Park City, Summit Co., Utah. Idle some years.

CRESCENT COPPER CO.

Dead. Formerly at Encampment, Carbon Co., Wyo. Descr

CRESCENT COPPER MINING CO.

Dead. Formerly at Bisbee, Cochise Co., Ariz. Described Vol

CRESCENT MINES, LTD. **BRITISH**

Dead. Formerly at Phœnix, Boundary district, B. C. Describ

CRESTON COPPER CO.

Office: New York, N. Y. Mine office: Suaqui de Batuc,
Mex. I. N. Kellogg and G. B. Floyd, directors. Lands, 10 group
hectares, near Campo Santo Niño, in very rugged hills in the Ures a
districts. Property shows contact deposits between limestone
porphyry and granite, carrying auriferous and argentiferous cop
quartz-porphyry gangue, opened by shafts and tunnels.

CRISTOBAL COPPER MINING CO. **NE**

Mine office: Taos, Taos Co., N. M. Property, in the South
is said to carry an 8′ ore body, opened by a 100′ tunnel. Idle.

CRŒSUS GOLD & COPPER MINING CO.

Office: Beatrice, Neb. Mine office: Hailey, Blaine Co., Idah
Plummer, secretary; Samuel E. Rigg, manager; R. J. Scoble, su
Mine, 4 miles west of Hailey, has an 800′ three-compartment vertic
20′ to 60′ fissure vein of nearly vertical dip, in granite, having paysti
walls, carrying auriferous and slightly argentiferous chalcopyrite,

here also is a nearly vertical blind vein, apparently joining
lepth, carrying silver-lead ore at depth of 600′. Equipment
electric power, and a 12-drill electric air-compressor. The
or has 10 stamps, crusher, rolls and Huntington mills.

TER. **BRITISH COLUMBIA.**

tannia Mining & Smelting Co., Ltd., at Crofton, New West-
. C.

CO. **COLORADO.**

Centre, Kan. Mine office: Lyons, Boulder Co., Colo. Chas.
sident; C. W. Strong, secretary and treasurer. Organized,
f New Mexico, with capitalization $1,000,000, shares $1 par.
miles from Lyons. Idle some years and apparently moribund.

MINES. **IRELAND.**

oca Copper Syndicate, Ltd.

COPPER MINING CO. **AUSTRALIA.**

merged, December, 1906, in Crowl-Creek-Shuttleton Copper
dead. Formerly at Shuttleton, Mouramba Co., N. S. W.,
ed Vol. VI.

MINE. **AUSTRALIA.**

magee Copper, Ltd., at Shuttleton, Mouramba Co., N. S. W.,

SHUTTLETON MINING CO. **AUSTRALIA.**

were sold, January, 1908, to Freehold Copper Properties,
Formerly at Shuttleton, Mouramba Co., N. S. W., Australia.
l. VIII.

SOUTH COPPER MINING CO., N. L. **AUSTRALIA.**

ne: Shuttleton, Mouramba Co., N. S. W., Australia. Prop-
uttleton, has a 125′ shaft, showing slight copper carbonate
t appearance of commercial ore or a defined ore body. Idle

R CO. **ALASKA.**

ed unclaimed from former office, 234 Pioneer Bldg., Seattle,
e: Valdez, Alaska. T. D. Bradford, president and treasurer;
secretary; preceding officers, C. D. Yendell, Hon. John Lyons,
R. Young and Fred S. Fogg, directors. Organized under laws
th capitalization $2,000,000, shares $1 par. Lands, 54 claims,
3 groups, 2 on Knights Island, Prince William Sound, Alaska,
either side. Property has several tunnels of 25′ to 100′ length,
le and presumably moribund.

R CO. **ARIZONA.**

Wendendale, Yuma Co., Ariz. Lands, about 25 miles north-
le, are developed by a shallow shaft and a 300′ tunnel.

& COPPER CO. **WASHINGTON.**

Leavenworth, Chelan Co., Wash. Lands, 8 claims, at the head
out 35 miles north of Leavenworth, said to show a 75′ vein
high assay values in gold, silver and copper.

COPPER CO., N. L. **TASMANIA.**

ieen St., Melbourne, Australia. Mine office: Mount Lyell,
smania. R. Giles, chairman; preceding officer and Moss
Wm. Madden, manager. Capitalization £250,000, shares
60,000 shares, 2s. 11d. paid in. Lands, 30 acres, having a
a little medium grade ore, and a 275′ tunnel in schist carrying
per sulphides, sparingly. Some diamond drilling, 1909, was
cores showing chalcopyrite of good assay tenor. Idle since

CROWN LYELL, LTD.
Dead. Was dissolved, December, 1902. Formerly at M
Co., Tasmania. Described Vol. V.

CROWN LYELL MINING CO., N. L.
Dead. Was succeeded by Crown Lyell Copper Co., N.
Mt. Lyell, Montagu Co., Tasmania.

CROWN MINING CO.
Dead. Property was 11 claims, said to show 7 veins, slig
3 crosscut tunnels. Work was carried on 1906–1909. Fo
Ferry Co., Wash.

CROWN POINT COPPER CO.
Dead. Formerly at Globe, Gila Co., Ariz. Described Vo

CROWN POINT MINING CO.
Office: 709 Grant Bldg., Los Angeles, Cal. Mine offic
Co., Wash. Property is claimed to show copper, silver and
No trace of operations secured, and company apparently
stock. Idle and presumably moribund.

CROWN PRINCESS MINING CO.
Dead. Was merged, 1908, in Clara Consolidated Gold
Co. Formerly at Planet, Yuma Co., Ariz.

CROWN QUEEN MINES CO.
Dead. Was merged, 1908, in Clara Consolidated Gold
Co. Formerly at Planet, Yuma Co., Ariz.

CRUSADER CONSOLIDATED MINING CO.
Office: Salt Lake City, Utah. Mine office: Eureka, Juab
Tibbals, president; F. O. Frick, secretary and treasurer. Orga
1909, under laws of Utah, with capitalization $300,000, shar
adjoin the Plutus, in the Tintic district. Presumably idle.

MINA LA CRUZ.
Office and mine: Indé, Durango, México. Ernesto Avila
includes a 40-ton matting furnace. Presumably idle.

COMPAÑÍA MINERA DE LA CRUZ.
Dead. Formerly at La Cruz, Centro, Tamaulipas, Mex.

CRYSTAL COPPER CO.
Dead. Formerly at Ingot, Shasta Co., Cal. Described

CRYSTALINA COPPER CO.
Dead. Formerly at Clifton, Graham Co., Ariz.

CRYSTAL LAKE GOLD & COPPER MINING & SMELTING CO.
Dead. Formerly at Lake City, Hinsdale Co., Colo.

CRYSTAL MINING CO.
Dead. Formerly at Bolster, Okanogan Co., Wash. De

CRYSTAL MOUNTAIN MINING & DRAINAGE CO.
Dead. Mine was slightly developed by tunnel, showi
argentiferous copper ore, and had a small steam plant. Fo
Gunnison Co., Colo.

C. S. A. BLOCK TEN MINING CO.
Dead. Was merged, 1907, in C. S. A. Mines, Ltd. F
Robinson Co., N. S. W., Australia.

C. S. A. MINES, LTD.
Office: 16 O'Connell St., Sydney, Australia. Mine office
Co., N. S. W., Australia. G. H. Blakemore, chairman and
preceding officer, J. O. Armstrong, A. T. Brown, J. T. Lemp
Read, Dr. W. H. Read and Peter Snelson, directors; J. N. Y
Organized Dec. 7, 1905, under laws of New South Wales,
increased, 1907, to £60,000, shares £1 par; fully issued, £

Annual meeting, in January. Absorbed, 1907, the C. S. ., N. L., an adjoining property.
leasehold, known as the Cornish, Scottish and Australian f Cobar, in the Bogan field, also a 20-acre water claim. ominent gossan, covering low grade sulphide copper im- d quartzite, in a mineralized zone said to be 10 chains, or pened by shafts of 453′ and 680′, showing ore assaying up 93 oz. silver per long ton. A drift on the 450′ level showed , for a short distance, and the 560′ level is said to show a 2′ Upper workings carry mainly silver-lead carbonates, with ies at depth. The mine is timbered with square sets, of ine, depleted stopes being filled with mullock.
les a double-cylinder hoist, and 2 single and 2-stage air- lls aggregate capacity, with boilers for condensing water, . There are 8 buildings. From a zone of secondary en- duced 2,950 tons of argentiferous and auriferous lead car- assay of 24% lead, 1 oz. silver and 1 dwt. 6 grains gold per circa 1908, with rather indifferent prospects of resumption.

LVER & LEAD MINING CO. **AUSTRALIA.**

ar, Robinson Co., N. S. W., Australia. Mine is opened to Idle several years.

ATED MINES CO., LTD. **HUNGARY.**

Court, London, E. C., Eng. Mine office: Csegez, Torda, W. E. Thomson and E. Phillips, directors; H. Bawden, Dec. 24, 1907, under laws of Great Britain, with capitaliza- l par; issued, 45,007 shares, fully paid. Lands, 61 claims, for which the company gave £45,000 in fully paid shares. without capital, and has continued existence devoid of Presumably moribund.

CO. **MÉXICO.**

Exchange, Chicago, Ills. Mine office: Ayutla, Autlán, McIntosh, president; Wm. H. Lees, vice-president; retary and treasurer; S. S. Gates, manager; Thos. M. nt, at last accounts. Capitalization, £100,000. Prop- mine, in the Bautista district, area circa 250 acres, also er lands. Mine is an antigua, worked by the Spaniards, A. D. 1745, at depth of 275′, on account of water and base that the mine caved in, burying 7 men. It is stated that gs assayed 2,268 oz. silver and 1 oz. gold per ton, which is s neither Spaniards nor Mexicans left any considerable n any abandoned mine, except from dire necessity. The rtas is about 30′ in average width, carrying mainly silver ys from old dumps are claimed to run circa 400 oz. silver , which either is untrue, or samples were selected with rded with suspicion. Idle and presumably moribund.

A CUATRO SEÑORES, S. A. **MÉXICO.**

t Coyamé, Iturbide, Chihuahua, Mex. Described Vol. VIII

NING CO. **MÉXICO.**

ania Bank Bldg., Pittsburg, Pa. Mine office: Ocotlán, McKay, president; Frank A. Vickery, vice-president; surer; Oscar A. Rogers, secretary; Guillermo W. Thomp- Organized 1904, under laws of West Virginia, with capi- Lands, 2[illegible] hectares, including the Carpintero y Anexas Taviche, San José and San Martín, showing auriferous and ores. El Carpintero mine has a 100-meter shaft. Idle ound.

CUBA COPPER CO.

Office: 2401–60 Wall St., New York, N. Y. Mine office: El C
de Cuba. Benj. B. Lawrence, president; Colgate Hoyt, vice-pr
Hunter, secretary; W. T. C. Carpenter, treasurer; Edw. H. En
manager; Edw. B. Nagle, superintendent. Organized Jan. 5, 19
of West Virginia, as successor of El Cobre Mines, with capitalizat
shares $100 par, in $1,500,000 non-cumulative 6% preferred and
mon stock. Annual meeting, first Tuesday in March.

This was the first copper mine in the new world worked
having been opened A. D. 1532 by the Spanish, the first copper
mines having been used for casting Spanish cannon. The proper
over, circa 1832, by a Hispano-English company, and ore mined
Swansea for reduction. The custom-house records of Santiago ar
exports of 610,210 tons of ore, 1851-1869, valued at $50,186,22
depreciated Spanish currency, the ore shipped assaying from 12.
and probably averaging about 16% in copper tenor. In 1844 El
was built, the queen of Spain being the principal shareholder.
shows the remains of an old stampmill, remaining from form
During the revolt of 1868-1878, the big Cornish pump was burne
mines, which remained idle until taken over, 1902, by the pred
company.

Lands are extensive, lying 8 miles west of Santiago Bay, and
eralized zone of 200′ width, traceable circa 6,500′, carrying 3
intervening rock being much altered. Ore is primarily chalcopyr
with pyrrhotite, in a quartz gangue, the grains of chalcopyrite fr
coated with covellite. Ore bodies occur in lenticular shoots,
planes, in serpentine, the largest lenses being about 30′ in extren
length of 200′, lenses averaging about 7′ width with occasional wi
and even 30′. The oxidized zone is of 50′ to 75′ depth only, suc
phide ores averaging 4 to 5% in copper tenor, without either go
important quantities.

The old workings were extensive, including some 40 old shaf
numerous remains of old hoists and boilers. The 4 deepest ol
about 1,200′ each, with 17 miles of workings, timbered mainly w
and the mine was found in bad shape, requiring heavy retimberi
the old stopes, up to 20′ and 30′ in width, had caved. A very seri
shut off the lower workings for some time. During the rainy se
makes 500 to 1,200 gallons per minute of strongly acid water, requ
composition metal, with lead or wood-lined pipes. The mine has
combined capacity of 5,000 gallons per minute, and the water, aft
the mine, formerly was leached over scrap-iron, producing consi
precipitate, but this has been discontinued, owing to cost and lo
mine-water formerly carrying 400 grams copper per ton now c
Owing to water and bad timbering, only the upper portions of the
worked, but the management plans getting down below the 1,200
virgin ore bodies. A large surface deposit yielded 64,000 tons of 6
The mine has considerable ore blocked out, averaging about 4% c
old waste-dumps contain about 250,000 tons of 2% discarded
mine has many old buildings, of heavy construction, with porthol

El Cobre railroad, 9 miles long, connects the mine with Punt
tiago harbor, and is equipped with 2 locomotives and 40 cars.

The reduction plant, at Punta Sal, includes a 440-ton conc
250-ton smelter, latter idle for several years. Forces are about 4
of about 4.5% average copper tenor is shipped for smelting t
smelter.

s 73,426 tons of ore, yielding 6,483,000 lbs. fine copper in
copper in 1908, and 6,028,649 lbs. in 1909, secured at a cost
10 cents per pound.

CO. UTAH.
Swanson was superintendent. Mine, developed by tunnel,
copper ores, employed about 15 men, circa 1903, and had
rmerly at Bingham Canyon, Salt Lake Co., Utah.

t DEVELOPMENT CO. WASHINGTON.
lverton Blk., Spokane, Wash. Mine office: Kettle Falls,
. H. Yake, manager; D. K. May, fiscal agent. Organized
08, under laws of Washington, with capitalization $1,500,000,
nds, 12 claims, area 240 acres, in the Covada district, 10 miles
lls, and 1 mile west of the Columbia River, nearest railway
Falls, 14 miles northeast. Property is in 2 groups, one, of 5
nelsite, near the Columbia River, and one, of 7 claims, carry-
nd half-mile, respectively, of the strike of 2 veins, of 12′ and
age width, in porphyry. The mine has a 142′ incline shaft,
l an opencut. The vein, of 24′ estimated average width,
s and slightly auriferous galena, and the 12′ vein carries
r ore.

LIDATED COPPER CO. MÉXICO.
rly at Arispe, Sonora, Mex. Fully described Vol. VIII.

ERA CUBAÑA DEL BRILLADOR. CHILE.
rly at Compañía, Coquimbo, Chile. Described Vol. VIII.

ATION CO. CUBA.
ssau St., New York. Letter returned unclaimed from former
ey, Santiago, Cuba. W. A. Dennis, vice-president and gen-
l a little exploratory work, circa 1904. Idle some years and
nd.

DEVELOPMENT CO., LTD. CUBA.
into voluntary liquidation Nov. 25, 1909. Formerly at
r del Rio, Cuba. Described Vol. VIII.

& DEVELOPMENT CO., LTD. CUBA.
eorganised Oct. 26, 1905, as Cuban Land & Development Co.,
Bahia Honda, Pinar del Rio, Cuba. Described Vol. IV.

ERA CUCHARA. MÉXICO.
Culiacán, Sinaloa, Mex. Lands show argentiferous and
nd lead ores. Idle.

ING CO. MÉXICO.
Acaponeta, Tepic, Mex. J. M. Winston, manager, at last
are the San Juan y Anexas mines, in the municipality of
n Juan mine, opened by shaft and tunnel, has argentiferous
ment includes steam power, and a smelter, having a 40-ton
rberatory furnace. Was operating on a small scale, at last
ion, 1903, was 200,618 lbs. fine copper.

AUSTRALIA.
Kilkivan, Lennox Co., Queensland, Australia. G. Turner,
ounts. Lands, on Thunder Creek, 15 miles north of Kilkivan,
15′ veins, assaying 3 to 24% copper. Ore is shipped to the
In 1906 employed 45 men and produced 114,388 lbs. fine
n tribute, to Turner Bros., at last account.

NG CO. WISCONSIN.
nds circa 1903. Formerly at West Superior, Douglas Co., Wis.

PPER CO. NORTH CAROLINA.
eorganized, 1905, as Cullowhee Mining & Reduction Co.
hee, Jackson Co., N. C.

CULLOWHEE MINING & REDUCTION CO. NORTE

Office and mine: Cullowhee, Jackson Co., N. C. S. B. E
D. D. Davies, vice-president; Thos. A. Cox, secretary and man
Chas. Davies, smelter superintendent. Organized 1905, as succ
whee Copper Co.

Lands, 1,300 acres, 12 miles from Sylvia, nearest rail point,
siderable body of sulphide ore, claimed to average about 5% copp
per ton, with occasional assays of 15% copper and increased gold
ment includes hoists and a Sullivan air-compressor, with steam an
latter with a plant 3 miles from works. The smelter, near Syl
daily capacity, blown in circa January, 1909, with semi-pyritic
pended operations late 1910, and probably will remain idle until r
are secured.

CUMARAL MINES & DEVELOPMENT CO.

Dead. Formerly at Old Glory, Pima Co., Ariz. Described

CUMBERLAND COPPER CO. NO

Dead. Lands were sold under foreclosure, circa January, 1
worth Copper Co., Ltd. Formerly at Wentworth, Cumberland

CUMBERLAND COPPER CO., LTD.

Letter returned unclaimed from former office, 1033-141 Mil
Mass. Mine office: Ely, White Pine Co., Nev. Organized under
with capitalization $6,000,000. Is some relation to the Cumberla
Co., but whether an ancestor, offspring or collateral relative, or som
nection on the distaff side, has not been learned. No trace of oper
Idle and presumably moribund.

CUMBERLAND-ELY COPPER CO.

Dead. Property was sold, October, 1909, to the Nevada
Copper Co., and delivery made, Aug. 30, 1910. Paid several 10-
dividends, aggregating $390,000, and paid, October, 1910, a fina
liquidation, of $6.16 per share, amounting to $8,008,000. Pr
second quarter of 1909, was 5,332,701 lbs. fine copper, and for h
was only about 250,000 lbs., and production was trivial in 1910.
Ely, White Pine Co., Nev. Fully described Vol. VIII.

CUMBERLAND MINING CO.

Mine office: Turkey, Yavapai Co., Ariz. Lands are about
north of the Corona Consolidated Gold & Copper Co. Idle.

CUNNINGHAM PASS COPPER MINING CO.

Letter returned unclaimed from former office, Phœnix, Ariz.
Wendendale, Yuma Co., Ariz. Harold Baxter, president and ger
J. W. Boone, vice-president; H. G. Mayer, secretary and treas
Hoyt, superintendent. Organized Feb. 11, 1908, under laws of
capitalization $1,000,000, shares $1 par, nonassessable; issued, $60
hattan Trust Co., New York, registrar.

Lands, 13 claims, partly patented, area 225 acres, known as
Bullard mine, and including the Josephi group of 4 claims, held u
bond and lease. Property shows granite, diorite and schist, carry
quartz, with 6 ore bodies, of which one, under development, rang
width, and is traceable circa 2,000', carrying chalcocite, estimate
ment to average 12% copper, and 1 oz. silver per ton. The mine s
oxides and carbonates. There are 3 shafts, deepest being the
Bullard shaft, and a 250' drift-tunnel, mine having about one-half
ings. Under former ownership the Bullard mine shipped ore to
smelter, running $50 to $100 per ton, and some ore was shipped to
Idle at last accounts.

CUPRIC MINES CO.

Office: 17 Battery Place, New York, N. Y. Operating office

City, Utah. Mine office: Frisco, Beaver Co., Utah. A. ; F. A. Bishop, secretary; M. C. Morris, manager. Organ- under laws of New York, with capitalization $1,000,000, able; issued, $500,000. Is closely affiliated, in finances and e Horn Silver Mining Co.

s, unpatented, known as the Washington mine, adjoining out 1½ miles northwest of the Horn Silver, supposed to r ore channel. Mine produced about $35,000 worth of ore, nine has 2 old incline shafts, and a new 425′ two-compart- sunk through an iron capping, near the main tunnel of the erty carries argentiferous lead and copper ore, and shows ite, carrying good gold and silver values, on the 500′ level. steam power and an air-compressor.

CO. ALASKA.

ser, Prince of Wales Island, Alaska. Lands, lying northeast of the Alaska Industrial Co., show a contact vein between e, carrying chalcopyrite, opened by a 100′ tunnel. Idle.

CO. ARIZONA.

unclaimed from former office, Columbus, Ohio. Mine am Co., Ariz. N. W. Lord, president; Isaac N. Stevens, . Kauffman, secretary; Geo. B. Kauffman, treasurer; F. endent; Frank A. Ray, engineer; preceding officers and tors. Organized March, 1904, under laws of Arizona, with 000, shares $1 par.

, area 490 acres, in the Copper Mountain district, opened 320′ and by tunnels of 150′ and 260′, showing ore bodies of ork has been done in the leached zone, which carries isolated om which sundry small shipments have given returns of 15 p to $5 gold per ton. Company also owns about 2,000 linear tic outcrops, ranging 5′ to 100′ in width. It is likely that ch are parallel with and similar to the Big Coronado vein of Co., are leached to very considerable depths, but prospects bodies of low and medium grade sulphides at depth seem idered promising. Idle and presumably moribund.

CO. ARIZONA.

at Vail, Pima Co., Ariz.

MINING CO. NEVADA.

y at Goldfield, Esmeralda Co., Nev. Described Vol. VIII.

CO. WYOMING.

lmes, Albany Co., Wyo. Idle since circa 1904, and appar-

& SMELTING CO. ARIZONA.

at Vail, Pima Co., Ariz. Described Vol. VIII.

MONTANA.

A. M. Holter, owner, Butte, Mont. Mine office: Victor, Thos. Cowan, superintendent. Mine, formerly a silver zinc ores, and a vein claimed to be 12′ wide, is said to show pper, with lead, silver and gold ores, opened 1906. Idle.

K COPPER MINING CO. SOUTH AUSTRALIA.

rrency Creek, Hindmarsh Co., South Australia. Lands, old, 4 miles from the Goolwa. Mine, opened 1848, by Cur- Mining Syndicate, has 2 veins, of 2′ to 3′ width, with a 60′ e, azurite, malachite and chalcocite, assaying up to 37% 09 company had received a subsidy of £28 6s. 6d. from the vernment, and had not repaid same at last accounts. Idle und.

CURROWONG COPPER CO.

Dead. Formerly at Goulburn, Argyle Co., N. S. W., Austra
Vol. VIII.

CURROWONG COPPER & GOLD MINING CO.

Dead. Was organized, 1906, to take over the Phœnix or C
but was unsuccessful, and was wound up circa 1907. Formerl
Argyle Co., N. S. W., Australia.

CURROWONG COPPER MINING CO.

Dead. Was organized, 1865, with capitalization £60,000,
and paid, 1866, a 10% dividend. Was wound up, 1869, and prac
ized, 1872, as Phœnix Copper Mining Co. Formerly at Goulbu
N. S. W., Australia.

CURROWONG MINE.

Mine office: Goulburn, Argyle Co., N. S. W., Australia. M
1862, was owned originally, 1865, by Currowong Copper Minin
ized, 1872, as Phœnix Copper Co., and property was held, 1896,
Copper & Gold Mining Co., Ltd. Was last owned by Currowo
organized 1907, but which abandoned the mine January, 1908.
from Lake George and 22 miles from Goulburn, are 13 miles fr
railroad at Bangalore. Property has 2 veins, in slate and sandst
with highly altered igneous rock, largely epidotal, and probably or
Vein is said to be 25′ wide at depth of 90′, and is developed by sh
77′ and 168′. One shaft, sunk in the gossan, gave an assay of 5 o
to 14 dwts. gold per long ton. In 1868 the mine had a smelter wi
ting furnaces. Property has yielded considerable ore in the pas
shipped about 1,000 long tons of 14% ore to Sydney, paying a d
amounting to £6,000, but the mine proved unprofitable in the
Idle several years.

CUSTER CONSOLIDATED MINING CO.

Letter returned unclaimed from former office, Elko, Nev
Murray, Shoshone Co., Idaho. Harry L. Day, president; Jerom
president, secretary and treasurer; preceding officers and Art
directors. Organized July, 1910, under laws of Nevada, with
$1,000,000, shares $1 par. Lands, near the Tamarack & Chesape
been in litigation. Idle.

CUSTER PEAK MINING CO. **SOU**

Mine office: Deadwood, Lawrence Co., S. D. John H. O'
tendent. Mine, southwest of Deadwood, is said to carry avera
per ton in oxidized ore to depth of 100′, changing below to slig
pyrite and chalcopyrite, showing, on the 200′ level, a vein of 85′
about 1% copper, with very little gold, but increasing, at slight
copper. Presumably idle.

CUTTER COPPER CO. **N**

Mine office: Cutter, Sierra Co., N. M. Lands, 14 claims,
Red Tiger claim, which has a 90′ shaft with a 110′ drift on a 3′
average 20% copper, with good gold and silver values. Presun

COMPAÑÍA MINERA DE CUTTER COVE.

Dead. Was succeeded May 20, 1906, by Sociedad de M
Cutter Cove. Formerly at Cutter Cove, Magallanes, Chile.

SOCIEDAD DE MINAS DE COBRE DE CUTTER COVE.

Mine office: Cutter Cove, Magallanes, Chile. Organized
under laws of Chile, as a reconstruction of Compañía Minera de
with capitalization £400,000, shares £1 par.

Lands, 265 hectares, in latitude 53° 22′ S., longitude 72° 25′
wich, on the west coast of the Brunswick Peninsula, near the no
the Canal Gerónimo, about 120 miles from Punta Arenas, and di

ner. The climate is very wet and cold, but, while unpleasant, ble obstacles to mining. Lands, fairly timbered, show prom- ns, made more apparent by erosion, probably through glacia- rries a mineralized zone of 5 to 6 kilometers length, in diorite generally NE. strike, and dip to the east. The mineralized em of lenses, with generally parallel NE. strike, and SW. in- e channel, of 4 to 7 meters width, has frequent fracture planes ein displacements, foliation planes providing for circulation aters, whether ascending or descending the schoolmen can lves, but leaving strong evidences of alteration, and deposits he junction. There apparently is no zone of oxidation, and , such as bornite and chalcocite, but, owing to percolating me bluestone, excepting which the ore is practically primary is mainly quite finely disseminated, in a gangue principally th occasional rich paystreaks, and some big bodies of com- being an intimate mixture of chalcopyrite and pyrite, in s, with some pyrrhotite, a little galena and sphalerite, and antities of native copper, in a quartz gangue.

uthernmost copper mine of the world. The mines as a whole shafts, 458 meters of tunnels, and 118 meters of drifts. Work 1904. The Mina Samuel has an open pit and shallow shaft, , with some ore assaying up to 18% copper and 0.02 to 7 oz. .

lejandro, apparently the most important, has a shaft and 2 na Catalana, 800 meters south of the Alejandro, includes the omiza, Catalana and Creston de la Catalana, with 2 tunnels, The Mina Sara also has some slight workings. The Mina eme northeast of the property, has a tunnel on a contact vein rite, associated with pyrite, said to assay 7.1% copper, with a The mine made small test shipments of ore, 1905, returning 16 th an average of about 7 oz. silver per metric ton, and secured copper, from selected ore.

nnected by tram with the Samuel mine, is of 50 tons daily d with a No. 6 Krupp ball mill, of one metric ton hourly ca- h Krupp Grusonwerk oscillating tables, a 6x16″ crusher, feed- tors, operated with a force of 8 men, working 12-hour shifts. was 4,103 metric tons of ore, averaging 3.9% copper, yielding f concentrates, of 21.5% assay tenor, equivalent to 172,055 dle since 1907.

& SILVER CO., LTD. **PERÚ.**

erly at Chumbivilcas, Perú. Described Vol. VIII.

R CO. **ALASKA.**

South Tenth St., Tacoma, Wash. Mine office: Baldwin, land, Alaska. J. M. Miller, Jr., president; F. P. Hicks, vice- D. Nash, secretary and treasurer; J. Cuthbert Welch, man- superintendent, at last accounts. Organized 1905, under laws th capitalization $50,000, shares $1 par.

ns, area 100 acres, on Moira Sound, showing 3 lenticular ore y company as of 40′ aggregate width, assaying 6 to 10% copper, nd $2 gold per ton, mainly from chalcopyrite, with occasional native copper. Mine has a 100′ shaft and a 187′ tunnel, with aidlaw-Dunn-Gordon air-compressor. A 4,000′ ground tram, with 20-lb. steel rails, leads to a 1,600-ton ore bunker on tide- oline locomotive. Fire destroyed the old machinery plant, d, circa June, 1908. Idle.

DACOTAH MINING CO.

Dead. Lands were sold, 1905, to Dacotah Heights Land C Houghton, Houghton Co., Mich. Described Vol. III.

DAGGETT LEAD MINING CO.

Letter returned unclaimed from former office, 204 Wilcox Bl Cal. Mine office: Daggett, San Bernardino Co., Cal. A. A. M. M. Davison, secretary. Lands, said to be extensive, ar northwest of Daggett, and company was said, 1908, to also h claims, under option. Mine, opened by tunnel, has about 3,0 and is a producer of lead concentrates. In 1908 an ore body as per, with gold and silver values, was cut.

DAIJI MINE.

Owned by Fujita-Gumi & Co.

DAILEY COPPER MINING & SMELTING CO.

Office and mine: Wickes, Jefferson Co., Mont. Wm. W dent; A. R. Robertson, vice-president; C. H. Dailey, secret February, 1907, under laws of Montana, with capitalization $1 $1 par; issued, $850,000.

Lands, 5 claims, patented, area 25 acres, having 4 veins, developed, of 12′ estimated average width, carrying malachit bornite and chalcocite, estimated by management to average 4 to 60 oz. silver, and 80 cents to $3 gold per ton, without lead or a 300′ shaft, with 2,500′ of workings, estimated by management tons of ore blocked out. Mine water, in small quantities, carries strongly in solution. Former owners shipped about $30,000 wo independent source estimates ore to average about 3% copper, 80 cents gold per ton. Equipment includes a 40-h. p. boiler s good for 500′, with 2 buildings, and a 30-ton test concentrator.

DAIRY FARM MINING CO.

Office: 165 Broadway, New York. Mine office: Van Trent, Daniel Guggenheim, president; Corey C. Brayton, manager, a Organized 1903, under laws of California, with capitalization $ $1 par; issued, $142,500. Is controlled by American Smelter through ownership of $96,927 stock.

Lands, 160 acres, on the Southern Pacific railway, showin fracture zone of 25′ to 50′ average and 80′ extreme width, in rhyol having a NS. strike, with dip of 60°, and a hematite gossan carry and silver. Upper workings at shallow depth show about 50,0 erous and argentiferous oxidized ores, amenable to cyaniding, at depth of 85′, to chalcopyrite, associated with pyrite, estim about 3.25% copper, and occasionally carrying as high as $3 Apparently the lens does not extend below a depth of about 500′

Equipment includes a 750-h. p. electric plant, with a 140-h. good for 1,000′ depth, and a 20-drill electric air-compressor. H 25 in number, include a 20x40′ wooden machine-shop, 30x50′ 20x30′ smithy, office, store, boarding-house and dwellings.

A small concentrator has Chilean mills, and there is a 100-to to treat the auriferous gossan. Survey was made, several years way from Lincoln to Van Trent. Property apparently has pr disappointing. Idle several years.

DAISY BELL COPPER-GOLD MINING CO.

Office: Butte, Mont. Letter returned unclaimed from for Whitehall, Jefferson Co., Mont. Malcolm Gillis, president. $600,000, shares $1 par. Lands, 8 miles from Whitehall, have a l ing ore giving assays up to $350 gold per ton, with fair coppe ar

increasing copper values at depth. Idle and presumably

LD & COPPER DEVELOPMENT CO. **MONTANA.**
rly at Whitehall, Jefferson Co., Mont. Described Vol. VIII.

LD & COPPER MINING CO. **MONTANA.**
rly at Whitehall, Jefferson Co., Mont. Described Vol. VIII.

CO. **IDAHO.**
e: Mullan, Shoshone Co., Idaho. Lands, 2 claims, area 40 iles east of the Hunter mine, carrying about 3,000′ of the veloped by several opencuts, showing rich surface ores carry- l values. Mine has a 35′ incline shaft, in a 5′ vein, and 2 1,050′ crosscut.

ET CO. **SOUTH DAKOTA.**
ucceeded by Continental Copper Mining & Smelting Co. ty, Pennington Co., S. D. Fully described Vol. VIII.

TS CO. **MICHIGAN.**
ck, Mich. Mine office: Houghton, Houghton Co., Mich. sident; Thos. Coughlin, vice-president; Chas. D. Hanchette, surer; Henry Z. Brock, superintendent; preceding officers, s. T. Healy, Frederick W. Nichols and Frank C. Mayworm, d Feb. 14, 1906, under laws of Michigan, with capitaliza- $10 par; fully issued.
ractional SW. ¼ of S. 35, T. 55 N., R. 54 W., area 160 acres, giving a total of about 220 acres of mineral rights, lying just ale mine, in the western limits of Houghton. Some explor- e, 1861, by an old company. This corporation was organ- any, to promote a townsite, but did some test-pitting, 1907, g, 1908, latter cutting an amygdaloidal bed carrying fair out 15′ and it is thought that the bed cut may have been the f the Pewabic or Quincy lode.

NG CO., LTD. **IDAHO.**
e: Wallace, Idaho. Geo. F. Stoney, president; W. W. t; Sidney Ferris, secretary and treasurer; preceding officers, d H. C. Topping, directors. Lands, on Pine Creek, have 2 ′ crosscut, planned to give a back of about 300′. Buildings forest fires of August, 1910.

MINING & MILLING CO. **UTAH.**
l unclaimed from former mine office, Lark, Salt Lake Co., on $2,500,000, shares $1 par. Has paid dividends of ; in July, 1901, and is controlled, through stock ownership, ines Co., and property is described under title of that com-

INING CO. **SOUTH AUSTRALIA.**
Leighs Creek, South Australia. F. Sutherland, manager, Lands, about 6 miles northeast of Yudnamutana, are very re vein in quartzite, carrying mainly malachite and azurite, ams of cuprite. Has steam power. Idle.

ARIZONA.
yrne Bldg., Los Angeles, Cal. Mine office: Bouse, Yuma J. Daly, president; Henry F. Daly, vice-president; Jos. A. nd treasurer; preceding officers, E. C. Daly and J. H. Clancy, . Haggott, engineer. Organized March, 1909, under laws pitalization $1,000,000, shares $1 par, nonassessable; issued, neeting, first Monday in March.
s, unpatented, area 270 acres, known as the Vulcan group, rsbach mine on the north and west, in the Plomosa district,

8 miles south of Bouse. Property carries 3 contact deposits, in
erous limestone, near contacts of altered andesite and quar
shows old workings, with opencuts and pits and shafts of 10′ t
oxidized surface ores. One ore body has new shafts of 30′, 50
400′ of workings, showing oxidized copper ores and chalcopyri
management to average 3% copper, 2 oz. silver and $1 gol
Vulcan No. 2 claim has a 50′ shaft, and a 100′ iron gossan, tra
carrying disseminated copper carbonates at several points. I
ment plans deepening shafts and doing churn drilling.

DALY MINING CO.

Office: care of Marcus Daly Estate, Butte, Mont. Lett
claimed from former mine office, Copperopolis, Meagher Co., M
1903, under laws of Arizona, with capitalization $1,000,000, to t
mining properties of the Marcus Daly Estate, in Meagher, Silver
& Clark counties, Montana. Properties in Meagher county
opolis, Daly, North Pacific, Darling Fraction and others. T
mines have 3 shafts, deepest 500′, with a good surface equip
small producers of high-grade ore for many years, but have been

DALY WEST MINING CO.

Office: 163 South Main St., Salt Lake City, Utah. M
City, Summit Co., Utah. J. Ernest Bamberger, president and g
H. G. McMillan, vice-president; J. Barnett, secretary; Herbert
ant secretary; W. S. McCornick, treasurer; preceding officers,
barth and John Dern, directors; P. L. Williams, Jr., general
Edw. L. Talbot, mine superintendent; Frederick W. Sherma
tendent; F. I. Williams, engineer.

Organized Feb. 14, 1902, under laws of Colorado, wit
$3,600,000, shares $20 par, and has been once reconstructed.
stock interest in the Little Bell Mining Co., an adjoining prope
2,800 shareholders. Corporation Trust Co., New York, North
Co., New York, and McCornick & Co., Salt Lake City, regis
Loan & Trust Co., Boston; North American Trust Co., New Yo
nick & Co., transfer agents.

Net earnings have been as follows: $843,886 in 1905; $8
$231,756 in 1907; $6,417 in 1908, and for 1909 there was a net
gross income shrinking from $1,521,288 in 1905 to $382,600 in 19
to end of 1910 were $6,201,000. Largest dividends were $1,3
and dividends were $378,000 in 1907, with none in 1908, but
resumed, Apr. 10, 1909, on the basis of 30 cents, quarterly, and
Sept. 20, 1910, when dividends were suspended, leaving $147
hand, Sept. 30, 1910.

Lands, 50 claims, patented, area 250 acres, in the Uintah di
the Daly West and Quincy mines, having extensive ore bodies c
erous and auriferous chalcopyrite, galena and sphalerite, with
values being mainly in silver and lead, with small copper values,
gold values. Lead ores are declining in value. Ore productio
about equally divided between smelting and concentrating gra
mainly the latter. The property has 3 principal veins, of 4′ to
up to 40′ maximum width. Upper workings are practically de
ble ore, and lower workings show mainly low grade ore, with c
centrating ore on the 1,700′, 1,800′ and 1,900′ levels, the mine h
to have about 3 years supply of milling ore blocked out, which a
serious overestimate. The main shaft is 1,920′ deep, and the m
miles of workings, an average of nearly one mile of new groun
yearly. Connection was made, October, 1909, with the 3-mile C
tunnel, on the 2,100′ level, giving much relief, as the bottom wo

npany pays $750 monthly rental for use of the drain tunnel. he Daly West and Daly-Judge ended July, 1910, when an ed providing for an extension of the Ontario tunnel, and the nected with the Daly West, November, 1910, for drainage ses. A number of leases, in force 1910, were revoked at the

ncentrator has crushers, rolls, automatic sorting belt, two 5′ d Wilfley tables, putting about 6 tons into 1, with an average ead and 70.5% silver, the practice being exceptionally ad- ful. The management decided, 1910, that available ore levels were insufficient to warrant the erection of a new mill. l, 56x82′ in size, 400′ northeast of the concentrator, has a 5′ regrinding, two 2-compartment jigs, 6 concentrating tables, slime, settling and classifying tanks, treating tailings at a per ton, when in operation. Water supply for both mills is act, from the Daly-Judge mine.

luction of the property was 3,160,824 lbs. fine copper, 4,382,222 oz. silver and 3,195 oz. gold, in 1903. Recent 830,307 lbs. copper, 12,150,000 lbs. lead, 1,200,857 oz. silver 1906; 673,890 lbs. copper, 8,051,386 lbs. lead, 1,042,062 oz. old in 1907, and 521,273 lbs. copper, 9,639,439 lbs. lead, l 644 oz. gold in 1909.

e reserves of high grade ore were depleted by undue crowding minating in the large forced production of 1903. Extraction num during the latter half of 1910, and about 150 men were , and the mill operated only single shift, with developments round, to provide ore reserves of concentrating grade. The ed, and shareholders have not been treated fairly, but the large producer, and probably can develop further consider- ade concentrating ore, though its palmy days have passed.

OPPER **GERMAN SOUTHWEST AFRICA.**

LTD.

uidated, voluntarily, February, 1903. Formerly at Wind- west Africa.

O. **MICHIGAN.**

onshire St., Boston, Mass. Mine office: Phœnix, Kewee- O. Burbank, secretary and treasurer; preceding officer, John eph H. Chandler, directors. Organized April, 1853, under ith capitalization $500,000, and reorganized with capital- hares $25 par. Is controlled, through ownership of 35,450 pitalization of 40,000, by the Calumet & Hecla Mining Co. levied assessments of circa $68,000.

, being the East ½ of Section 25, Town 58 North, Range 31 he north by the Arnold and on the other three sides by the ed 1851, never was a producer, and has been idle since 1857.

D & COPPER CO. **ALASKA.**

teenth Ave. North, Seattle, Wash. Mine office: Nizina, t, Alaska. J. W. Range, president; John F. Jury, secretary; ting engineer. Organized 1907, under laws of Washington, 1,000,000. Lands, 28 claims, 1 fractional, area 550 acres, area 560 acres, and two 5-acre millsites, on Dan and Copper Gulch. Lands, said to be fairly timbered, are in 3 groups, d group of 11 claims, showing a vein of 2 to 10′ width, carry- copyrite, slightly auriferous and argentiferous; the Seattle the Hardscrabble group of 6 claims, and the Nugget Placer ims, latter covering a mile and a quarter of the course of

Dan Creek, about 9 miles from Nizina, and circa 16 miles east
mine.

DANDY MINING & MILLING CO.

Dead. Formerly at Sandpoint, Bonner Co., Idaho.

DANES LEA MINING CO.

Office: San Diego, Cal. Mine office: Encinitas, San Dieg
C. Harland, president; W. H. McKinnon, manager. Lands, 2
east of Encinitas, with shafts of 100′ and 280′, also a tunnel, sh
of medium-grade chalcopyrite, traversing porphyry. Has gasol
for several years.

DANIA COPPER MINES.

Mine office: Undweni, Ngutu, Zululand, Natal. Lands, 57
Undweni River, about 30 miles from Vryheid. Property shows
16′ to 20′ width, traceable about 2 miles, carrying occasional b
high grade ore, opened by a 215′ shaft. There is a small mill, an
duction was secured, 1908. Property considered promising, tho
pective. Idle.

DANUBE COPPER MINING CO., LTD.

Office: 20 Lawrence Lane, London, E. C., Eng. Letter retu
from former mine office, Oraviczabanya, Majdan, Hungary.
Bart., chairman; preceding officer, J. Weller, R. S. Simpson an
directors; G. Thompson, secretary. Organized Dec. 11, 1907
Great Britain, with capitalization £1,000, shares £4 par, subs
shares, January, 1908, and capitalization increased, circa 190
shares £1 par; issued, £75,357. Lands are 60 copper claims
Consolidated Gold Trust, Ltd. No trace of operations secured.

DANVILLE & VIRGINIA COPPER MINING CO.

Dead. Was merged, 1903, in Carolina King Mining Co
Virgilina, Halifax Co., Va.

DARBY MINING & MILLING CO., LTD.

Office: Mullan, Idaho. Mine office: Superior, Missoula Co
Pooley, president; M. J. McHugh, secretary; preceding officer
S. C. Bean and Jas. Gormley, directors. Lands, 3½ miles north
in the Carter camp, have 2 tunnels, lower 720′, and a 50′ incline sh
carrying a little copper and galena, assaying 5 to 7% lead, with go

DARGIN & RICHARDSON.

Office and mine: Unión de Tula, Autlán, Jalisco, Mex.
tenencias, 7 miles southwest of Ayutla, showing a fissure vein of
in diorite, carrying argentiferous oxides and carbonates, associa
tite. Has a 130′ shaft and 325′ crosscut tunnel, with some ore
stoping. Presumably idle.

DARNELL MINING & MILLING CO. W

Dead. Formerly at Kalama, Cowlitz Co., Wash. Describ

DARRINGTON-INDIANA MINING CO. W

Dead. Formerly at Darrington, Snohomish Co., Wash. Desc

DARWIN SYNDICATE PROSPECTING ASSOCIATION.

Office and mine: Gormanston, Montagu Co., Tasmania.
legal manager; J. Souter, manager. Mine, developing by tunn
of 3 men, at last accounts, has a large body of schist, carrying c
pregnations, and a small vein carrying covellite, from which a 1
ment, to the Mount Lyell smelter, 1908, returned about 12% co

DAVID HARUM COPPER CO.

Office: 30 Broad St., New York, N. Y. Mine office: Van
Co., Texas. Organized 1901. Lands, in the Diablo Mountain
of Van Horn, showed a 12x40′ pothole, carrying good ore, which
quickly. Idle some years and apparently moribund.

A COPPERS, LTD. **TRANSVAAL.**

at Zoutpansberg, Transvaal. Described Vol. VIII.

ER CO. **MONTANA.**

lway, New York, N. Y. Mine office: Butte, Silver Bow
tus Heinze, president and chairman of the board; John L.
ent; preceding officers, F. A. Schirmer, H. M. Burton and
tors; W. M. Bacon, manager; Albert Frank, consulting
Sept. 14, 1908, under laws of Maine, as successor of Davis-
Co., with capitalization $6,700,000, shares $10 par, assess-
0, paid, $9. Metropolitan Trust Co., New York, and Inter-
oston, transfer agents; Colonial Trust Co., New York, and
oston, registrars.

xchanged its stock for shares of the Davis-Daly Estates
er share, marking its stock $7 paid, and has since levied $2
March, 1911, stock was selling at $1.50 per share, the share-
rotten company having thrown good money after bad in
mething from the wreck. Shareholders of the old company
ew stock were given a 50-cent dividend, in liquidation, and
ahead of those who went into the reorganization.

tatement of June 30, 1910, credits as an asset a $1 assess-
as an asset the right to levy $1,200,000 additional assess-
olent bookkeeping, brings out a surplus of $544,888.53 on
nditures for the year of $444,723.48. The company was
1910, to have $400,000 in cash assets, but under the man-
ze, it is impossible for shareholders to be sure of anything,
hat they will get the worst of it.

hapters in the history of the rotten financing of this com-
erred to the description in Vol. VIII. of the Davis-Daly
the predecessor of this corporation, and under the same
riginal company was singularly successful in blending the
ods of high finance, bunco-steering, porch-climbing and
er known form of larceny, petty and grand. The old com-
ed with $2,000,000 cash, but actually had $500,000 cash,
ement with the promoters, by which those persons could
treasury at $15, when it was selling higher, and put it back
elling lower, and advantage was taken of this to return the
ing at $5. The original company had defective titles, par-
ther form of titular trouble known to mining science, the
Copper Co. never owning more than a six-elevenths un-
ost of its properties, which unpleasant fact was assid-
m shareholders, until after the smash.

e organization of the present company, a private syndicate,
secured the stock for the benefit of their own pockets, and
hareholders, but some of these insiders learned that other
g out," and suit was brought, with much consequent dam-
of all concerned, except to such as had no reputations to be
ze was accused, 1909, by Newman Erb and Samuel L.
ctors, of misusing the funds of the company, and the airing
ed in smirching the reputations of Messrs. Erb and Jarvis,
reputation absolutely unchanged.

were up in arms, early 1911, because Mr. Heinze had
nt of the company's funds in gold claims in the Porcupine
, which deal was typical of Mr. Heinze's methods. Mr.
,000, in January, 1911, on these claims, and agreed to make
nthly, until a total of $200,000 was paid. Mr. Heinze's
ting shareholders was that he intended to make a public

flotation of the Porcupine property, in which case the Davis-Da
get its money back, and possibly a profit — that is, if the ventu
Mr. Heinze had agreed with the Davis-Daly directorate, which
under his thumb, though it now contains 3 new men, Messrs.
and Bancroft, who have had no part in the disgraceful larce
company has been victimized, to give the company one-thir
profit in the Porcupine deal, which was very kind of him, co
company took all the chances of loss, and furnished all the ca
that if the Porcupine deal is profitable, the Davis-Daly will ge
the stick, while if it is unprofitable, there will be another heav
on the books, but this easily can be made right, on the books,
it, as an asset, the right to levy further assessments on those
burden, the shareholders of the Davis-Daly Copper Co.

The Davis-Daly cash apparently also has been used for
Ohio Copper Co., another weak-kneed concern under Mr. Hei
the Davis-Daly having been mulcted for a $50,000 loan to the
thrice-unfortunate Davis-Daly treasury has been tapped for m
working bond on a gold property in Alaska. Just before the las
levied, Mr. Heinze stated that none would be levied, but at tha
visited Porcupine. Davis-Daly shareholders are reasonably
lating themselves on the prospect that no matter what happe
they will get the quills.

Lands are said to be 490 acres, but the Heinze methods
extremely devious that no confidence can be placed in any s
and, in view of the revelations regarding the titles of the origi
possible only to describe the lands held, or claimed to be held,
with the notation that titles presumably are defective, def
crooked financing being Mr. Heinze's specialties.

The original company held merely a six-elevenths undi
most of its properties, but at the time of reorganization Mess
Jos. A. Coram and Chas. R. Leonard, the promoters, very g
to donate an additional undivided fourth interest in the Daly
seems the original Davis-Daly never owned, and presumably
guished prestidigitateurs named "held out" at the time of the
feeling that the public was getting entirely too good a thing in o
as six-elevenths of what the public thought it was getting.
fourth undivided interest in the Daly Estate was given, as pro
sumably was the case, unless the promoters changed their mind
pany would now have the same, unless it has been deprived of
arrangement of the sort of which Mr. Heinze is so prolific; and
pany does own the additional fourth interest, and same has n
abstracted, taken away, set aside, put across, hypothecated,
mislaid or loaned, the company would now be in full possession,
undivided interest of thirty-five forty-fourths in the Daly E
being impossible to say what the company does or does not ow
lands, the management being the same as that of the preceding
was a deliberate swindle, and never owned what it claimed to o
description is given of what the Davis-Daly Copper Co. is suppo
ulous, to own.

Lands, circa 490 acres, lying to the south and west of the pro
of Butte, though very close thereto, stretching over an are
one-half mile wide by 1½ miles long, including old properties
yielded profits of $2,000,000, these figures apparently being est
to be received cum grano salis. Property also includes, or is sup
the Owsley ranch, and water-rights. The mines were idle from
taken over by the predecessor of the present company. The mi

ng June 30, 1910, are alleged to have made 8,209′ of new

operty is the Colorado mine, having a 1,850′ three-com- bottom level at 1,800′ and claimed to have 14,362′ of 09. The 1,700′ level shows a vein of 2′ to 6′ width, with payable ore, but ore is mainly 3% or under in copper tenor, hstanding much loud talk, has no considerable bodies of ped, and is with rather indifferent prospects of finding any. and south show several veins having bunchy values in sinc. Equipment of the Colorado includes an 80′ steel ant with four 150-h. p. boilers, a 20x48″ Webster, Camp & st, good for circa 3,000′, and an electric air-compressor. mine consists of one city lot, circa 50x165′ in size, with a ne vein on the 500′ level. The former plant has been dis-

mine has a 300′ three-compartment shaft, north of the perated by lessees, the mine showing, at 175′ depth, a 7′ to 5.6% in copper tenor, ore being strongly argentiferous, e.

iah mine has a 640′ three-compartment shaft, and a cross- ven to the Mount Moriah from the 1,800′ level of the Orig- casional stringers of ore, and leached veins, apparently value having been developed by the crosscut, notwith- hes of trumpets in the press.

about a quarter-mile east of the Colorado, has a 100′ shaft med to show a 30′ vein carrying up to 8% copper, and was ees, under a 25% royalty, producing a little good silver ore. aim was worked, 1908, in a small way, by lessees.

cured, 1910, a franchise for a tramline through the streets of which was held up by an injunction, and, after the in- d, the management found that the tramline was not needed, hip.

, included a little copper and considerable silver, taken out s suspended, 1907, and resumed June, 1908. Production, . fine copper, and apparently no production was secured in vas closed down, early 1911. Notwithstanding great talk n, from time to time, no material production has been se- ough lack of ore, though the property always, just previous ows enormous ore reserves, these going into cold-storage patient shareholders have been parted from their money. said to have spent $1,800,000 in Butte, but how much was nd how much otherwise, is a question. The company ed to get through a great deal of money, considering that luring 1910 apparently were only $8,000 to $10,000 per ers' protective committee is asking for voluntary contri- e matters.

Davis-Daly Copper Co. is operated mainly as an assessment s and their money, for the benefit of Mr. Heinze's mining l pocket. The directorate now includes some new men, ast rascalities, but it is difficult to understand how the old ccessful in keeping out of jail, in view of what they have e "done," and the brazen manner in which their rascalities

TES COPPER CO. **MONTANA.**

vindle. Was succeeded, October, 1908, by the Davis-Daly nal dividend, in liquidation, of 50 cents per share, to holders

of 40,000 shares of stock, who refused to be cajoled into the ne by showing belated wisdom on their part. Formerly at Butt Mont. Very fully described Vol. VIII.

DAVIS MINING & SMELTING CO.

Dead. Formerly at Halleck, San Bernardino Co., Cal. D

DAWES RANGE COPPER & GOLD MINING CO. OF QUEENSLAND, N. L.

Dead. Formerly at Glassford Creek, Queensland. Desc

DAWSON MINING CO.

Dead. Former office was El Paso, Tex. Officers were I president; H. S. Roper, superintendent; Francisco Galleg custodian. Lands, adjoining the Harris Copper Co., were s 1908–1909. Carlos Soto was appointed receiver, April, 19 creditors. Formerly at Moctezuma, Sonora, Mex.

DAY DREAM & BRETONARTE COPPER MINING CO.

Mine office: Leighs Creek, South Australia. F. M. Mc at last accounts. Has steam power. Idle some years and app

DEADWOOD GOLD & COPPER MINES CO. S

Dead. Formerly at Deadwood, Lawrence Co., S. D.

DEATH VALLEY COPPER GLANCE MINING CO.

Office: 407–346 Fourth Ave., Pittsburg, Pa. Letter re from former mine office, Greenwater, Inyo Co., Cal. Capitali shares $1 par. Claimed, early 1907, to have nearly $15,000 i velopment purposes, but it cannot be found that any wor Lands, 6 claims, known as the Poorman group. Entire camp less; idle several years and moribund.

DEATH VALLEY COPPER MINES & SMELTING CO.

Mine office: Greenwater, Inyo Co., Cal. Jerry Rourke accounts. Lands are said to comprise several hundred acr numerous pits and shallow shafts. Idle and presumably mor

DE BORGIA COPPER MINING CO.

Office: Mullan, Idaho. Mine office: De Borgia, Missoula Weiand, president; O. W. Lewis, vice-president; C. H. Clod treasurer; preceding officers, A. O. Ott and T. S. Hogan, dir Goat Mountain, show a 6′ fissure vein, carrying argentifer conite and bornite, with quartz gangue. Development is by tunnels, upper 350′, with back of 350′, lower having a 400′ back.

DECATUR COPPER MINING CO.

Office: 503 North Main St., Decatur, Ills. Letter return former mine office, Jerome, Yavapai Co., Ariz. W. J. Wayne, P. Wills, vice-president and treasurer; Geo. R. Bacon, secr 1907, under laws of Arizona, with capitalization $2,000,000, sha 10 claims, area 180 acres, also a 10-acre millsite and 10-acre sr south of Jerome, in the Verde district, claimed to show 10 fissur of which 4, slightly developed, are claimed to have an ave giving average assays of 5 to 8% copper, 20 oz. silver and $10 g figures are too high. Has 6 shafts, deepest 280′, and tunne Idle since circa 1904, treasury bare, and practically moribund

DECKER CANYON MINING CO.

Office: Provo, Utah. Mine office: Heber, Wasatch C Buckner, president; John E. Peay, vice-president; P. P. Hin and treasurer. Organized March, 1909, under laws of Utah, v $50,000, shares 5 cents par, assessable. Stock is listed on the S. Lands, 12 claims, unpatented, in Decker Cañon, south of th mine, 3 miles from Heber, having a 75′ shaft and 1,100′ of argentiferous and auriferous lead and copper ores, in small q

MINING CO. WISCONSIN.
at Superior, Douglas Co., Wis. Described Vol. VIII.
. UTAH.
at Bingham Canyon, Salt Lake Co., Utah. Described

MINING CO. NORTH CAROLINA.
Point, Guilford Co., N. C. W. G. Gaither, manager, at
pened many years ago, has auriferous and argentiferous
years.
LOPMENT CO. UTAH.
rican Fork, Utah Co., Utah. John Cleghorn, president;
ry. Organized, 1903, with capitalisation $125,000, shares
claims, in the Deer Creek district, showing a fissure vein
idth, carrying ores assaying up to 22% copper and 7 oz.
me years.
& COPPER MINING CO. WASHINGTON.
at Silverton, Snohomish Co., Wash.
OLIDATED MINES, LTD. MONTANA.
dated, voluntarily, 1910. Formerly at Anaconda, Deer
escribed Vol. VIII.
ER CO. ARIZONA.
er, Yavapai Co., Aris. Presumably idle.
DEFENSO y TODOS SANTOS. CHILE.
al, Antofagasta, Chile. Daniel Olivia, superintendent,
mine is a small producer of slightly auriferous copper ore.
MINES, LTD. TRANSVAAL.
t Barberton, Middelburg, Transvaal. Described Vol. VIII.
ER REFINING CO. NEW JERSEY.
eded, Oct. 15, 1906, by United States Metals Refining Co.
Middlesex Co., N. J. Very fully described Vol. VI.
MINING & MILLING CO. UTAH.
e sold, 1903, to Utah Copper Co. Formerly at Bingham
., Utah. Described Vol. III.
MICHIGAN.
u Mining Co., at Delaware Mine, Keweenaw Co., Mich.
CO. MICHIGAN.
at Delaware Mine, Keweenaw Co., Mich. Exhaustively
f Oneida, Vol. II.
OLIDATED MINING CO. ARIZONA.
at Red Rock, Pinal Co., Aris. Described Vol. VIII.
CO. MÉXICO.
ercantil, Tercera Piso, México, D. F. Mine office: Chil-
errero, Mex. Paul Merienne, superintendent, at last
ude the Delfina, Argentina and Esperanza mines, carry-
uriferous copper ores. Equipment includes steam power

DATED COPPER CO. NEVADA.
l Bldg., Salt Lake City, Utah. Letter returned unclaimed
e, Bullion, Elko Co., Nev. Perry D. Delmas, vice-pres-
ager. Organized circa July, 1908, as a reconstruction of
nds, in Leigh Cañon, are 7 miles east of Evans, the nearest
be extensive. Property shows a 30′ fissure vein of high
e, and contact deposits in wollastonite, near granite, esti-
dth. Development is by a 170′ tunnel, planned to give a
of 1,600′. Mine is claimed to show 6′ of ore assaying up
, silver and $9.60 gold per ton, which figures are too high

for credence. Shipments of 20 carloads of ore, previous to end to have given average returns of 10.5% copper and 70 oz. silve erty considered promising. Presumably idle.

DELMAS COPPER CO.

Dead. Was succeeded, 1908, by Delmas Consolidated C merly at Lee, Elko Co., Nev. Fully described Vol. VIII.

DEL NORTE COPPER CO.

Dead. Formerly at Kirkland, Yavapai Co., Ariz. Desc

DEL NORTE COPPER CO.

Dead. Formerly at Smith River, Del Norte Co., Cal.

DEL ROY COPPER MINING & SMELTING CO.

Dead. Was a fraud, promoted from El Paso by Wm. Moe H. F. Kettler, M. D. Gaylord and others. Sold stock on stren purchase sundry lands. Formerly at Alamogordo, Otero C described Vol. VI.

DEL VERDE TUNNEL CO.

Office and mine: 317 First National Bank Bldg., Ogden, Francis L. Woods, vice-president and general manager; C. H. and treasurer; preceding officers, Moroni S. Poulter, B. F. Crit Porter, directors. Organized January, 1908, under laws of Ut ization $200,000, shares 10 cents par, assessmen half cent yearly. Was a merger of the Utah Buckhorn Minin County Mining & Milling Co.

Lands, 18 claims, area 300 acres, being the Weber group of Buckhorn group of 10 claims, in Coldwater Cañon. Property and limestone, carrying 2 ore bodies, of 5′ to 20′ reported width able 6,000′, estimated by company to average 2% copper, 1 t $1 to $3 gold per ton. Mine shows a limited amount of oxidize chalcopyrite, with a paystreak carrying bornite. Developme of 40′, 80′ and 425′. Has no power equipment. Idle several to resume, late 1911.

DE MIER COPPER CO.

Office and mine: Alamogordo, Otero Co., N. M. John F ident; O. G. Cady, vice-president; E. D. McKinley, secretar Organized Aug. 4, 1910, under laws of New Mexico, with capital shares $1 par, nonassessable. No trace of operations secured.

DEMING SMELTER.

Owned by National Mining & Smelting Co., at Deming, Lu

DEMOCRATA CANANEA SONORA COPPER CO.

Office: 815 Fourth National Bank Bldg., Cincinnati, Oh La Cananea, Arizpe, Sonora, Mex. H. H. Hoffman, presider C. E. Hoffman, vice-president and general manager; Herbert retary; Wm. Harris, smelter superintendent; H. S. McKay, e ized May 8, 1905, under laws of Arizona, with capitalization $ $10 par; issued, $2,800,000. Central Trust Co., Cincinnati, re meeting, last Tuesday in May.

Lands, 18 hectares, lying between the Capote and Veta Gra of the Greene Cananea mines. Development is by an 800′ 3,000′ crosscut tunnel and a 500′ shaft, latter with collar at giving an advantage of circa 800′ in depth, as compared with Capote shafts. Mine has 2 miles of workings, estimated to sh tons of ore, averaging 6% copper, with combined gold and silve $3 per ton, which estimate is too high.

Equipment includes three 80-h. p. hoists, two 120-h. p. hois Sullivan air-compressor. There are 15 buildings, including a shop, 15x25′ carpenter-shop, assay office, warehouse and genera

blast-furnaces of 125 and 250 tons rated daily capacity, matte, formerly sent to the Greene Cananea works for production was 3,747,820 lbs. fine copper in 1903, with a 37,532 lbs. in 1906, and 3,067,039 lbs. copper, 94,434 oz. in 1907. Mine considered valuable, though small. Idle

ING CO. MÉXICO.
ceeded, 1905, by Democrata Cananea Sonora Copper Co. nea, Arispe, Sonora, Mex. Described Vol. V.
OPPER CO. ARIZONA.
National Bank Bldg., Duluth, Minn. Mine office: Bis- Martin Pattison, president; A. Guthrie, vice-president; treasurer; Byron M. Pattison, superintendent; preceding n, Archibald M. Chisholm and Maurice Denn, directors; retary. Organized Jan. 14, 1907, under laws of Minnesota, Arizona Development Co., with capitalization $3,500,000, sued.
patented, area circa 200 acres, immediately north of the Superior & Pittsburg. The Dividend fault traverses the about 1,000′, and big ore bodies have been found on adjoin- this fault. Mine has a 1,600′ shaft, started in con- rating limestone at 840′, with upwards of a mile of ′ and 1,100′ levels show considerable leached ore, but little gh carrying occasional small bodies of rich cuprite. The s also show large areas of leached ore, with some low grade ′ level, and a little native copper on the 1,350′ level. The e ore of 12 to 15% copper tenor. Management estimates re developed, almost exclusively oxides and carbonates, at ntly some good ore bodies may be developed at 1,800′ or e is erratic. Work was resumed March, 1909, after nearly but the pumps were pulled December, 1910, and mine though resumption is planned for an early date in 1911. l has a 1,000-gallon triple-expansion pump on the 1,000′ gallon sinking pumps. Some diamond drilling was done, level, apparently with negative results.
n the Lee claim has a temporary hoist and a 6-drill Sullivan

des a 1,600-h. p. steam plant, with 6-drill and 25-drill ors, and an 18x36″ Ottumwa Corliss first-motion hoist, ages. Buildings include an 18x24′ carpenter-shop, 18x24′ her structures. There is a railroad spur to the mine.
, was 99,222 lbs. fine copper and 41 oz. gold. Company very strong shape financially, at the end of 1910. Not- ly negative results secured so far, the property is considered fair prospects of finding good ore bodies at greater depth.
EVELOPMENT CO. ARIZONA.
ganized Jan. 14, 1907, as Denn-Arizona Copper Co. For- ise Co., Ariz. Fully described Vol. VI.
D & COPPER MINING CO., LTD. MONTANA.
Idaho. Letter returned unclaimed from former mine Co., Mont. Oscar Nordquist, president and treasurer; resident and manager; Walter H. Hanson, secretary; pre- Foreman, Mrs. S. M. Ault and J. Love, directors.
well timbered, about 3,000′ northeast of the Bullion mine, Development is by 2 tunnels and a 158′ shaft, showing pper 400′ tunnel shows mainly silver-lead, with small

quantities of chalcopyrite, in a vein of 2′ to 4′ width. The lo
tunnel has a 150′ blind shaft, and 600′ of drifting, on a vein
chalcopyrite, with some argentiferous galena, and gangue of
giving assays of 14% copper, 40 oz. silver and $2 gold per ton
Equipment includes water power with 3,000′ of flume and
with an air-compressor and hoist, and there are several small

DENORO MINES, LTD. BRITI

Dead. Lands were sold June, 1906, to British Columbia
Formerly at Eholt, Trail district, B. C. Fully described Vol. V

DENVER COPPER MINING & LEASING CO.

Mine office: Morrison, Jefferson Co., Colo. Everett B.
and treasurer. Capitalization, $1,000,000, shares $1 par. Land
Cup Creek district, also coal claims. Idle some years and appar

DENVER & GLOBE MINING & SMELTING CO.

Dead. Formerly at Globe, Gila Co., Ariz. Described Vo

DENVER GROUP GOLD & COPPER CO.

Office: 319 Douglas Bldg., Los Angeles, Cal. Letter ret
from former mine office, Wickenburg, Maricopa Co., Ariz. Tho
president. Capitalization $2,000,000, shares $1 par. Lands, 10
area 194 acres, 12 miles northeast of Wickenburg, showing a
of 80′ to 300′ width, traceable 6,000′, having scattered pa
stringers, opened by 5 prospecting shafts, and tunnels of 225′ a
occasional native copper and sulphide ore assaying up to 15%
gold per ton. Idle since circa 1904, and apparently moribund.

DENVER & ROCK ISLAND MINING CO.

Letter returned unclaimed from former mine office, Mulla
Idaho. Mine has a shaft of circa 100′, showing ore assaying u
with a good wagon-road from the mine to nearest railway. T
of about 35,000′ board measure daily capacity. Idle and presu

DERBY COPPER SYNDICATE.

Dead. Formerly at Derby, Western Australia. Describe

DERBY SYNDICATE, LTD.

Dead. Was liquidated, voluntarily, July, 1902. Formerly
ern Australia.

DERWENT PROSPECTING ASSOCIATION.

Office: Hobart, Tasmania. Mine office: Leina, Devon
E. H. Butler, chairman. Lands, 24 miles from Leina, in the Cr
include the Derwent, Cradle Mountain and Lake Windermere
large quantities of low grade ore, occurring as stockwerks in
Property is estimated, by Dr. Fritz Noetling, to show 2,000,00
surface, which possibly may be the case. Company also had pr
wood, on the Whyte river, which was forfeited as valueless. Pr

COMPAÑÍA MINERA y FUNDIDORA DESCUBRIDORA.

Is the Mexican incorporation of the Descubridora Mining

DESCUBRIDORA MINING & SMELTING CO.

Office: 17 Battery Place, New York, N. Y. Mine office: C
Durango, Mex. H. L. Albridge, general manager; D. Gough,
Property is the Mina Descubridora, an antigua, carrying large q
low grade basic silver-copper carbonates, requiring silicious or
produced by the company's mines. Mine has a 500′ shaft. Equ
steam and electric power. A former 600-ton smelter was dismar
ment sold. Property was leased for several years, until 1908, to
Exploration Co. Forces are about 75 men, and ore is sent to the
Production was 4,964,272 lbs. fine copper in 1903, but thereaft
smaller, and production, 1909, is estimated at circa 750,000 lbs.

GAÑO DE PABELLÓN DE PICA. **CHILE.**
Chile. Mine office: Pica, Tarapacá, Chile. Organized laws of Chile, with capitalization £25,000, shares £1 par. secured. Presumably moribund.

& REDUCTION CO. **CALIFORNIA.**
h Second West St., Salt Lake City, Utah. Mine office: ino Co., Cal. Lands, 9 claims, being 3 copper claims and 6 rom Leastalk, in the New York Mountain district. Prop- of workings, showing auriferous and argentiferous copper s, and a 650′ tunnel is planned, management also planning ver to operate the mine and irrigate desert land in the accounts, but planned resumption.

MINING CO. **UTAH.**
National Bank Bldg., Salt Lake City, Utah. Mine office: , Utah. John C. Sharp, president and treasurer; L. L. Lar- scar W. Moyle, secretary. Organized circa 1907, under laws zation $25,000, shares 5 cents par, assessable; issued, circa ims, unpatented, 8 miles from Wendover, carrying argenti- ores. Mine, slightly developed, has several shallow shafts.

AIN COPPER KING MINING CO. **UTAH.**
at Eureka, Juab Co., Utah. Described Vol. VIII.

INING CO. **UTAH.**
at Lucin, Box Elder Co., Utah. Described Vol. VIII.

OPPER MINING CO. **ARIZONA.**
rtzite, Yuma Co., Ariz. Organized circa May, 1907, under capitalization $1,000,000. Lands, 11 claims, in 2 groups, nnels, intersecting veins at 300′ to 500′ depth, with 600′ odies. Has a 40-h. p. gasoline engine, air-compressor and as been under development since circa 1902. Ores have of 10% copper, 25 oz. silver and $12 gold per ton.

CO. **ARIZONA.**
Broadway, New York, N. Y. Mine office: Middelton, ohn L. Elliott, president; Cyrus Robinson, vice-president; y; preceding officers, Francis Risk, LeRoy T. Harkness rectors. Organized January, 1905, under laws of New tion $100,000, shares $100 par. Bonds, $1,000,000 author- $500,000. Is controlled, through ownership of practically Consolidated Arizona Smelting Co.
, area 1,400 acres, circa 40 miles southeast of Prescott tween Crown King and Mayer, in the Peck district of the carrying 6½ miles of the strike of a very persistent copper rocks, of porphyry and quartzite, carry 5 parallel veins, aving cuprite, melaconite, malachite, azurite, bornite and istose gangue, all carrying fair values in copper, gold and

y 2 tunnels, the Copper Link of 800′, and the Hot Num- tter 400′ vertically lower than the former, with a back of e tram-track laid with 20-lb. steel rails. Mine has about 2 owing a considerable amount of medium grade ore. A tram connects the mouth of the Hot Number tunnel with the railway.
t includes two 80-h. p. boilers and a 24-drill Ingersoll- or. There are 9 miles of air and water pipes.
frame concentrator has 2 Blake crushers, 2 centrifugal s, 2 Hancock jigs, 16 vanners, 16 Overstrom tables and 8

Production was 1,128,327 lbs. fine copper, 19,259 oz. silver a in 1906; and 1,016,000 lbs. copper, 22,216 oz. silver and 933 o Mine has large ore bodies, though of low grade, and is consi Idle since 1908.

DESPATCH COPPER-GOLD MINING CO.

Letter returned unclaimed from former office, Denver, Colo Morrison, Jefferson Co., Colo. Henry Appel, president; Geo. C president and superintendent; R. A. Gurley, secretary and tre Deemer, managing director. Organized Apr. 12, 1903, with $150,000, shares 10 cents par. Lands, 8 claims, patented, adjoini D. Copper Mining Co., circa 10 miles west of Morrison, opened b ing stringers of ore assaying 9 to 14% copper. District appa developed continuous ore bodies of fair size. Idle several years moribund.

DESSIE BOYER COPPER-GOLD MINE, LTD.

Dead. Formerly at Vontrigger, San Bernardino Co., C Vol. VIII.

DETROIT & COLORADO MINING CO.

Mine office: Silverton, San Juan Co., Colo. L. W. Partri Has auriferous and argentiferous copper ores, with electric power

DETROIT COPPER MINING CO. OF ARIZONA.

Office: 99 John St., New York, N. Y. Mine and works off Graham Co., Ariz. Employs about 1,000 men. Dr. Jas. Doug Cleveland H. Dodge, vice-president; Geo. Notman, secretary Chas. E. Mills, general superintendent; M. H. McLean, mine s G. E. Hunt, mill superintendent; H. S. Van Gorder, supply a superintendent; L. R. Wallace, metallurgist; J. B. Flemin engineer.

Organized under laws of Michigan, with capitalization $1,0 $25 par. Is controlled, through ownership of entire stock issue, by & Co., Inc. Net earnings in recent years have been as follows 1903; $603,340 in 1904; $532,684 in 1905; $973,456 in 1906; $81 $1,074,296 in 1908; $1,153,269.66 in 1909. Company ended 1909 of $2,220,405.77. Paid $480,000 dividends in 1908, and $760,000 i dends, 1897-1909, of 3¾ to 110% yearly, aggregated $4,817,500.

Lands are extensive, including the Ryerson, Arizona Central, tain, Yankee, West Yankee, Montezuma and Santa Rosa mines Morenci. Ores are mainly sulphide, with but trivial gold and silv are highly silicious, with gangue carrying up to 40% alumina, hen careful handling. Production is about half oxidized and half sulp about 95% of the output is ore of concentrating grade, with an aver of 35 to 40 lbs. fine copper per ton. For 1909 smelting ore ave copper, and concentrating ore had an average assay of 3.106% co

The mine, opened circa 1880, was first worked opencast, but oped by tunnels and shafts, deepest workings being only about 400 system was adopted, 1909, where feasible, but the square-set sli used in other portions of the mine, the caving system, which is n for the entire mine, giving a reduction of about 40% in mining ore-bin at the Ryerson mine is connected with the mill by belt-conv

Gas power is employed for practically all machinery except h motives. A Loomis generator, with capacity to supply gas for de h. p., consumes New Mexico bituminous coal, giving an efficiency horse-power-hour from 1.5 to 1.75 lbs. coal. The 64x200′ power- frame on concrete foundations, has Crossley gas-engines aggregati This plant includes three 100-h. p. engines driving blowers that with the furnaces by a 300′ blast-main; a 500-h. p. air-compres

bs. pressure only, and two 200-h. p. 250-volt electric gen-
rent that is stepped up to 2,500 volts at the power-house,
wires to a second set of transformers at the West Yankee
lown to 250 volts, and distributed to the various mines.
te electric lighting plant.
ncentrator, having two 650-ton units, is 166x240′ in size,
,000. Equipment includes Chilean mills, 6 sets of 16x42″
ens, 80 Frue vanners, 40 Wilfley tables, and Deister tables.
7 tons into 1. A pumping station 6 miles distant raises
e San Francisco River to a height of 600′, whence it is fed
which uses about 4,400 gallons per minute, with a consump-
nly about 80 gallons per minute, new water being supple-
ter from an ingenious and highly efficient settling system,
t, that includes concrete tanks and settlers, a steel dam,
s. A 14,000′ launder was built, 1909, along Chase Creek
ngs from the mill to impounding reservoirs on the slopes
orenci Cañon. The bursting of the company's dam, 1906,
s, aggregating $250,000, which were dismissed, in the Pima
910. In 1909 the mill treated a daily average of 1,293 tons,
1, with a saving of 78% of the assay values, tailings aver-
and concentrates assaying 15.85% in tenor, one ton of
d with 332 gallons of water, which is a remarkably low

pling mill is connected with the concentrator by a 400′
riments, 1904, with oil concentration, did not lead to the
ss.
one 42x264″ and four 54x144″ blast-furnaces, and a con-
Flue dust is briquetted for resmelting. The smelter has
rmounted by a steel railroad trestle.
way connects the mines and smelters with the Arizona &
at Guthrie, this line having a maximum grade of 3.5%,
s within an air-line distance of 1½ miles, near Morenci.
gfellow Hill, completed 1909, gives direct rail connection

rates a large department store, and an excellent hotel, and
ymnasium and clubroom for employés.
n has been as follows: 14,692,421 lbs. fine copper in 1905;
; 17,346,411 lbs. in 1907; 24,223,172 lbs. in 1908; 24,347,210
t 23,000,000 lbs. in 1910. The property is managed with
artments, and is an exceptionally fine example of a suc-
e.

SUPERIOR COPPER CO. CONNECTICUT.

Waterbury, New Haven Co., Conn. Is a half owner of
Superior Smelting Co., which bought the plants of the
or Copper Co. at Hancock and Dollar Bay, Houghton Co.,
er at Detroit, 1850, and shortly after built another at
oneer in Michigan smelting.

E EXPLORATION CO. WASHINGTON.

win Bldg., Detroit, Mich. Mine office: Oroville, Okano-
. Kelsey, president; Chas. E. Kanter, vice-president; Mil-
ary and treasurer. Organized June 1, 1908, under laws of
alization $3,000, shares $10 par. Lands, 15 claims, area
ter site, showing Carboniferous limestone resting on gray-
chalcopyrite giving assays up to 15% copper. Property
ored by diamond drilling, last work, 3 holes, of circa 1,000′
ng been done 1910.

DETROIT & PARRY SOUND MINING CO., LTD.

Office: 311 Wetherbee Bldg., Detroit, Mich. Mine offi
Parry Sound district, Ont. W. A. Phillips, president; H. C.
dent; E. A. Covell, secretary. Organized June 3, 1903, un
Dakota, with capitalization $3,000,000, shares $1 par; issued
$490,750. Lands have given specimens of ore assaying wel
some years.

DETROIT QUO VADIS COPPER CO.

Dead. Formerly at Moctezuma, Bravos, Chihuahua,
Vol. VIII.

DETROIT SONORA MINING CO.

Office: Detroit, Mich. Letter returned unclaimed from
La Cananea, Arizpe, Sonora, Mex. M. H. Gilbert, president;
secretary; F. O. Bostwick, vice-president and general ma
circa 1906, under laws of Arizona, with capitalization $1,000,0
Lands, 3 groups, area 214 acres, about 25 miles from La Cana
tunnel on the Abigail claim, said to show 200′ of medium gra
eral years and apparently moribund.

DEVELOPMENT COMPANY OF AMERICA.

Office: 11 Pine St., New York, N. Y. Mine office: To
Co., Ariz. Hon. Frank M. Murphy, president; preceding offi
H. M. Robinson, C. A. Griscom, Jr., John Hertzler, Ruthe
Gustav Baumann, J. H. Emmert, Jas. L. Wolcott, Temple E.
nell and Victor L. Mason, directors; J. J. Wragovich, secret
Organized Nov. 23, 1901, under laws of Delaware, and capita
1906, to $5,000,000, and again increased, 1908, to $7,000,000.
second Tuesday in January.

Debentures, $5,000,000 collateral 6% gold bonds, due J
standing $3,718,200, on Jan. 1, 1910. Is in default on interest,
1910, asked its stockholders to loan the company 51% of thei
vide collateral for financing the corporation.

This corporation is a holding company only, controllin
stock ownership, the Tombstone Consolidated Mines Co., Lt
per Co.; Congress Consolidated Mines Co., Ltd.; Poland
Copper Sulphide Co.; Lookout Copper Co., and Southern Ariz
also owns a large stock interest in the London-Arizona Copper
that company, a large interest in the London-Range Coppe
organized, 1910, the Arizona, Mexico & Gulf of California R
capitalization $13,500,000, and authorized bonds of $6,000,000
to build a railway from a point on the Arizona Southern railroa
by the Imperial Copper Co., a subsidiary, to Port Lobos, on th
nia, a distance of approximately 200 miles.

In September, 1910, the company planned an issue of $1,
6% one-year notes, offered at par to shareholders of this com
sidiaries, the Tombstone and Imperial.

The company has expended about $8,000,000 on the
Imperial properties, and apparently the Tombstone is a failu
regretted, as the company has made a brave and well sustaine
Tombstone mines on their feet.

DEVINE MINING CO., LTD.

Office: 703 New York Blk., Seattle, Wash. Mine office
titas Co., Wash. C. P. Devine, president and general manage
vice-president; Henry S. Noon, secretary; Wm. T. Kipp, trea
Lewis, engineer. Organized, 1904, under laws of Washington
tion $1,000,000, shares $1 par. Annual meeting, second Mon

Lands, 2 claims, area 40 acres, also two 5-acre millsites a

strict, circa 12 miles north of the Northern Pacific railroad, d rhyolite, with lenticular shoots, of 45′ estimated average hide ores, reported to average 5% copper, 25 oz. silver and h traces of lead and zinc, these estimates being too high. re mainly in a 40″ footwall paystreak, balance of vein carry- e of 2.5 to 5% copper tenor, with small gold and silver values. tunnels of 75′, 125′, 300′, 320′ and 800′, the longest tunnel ut 700′. The mine had 1,520′ of workings, 1908, estimated w 100,000 tons of ore, with 50,000 tons blocked out for loping, with a small force, at last accounts.

A COPPER CO. ARIZONA.
ly at Bouse, Yuma Co., Ariz. Described Vol. VIII.

MINES (1906), LTD. ENGLAND.
del St. Strand, London, W. C., Eng. Mine office: Peter Eng. G. Bargate, chairman; J. V. E. Taylor, S. H. Badock, d S. R. Thornton, directors; R. L. McLatchie, secretary. 1906, under laws of Great Britain, as successor of Devon icate, Ltd., with capitalization £25,000, shares £1 par, fully d. Has a £5,000 issue of 6% debentures. Lands, 2 leases, ing tin, copper and arsenopyrite. Presumably idle.

MINES SYNDICATE, LTD. ENGLAND.
ıcceeded, Dec. 10, 1906, by Devon United Mines (1906), Peter Tavy, Devonshire, Eng. Described Vol. VIII.

IDATED COPPER & GOLD IDAHO.
ILLING CO.
ly at Grangeville, Idaho Co., Idaho.

CO. IDAHO.
ly at Bear, Washington Co., Idaho.

CO. UTAH.
imer Bldg., Salt Lake City, Utah. Letter returned un- r mine office, Ibapah, Tooele Co., Utah. Horace M. John- A. Ulrey, vice-president; J. M. Johnson, secretary and ed 1904, under laws of Utah, with capitalization $60,000, nonassessable. Lands, 7 claims, in the Deep Creek district, oad, having about 400′ of workings, from which 5 shipments n made. Presumably idle.

CO. ARIZONA.
ly at Globe, Gila Co., Ariz.

MONTANA.
conda Copper Mining Co., at Butte, Silver Bow Co., Mont.

COPPER EXPLORATION CO. UTAH.
righton, Salt Lake Co., Utah. Nicholas Schmittroth, presi- troth, vice-president; John Boehmer, secretary and treas- ers, Hannah Boehmer, Frank B. Stephens, Vincent Schmitt- orter, directors. Property is in the Big Cottonwood district.

PERÚ.
s: Cerro de Pasco, Junín, Perú. Mine, known as the Mina de Pasco, carrying copper ore without gold or silver values, 908. There also are 2 extremely small and antiquated fur- 3 metric tons daily capacity, idle, and San Miguel, of 6 to 8 pacity, employing 10 men, 1908.

MÉXICO.
e: Túxpam, Santiago Ixcuintla, Tepic, Mex. A. C. Gon- t. Property is the Cardenillo mine, carrying argentiferous uipped with a small steam plant.

DICKERSON MINING CO.

Mine office: Basin, Jefferson Co., Mont. J. W. Dickerson is slightly developed by tunnel, with steam and water power and apparently moribund.

DILL GOLD & COPPER MINING CO.

Office: Prescott, Wis. Mine office: Rambler, Carbon Dill, president; Geo. S. Hollister, vice-president and treasur lace, secretary. Organized July, 1903, under laws of Wyomin tion $1,500,000, shares $1 par. Lands, 4 claims, area 80 acres Doane, in the Battle Lake district, opened by 900′ tunnel and 100′, with circa 1,000′ of workings, showing several qua low grade copper ores. Has a 40-h. p. boiler, 6x8″ hoist and pump. Idle some years and apparently moribund.

DILLON-ARGENTA MINING CO.

Dead. Lands and machinery were sold, January, 1910, $3,782. Formerly at Argenta, Beaverhead Co., Mont. Desc

DILLON CONSOLIDATED MINING & TUNNEL CO.

Dead. Formerly at Dillon, Carbon Co., Wyo. Described

DILUVIO GOLD & COPPER MINING CO.

Dead. Former office was Pasadena, Cal. W. D. Trem Property was 5 groups of claims, said to have been taken und and lease. Property was said to have a vein of high grade ore, mineralized zone up to 50′ width traceable 5 miles. Managem shaft. Formerly at Bouse, Yuma Co., Ariz.

DINGO COPPER MINING CO.

Mine office: Essington, Georgiana Co., N. S. W., Austr Rockley district, shipped, 1901, circa 200 tons of high grade h the "Lloyd" smelter. Idle since 1902, and apparently moribu

DIPPER GOLD MINING & MILLING CO.

Office: 207 Templeton Bldg., Salt Lake City, Utah. L claimed from former mine office, Alta, Salt Lake Co., Uta president; W. H. Evans, vice-president; R. P. Morris, secret Organized June 5, 1896, under laws of Utah, with capitali shares $2.50 par, assessable. Lands, 60 acres, patented, in L Cañon, 8 miles from a railroad, having a 100′ shaft and 300′

DIRIGO-LA SAL GOLD & COPPER MINING CO.

Dead. Property passed to Boston & Utah Copper Co. tleton, Grand Co., Utah. Described Vol. VIII.

DISPATCH MINING CO.

Letter returned unclaimed from former mine office, La Sonora, Mex. Is controlled, through ownership of 60% of stoc Sonora Development Co. No trace of operations secured.

SOCIÉTÉ FRANÇAISE D'ELECTRO-METALLURGIE DE DIVES.

Office: 11 bis, Rue Roquèpine, Paris, France. Wor Calvados, France. Plant is an electrolytic refinery, treating C four 170-kw. generators, with 216 tanks, electrodes being arran plan, works having a capacity of 10 to 12 tons of copper daily.

DIVIDEND MINING & MILLING CO.

Office: 65 Journal Bldg., Boston, Mass. Mine office: E N. M. J. M. Bryson, president and general manager; J. president; B. F. Coburn, secretary and treasurer; precedi Street, J. Wm. Rice, Samuel Porter, A. B. Spear, Jas. B. Put E. Parkhurst, directors; W. E. Morong, superintendent. Orga 1902, with capitalization $3,000,000. Has authorised a $150, bond issue.

,000 acres, also coal lands about 16 miles distant. It is
t $250,000 has been expended on the mine, which shows a
ide ore, carrying good values in copper, with a little lead,
ues in gold and silver.
centrator, apparently since enlarged to 250 tons rated daily
all smelter, were inherited from the Estey Mining & Milling
ers, and company is supposed to have begun milling, circa
l not continue long.
has been very prolific of "estimates" and promises, dem-
per—how, by merely producing 14,400,000 lbs. of copper
nillions of dollars could be earned. Company's advertising
nd the statement that "there has been no such opportunity
e the Calumet & Hecla and United Verde were first put on the
he conclusion that the promoters of the company are sadly
nse or truth. At last accounts was endeavoring to settle with
ing them the property. Is regarded unfavorably. Idle and
nd.

NG & SMELTING CO. **MÉXICO.**

t Ninth St., Kansas City, Mo. Mine office: Suaqui de Batuc,
. Louis Fournie, president; W. E. Flanery, vice-president
R. E. Kirtley, secretary; John W. Opie, treasurer; preceding
Muir, directors. Organized October, 1904, under laws of
alization $1,000,000, increased later to $2,000,000, shares $1

es, some distance from a railway, having a 75′ shaft, planned
o 500′, and a 230′ tunnel, planned to have been driven 2,000′,
ntiferous and slightly auriferous lead and copper ores, giving
opper and 170 oz. silver per ton. Idle.

OPPER CO. **COLORADO.**

r office was Farmington, N. M. C. L. Tripp was president;
retary and manager. Lands were near the Dolores River,
vailable, on the western slope of La Plata Mountains. Mine
0′ to 20′ depth, and a 200′ tunnel, claimed to show some high
ke, of more than 50′ claimed average width, said to be trace-
roperty, carried low grade ore. Formerly at Mancos, Monte-

OPPER MINING CO., LTD. **IDAHO.**

e, Sandpoint, Bonner Co., Idaho. Wm. C. Ames, president;
ce-president; B. S. Bennett, secretary and treasurer; E. C.
manager; preceding officers and Ignatz Weil, directors;
er. Organized Apr. 2, 1909, under laws of Idaho, with capi-
0, shares $1 par; issued, $600,000. Lands, 6 claims, area
-acre mill and tunnel site, in the Lakeview district. Lands
ted by management to average 11′ 4″ in width, carrying sul-
d to average 13.5% copper, 20 oz. silver and $1.20 gold per
an 80′ shaft and tunnels of 85′ and 320′. There are several
Management plans continuing development and shipping ore,

CO. **ARIZONA.**

e: Globe, Gila Co., Ariz. Fred Newmeyer, president; J. W.
Capitalization $1,000,000, shares $2 par. Lands, 20 claims,
vest of Globe, near the Sleeping Beauty Mountains, having a
with a 30′ winze, showing auriferous and argentiferous cop-
e bonded, September, 1910, to Globe, Arizona & El Paso Cop-
ting Co., bond being said to have been for a small cash pay-
hares of Globe, Arizona & El Paso stock.

DJEBEL CHOUICHIA MINE.

Mine office: Souk El Arba, Tunis. Property carries ma azurite, with occasional chalcopyrite and tetrahedrite, in contact with hematite. The antimony and arsenic in the te considerable speiss. The smelter has two 30-ton circular furnaces, using coke, costing f65 per ton delivered, to the the copper ore charge. Silicious flux is used generally, bu mixture of oxidised ores and pyrites is smelted without flux. and copper matte of 35 to 50% copper tenor, sold mainly manufacture of copper sulphate.

DJEBEL OUENZA MINE.

Owned by Société Concessionaire des Mines d'Ouenza.

D'JELELE COPPER SYNDICATE.

Office and mine: Pietersburg, Zoutpansberg, Transvaal July, 1907, but apparently not incorporated, with capitalizat £10 par. Lands, 96 claims, near the D'Jelele River, in the of the Zoutpansberg district, having a 44′ shaft showing c 15% copper. Presumably idle.

DOANE-VERDE MINING CO.

Office: 1204–37 Wall St., New York, N. Y. Letter return former mine office, Rambler, Carbon Co., Wyo. Henry T. Cla Oliver S. Brown, vice-president; Robt. H. Young, general m counts. Organized June, 1902, under laws of Wyoming, $1,500,000, shares $1 par. Lands, 7 claims, patented, area 1 tract of 60 acres lying between the Doane-Rambler and Batt tracts being 40 acres about a quarter-mile from the Ferris- acres near the Hidden Treasure mine. A little work was d strike the extension of the Doane-Rambler ore body, but with some years and apparently moribund.

DOGAMARU MINE.

Mine office: Ago-mura, Ochi-gori, Iwami, Japan. To J. Stajaki, manager. Mine was opened circa 1845, and reopen chalcopyrite, argentiferous galena and sphalerite, associated w a quartz gangue. Principal vein, of 10′ to 25′ width, traverses with frequent faults. Equipment includes steam and ele aggregating 744 h. p., and there is a small smelter. Productio fine copper and 1,141,482 grams silver in 1906; 423,371 lbs. c momme silver in 1907, and 125,605 lbs. copper and 79,200 mon

DOLD & VOELKER.

Mine office: Ayutla, Autlán, Jalisco, Mex. Property mine, from which small shipments of high grade copper ore, have been made, from time to time.

DOLGELLY COPPER MINES, LTD.

Office: 29 St. Swithin's Lane, London, E. C., Eng. Min Merionethshire, Wales. A. S. Elmore, chairman; preceding off W. J. Payne and C. V. Thomas, directors; Geo. Kerr, secret mine manager. Organized March 7, 1907; under laws of G capitalization £60,000, shares £1 par; issued, £42,882, fully p £20,000 authorized, at 10% issued, £14,125. Company also lien debenture stock.

Mine has a large body of ore of low average tenor, ore b difficult of reduction, having yielded, under a former milling p 15% of assay values, but a new 120-ton mill, planned as the f ton mill, using the Elmore vacuum flotation process, has give averaging 80.9% of assay values, from complex sulphide ores reduction by any ordinary process. Presumably idle.

OPPER CO. **NEVADA.**
ffice was Ely, White Pine Co., Nev. Geo. Nix was man-
1907, with capitalization $1,000,000, shares $1 par. Lost
tically was succeeded by Dolly Varden Mining Co. For-
Co., Nev.

NITED COPPER CO. **NEVADA.**
unclaimed from former office, Ely, Nev. Mine office:
ev. Frank A. Herrell, president. Organized 1907, with
000, shares $1 par. Lands, 9 claims, adjoining the Dolly
lightly developed, showing auriferous copper ore. Idle.

y ANEXAS. **MÉXICO.**
enheim Exploration Co., at Matehuala, Catorce, San Luis

MINING CO. **MÉXICO.**
was sold to Guggenheim Exploration Co. Formerly at
San Luis Potosí, Mex. Described Vol. V.

G, MILLING & SMELTING CO. **WASHINGTON.**
at Republic, Ferry Co., Wash. Described Vol. VIII.

PER MINING CO. **COLORADO.**
a, Delta Co., Colo. Lands, known as the Flossie B. group,
Cañon. Idle some years and apparently moribund.

ER CO., LTD. **BRITISH COLUMBIA.**
was thrown into receivership, circa October, 1908, and
e 4, 1909, under foreclosure, for $261,000, to a bondholders'
ganized as New Dominion Copper Co., Ltd., old share-
in the reorganisation. Efforts were made, by dissenting
arge the liquidator, set aside the sale, and bring suit in the
but all these attempts were unsuccessful. Formerly at
istrict, B. C. Very fully described Vol. VIII.

IEW COPPER CO., LTD. **BRITISH COLUMBIA.**
n Viaduct, London, E. C., Eng. Mine office: Fairview,
C. John P. Spencer, Jas. Wm. Bryan, and Capt. John
Wm. J. Spratling, secretary. Organized Dec. 22, 1897,
Britain; reorganised, Sept. 22, 1901, as Dominion Fairview
Ltd., and name changed to present title, March, 1907, with
00, shares £1 par; issued, £56,077. Lands 4 claims, area
s north of the international boundary line, having a 6′ vein,
0′ and 65′, and a very short tunnel, showing a little copper
r. Idle several years.

G & SMELTING CO. **CANADA.**
tou, Pictou Co., N. S. Property is a 70-ton furnace, blown
making matte of about 35% copper tenor, when in com-

TING CO., LTD. **ONTARIO.**
rtive. Formerly at Parry Sound, Parry Sound district,
VIII.

CO. **BRITISH COLUMBIA.**
, Wash. Letter returned unclaimed from former mine
dary district, B. C. J. H. Tilsley, president; C. R. LeMas-
an Haas, consulting engineer; J. D. Graham, superintend-
s and Dr. H. R. Swaine, directors. Lands, known as the
e from a railway, have a 400′ tunnel, said to have a 400′
ing 5 to 6% copper and up to $6 gold per ton, the ore body
about 10′ in width, where cut by a trench. Idle and
d.

DONALD MINING CO.

Letter returned unclaimed from former office, Kansas C
office: Cave Creek, Maricopa Co., Ariz. Mine is opened to dep
with a 110′ crosscut in low grade copper sulphides. Mana
February, 1910, adding a power plant.

DONA LOUISA CONSOLIDATED COPPER CO.

Dead. Was abortive. Formerly at Coapa, Morelia, M
Described Vol. VIII.

DONA LOUISA COPPER & GOLD MINING CO.

Dead. Was practically a swindle. Formerly at Coapa, Mor
Mex. Fully described Vol. VIII.

DON CARLOS & EUREKA CONSOLIDATED COPPER MINING CO.

Letter returned unclaimed from former office, Detroit, Mi
Nombre de Dios, Durango, Mex. Property includes the Don
Eureka and other mines, showing a vein about 150′ wide, carryin
and pockets of high-grade auriferous and argentiferous bornite
18% copper, 3 kgs. silver and 7 grams gold per ton. Surface ores
group are claimed to assay 2% copper and circa 1,000 grams
ton. Production was about 75 tons of ore, in 3 years. Idle
moribund.

DON FULANO COPPER MINES, LTD.

Dead. Was liquidated 1910. Formerly at Cabrales, Astur
scribed Vol. VIII.

DON JUAN MINING CO.

Letter returned unclaimed from former mine office, F
Sonora, Mex. Wm. Younger, president. Lands near the Ephia,
Carrizo district, are developed by a shaft bottomed in ore givi
10% copper and 60 oz. silver per ton. Idle since circa 1906,
moribund.

DONNA DORA MINING CO.

Office: 220 Broadway, New York. Mine office: Kent, I
N. M. Jos. Willetts, president; Edwin L. Scott, secretary and tr
W. Kent, general manager. Lands, on the eastern slope of the Or
are developed by a 400′ tunnel and a shallow shaft, on a 5′ vein
lead, silver and gold values. Equipment includes a 100-h. p. hois
air-compressor and a small electric light plant. There is a 150-t

DONNELLY MINING & REDUCTION CO.

Mine office: Lake City, Hinsdale Co., Colo. B. N. Ramsey,
at last accounts. Property carries auriferous and argentiferous
ores. Equipment includes water power and an air-compressor.

DORA COPPER MINES, LTD.

Office: 34 Coleman St., London, E. C., Eng. Letter retu
from former mine office, Pretoria, Transvaal, South Africa.
Williams, chairman; J. H. Bailey, secretary. Organized May
laws of Great Britain, with capitalization £150,000, shares
£100,010. Property is mining rights to the northwestern half of th
poort No. 278, area 4,027 morgen, near Pretoria. Idle and presum

DOROTEA MINING CO.

Dead. Lands were sold, circa 1905, to Fay-Cananea Copper
at La Cananea, Arizpe, Sonora, Mex.

GEWERKSCHAFT DES BLEI- UND KUPFER-ERZBERGWERKE DOROTHEA.

Mine office: Jannowitz, Schlesien, Germany. Herman Sch
Herr Wittig, superintendent. Mine is opened mainly by tunnels,
and employs a small force only.

NSOLIDATED MINES CO. ARIZONA.
ere sold, circa 1907, to Mascot Copper Co. Formerly at
e Co., Ariz. Described Vol. VI.

INING CO. MÉXICO.
Dorado, Jiménez, Chihuahua, Mex. Heffron & Piper,
riferous and argentiferous lead and copper ores, with steam
o mill. Presumably idle.

MINES & DEVELOPMENT CO. MÉXICO.
swindle, for which Geo. W. Emanuel was given a prison
Prince was arrested, but jumped a $6,000 bail bond, and
dicted under United States laws, stayed out of reach in
t Taxco de Alarcón, Alarcón, Guerrero, Mex. Fully de-

INING CO. MÉXICO.
ere sold to Cananea-Duluth Mining Co. Formerly at La
nora, Mex. Described Vol. VI.

MINING & MILLING CO. ARIZONA.
lle, Kas. Mine office: Paradise, Cochise Co., Ariz. A.
last accounts. Idle several years and apparently moribund.

A-SONORA DEVELOPMENT CO. ARIZONA.
y at Patagonia, Santa Cruz Co., Ariz. Described Vol. VIII.

R CO. MÉXICO.
Broadway, New York, N. Y. Mine office: Cocorit, Alamos,
ert B. Cary, president; John C. Rowe, vice-president; C.
tary and assistant treasurer; Wm. S. Higgins, treasurer;
d, consulting engineer; preceding officers, Geo. W. Ryall,
, Geo. L. Prentiss, Max Müller, Robt. B. Armstrong, Ron-
ckton Higgins and Wolcott H. Pitkins, Jr., directors.
23, 1903, under laws of Maine, with capitalization
5 par. Bonds, $900,000 authorized, at 6%; outstanding,
unts, of which $400,000 are convertible into stock, part at
Company is said to be controlled, through ownership of
ican Exploration & Milling Co. Is a securities holding com-
3% of the stock issue of the Pacific Smelting & Mining Co.,
nes Co., Ltd., and is said to control, through ownership of a
est, the Sonora Consolidated Gold Mines Co., Ltd. The
s to be wound up, 1911, and stocks now in its treasury trans-
Smelting & Mining Co. Very fully described Vol. VIII.

R MINING CO. NEVADA.
ceeded, circa 1906, by Nevada-Douglas Copper Co. For-
Lyon Co., Nev. Described Vol. VI.

NES CO. NEVADA.
St., New York, N. Y. Letter returned unclaimed from for-
, White Pine Co., Nev. John W. Keller, president; Sid-
president; Cornelius A. Haggerty, treasurer; J. E. Simons,
; officers, Max Oberfelder, Samuel Joseph, Hon. Jas. J.
ickelsburg and Sidney Nickelsburg, directors. Organized
a, with capitalization $3,000,000, shares $1 par.
d to be circa 600 acres, of which about 180 acres are claimed
ations, and 420 acres are said to carry indications of gold,
ds are on Cave Creek, near the Success mine, in the Duck
4 miles southeast of Ely. In May, 1908, property had a 60′
pits and a 70′ incline shaft, claimed to show ore giving good
ned to employ 12 men. Presumably idle, and is regarded

DOUGLAS, LACEY & CO.

Office: 66 Broadway, New York, N. Y. This firm of swi upwards of 20,000 individuals out of probably about $5,000,0 had about 40 branch offices, in the United States and Canada, fr worthless mining stocks were peddled. In earlier years cons was done, in the way of crude mining operations, but these we purpose of keeping up appearances. Dividends were paid on earned no profits, and from "mines" that had produced no ore, las, Lacey & Co. should have been jailed, for the common swi are, and doubtless would have been jailed, were the laws of t better administered.

Efforts, begun November, 1903, to have the methods of t gated by the United States Postal Department, came to naug matter was pushed persistently, and finally was taken to the the United States, Col. Theodore Roosevelt, and by him refer George Bruce Cortelyou, then Postmaster-General, and later Treasury of the United States, who "investigated" the firm b privately of the charges made against them, and accepted their a that the Copper Handbook was a blackmailing publication, th perfectly satisfactory to the Hon. Mr. Cortelyou, best known a who "fried the fat" out of sundry insurance companies and oth for the presidential campaign of 1904. Mr. Cortelyou is now run in New York. Douglas, Lacey & Co., with the advent of a new and the appointment of Postmaster-General Frank H. Hitchco many notorious swindlers out of business, slid from under by Amalgamated Properties, Inc., which has paid, in liquidation, one-half cent on the dollar.

DOUGLAS MINING & MILLING CO.

Dead. Formerly at Rambler, Carbon Co., Wyo. Describe

DOUGLAS MINING & SMELTING CO.

Dead. Was succeeded by Douglas Copper Mining Co., bankrupt, 1905. Formerly at Yerington, Lyon Co., Nev. De

DOUGLAS MOUNTAIN GOLD MINING & TUNNEL CO.

Dead. Formerly at Loomis, Okanogan Co., Wash. Desc

DOUGLAS SMELTER.

Owned by Copper Queen Consolidated Mining Co., at D Co., Ariz.

DOVER MINING CO.

Mine office: Idaho Springs, Clear Creek Co., Colo. Davi tendent, at last accounts. Ores carry gold, silver and copper. H Idle.

DOYLE CONSOLIDATED MINES CO.

Office: 507 E St, N. W., Washington, D. C. Mine office: zuma Co., Colo. Hon. Jas. Doyle, president; Earl P. Hopkins, Wm. H. Myers, secretary; D. T. Thompson, treasurer; preceding W. Fry and J. J. Butler, directors; E. R. Marden, general manag mine superintendent; R. C. Morrison, mill superintendent; C. neer. Organized Oct. 21, 1907, under laws of Arizona, wit $10,000,000, shares $1 par, nonassessable; issued, circa $3,000,0

Lands, 31 claims, patented, area circa 300 acres, and 80 acr lands, including a water-right to 50 miner's inches from East M the California district, about 18 miles from Mancos and 7 mil railway. Company stated that it had a gold-bearing blanket more than a mile, and claimed, on the strength of a 510' tunn least 1,200,000 tons of ore capable of giving $15 per ton net profi

is actually and positively available at this time," which state- and positively an unqualified perversion of the truth. Com- . 9, 1910, having about 16,000′ of workings, estimated to show , but is reported, from independent sources, to have about a howing ore having good assay values in gold and silver.
ncludes several mine buildings and a 10-stamp mill, and adding new stamps and a cyanide plant. In February, 1910, ing stock at 40 cents per share, or on the basis of $4,000,000 0-stamp mill. Is not regarded favorably.

PER MINING & SMELTING CO. **ARIZONA.**

d unclaimed from former office, 310 Frost Bldg., Los Angeles, Tombstone, Cochise Co., Ariz. C. M. Renaud, president; ipps, vice-president; G. H. Mosher, secretary and treasurer; neral manager. Organized May, 1902, under laws of Arizona, $2,000,000, shares $1 par.
ms, area 400 acres, near the Middlemarch and opposite the showing 3 contact veins between limestone and porphyry, 6% copper, 11% lead and 14 oz. silver per ton, from azurite, and chalcopyrite. Has 4 short tunnels and a 465′ shaft, ore. Has steam power and a 34-h. p. hoist, good for depth of considered promising. Out of funds and practically idle since nwatering, 1910.

NG CO. **ARIZONA.**

were sold, circa 1907, to Bonanza Belt Copper Co. Formerly e Co., Ariz.

NG & DEVELOPMENT CO. **MÉXICO.**

ucceeded by San Rafael Copper Co. P. W. K. Roberts was known as the Columbia group, carried auriferous and argentif- and company employed circa 35 men at one time. Formerly de, Chihuahua, Mex.

NTAIN MINING CO. **ARIZONA.**

ed unclaimed from former mine office, 533 Kearney St., San Mine office: Pearce, Cochise Co., Ariz. Lee Wee, president; -president; Louis Fon, secretary; Leung Ting Mai, treasurer; ntendent, at last accounts. Organized under laws of Arizona, n $300,000. Lands, near Middle Pass, in the Dragoon d by shaft and tunnel, give a promising showing of ores ilver and gold. Company was organized by Chinese resi- cisco and Tombstone, Arizona. A little ore was shipped, in several years, and apparently moribund.

NGS MINES & SMELTERS. **ARIZONA.**

ucceeded, 1907, by London-Arizona Copper Co. Formerly at Ariz. Described Vol. VIII.

ERVAERK. **NORWAY.**

Röros, Trondhjem, Norway. Ore is slightly cupriferous pyrite. oduction was 2,718 long tons ore in 1900. Idle some years.

VELOPMENT CO. **WASHINGTON.**

mison Bldg., Spokane, Wash. Letter returned unclaimed office, Chelan, Chelan Co., Wash. R. D. Johnson, president; secretary. Capitalization $100,000, shares 10 cents par. prospected, shows ore of fair grade. Idle some years and nd.

INES CO. **UTAH.**

mmercial Bldg., Salt Lake City, Utah. Mine office: Ophir, J. E. Darmer, president; H. M. Eakin, vice-president; G. L. y and treasurer. Organized December, 1909, under laws of

Utah, with capitalization $10,000, shares $1 par, assessable. known as the Kearsarge mine, said to have produced, circa million dollars worth of high grade silver-lead ore. Mine, o 1,000′, with considerable development, carries auriferous and and copper ores. Shipped, June, 1910, a carload of ore assaying and $7 gold per ton, with values mainly in silver-lead, netting

DUBUQUE MINING & TUNNEL CO.

Office: Colburn Bldg., Denver, Colo. Letter returned ur mer mine office, Idaho Springs, Clear Creek Co., Colo. E. A. C W. W. Kirby, vice-president; J. A. Wright, secretary and tre officers, B. L. Gorich and D. C. Waugh, directors. Organized I laws of Colorado, with capitalization $2,000,000, shares $1 par. known as the Dubuque mine, opened by a 460′ tunnel, said carrying a 3′ paystreak carrying copper carbonates and mels gold values. Idle.

DUCHESS MINING, MILLING & SMELTING CO.

Dead. Former office was Cheyenne, Wyo. Mine, west o a 92′ incline shaft, said, 1906, to cut, at 60′, limestone carrying included steam power. Formerly at Holmes, Albany Co., W

DUCKTOWN SULPHUR, COPPER & IRON CO., LTD.

Office: 1 Gresham House, Old Broad St., London, E. office: Isabella, Polk Co., Tenn. Col. Jas. LeGeyt Daniell, chai Gordon, managing director; preceding officers, L. G. Mortime er, directors; Henry Godber, secretary; Chas. W. Renwick, Wm. F. Lamoreaux, assistant general manager.

Organized Feb. 16, 1891, under laws of Great Britain, w £75,000, shares £1 par, in £200 founder's shares and £74,80 increased, 1907, to £200,000, and £48,799 ordinary shares with a preferential dividend of 10% paid out of net profits fo ranking as other ordinary shares. Stock is fully issued and fully divisible on the basis of 7%, plus one-half of net remaining p shares, balance of profits going to founder's shares. Debe £50,000 first-mortgage, at 5%, have been reduced, by annual sinking fund, to £28,500. Recent dividend payments have be nary and £158 8s. on founder's shares in 1907; 10% on ordina founder's in 1908; 10% on ordinary and £21 16s. 11d. on Total dividends to end of 1909 were 293% on ordinary shares founder's shares, latter constituting the world's record for a mining investment. Profits were £69,019 in 1907; £13,955 in in 1909.

Lands are nearly 7,000 acres, bought for £68,057, includi Tennessee and Isabella mines, which are active, and the Callo mines, which are idle. Country rock is a silicified and very Ores are exclusively sulphide, averaging under 3% in copper preciable gold or silver values.

The Mary mine, which is the principal producer, has an the new 671′ three-compartment Gordon shaft, to be deeper 850′. The Gordon shaft was sunk in a trifle over 12 months, plats were cut to north and south on 7 levels, being sunk by u 7th levels, inclusive. Diamond drill borings have proven a co ore north and west of the main ore bodies, extending from 1 with best ore near the bottom. Ore reserves of the Mary mi 1909, at 311,000 tons in sight, since materially increased, with tenor of 2.3%.

The East Tennessee is an early-day mine, and carries or 3.4%, developed by a vertical shaft. Diamond drilling has

, of good grade, and regular production was begun from this

ne, worked opencast, has a large deposit of low grade pyritic
rilling, 1910, disclosed immense reserves of similar ore, low
sulphur, and excellently adapted to the manufacture of acid.
nt, enlarged 1910, and changed from direct to alternating
25-kw. Westinghouse-Parsons steam turbines, with direct-
rs, and additional motors of circa 1,000-h. p. aggregate
nstalled later.
s two 400-ton Herreshoff water-jacket blast-furnaces, with
lowers, and is operated electrically throughout. The smelting,
l, 1905, heap-roasting being discarded for semi-pyritic smelt-
20% first-fusion matte and a 50% second-fusion matte. The
t first reduced the smelting capacity by 48%, but eventually
n to only 16.5% in net tonnage, which was more than offset
aving in fuel charges, resulting in a final saving of nearly 3
cost of finished copper. Slag losses are very small. The
wn has been adopted by its neighbor, the Tennessee Copper
ber of other progressive smelters. The credit for this im-
y successful metallurgical development is due to Messrs.
, Renwick, and Mr. W. H. Freeland, the former general
ents were begun as early as 1898, and the first pyritic
bella ore alone, was done in 1903. Copper is marketed
heimer & Co.
ant, using the contact system, was built, 1906, as an experi-
prove successful, hence it was decided to try the chamber
e, the State of Georgia had brought suits, in the federal
ceeded in securing a ruling from the Supreme Court of the
ting the State of Georgia an injunction on the smelters of
Tennessee companies, enjoining them to do away with the
the escape of sulphurous acid fumes from their works.
nt was begun, June, 1908, and completed June, 1909. The
of 1,000 tons weekly of 60° Beaumé chamber acid, and was
nd put in operation by Mr. N. L. Heintz. This is the first
in existence to successfully convert sulphurous gases from
o 60° Beaumé acid, and much credit is due Mr. Heintz for
anagement for its courage in attacking so grave a problem,
erious nuisance into a large and steady source of revenue.
about $500,000, and it was to build this plant and develop
low grade pyritic ore, that the capitalisation was increased

tion has been as follows: 6,569,726 lbs. fine copper in 1906;
07; 4,936,984 lbs. in 1908, and 4,892,153 lbs. in 1909. The
of the mine was decreased 20 to 25% by the change to
t this change, while reducing the output, greatly increased
the highly successful acid plant is an added source of steady
e. The company is managed with highly commendable
nd technical ability of a high order.

R MINING & SMELTING CO. **UTAH.**

elt Bldg., Salt Lake City, Utah. Mine office: Clover,
O. P. Peterson, president and general manager; P. C. Kittle,
V. Peterson, secretary; O. F. Peterson, treasurer; preceding
eterson and H. B. Windsor, directors. Organized June 13,
of Utah, with capitalization $30,000, shares 10 cents par,
$22,506,20. Assessments, to end of 1910, were 3 cents per
eting, third Tuesday in July.

Lands, 6 claims, area 118 acres, in the Dugway district railroad. Property shows an ore zone, reported by company on surface and 300′ wide on the 325′ level, the shrinkage of 1 325′ being painfully marked, carrying a number of ore bodies, development, carry chalcopyrite, bornite and argentiferous gal of 1 to 15% copper, up to 30% lead, up to 7% zinc, up to 66 oz. gold per ton. Development is by a 333′ shaft, and tunnels of with about 1,000′ of workings, showing considerable ore of g tenor. Mine has no power equipment. Idle several years.

DUKE LYELL GOLD, SILVER & COPPER MINING CO., N. L.

Dead. In 1893, held 80 acres, leasehold, near the Mt. merly at Gormanston, Montagu Co., Tasmania.

DUKE MINE. NOR

Office: care of Brodie L. Duke, owner, Durham, N. Roxboro, Person Co., N. C. Thos. Morcom, superintende acres, formerly known as the Tingen mine, showing fissure vein ores, with gangue of epidote, calcite and quartz. Has 4 sha 200′. Mine has produced some high grade ore, the last carl aging circa 17% copper, and netting $1,100. Ore is high in in narrow veins, like the other mineral deposits of North ment includes steam power. Work was resumed, on a smal 1911, mainly for the purpose of more thorough investigation.

DULUTH & ARIZONA COPPER MINING CO.

Dead. Formerly at Prescott, Yavapai Co., Ariz. Des

DULUTH-ARIZONA MINING CO.

Office: Duluth, Minn. Mine office: Wickenburg, Mar E. W. Carpenter, president; Milton Doughty, vice-president; J. tary and treasurer. Organized circa September, 1907, under with capitalization $1,000,000, as a reconstruction of the Bla Copper Mining Co., Ltd., funds of the old company have bee former superintendent. Lands, 9 claims, 8 patented, area Bradshaw Mountains, 17 miles from Wickenburg, the nearest erty shows syenite, with 4 fissure veins, of about 30″ average auriferous and argentiferous copper and lead ores, with quartz has porphyritic dykes carrying low grade ores. Mine has shafts and short tunnels, with gasoline power. A cyanide said not to have given satisfaction. Presumably idle.

DULUTH & CHIRICAHUA DEVELOPMENT CO.

Office: Lonsdale Bldg., Duluth, Minn. Mine office: Co., Ariz. Martin Pattison, president; Edward F. Sweeney, v general manager; Geo. H. Crosby, secretary and treasurer; p Byron M. Pattison and Thomas Bardon, directors. L partly patented, including the Sullivan, Copperopolis and H groups. The Sullivan group, 7 claims, circa 4 miles west of th open-cuts, showing leached copper ore and a little very rich 60′ tunnel showing lead ore. The Copperopolis group, 8 claim van, is slightly developed. The Horace Mountain group, of 300′ tunnel. Litigation over the Sullivan group was settled i favor, 1908. Management considered good and property except for annual assessment work.

DULUTH CONSOLIDATED COPPER CO. ID

Dead. Was succeeded, Jan. 25, 1907, by Red Warrior M merly at Baker, Lemhi Co., Idaho, and Milford, Beaver Co., U

DULUTH-HUSA COPPER MINES CO.

Office: 218 West Superior St., Duluth, Minn. Mine

veden. Martin Moe, president; Albert Johnson, vice-presi-
Dr. C. L. May, secretary; August Hagberg, general manager;
3. F. Lindstrom, C. W. Renard, Adolf Linden, J. H. Nelson,
Wilander, John Boden, Ole Berglund, and Emil Newquist,
los W. Musser, executive secretary; J. H. Langeland, mine
ederick Nybom, engineer. Organized Nov. 12, 1909, under
ith capitalization $1,000,000, shares $5 par, nonassessable.
rough the Aktiebolaget Husâ Grufvor, a Swedish corpora-
ing, first Tuesday in October.
000 acres, with about 3,000 acres timbered, said to include
on the slope of Mount Areskutan. Property, 3 miles from
anite, quartzite and schist, of various ages, with rather flat
ing into the mountain, carrying seams, streaks and pockets
well defined, with outcrops traceable for miles, principal
rite, with some bornite. These copper deposits were dis-
nining begun 1745, but mines were closed, 1881, because of
and low price of copper. Property is under development.

MINING CO. **IDAHO.**

onsdale Bldg., Duluth, Minn. Mine office: Baker, Lemhi
J. H. Lanyon, president and general manager; A. R. Ander-
W. H. Locker, secretary and treasurer; preceding officers,
Gill, and P. J. Blais, directors. Organized August, 1910,
esota, with capitalization $250,000, shares $1 par; nonassess-
00. Annual meeting, first Tuesday in August.
s, area 120 acres, said to carry 1,000,000′ of standing white
nillsite, 3 miles from a railroad, in the Wimpey Creek dis-
ows diorite-porphyry carrying 2 ore bodies, of 4′ and 16′
width, traceable circa 1,800′, carrying cuprite, azurite,
copyrite, estimated by the Duluth office to average 8 to
oz. silver and $60 gold per ton, and estimated by Capt.
und, to average 6% copper, 4 oz. silver and $8.50 gold per
ndependently reported to have a 2′ vein giving assays of
ton, and a large ore body assaying about 3% copper. The
nel, planned to be driven 427′. Work was begun July, 1910,
lans continuous development by a main tunnel, to have a

ZUMA MINING CO. **MÉXICO.**

onsdale Bldg., Duluth, Minn. Mine office: Moctezuma,
. H. Mance, president; Geo. H. Crosby, vice-president; A.
ary; Will C. Brown, treasurer; preceding officers, and Cas-
ctors; Chas. H. Jones, manager; A. F. Bennett, superintend-
bruary, 1909, under laws of Minnesota, with capitaliza-
s $10 par; issued $300,000. Holds title to lands through
Dia Claro, S. A.
s, in 5 groups, including 4 idle properties, partly developed,
o silver mine. Four groups are owned outright, and the
l under a $200,000 bond and lease, on which $50,000 has
ning for 3 years, with provision that 25% of net smelter
n the purchase price.
up, area 14 hectares, between the Promontorio copper mine
ilver-lead mine, shows at surface a 10′ vein, with a 2′ pay-
onate ore assaying upwards of 10% copper, with small gold
This property is idle.
Fierro copper group, area 20 hectares, in the Joriquipi
east and south of Nacozari, shows a heavy outcrop of spec-

ular and magnetic iron, carrying considerable copper ore, chie surface. No work has been done here by the company.

La Concha group, area 22 hectares, 15 miles south of Nac west of the Southern Pacific line, now building, shows a fissure width, in porphyry, outcropping for 700′, carrying auriferous a copper ore, and small shipments of high grade ore have been owners in the past. Idle.

The Idaho group, area 26 hectares, and the Monstruo de P 29 hectares, are adjoining properties, 14 miles south of Moctez contact ore body between limestone and porphyry, up to 7′ in showing ore that has given average assays of 14% lead and 7 oz.

The Monte Cristo group, area 311 hectares, 28 miles nort zuma and 6 miles from the surveyed line of the El Paso & South includes the Monte Cristo and La Cruz mines, latter covering the Monte Cristo vein, and carrying ore assaying well in copper Monte Cristo mine, opened 1903, was operated along primitive li ownership, yielding, above the 132′ level, upwards of 1,300,00 shipped by former owners giving smelter returns averaging abo per metric ton, and some ore returning 1,300 oz. silver has been company. Country rock is porphyry, carrying a fissure vein, wit ranging from a few inches to several feet in width, that is very e faulted. Apparently the vein was lost, 1910, though there is so being picked up again. The vein dips at about 30°, carrying o surface, with silver mainly in chloride form, assaying 150 to 4 metric ton, succeeded, at little depth, by argentiferous galena ore. The mine has about 2,000′ of old workings, including 3 i a short tunnel. The new work is from a 2-compartment shaft, 1909, that is vertical to the 162′ level, thence following the dip ore occasionally includes magnificent specimens of ruby silver, w native silver.

For about a year, 1909–1910, the mine shipped one carl ore monthly. Production, 1909, was 5,090 lbs. fine copper, 93,0 24 oz. gold. Average of all shipments to end of 1910 was 1.72% silver and 0.165 oz. gold per metric ton. Mine was said to have s of good ore, circa February, 1911, after some months of non-prod ment includes a 40-h. p. boiler and hoist.

The company began 1910 with quick assets of $70,350.57 exclusive of bond, of only $8,225.26, but bought the Comet m Blaine Co., Idaho, circa June, 1910, and was badly stung, sin funds therein and this loss, together with the faulting of the v company in rather hard circumstances, badly clouding its former

DULUTH-PACIFIC COPPER CO.

Office: Duluth, Minn. Letter returned unclaimed from for Chelan, Chelan Co., Wash. A. C. Ribenack, president; A. K dent; Louis Hammel, treasurer; H. Heimann, secretary; pr W. L. Devine, A. H. Grieser and J. D. Campbell, directors; Ar perintendent; Victor L. Rakowsky, consulting engineer. Organi laws of Arizona, with 500,000 shares. Annual meeting, second T

Lands, 12 claims, including the Copper Glance and Copper 6 claims each, 1½ miles apart, well timbered and watered, 2 railroad, with good wagon-roads, 5 and 8 miles distant respectivel Stewart district, Wenatchee Mountains. Lands, carrying fissu dotite, and contact deposits between gabbro and peridotite, and an 18″ vein of chalcocite and bornite, averaging 35 to 40% copper silver values. Development is by a crosscut tunnel. Equipm air-compressor. Idle and presumably moribund.

ORA MINING CO. **MÉXICO.**

ellwood Bldg., Duluth, Minn. Mine office: La Cananea, x. Jas. W. Norton, president and general manager; Bernard ice-president; Hon. N. F. Hugo, second vice-president; third vice-president; Wm. D. Underhill, assistant secretary; treasurer; preceding officers and R. P. Burgan, directors. ber, 1908, under laws of Minnesota, with capitalization $10 par, nonassessable; issued, $2,425,510. Company ab- s of the South Cananea Copper Co., S. A., which was the ation of the Pennsylvania & Cananea Copper Co., giving stock therefor. Annual meeting, second Tuesday in October. ectares, property taken over from the South Cananea being ding the Collins group of 305 hectares; Arizpe group of 40 ad group of 60 hectares; Last Chance group of 22 hectares, of 150 hectares, latter adjoining the Massey mine of the nd supposed to carry the extension of the Massey ore body. anea lands are 3 to 4 miles south of the Oversight mine of the

ies 4 principal ore bodies, estimated by management to ' and 61' in width, and to carry ore averaging 2.25 to 19.6% r and $1.20 gold per ton. Mine is developed by a 3,000' lorton shaft, 117' Underhill shaft, 400' Collins shaft, 125' t, and 130' Collins No. 3 shaft, with total of about 4,500' ted by management to show 225,000 tons of ore. An experi- f gold-silver ore was made, 1910, to the Douglas Smelter. cludes a 250-h. p. steam plant, with 2 hoists, good for 1,000' ompressor. Management plans deepening the Norton shaft g a new shaft, 1911.

H DEVELOPMENT CO. **UTAH.**

aba Blk., Duluth, Minn. Operating office: 503 Utah Savings Lake City, Utah. Letters returned repeatedly from former on, Tooele Co., Utah. H. E. Smith, president; Peter Porter, rvey J. Jones, secretary; E. J. Raddatz, treasurer and general ed under laws of Utah, with capitalization $500,000, shares or of No-U-Dont Mining & Milling Co.

ional claims, area circa 50 acres, near the Honerine tunnel the Honerine mine, which carries copper, at considerable shafts, deepest 500', with about 3,000' of workings, and, under produced silver-lead ore from above the 500' level, shipments turned 35 to 60% lead and 20 to 30 oz. silver per ton, and to 50,000 in value. Copper ore is expected at depth. Idle since

G & DEVELOPMENT CO., LTD. **BRITISH COLUMBIA.**

Duncans, Vancouver Island, B. C. Lands, 4 claims, in the trict, showing ore giving assays up to 4% copper, 50% lead, d $2.50 to $5 gold per ton. Idle since circa 1901, and appar-

& SILVER MINING CO. **ARIZONA.**

were sold to Mt. Tritle Copper Co. Formerly at Prescott, Described Vol. VI.

ING CO. **ARIZONA.**

s, Pa. Letter returned unclaimed from former mine office, riz. John F. Shaw, president and manager; Edw. S. Straw- nt; T. A. Lukehart, secretary; G. A. Lukehart, treasurer. nder laws of Arizona, with capitalization $1,000,000, shares

Lands, 12 claims, in Gold Gulch, about 3 miles south of the Ar and 15 miles west of Globe, in the Pinal Mountains. Mine has a ing mainly silver-lead ore with copper expected at depth, opened 2 of circa 200′ and 300′, showing ore assaying well in gold, and a 5 East End claim showing ore giving assays of 5% copper, 3 oz. gold per ton. Management planned, early 1910, sinking a 2-comp near the tunnels, but failed to start same. Property has sever buildings.

Equipment includes a 25-h. p. gasoline hoist. Mine shipped of ore weekly during part of 1909, to the Old Dominion smelter, said to average about $32 gold per ton, with a very small percent with 6 cents per unit bonus paid by the smelter for lime and iron co

DUQUESNE MINING & REDUCTION CO.

Mine office: 820 Penn Ave., Pittsburg, Pa. Mine office: Du Cruz Co., Ariz. H. T. Herr, vice-president and general manager; superintendent. Lands, 40 claims, unpatented, area circa 800 a Pride of the West and several miles south of the Mowry, in the Was of the Patagonia Mountains. Property shows a contact deposit stone and granite-porphyry, carrying argentiferous and auriferous sphalerite, galena and pyrite, opened by a shaft of circa 1,000′ dept complex sulphides, are very refractory.

A small matting furnace, was built, 1907, at Calabasas, when employed about 100 men.

Production was 421,487 lbs. fine copper and 9,622 oz. silver i since 1907.

COMPAÑÍA MINERA DE COBRE DE DURANGO.

Dead. Formerly at Otaez, Santiago Papasquiaro, Durango,

DURANGO COPPER SYNDICATE, LTD.

Dead. Was an English company, that sold its property, circ Avino Mines of México, Ltd., since reorganized as Avino Mi £400,000 in full-paid shares, sale being in the nature of a reorgani merly at Avino, San Juan del Rio, Durango, Mex.

DURANGO INVESTMENT & DEVELOPMENT CO.

Letter returned unclaimed from former office Callejón Santa México, D. F. Mine office: San Francisco del Mezquital, Duran Lic. José Luis Requeña, president; M. Sanciprian, general manag Sosa y Avila, consulting engineer. Organized under laws of Unite capitalization $1,000,000, and is protocolized under laws of México the Plateros and Carmelita mines, in the Mezquital district, and El Oro district of Durango, all antiguas, carrying ores of gold, silv Main shaft, 90 meters. Properties are said to have produced 1,800 in the past. The company has a concession for use of water from t River, for power purposes. Idle and presumably moribund.

DURANGO MINING CO.

Dead. Was organized 1903, with capitalization $1,000,000. ously reported as 5 hectares, and as 5 properties, were bought of Apparently little or no work was done. Formerly at Yerbani Durango, Mex.

COMPAÑÍA MINERA EL DURAZNITO.

Office: Apartado 102, Durango, Mex. Mine office: Tejam Mex. Edw. Williams, president; Alejandro Tagle, secretary; J. treasurer; F. D. Davis, manager. Organized March, 1906, under la with capitalization 60,000 pesos, shares 10 pesos par. Lands, 8 hect one silver-lead and one silver-copper vein, former having ore said to lead and 6 kgs. silver per metric ton, and latter said to average 6

ton. Development is by 2 shafts, of about 60 meters depth
er tunnel.

URAZNO. CHILE.
acisco Greve G.

MINING & SMELTING CO. WASHINGTON.
ly at Skykomish, King Co., Wash. Described Vol. VIII.

MONTANA.
Butte Copper Mining Co., at Butte, Silver Bow Co., Mont.

SS CO. MÉXICO.
uato, Gto., Mex. Mine office: Etzatlán, Ahualulco, Jalisco,
ness, president; Willis S. Caypless, manager. Property
ups of mines, in the Etzatlán, Ameca and Ahualulco districts.
group, 31 hectares, 21 miles west of Hostotipaquillo, shows
dth, carrying native silver and gold and silver sulphide ore,
shafts and tunnels, with considerable ore exposed. The
ectares, 25 miles west of Hostotipaquillo, shows veins of 3′
g native gold and silver and silver sulphides. The Calabaza
4 miles south of Etzatlán, shows 4 fissure veins, of 4′ to 12′
nly auriferous and argentiferous sphalerite and galena, with
imated to show 20,000 tons of ore. Company does an exten-
and matte, but apparently is not doing much mining.

CO. CALIFORNIA.
n Bldg., Los Angeles, Cal. Mine office: Parker, Yuma Co.,
k, president and general manager; Sylvester Marshall, vice-
oche, secretary. Lands are in the Whipple Mountain district
County, California, about 5 miles from the projected line of
izona railroad, 17 miles north of Parker and about 40 miles
Property shows 2 parallel veins, one of 60′ estimated width,
begun 1907. Development includes a 375′ two-compartment
hat has given assays of 5 to 40% copper and $10 to $52.50
carload of ore, shipped February, 1909, returned circa 30%
t includes an 18-h. p. gasoline hoist, 40-h. p. gasoline engine
or. Was developing at last accounts.

NING & MILLING CO. UTAH
ake City, Utah. Letter returned unclaimed from former
n Canyon, Salt Lake Co., Utah. Geo. A. Whittaker, presi-
. Lewis, vice-president; Jacob E. Meyer, secretary; A. G.
Geo. E. Yeadon, general manager. Organized 1907, under
capitalization $400,000 increased, 1910, to $600,000, nonas-
claims, surveyed for patent, area circa 280 acres, in Barney
ghland Boy mine, in the northern part of the Bingham dis-
75′ slope-tunnel, planned to be driven 1,000′, and a 42′ shaft,
rca 14′ width, giving ore assaying up to 37% lead, with silver

BELL MINING CO. UTAH.
Congress St., Boston, Mass. Operating office: 403 Dooly
ity, Utah. Mine office: Eureka, Juab Co., Utah. Jas. P.
Geo. E. Davis, vice-president; Imer Pett, general manager
rer; preceding officers, Henry N. Sweet, Fred H. Williams,
and Fred R. Sands, directors; Sidney S. Millett, secretary
. Owens, mine superintendent.
tember, 1898, under laws of Utah, with capitalization
d, March, 1910, to $1,000,000, shares $1 par; issued,
ch, 1910, issued 664,251 shares of new stock, at 50 cents, to
débt of $269,925.25, and put circa $60,000 in the treasury.
Is controlled, through stock ownership, by Bingham Mines

Co. First National Bank, Boston, registrar; Federal Trust C agent. Stock is listed on the Boston curb. Annual mee after first day of October.

Lands, 15 claims, area 75 acres, also a 9-acre millsite right to a spring having a flow of about 50 gallons per minute by a small pumping plant and pipeline. Lands lie betwe Eureka, Victoria and Chief Consolidated mines, on the Victo ore zone, in the Mammoth limestone. The lime is cut by n all angles, with mainly vertical dip, carrying pipes, shoots of ore at the intersections of fissures and bedding planes, in stone, the main ore body being a system of pipes, roughly rake of about 30° S., extending from the tunnel level to branching. The mine has considerable bodies of silicious c sulphides, former carrying only small copper percentages, ton in combined gold and silver values. A new ore body, cu 1,000′ level, possibly is in a western ore channel. Developme a tunnel, with a 1,200′ blind shaft, showing, on the bottom le to 66′ in width, said to assay $10 to $20 per ton in copper, sil development is by the 3-compartment McCrystal shaft, deepened, October, 1910, to 1,000′, and connected with the mine has considerable reserves of low grade ore.

Equipment includes a steam plant with a 180-h. p. H double-drum hoist, good for 2,000′ depth.

Production, August to October, 1907, before suspension tons monthly, giving net smelter returns averaging $5 to $6 pe first 9 months of 1910, was 5,268 tons of ore, averaging net $12.98 per ton, and giving earnings, for 9 months, of $67,912. prospects of the property were greatly improved during 1910.

EAGLE CONSOLIDATED GOLD MINING & MILLING CO.

Dead. Lands were sold, 1908, for $13,000, to Blue Star merly at Chewelah, Stevens Co., Wash.

EAGLE CONSOLIDATED MINES CO.

Dead. Formerly at Wendendale, Yuma Co., Ariz. Desc

EAGLE COPPER CO.

Dead. Formerly at Encampment, Carbon Co., Wyo. D

EAGLE COPPER-GOLD MINING CO.

Office: 2072 East Fortieth St. SE., Cleveland, Ohio. repeatedly from former mine office, Wickenburg, Maricopa C Kuder, president; Henry Wehner, vice-president; A. L. J. L. Zesiger, treasurer; preceding officers, Henry Biddle, J Motts and C. A. Schettler, directors; Nicholas McCarver, last accounts. Organized Sept. 8, 1902, under laws of South talization $1,000,000, shares $1 par.

Lands, 7 claims, 1 fractional, area 130 acres, known as th in the Blue Tank and Black Rock districts, in the foothills Mountains, 12 miles east of Wickenburg, with connection by and 2 miles of bad wagon-roads. Lands are reported to sho which 2 are partially developed, one, of 12′ average reporte 3,000′, carrying native copper, cuprite, malachite and chalcop age assays of 4% copper, 2 oz. silver and $3.10 gold per ton. tunnels of 35′ and 193′, and by shafts of 50′, 60′, 100′ and 15 gasoline hoist and 4-drill air-compressor, with 7 mine buil planned deepening shaft to 300′ and building a 50-ton concen ently came to grief. Idle several years and presumably morib

GOLD MINING CO. IDAHO.
Idaho. Letter returned unclaimed from former mine office,
., Idaho. Organized 1902, under laws of Idaho, by J. H.
h capitalization $1,000,000, shares $1 par. Lands, near the
150′ tunnel, show copper ore, associated with hematite.

MINING CO. UTAH.
ntaquin, Utah Co., Utah. Armon Cravens, president; C.
resident; C. E. Snell, secretary and treasurer. Organized
ws of Utah, with capitalization $1,000,000, shares 10 cents
at Nebo, east of Santaquin, has shipped a little high grade
Was developing with a small force, at last accounts.
MINING CO. WASHINGTON.
ewelah, Stevens Co., Wash. Lands, 3 claims, lying south
up, on Stevens Peak, slightly developed by shaft and tun-
ls and argentiferous lead and copper ores. Idle some years
ound.
COPPER CO. PENNSYLVANIA.
e, N. J. Branch office: Allentown, Pa. Mine office: R. F. D.
Co., Pa. F. H. Cuyle, president; Dr. P. A. Stem, vice-
kert, secretary; Thos. Zellner, treasurer; Owen H. Nagle,
eceding officers and A. V. Diefenderfer, directors. Organ-
of New Jersey, with capitalization $500,000, shares $1 par,
. 9, 1910, under laws of Pennsylvania.
near Charmian, including an old copper mine, never worked
Western Maryland railroad. Property shows a mineralized
width, carrying native copper, chalcocite, bornite, chalco-
te, averaging about 2 oz. silver per ton, with traces of gold.
300′ shaft at 40° incline, in ore from surface, giving assays

ides a steam plant and a 2⅝″ core-drill, with a 24x30′
Management planned a 200-ton mill, 1908, and now plans
11. Mine was said, 1908, to have about 5,000 tons of ore
for treatment.
O. ALASKA.
y at Ketchikan, Alaska. Described Vol. VIII.
O. CALIFORNIA.
ld, 1909, to Arizona Empire Copper Mines Co. Formerly
, Ariz.
O. MONTANA.
: Butte, Silver Bow Co., Mont. Hon. Patrick Mullins,
l Thos. Bryant, directors. Organized March 10, 1906,
ana, with capitalization $150,000, shares $1 par, and is
creased capitalization, Apr. 29, 1907, to $250,000, shares
, north of La France, have a 250′ shaft, showing a 5′ vein.
as a silver mine, shipping ore running up to 1.7% copper
r ton. Idle.
SMELTING CO. MONTANA.
s changed, 1907, to Copper Eagle Mining & Smelting Co.
lver Bow Co., Mont.
SMELTING CO. WASHINGTON.
hewelah, Stevens Co., Wash. Mark Mitchell, manager.
iles from Chewelah, including the Eagle group of 4 claims,
Eagle Consolidated Gold Mining & Milling Co., and later
g Co. Mine has a 240′ two-compartment shaft, and an
; a 4′ vein of silver-lead ore, said to parallel the copper

vein of the United Copper Co., at a distance of 400'. Eq
steam plant.

EAGLE MOUNTAIN COPPER CO.

Mine office: Kelvin, Pinal Co., Ariz. Col. P. T. McC
ager. Lands, 27 claims, known as the Copper Queen grou
district, having small development, with several mine buildin
said, June, 1908, also to have an option on the Blackburn gr

EAGLE MOUNTAIN COPPER MINING CO.

Dead. Was a swindle that peddled "guaranteed" st
Harrisburg, Linn Co., Ore. Very fully described Vol. VIII.

EAGLE PEAK MINING CO.

Office: Longmire, Pierce Co., Wash. Lands, in the Ta
vicinity of Mt. Tacoma, are said to show bornite. Presumab

EAGLE RIVER COPPER CO.

Dead. Lands were sold, circa 1905, to a subsidiary comp
& Hecla. Formerly at Eagle River, Keweenaw Co., Mich.

EAGLE VALLEY MINING & MILLING CO.

Letter returned unclaimed from former office, Salt Lake
office: Carson City, Ormsby Co., Nev. Jas. E. Sellers, p
Moffatt, manager. Lands, 3½ miles from Carson City, sho
erous copper ore, said to give assays up to 45% in copper t
drift-tunnel, and was developing with a small force, at the en

EAST BUFFALO MINING CO.

Mine office: Saltese, Missoula Co., Mont. Mine has a
shaft, showing ore assaying 5% copper, 15% lead and 8 to 1
Presumably idle.

EAST BUTTE COPPER MINING CO.

Office: 85 Devonshire St., Boston, Mass. Mine and w
Silver Bow Co., Mont. Robt. H. Gross, president; Hon. J
president; Wm. P. Everts, secretary; Frank P. Son, treasurer
eral manager; preceding officers, Chas. R. Leonard and Dani
ors; Horace V. Winchell, consulting engineer; Andrew J. F
tendent; F. Pratt, mill superintendent; J. Cuthbert Welch, s
ent; Ralph C. Works, assistant smelter superintendent; Jul
Daniel J. Williams, engineers.

Organized Oct. 14, 1905, under laws of Arizona, w
$3,000,000, shares $10 par, increased, May 11, 1909, to
$10 par, nonassessable; issued, $3,000,000. Has about
State Street Trust Co., Boston, registrar; American Trust C
agent. Stock is listed on the Boston Stock Exchange. An
Monday in June.

By an agreement made Apr. 8, 1909, becoming operativ
East Butte took over the physical property of the Pittsburg &
Co., the agreement providing that the East Butte should issu
in exchange for 83% of the capital stock of the Pittsmont Co
collateral trust bonds and other indebtedness, approximati
remaining percentage of the stock being scattered. The Pitt
is a holding company, owning 90% of the stock, and all of the
burg & Montana Copper Co. The arrangement provided t
issue of Pittsmont bonds was not to be paid before Dec. 1,
payment has been extended for one year, to Dec. 1, 1911.

While title to the principal property of the East Butte Co
actually vested in the Pittsburg & Montana Copper Co., t
scribed under this title, because the Pittsburg & Montana
a stepping-stone.

Lands originally were 134 acres, patented, being the D

ns of 19 acres area, in the southeastern part of the Butte
sylvania mine. The various original properties were said
ins, of more or less promise, with 11 shafts, of 50′ to 1,000′

ne is a placer claim, and apparently the principal ore body
hern side-line, at depth of 900′ to 1,000′. The Dutton has
the clear, being the largest in Butte. No. 1 shaft, 1,300′
ne north, and No. 11 shaft, 500′ deep, at the extreme south of
iderable ore was developed on the 200′, 400′, 600′ and 800′
was claimed, September, 1907, to have blocked out, on the
, 597,404 tons of ore, with an estimate of 1,000,000 tons of
er tenor blocked out in the entire property, which figures,
management, were much too high, both as to tonnage and
′ level shows a 6′ vein assaying up to 5% copper. The
ns having more or less commercial ore, and a long crosscut
the 900′ level, cut the Glengarry vein, about 20′ in width,
ayable, after passing through several small veins carrying
. The mine was flooded, after cutting the Glengarry vein,
ded, August, 1909.
s of the East Butte include the Oneida mine, which has
e, up to 16% in copper tenor; the Lassen mine, which also
ore carrying up to 16% copper and 10 oz. silver per ton, and
ne, which was claimed to show a 9′ vein of ore averaging
was a great exaggeration.
he Dutton includes a 150-h. p. Lidgerwood hoist, good for
office building and several minor structures. The Dutton
concentrators, of little value, including the 100-ton Yankee
occasionally by lessees. The leaching plant, one of the
ubled in size, 1908, leached mine-water from the Dutton,
efit of leachings from the old Parrot waste-dumps. This
the original management of the East Butte, for reasons of

e Mining Co. was sued for damages caused by the blowing
removal of ore, and there also was litigation, of a friendly
d Metal Co., intended merely to restrain the pernicious
e lessees in going beyond the boundary lines. From Jan. 1,
07, the royalties of the company amounted to $149,728.84,
he gross ore values extracted.
ands were 1,384 acres, of which 46 claims, area 850 acres,
t of the Butte district, with 634 acres of miscellaneous lands
n and Greenhorn districts of Montana. Principal property
260 acres, lying on the flat east of Butte, including the
adjoining claims, formerly owned by Franklin Farrell.
oldings include the Swissmont mine, near Elkhorn, Jeffer-
a, bought for $60,000, which shows a large body of low grade
o 3% copper tenor. This is idle. The Chamounix mine,
Clark County, Montana, includes the Christina group of 6
ie Parnall group of 33 claims. This property has considera-
l shipped some argentiferous copper ore, but has been idle
re also are mining claims at Pittsburg, 4 miles from Helena,
ty, Montana, little developed and idle.
nine carries 4 veins, of 2′ to 12′ estimated average width,
e continuations of the Butte & Boston veins, and also has a
re body, developed 1910. The mine has 2 shafts, Nos. 2
eep, connected by a half-mile crosscut on the 1,200′ level,
elow the bottom level, the mine having about 10 miles

of workings. Owing to the great depth of overburden, the reached until a depth of several hundred feet, and sinking was being rendered worse by the existence of considerable quicksa The original ore bodies are small, compared with the big vei but carry good silver values and small gold values, ore smel 8% copper, and 5 to 12 oz. silver per ton, first-class ore carry and 8 to 12 oz. silver. The best ore has been found between levels, though some ore of 7% copper tenor was stoped on fault-vein, only 12′ south of a crosscut from No. 2 shaft, on opened, 1910, the ore body being up to 38′ in width, and carr average width, with a maximum of 20′, giving average ass and $2.50 per ton in combined gold and silver values, this dev most important and promising made in the property for year 500-gallon electric pumps on the 700′ and 1,200′ levels.

Equipment is very complete, including a 2,000-h. p. ste h. p. electric plant, with about 1,900 h. p. used at the mine a mill and smelter, a 500-h. p. hoist good for 1,300′ depth, an good for 1,600′ depth, with 25-drill Nordberg and 40-drill Ra and 20 power drills. Electric power is used for practically hoisting. There are about 20 buildings, including a 38x70′ br frame smithy, 2 engine-houses, 2 boiler-houses, changing-hou office, latter having a library, reception room and café. The the Northern Pacific railway, which makes connections at But and the company has about 3 miles of private track, connectin mill and smelter, with one locomotive for switching. The la were surrounded by high board fences by the former manage

The frame concentrator, near the smelter, is of 350 to fully equipped with crushers, jigs, tables, etc., and about tw produced is of concentrating grade. A precipitation plant, co includes a high dam around the tailings pile, and mine-water tailings for enrichment before going into the leaching launde

The Pittsmont reduction plant is the only independent sm district, and does a considerable amount of custom business, the Tuolumne, Butte-Ballaklava and other independent mi building has two 250-ton blast-furnaces, with room for 3 ad the same size. The old 150-ton Garretson pyritic furnace, Ralph Baggaley, a former manager, has been discarded. The ment has 2 stands, with 96x156′ shells, and there also are Baggaley converters, of smaller size, not in use. Product averaging about 96% copper, 200 oz. silver and 3.5 oz. gold the Nichols Copper Co., New York, for refining.

A limestone quarry, area circa 275 acres, was bought, 19 east of Whitehall and about 40 miles east of Butte, in Jeffer furnishes flux for the smelter and limestone for sale. Buildi burned Aug. 31, 1910, have been replaced.

About 450 men are employed, and costs were said to h cents per lb. during the latter half of 1910, but this probably w mine, and cost of copper delivered, for 1910, probably was abo per lb. Profits were reported at $53,500 for December, 191 January, 1911, latter from a production of 1,134,000 lbs. fine silver and 2,700 oz. gold. Production, early 1911, was about 27 Production of the Pittsburg & Montana was 790,600 lbs. fine silver and 1,422 oz. gold in 1905, and 4,753,500 lbs. copper in 19 the East Butte Copper Mining Co. has been as follows: circa copper in 1906; 3,965,480 lbs. in 1907; 1,756,000 lbs. in 1909, in 1910. The prospects of the Pittsmont mine have been

d developments of 1910, and the surface plant, under the able Ir. Rohn, has been remodeled and brought to the point of iency. Property considered promising and management good.

XTENSION COPPER MINING CO. **MONTANA.**

ine: 322 East Platinum St., Butte, Silver Bow Co., Mont. n, president; Philip A. Breen, vice-president; Frank H. Coon- general manager; Dr. C. E. Blackburn, treasurer; preceding N. Joyce, directors; A. F. Munroe, engineer. Organized Apr. ws of Arizona, with capitalization $1,000,000, shares $1 par; Paid, Oct. 1, 1906, a 1% dividend, amounting to $2,486. rious fractional claims, area 4 acres, lying between the Bel- ia and Ground Squirrel mines of the Anaconda. On these 4 shafts, deepest being the 250′ two-compartment No. 6 shaft, about 500′ of crosscuts. The Westlake and Wall mines are ced, under former ownership, about $300,000 worth of ore. The o. 1 shaft is 170′ deep, and the 200′ No. 2 shaft shows ore assay- opper and 1 oz. silver per ton. No. 3, formerly known as the mall precipitation plant. A little ore was produced, 1907, by reaching 40 tons daily, with net smelter returns of $37,360.21, pany a net royalty of $12,881.83 in 1907. Company also owns f interest in the Centerville claim, and undivided interests lf in Malone; $\frac{11}{16}$ in Little Evelyn; $\frac{1}{4}$ in Valley Forge; $\frac{1}{2}$ in on; $\frac{1}{8}$ in Eureka First; $\frac{1}{16}$ in Lost Fraction, and $\frac{5}{16}$ in Katy T. , 1909.

SMELTING CO., LTD. **QUEBEC.**

all St., New York, N. Y. Mine office: Weedon, Wolfe Co., iary of the Precious Metals Corporation. Lands, about 4½ edon, show a broad band of schist, carrying iron and copper ite. The McDonald shaft develops a lens of 40′ estimated gth, carrying a paystreak of high grade chalcopyrite, and some d with pyrite. Mining work was begun 1909, and production 10, first shipment of 1,000 tons, to the Nichols works, at Capel- 2% copper and 41.78% sulphur, a second, 1,000-ton shipment, .85% copper and 43% sulphur. Company plans continuous increasing shipments. Production is estimated at 225,000 r 1910.

IINING CO., N. L. **AUSTRALIA.**

Cobar, Robinson Co., N. S. W., Australia. H. R. Treatt, zed 1907, under laws of New South Wales, with capitalization s. par. Presumably idle.

JS MINING CO. **UTAH.**

Judge Bldg., Salt Lake City, Utah. Mine office: Alta, Salt Tony Jacobson, president; A. O. Jacobson, vice-president; , secretary. Organized Nov. 28, 1908, under laws of Utah, with 0,000, shares $1 par, assessable. Lands, 100 acres, partly from a railroad. Property, known as the Silver King mine, is with about a mile of workings, showing auriferous and argen- opper ores, and is said to have produced, under former owner- dred thousand dollars worth of ore, from shallow workings.

MINE. **MONTANA.**

aconda Copper Mining Co., at Butte, Silver Bow Co., Mont.

LAND ELY CO. **NEVADA.**

ed unclaimed from former mine office, Ely, White Pine Co., l, president and clerk; H. J. Morrison, treasurer. Organized der laws of Maine, with capitalization $5,000,000, shares $1

par. Lands, 2 claims, south of the Chainman, known as the formerly shipped some ore carrying up to 25% lead, 12 oz. per ton. Mine has a 600′ tunnel, with a 100′ winze. Idle sin ently moribund.

EASTERN NATIONAL COPPER CO., LTD.

Dead. Was succeeded, 1904, by Cheticamp Copper C at Cheticamp, Inverness Co., N. S. Fully described Vol. IV

EASTER SUNDAY MINING CO.

Office and mine: Bisbee, Cochise Co., Ariz. Organized are in Gold Gulch, and a sensational gold discovery wa 1903. Property also carries copper ore. Company is out of f 1905, and presumably moribund.

EAST GREENWATER COPPER CO.

Dead. Formerly at Greenwater, Inyo Co., Cal. Des

EAST GREY ROCK MINE.

Owned by Anaconda Copper Mining Co., at Butte, Silv

EAST GRIQUALAND COPPER & NICKEL MINING CO., LTD.

Office: 97 New Stock Exchange, Johannesburg, Trans Mt. Ayliff, Griqualand East, Cape Colony. Geo. Peel, chai manager; preceding officers and Dr. Davie Thompson, di December, 1908, under laws of Transvaal, with capitalizati £1 par, of which £7,000 went to vendors and £1,500 remain u giving £4,000 for working capital.

Lands, 44 morgen, on the eastern side of the Insizwa ran held on a 99-year lease, which carries a royalty of 2s. 6d. payable to the government, plus a royalty of 1% on the gr from ore. A test parcel of ore, shipped circa 1909, to Great per, nickel and platinum. Mine has a crosscut tunnel, cu from portal, giving a back of 150′. Some ore has been found oz. platinum per long ton, with small silver and cobalt valu

EAST GWANDA MINES, LTD.

Office: 32 Old Jewry, London, E. C., Eng. Mine offi Bulawayo, Rhodesia. T. B. Reynolds, chairman; Maj. M aging director; preceding officers, W. Rhodes and Lord We Mackenzie Greene, mine manager; Tom Priest, secretary; secretary; A. H. Lawrence, consulting engineer. Organized laws of Great Britain, with capitalization £600,000, shar £459,605, fully paid. Debentures, £125,000, at 6%, conve par, on 3 months notice.

Lands, 284 claims and a 10-acre millsite, in the Gwanda land, south of Bulawayo, between the Zambezi and Limpopo West Nicholson, Jessie and Valley mines, latter having a fiss carrying auriferous chalcopyrite and pyrrhotite, with ore circa 1908, at 25,000 long tons, assaying about 1.5% coppe per ton.

Equipment includes a 110-stamp mill, cyanide plant also a smelter, the first in Rhodesia, blown in, 1906, having blast-furnace and a reverberatory furnace. Forces are abou 400 natives. Production, 1906, from 61,875 tons of ore mil gold and silver, 2,255 long tons of concentrates yielding £3 tons of copper matte, of £14,406 estimated value, carryin fine copper. Production first 4 months of 1908, was 23 lon copper in matte, or at the rate of about 175,000 lbs. of coppe pany made some serious mistakes in development and equipm been rectified, and the position and prospects of the property

ING CO. **IDAHO.**

Wallace, Shoshone Co., Idaho. C. F. O. Merriam, presi-
stone, vice-president; P. L. Everhardt, secretary; preced-
cCarthy, W. H. North and Dr. Geo. Gray, directors. Lands,
e National and Hecla mines. Was driving a 2,500′ crosscut
n Gulch, in connection with the Copper King, to develop
below present workings. Property considered promising.

IELTER. **MONTANA.**

rican Smelting & Refining Co., at Helena, Lewis & Clark

NING CO. **MONTANA.**

y Blk., Helena, Mont. Mine office: Winston, Broadwater
. Bell, president and general manager; C. N. Kessler, vice-
th, treasurer; W. H. Dickinson, cashier; preceding officers
directors. Organized under laws of Montana, with capitali-
ares $1 par. Lands formerly were 14 claims, area 220 acres,
ims were dropped. Mine has about 4 miles of workings,
r-lead ores, with some auriferous copper ore. Mine has a
duced ore giving net smelter returns of $1,381,133.12 to

NIA MINE. **MONTANA.**

onda Copper Mining Co., at Butte, Silver Bow Co., Mont.

MINING CO. **ARIZONA.**

y at Bisbee, Cochise Co., Ariz. Fully described Vol. VII.

M-CŒUR D'ALENE MINING CO. **IDAHO.**

y at Mullan, Shoshone Co., Idaho. Described Vol. VIII.

M MINING CO. **IDAHO.**

umbia Bldg., Spokane, Wash. Mine office: Larson, Sho-
John C. Kleber, vice-president; C. E. Mitchell, secretary
ding officers and C. M. Baillie, directors; Samuel Aughey,
Wm. McCullough, superintendent. Organized October,
Washington, with capitalization $1,500,000, increased, May,
shares $1 par, nonassessable; issued, $1,800,000. Stock is
ining exchange.

s, area 135 acres, in the Hunter district, east of the Snow-
osed to carry 3,000′ of the Snowstorm fissure vein, in quartz-
by tunnels of 40′, 125′, 355′ and 900′, mine being reported
20,103′ of workings, estimated to block out for stoping
n a vein of 22′ average width, carrying argentiferous chal-
ss than 1% copper, 1 to 4 oz. silver and $5 to $20 gold per
t source reports No. 1 tunnel to show traces of silver-lead;
andoned, to have followed an insignificant seam of copper
main tunnel, to follow a badly broken vein carrying occa-
Company's figures regarding workings, tonnage and values
gh the property is by no means devoid of promise. Com-
ation, as the Snowstorm Deep Mines, Ltd., with stock made
e funds for development.

MINE. **MONTANA.**

onda Copper Mining Co., at Butte, Silver Bow Co., Mont.

RAY MINING CO. **UTAH.**

ıth Fourth East St., Salt Lake City, Utah. Mine office:
Utah. Paul T. Brockman, president; Emanuel Rydeberg,
Bussard, secretary; F. W. Bussard, treasurer; preceding
rlund, directors. Organized Apr. 5, 1909, under laws of
tion $50,000, shares 5 cents par. Lands, 6 claims, patented,

adjoining the East Tintic Gold King mine, showing ore carr
in silver and lead, with a little gold. Presumably idle.

EAST TINTIC TERMINAL MINING CO.

Dead. Formerly at Eureka, Juab Co., Utah. Describ

EAST YERINGTON COPPER CO.

Office: Salt Lake City, Utah. Mine office: Yeringt
Matthew Domm, treasurer. Lands, adjoining the Contact
prospected, 1907, showing a little high-grade copper ore. I

GUILLERMO ECHAVARRÍA.

Office, mine and works: Illapel, Coquimbo, Chile.
small smelter, known as the Fundición de Quilomenco, at the
near Illapel. Production formerly was about 225,000 lbs.
but was only 11,743 lbs. in 1907. Idle.

ECHO COPPER MINING & MILLING CO.

Office: 413-95 Dearborn St., Chicago, Ills. Letter
from former mine office, Rudefeha, Carbon Co., Wyo. Dr.
president; W. D. Meeker, vice-president; W. R. Stiles, secret
managing director. Organized Dec. 21, 1902, under laws
capitalization $1,000,000, shares $1 par. Lands, 4 claims, ar
ing the Ferris-Haggarty mine on the northeast, opened by a
copper stains. Did a little work, 1906. Idle several yea
moribund.

ECHO MINING CO.

Dead. Formerly at Sandpoint, Kootenai Co., Idaho.

ECLIPSE-ARGO MINING CO.

Office: New Britain, Conn. Mine office: Argo, Bro
Property in process of foreclosure by bondholders. Fully d

ECLIPSE (BARBERTON) COPPER, LTD.

Dead. Formerly at Barberton, Middelburg, Transvaal.

ECLIPSE CONSOLIDATED MINING & INVESTMENT CO.

Office: Seattle, Wash. Mine office: Silverton, Snoh
O. Robert Dahl, president; A. J. Emptage, vice-president;
tary; preceding officers, Andrew Chilberg and John E. Newell,
ized circa 1906, under laws of Washington, with capitalizatio
$1 par, nonassessable, giving $2,000,000 in stock for the pr
claims, unpatented, and a millsite, in 2 groups, including pro
by Copper Independent Consolidated Mining Co., which ca
peddling stock and paying 6% dividends simultaneously.

Mine has 5 tunnels, longest circa 1,100′, on a fissure vei
ing a little copper, but mainly gold and silver values. Wa
Stillaguamish River develops 500 h. p. by turbine. The 52x
trator, rated at 300 tons daily capacity, has crushers, rolls a

ECLIPSE GOLD & COPPER MINING CO.

Dead. Was merged, 1904, in Eclipse-Argo Mining Co.
Broadwater Co., Mont.

ECLIPSE MINE.

Mine office: Wertago, Yungnulgra Co., N. S. W., Au
acres, 60 miles from Wilcannia. Mine, discovered 1892, ha
schist and slate, developed by a 140′ shaft, showing, on the
30″ maximum width, carrying sulphide ore of good grade.
1907, was 200 long tons of ore, of 25 to 30% copper tenor, an
is estimated at 60,000 lbs. fine copper.

ECLIPSE MINING CO.

Office: Mullan, Idaho. Arthur A. Hale, superin
claims, surrounded by the Lucky Calumet, Missoula and Sn

e traceable circa 2 miles, through the Missoula and Copper veloped by a 100′ tunnel. Presumably idle.

VER & COPPER MINING CO. **ARIZONA.**

Box 596, Phœnix, Ariz. Mine office: Glendale, Maricopa ddy, president and general manager; J. R. Aich, vice-presi-, secretary and treasurer. Organized Aug. 22, 1902, under vith capitalization $1,000,000, shares $1 par. Lands, 10 res, also a 5-acre millsite, in the Frog Tank Mountains, Old 3′ fissure vein in porphyry, opened by six 10′ pits, a shaft of 55′ and 105′, carries oxide and carbonate ores, assaying 4 to 0% lead, 10 to 62 oz. silver and $5 to $32 gold per ton. Idle

O. **MONTANA.**

ggins Blk., Missoula, Mont. Letter returned unclaimed ffice, Saltese, Missoula Co., Mont. Edward Donlan, presi-n, vice-president; A. M. Stevens, secretary and treasurer; as. L. Wallace and S. Fredericks, directors; Chas. Stillinger, apitalization $1,000,000, shares $1 par. Lands, 12 claims, on Eddy Creek, about 3 miles from Saltese, and 8 claims on Copper Mountain. Mine has 2 tunnels, upper of 150′ and a vein up to 34′ claimed width, proven for 6,000′ by pits and ainly silver-lead values, with a little gold. Presumably idle.

CO. **BRITISH COLUMBIA.**

were the Superior group, adjoining the Yreka Copper Co., promising showing, and were slightly developed, with a small Formerly at Yreka, Vancouver Island, B. C.

& MILLING CO. **NEW MEXICO.**

Red River, Taos Co., N. M. A. K. Long, superintendent, Property carries auriferous and argentiferous copper ores. a steam plant and 10-stamp mill. Presumably idle.

PPER MINING CO. **PORTUGUESE EAST AFRICA.**

Jewry, London, E. C., Eng. Mine office: Umtali, Mozam-East Africa. H. D. Boyle, chairman; preceding officer, J. ymms, directors; N. S. Sidgreaves, secretary; Consolidated Africa, Ltd., consulting engineers. Organized Aug. 7, 1907, Britain, with capitalization £135,000, shares £1 par; issued, . Was promoted by the Consolidated African Trust, Ltd., ough stock ownership, and which advanced working capital, 1910, in cash or shares, and which apparently was not repaid

copper claims, including the Edmundian mine, near the The Five Streams farm was bought, 1908, for £500, as a site . The Edmundian mine, 3 miles from a railway, was opened level, when taken over by present company. Ore reserves ne, 1909, at 25,742 long tons, averaging 9.8% copper; com-r estimate of 22,799 long tons of 5% copper tenor, the sudden ues seems strange. Ore occurs in a fissure vein in talcose idth, but with fairly regular contents ranging from 5 to 15%, turn, from ore actually mined, of nearly 10% copper, and wts. gold per long ton. Ore is oxidised near surface, but at depth, and is exceedingly friable.

ic plant, on a river 6 miles distant, transmits current at down for use at the mine.

is hand-picked on belts, rich ore and barren rock being re-ged from end of belt averaging 4 to 5% copper, this ore being usher and 3 Holman pneumatic stamps, latter crushing ore

to pass 300 mesh. The Holman air-cushion stamps have a of 20 to 25 tons each, and were giving only about half de Fine ore from the stamps goes to an Elmore oil concentr concentrates of 20 to 22% copper tenor, with tailings of al

The smelter, about a mile from the mine, started circa October, 1908. The smelter is connected with the mine by aërial tram, which crosses a spur of the Sierra Isataca, ove difference of about 1,000′ in altitude. Elmore concentrat sent to the reverberatory furnace, which makes matte, or averaged 84.03% copper in 1908. The matte is crushed in and shipped to England for sale. A blast-furnace, built 19 semi-pyritic smelting, and also to treat the coarser ores, reverberatory. The mill and smelter have not given entir is hoped that they may be keyed up to do better later. T is not large, but has fair sized bodies of ore, of excellent ave tion was circa 600,000 lbs. fine copper in 1906 and was 1,15 in 1910. Idle.

EDMUNDIAN (MANICALAND) COPPER CO., LTD. PORTUGUE

Dead. Was liquidated, voluntarily, July, 1902. F Manicaland, Portuguese East Africa.

EDNA MAY MINING CO.

Dead. Formerly at Winfield, Chaffee Co., Colo.

E. & F. MINING CO.

Office: 511 Tribune Bldg., Salt Lake City, Utah. I Lincoln Co., Nev. A. C. Ellis, Sr., president; A. Levy, secr Bank, treasurer. Organized March 17, 1902, under laws of zation $100,000, shares 50 cents par, assessable. Lands, 12 in the Bristol and Jackrabbit districts, 1½ miles from a ra 450′ incline shaft and 2 tunnels, one of 350′, with several hu workings. Equipment includes a 25-h. p. gasoline hoist buildings. Mine has produced a little copper ore, with ex been practically idle since 1907.

EIGHTY-FIVE MINING CO.

Office: Moline, Ills. Mine office: Lordsburg, Grant Barclay, president and general manager; P. B. Yates, vi Warner, secretary; A. P. Warner, treasurer; preceding Forbes, directors; C. W. Wiley, superintendent. Organized laws of New Mexico, with capitalization $1,000,000, shar meeting, second Wednesday in December. Was a reconstru Mining & Milling Co., which was a reconstruction of Eighty

Lands, 6 claims, leasehold, about 4 miles from Lordsb district. Property includes a former mine, in rhyolite, d tunnel and a 300′ blind shaft, with a 300′ air-shaft to surface by company to average 10′ in width, and to carry 3.5% cop 0.1 oz. gold per ton. Present work is on a 14′ fissure vein, carrying argentiferous bornite and chalcocite, giving assays

Equipment includes a 40-h. p. gasoline plant, with a Jackson electric drill. Management was said to plan a conc making small ore shipments, August, 1910.

EIGHTY-FIVE MINING & MILLING CO.

Dead. Was reorganized Sept. 23, 1909, as Eighty-Fiv merly at Lordsburg, Grant Co., N. M. Described Vol. VII

EINASLEIGH AMALGAMATED COPPER MINES, LTI

Office: Adelaide, South Australia. Mine office: Ein Queensland, Australia. Organized circa May, 1908, with ca

nérger of the Einasleigh Proprietary, Ltd., and an exploring
Block 55, adjoining.
o about 300′ depth, has a vein in mica-schist, near a granite
ghly silicious low grade copper ore, and some diamond drill-
ow grade copper ore at considerable depth. Blast-furnace
with charcoal, but was unsuccessful. Mine was shipping
daily, March, 1910, to the Chillagoe smelter, ore being
6% copper tenor.

LORATION SYNDICATE, LTD. **AUSTRALIA.**

hall Ave., London, E. C., Eng. Mine office: Einasleigh,
sland, Australia. J. S. Smith-Winby, chairman; W. H.
g director; preceding officers and F. S. Saunders, directors;
tary. Organized Aug. 16, 1899, with capitalization £4,000,
d, £3,850. Lands, 100 acres, on the Einasleigh River. Idle
h, and presumably moribund.

EHOLD COPPER MINES, LTD. **AUSTRALIA.**

rganized, Jan. 17, 1907, as New Einasleigh Copper Mines,
Einasleigh, Gilbert Co., Queensland, Australia. Fully

PRIETARY, LTD. **AUSTRALIA.**

rged, circa 1908, in Einasleigh Amalgamated Copper Mines,
Einasleigh, Gilbert Co., Queensland, Australia. Described

TH BLOCKS. **AUSTRALIA.**

inasleigh, Gilbert Co., Queensland, Australia. Lands lie
igh Freehold. Idle some years and apparently moribund.

EISERNER UNION. **GERMANY.**

Germany. Mine office: Eisern, Westfalen, Germany. Robt.
igsheim, Paul Petzold, Dr. Loeb, Albert March and J. W.
e committee; Emil Frisch, general manager; Herr Kolb,
pitalization is 1,000 shares. Property is 3 mines, the Prinz
nion and Thalsbach, the Alter Flussberg mine having been
haft Werder for 150,000 marks. Mines having 3 shafts and
iron ore and copper sulphides. Company plans installation
nd an ore washing and roasting plant. Employs about 100
roduction of about 120,000 metric tons of iron ore.

ERGEWERKSCHAFT. **GERMANY.**

lücksbrunn, Saxe-Meiningen, Germany. E. J. Enners, J. W.
Hecker, Jos. Schmidt-Jerome, Dr. Emil Müller and F. Wip-
mittee; Alex. Müller and Herr Wenzel, general managers.
00 marks, shares 100 marks par.
the Marie Louise and Wilhelm August mines, having 2
has been a producer since 1904. A concentrator, built
om ores. It has been decided to build a potash plant at the
struction to start as soon as drill borings develop adequate

NG CO. **MÉXICO.**

y at Moctezuma, Sonora, Mex. Described Vol. VIII.

PER CO. **ARIZONA.**

windle, perpetrated by the notorious firm of Douglas, Lacey
Kirkland, Yavapai Co., Ariz. Described Vol. IV.

ELOPMENT CO. **ARIZONA.**

obe, Gila Co., Ariz. E. T. Satchell, superintendent. Lands,
miles south of Globe, held under option, originally expiring
Mine has about 350′ of tunnels, and a 110′ winze, proving

values mainly in silver and lead, and in the past has produ
running as high as 800 oz. per ton. Presumably idle.

EL CAPITAN MINING CO.

Dead. Formerly at Kirkland, Yavapai Co., Ariz. D

EL CARMEN MINING CO.

Mine office: San Javier, Hermosillo, Sonora, Mex. C
laws of Arizona. Property, at Los Bronces, near San Javi
organization, and company apparently is moribund.

EL CLIFF MINING CO.

Office: Philadelphia, Pa. Mine office: Hermosa, Si
G. H. Holgate, secretary and treasurer; J. S. Lovern, su
in the Lower Camp, has an 85′ shaft, and about 1,200′ o
carrying values mainly in silver and lead. A small smelt
burning Partridge hot-blast furnace.

EL COBRE MINES.

Dead. Was succeeded Jan. 5, 1907, by Cuba Coppe
Cobre, Santiago de Cuba. Very fully described Vol. VI.

EL COBRE MINING CO.

Dead. Was a swindle. Formerly at Hermosillo,
described Vol. VIII.

EL CORRAL GOLD & COPPER CO.

Office: Rosario, Hidalgo, Chihuahua, Mex. Agust
Capitalization $50,000. Property is La Gran Bonanza m
carrying copper, gold and silver values. Mine has about 6

ELDER MINING CO.

Office: Colorado Springs, Colo. Mine office: Waldo
E. M. Walter, superintendent, at last accounts. A little d
done on the lands, 1909, but company did not take over
as was stated in the press. Presumably idle.

EL DÍAZ GOLD & COPPER CO.

Dead. Formerly at San Martín Hidalgo, Ameca, Jali
Vol. V.

EL DORADO COPPER CO.

Dead. Formerly at Globe, Gila Co., Ariz. Described

EL DORADO COPPER MINING CO.

Dead. Was succeeded, circa 1906, by Woodside-Eur
merly at Georgetown, El Dorado Co., Cal. Fully describe

ELDORADO GOLD MINING & MILLING CO.

Office: 549 25th St., Ogden, Utah. Mine office: He
Co., Utah. Don Maguire, manager. Ores carry silver, l
several years.

ELDORADO MINING CO.

Letter returned unclaimed from former mine office, K
Idaho. Organized circa July, 1907. Lands, 4 claims, ab
logg. Idle several years and presumably moribund.

ELDORADO MINING CO.

Letter returned unclaimed from former office, Méxic
Amatlán de las Cañas, Ahuacatlán, Jalisco, Mex. Mine,
velopment, is said to have a fair showing of auriferous and
ore. Equipment includes a 10-ton experimental blast-fu
few weeks, 1910. Suspended operations circa October, 19

ELDORA ENTERPRISE GOLD MINING CO.

Mine office: Eldora, Gilpin Co., Colo. Ores carry g
Has steam power and a 10-ton smelter. Idle.

ELECTRA MINING & MILLING CO.

Dead. Former office was P. O. Box 513, Steubenville, O

ng Co. Mine was claimed to show ore giving average assays
rmerly at Wickenburg, Maricopa Co., Ariz.

NG & MILLING CO. **NEW MEXICO.**
Orogrande, Otero Co., N. M. In 1907 planned building a con-

NG & SMELTING CO. **OREGON.**
danha, Marion Co., Ore. Lands, 12 claims, area 240 acres,
a water-right, in the foothills of the Cascade range, at the
reek and the Little North Fork of the Santiam River. Mine
' width, said to be traceable about a mile, carrying auriferous
ornite, associated with pyrite, with a paystreak carrying
values in free gold, developed by a tunnel having a back of
vember, 1909, to plan a smelter. Presumably idle.

TING & REFINING CO. **ONTARIO.**
Sturgeon Falls, Nipissing, Ont. Property is a small custom

TROLITICA MANUFACTURERA DE COBRE. **CHILE.**
ly at Santiago de Chile. Described Vol. VIII.

COPPER CO. **IDAHO.**
tury Blk., Mason City, Ia. Mine office: White Bird, Idaho
Campbell, president; F. S. Kingsbury, secretary; preceding
F. B. Platt and J. F. Ferry, executive committee. Organized
ington, with capitalization $1,500,000, shares $1 par. Lands,
actional, showing 5 ore bodies, said to be 10′ to 25′ in width,
covering the widest ledge, veins being crosscut by tunnel.

COPPER MINING & SMELTING CO. **OREGON.**
ly at Imnaha, Wallowa Co., Ore.

REFINING & SMELTING CO. **AUSTRALIA.**
IA, LTD.
tt St., Sydney, N. S. W., Australia. Works office: Port
Co., N. S. W., Australia. Employs about 300 men. W. R.
eceding officer, Kelso King, Francis H. Snow and Capt. G. A.
J. S. Spark, secretary; Benj. Magnus, general manager.
907, with capitalization £150,000, shares £5 par, nonassess-
Debentures, £150,000 authorized, at 5%; issued, £140,000.
ec. 20th of each year. Is practically a subsidiary corporation
an Gold Mining Co., Ltd.
, with deep water in front and direct rail connection at the
e are produced in the immediate vicinity, with annual con-
by management, 1910, at 20,000 long tons of coal, averaging
t, and 4,000 long tons of coke, costing 15s. The plant, costing
the foot of a gentle slope, buildings practically being on one
and storage-houses above. There is a tank for water storage.
mill, in line with the storage-house, is in two sections.
uilding is 105x216′, having one 150-ton rectangular water-
e. There are four 18x35′ reverberatory furnaces, with 2
ide, formerly rated at 60 tons daily capacity each, but now
ent at 30 tons only. The main flue is of steel pipe, 48″ in
-lined, with dust-chambers, and a flue from the converters,
rick flue running up the hill to the stack. The converter
s 2 reverberatory furnaces. The charging floor supported by
ies tracks for electric cars, with openings for the hoppers
and fuel to the furnaces.
department has 2 stands, with 80x120″ shells, of barrel type,
. Matte is run into ladles and taken by a 40-ton traveling

crane to the shells. Sheet steel removable hoods connect w steel pipe, leading to the main flue. Blister copper from the to the refining department, where cast into anodes. The linir a jaw crusher, Chilean mill and mixing pan, using barren quar clay, linings being tamped into shells by a rock-drill fitted with

Blister copper from the converters is sent to a building 5 90-ton refining furnaces, with a casting machine for each, ca average 98.7% copper, 40 oz. silver and 15 oz. gold per ton. T ton wirebar furnace, with mechanical charging.

The electrolytic refinery is 100x257′ in size, treating bli Mount Morgan and Mount Lyell mines, and refining about 8 lian copper output. The works use the multiple system, with an adaptation of the 3-wire system, a small triangle of copp center conductor. The plant began with 360 and now has 10′ 2″ long, 3′ 6″ deep and 3′ 7″ wide, lead-lined, and placed communicating by pipes. Each tank holds 5 tons of anodes. refinery has a silver refinery, where the sludge is leached, an are melted into bars, which are refined electrolytically and th parted.

The 100x100′ powerhouse has a boiler plant with 5 Babcc ers, mechanical stokers, Green fuel economizer, superheater, The engine plant includes two 880-h. p. Bellis & Morcom triple- direct-connected to two 550-kw. Westinghouse generators, su current for the tankhouse. There also are two 150-h. p. Bellis expansion engines, direct-connected to Westinghouse generat rent for power and light. A Parsons turbo-blower has a ca 25,000 to 35,000 cubic feet of free air per minute, at a pressu per inch.

The shop building, 50x120′ in size, includes a machine- carpenter-shop, all fully equipped with modern tools. In co works is a fine laboratory and assay office.

A jetty, built by the government, with 40′ of water in length, and is to be 500′ when completed. There are 4 miles tracks, with 2 locomotives.

This plant began work Feb. 1, 1908, and has demonstrate reaching a point where it now refines about 85% of the entire of copper. The electrolytic copper produced is branded E. S was 5,851 long tons of electrolytic copper, mainly from Mou valued at £351,060, and doré bullion valued at £123,952, m Morgan matte, in 1909, and production was much larger in increase in the refining department is planned for 1911. This long and seriously felt in Australia, and the design and manag creditable to Mr. Magnus.

COMPAÑÍA MINERA y BENEFICIADORA EL EDEN.

Office: Segunda Calle de Mesones 22, México, D. F. Min Zacatecas, Mex. Francisco Llamosa, president and general m Gutierrez, secretary; Luis Colina, superintendent. Organiz organized 1907, under laws of México, with capitalization 600 100 pesos par. Lands, 102 hectares. Mine has 8 shafts, de tunnels aggregating 1,120′ in length, with considerable under developing ores of gold, silver, copper, lead and zinc.

The mill has 40 stamps, 2 Krupp tube mills, 6 Wilfley ta son tables, and it is planned installing a cyanide plant, to tre of tailings accumulated, the dump being estimated to average silver and 3 to 5 grams gold per metric ton.

LOPMENT CO. **MÉXICO.**
Alworth Bldg., Duluth, Minn. Operating office: Warren, Co-
Mine office: San Felipe, Arizpe, Sonora, Mex. Letter returned
rmer mine office, La Cananea, Arispe, Sonora, Mex. Col. Louis
ent and general manager; Frank H. Hereford, vice-president;
ecretary and treasurer; preceding officers and Thos. F. Cole,
alization, originally $200,000, was increased, 1907, to $400,000,
aid in, $5. Property is the entire stock issue of the Lomita
a Mexican corporation that holds direct title to the lands.
udes 2 widely separated groups, known as the Bonanza de
anea, and the San Felipe, on the Sonora River, nearly a hun-
outhward.
de Cobre mine, area 1,628 acres, lies north of the smelter, and
nearly opposite the Puertecitos mines of the Greene Cananea.
2 shafts and 5 tunnels, mine being wet, at slight depth, and
veloped, mainly silver-lead and zinc ores, with a little copper.
e mine, on the Sonora River, includes holdings of 2,466 acres
d 593 acres held under bond and lease. The mine has 3 veins,
o 153′ width, with antigua workings, from which the records
,000,000 worth of silver was produced in the past. New work
7 tunnels, begun October, 1909, with 3,715′ of new workings
onths following. Management considered good.

D MINING & MILLING CO. **ARIZONA.**
ed unclaimed from former office and mine, Tucson, Cochise Co.,
. Daniels, manager. Organized 1910. Lands are about 40
n, and 6 miles from the Calabasas railroad, near Elephant
e Santa Rita Mountains. A vein, said to have a 40′ outcrop,
f argentiferous lead, copper and zinc sulphides, of low average
lso is a 20′ vein of quartzite, said to give surface assays of $10

ING & MILLING CO. **MÉXICO.**
Railway Exchange Bldg., Milwaukee, Wis. Mine office:
ra, Mex. Chas. A. Romadka, president and manager; C. P.
esident; W. S. Dixon, secretary and treasurer; Rolla Ro-
ndent. Organized 1905, under laws of Arizona, with capi-
, shares $10 par.
30 hectares, about 20 miles east of Nacozari, the nearest rail
a shallow shaft and a 1,600′ crosscut tunnel, cutting a vein with
,000′. Ore values are mainly gold and silver. Equipment
electric plant, with a 15-stamp mill having 2 Wilfley tables,
le plant.

. **CHILE.**
Peña Blanca, La Ligua, Aconcagua, Chile. Property is the
15 kilometers from Peña Blanca, showing a vein of about 1
th, which has produced small quantities of 9% copper ore.

COPPER MINING CO. **WASHINGTON.**
erly at Index, Snohomish Co., Wash. Described Vol. V.

RGWERK ELIZA. **GERMANY.**
Mallau, Elsass, Germany. Obersteiger Herzinger, agent and
Property, said to be owned in London, is merely a prospect,
der leisurely development for some years.

PPER CO **VERMONT.**
succeeded, circa 1907, by Vermont Copper Co. Formerly at
range Co., Vt. Fully described Vol. VI.

PPER MINING CO. **WASHINGTON.**
North Yakima, Yakima Co., Wash. Property carries copper

ore, and company was reported, 1909, to have a 50-ton smelt
25 men.

ELIZABETH GOLD HILL MINING CO.

Office and mine: North Yakima, Yakima Co., Wash.
ident; Frank X. Nagler, secretary and treasurer; preceding
Thos. Hope and Rudolph Meyer, directors. Organized
Washington, with capitalization $1,000,000, shares $1
Annual meeting, second Monday in March.

Lands, 10 claims, unpatented, area 200 acres, adjoining
on the north, about 65 miles northwest of North Yakima, in
Property shows a number of ore bodies in granite, 4, of 7′ to
carrying auriferous and argentiferous lead and copper ores,
ings, estimated by management to show 150,000 tons of or
blocked out for stoping, averaging $40 per ton, which figure

Equipment includes steam and water power, and a
material for a 10-stamp mill on the ground. Idle, but plan
1911.

ELIZABETH MINING CO.

Dead. Was succeeded, 1905, by Elizabeth Copper
South Strafford, Orange Co., Vt. Fully described Vol. V.

ELKHART MINE.

Owned by Walcott Copper Mining Co.

ELKHORN COPPER MINING CO.

Dead. Formerly at Argenta, Beaverhead Co., Mont.

ELKHORN COPPER MINING CO.

Office: Oklahoma City, Okla. Letter returned uncl
mine office, Encampment, Carbon Co., Wyo. A. C. Far
Campbell, general manager; W. W. Petty, superintendent.
about 15 men. Lands, on Elk Mountain, carry a vein of ci
phide ore, giving assays of 6 to 20%, and claimed, June,
to 8% copper, with considerable ore in sight. Mine has
tunnel, and shipped, 1909, 4 carloads of ore, to the Argo
better than 10% copper, one carload returning 15.93% co
was said to plan a mill. Property considered promising.

ELKHORN GOLD & COPPER MINING CO.

Office and mine: Ogden, Weber Co., Utah. S. W.
Moroni S. Poulter, vice-president; Walter J. Hoyt, secre
preceding officers, F. E. Kinman, Willey Cragun and J. W.
Organized Nov. 9, 1907, under laws of Utah, with capitaliza
10 cents par, nonassessable; issued, $26,500. Annual meetin
in March.

Lands, 8 claims, unpatented, area 160 acres, in the Si
showing granite, quartzite and limestone, with 7 ore bodies,
ment, reported by company as of 11′ average width, and tra
ing cuprite, chalcopyrite and bornite, having 50′, 65′ and
agement plans continuing the 65′ No. 3 tunnel, and adding

ELKHORN MINING CO.

Letter returned unclaimed from former mine office, Twi
Ariz. E. Shelley, president; E. S. Forderer, secretary an
Capitalization $100,000, shares $1 par. Lands, 10 claims,
the Senator Morgan mine of the Twin Buttes, opened to dept
500′ of workings, showing copper sulphides. Idle and pres

ELKHORN MINING CO., LTD. BRI

Mine office: Greenwood, Boundary district, B. C. Ja
dent and general manager. Mine, under development, has a
tiferous lead and copper ores.

MINING CO. NEVADA.
ree Creek, Owyhee Co., Idaho. M. S. Estes, president and
il Beaton, vice-president; C. W. Robinett, secretary and
ation $500,000, shares $1 par. Lands, 5 claims, in Elko
iles from the Idaho line, about 16 miles northwest of Con-
ected therewith by a good wagon-road. Has a 14′ contact
one and granite, of silicious sulphide ore, said by company
r, 7 oz. silver and 0.04 oz. gold per ton, apparently from
by a 40′ tunnel. Company planned installing a smelter,
ation was not justified by the limited development secured.

MINING & MILLING CO. WYOMING.
: Encampment, Carbon Co., Wyo. J. D. Tillou, presi-
nager; E. E. Hanna, vice-president; S. E. Phelps, secretary
ling officers, M. L. Phelps, F. S. Bash, G. B. Gunnison and
rs. Organized 1900, under laws of Wyoming, with capital-
ares $1 par.
s, patented, 200 acres of which are well timbered, on Elk
Medicine Bow range. Property carries contact deposits
nd schist, opened by an 80′ tunnel and 3 shafts, deepest
up to 20′ estimated width, carrying chalcocite in the upper
by chalcopyrite, estimated to average 2 to 4% copper.
tons of ore, to the Encampment smelter, some years ago,
% copper. Has steam and electric power and necessary

NING & DEVELOPMENT CO. CALIFORNIA.
unclaimed from former office, San José, Cal. Mine office:
a Clara Co., Cal. Lands, near the New Almaden cinnabar
show a 40′ vein of 10% copper ore, which is a wilful and
ion. Is not regarded favorably. Presumably idle.

G CO. ALASKA
adison St., Seattle, Wash. Mine office: Ellamar, Prince
ka. E. L. Welch, president; Chas. Welch, vice-president;
tary, treasurer and general manager; C. A. Middlekamp,
ganized under laws of Washington, with capitalization
$100 par. Is reported to have paid over $300,000 in divi-

s, patented, known as the Gladhaugh mine, on Virgin Bay,
h of Valdez. The mine has a 600′ three-compartment
levels at 100′ intervals, and has about 2 miles of work-
out about 250,000 tons of ore for stoping. A contact
one and slate, carries a lens of 80′ maximum width and
the 200′ level, but pinching out before reaching the 600′
ly chalcopyrite, associated with pyrite and pyrrhotite,
y rock, ore assaying 3 to 30% copper, 1 to 2 oz. silver and
. Ore as shipped is said to have averaged about 7.5% cop-
r ton, with very small gold values. This was the first copper
beginning shipments circa 1901. Some diamond drilling
A cofferdam has been built, to permit mining an ore body
each, below the water.
ides a 300-h. p. steam plant, with 3 boilers, and 2-drill
Rand air-compressors. Buildings include a machine-shop,
nesshouse and 12 other buildings. A 40x150′ wharf has
, about 250′ from the main shaft.
be about $3 per ton, for ore loaded on vessels, with about
ge to the Tacoma smelter. Production, for 6 years ending

1908, is said to have been about 80,000 tons of ore. Produ
1,000,000 lbs. fine copper, 1907, and 1,250,000 lbs. in 1910.
valuable.

ELLA MINING CO.

Dead. Lands passed to Reins Copper Co. Forme
Bow Co., Mont. Described Vol. VIII.

ELLISTON COPPER MINING CO.

Mine office: Elliston, Powell Co., Mont. J. J. Dela
Shattuck, vice-president; Allan McNaughton, secretary
Keebat, treasurer; preceding officers and Geo. Leonhardt, d
Oct. 12, 1908, under laws of Montana, with capitalization
par.

Lands, 4 claims, and a fractional interest in 6 addit
Snowshoe district, 11 miles northwest of Elliston. Min
claimed width, carrying ore giving assays of 5 to 70% coppe
combined gold and silver values, obviously from selected s
to Tacoma smelter have returned 21.35% copper and 2.6
with traces of gold. A little ore was shipped, 1908, to the

EL MAGISTRAL COPPER CO.

Office: 1 Madison Ave., New York, N. Y. Mine off
Sinaloa, Mex. H. L. McNair, president; Hon. C. F. Wrigh
G. Nash, secretary and treasurer; preceding officers, Hon.
Carvin, H. R. Woodward, John J. Dowdle, John P. Fiebig,
and Hon. G. E. Green, directors. Organized June 15, 1906,
with capitalization $1,000,000, shares $10 par. Property
stock of San Lucas Copper Co.

ELM RIVER COPPER CO.

Office: 70 State St., Boston, Mass. Mine office: Wi
Mich. H. F. Fay, president; C. J. Morrissey, secretary and
officers, John C. Watson, Stephen R. Dow, and Chas. N. F
S. Goodale, superintendent. Organized Apr. 20, 1899, under
with capitalization $1,200,000, shares $12 par, fully paid.
Co., Boston, registrar. Annual meeting, third Wednesday in

Lands, 2,300 acres, in Section 6, Town 52 North, Rang
1, 2, 11 and 12, Town 52 North, Range 36 West, and Section
Range 36 West; also a millsite in Section 30, Town 54 No
on the shore of Lake Superior. Nearly a complete cr
secured by upwards of 5,000′ of diamond drill borings, the
overburden on nearly all of the tract. Borings have given co
in variable quantities, from a number of different beds.

Considerable sinking and drifting has been done, on se
beds, at different points. Shafts No. 1 of 800′ and No.
Winona bed. No. 3 shaft, 100′, and No. 4 shaft, 50′, are o
No. 5 shaft was sunk on an unidentified lode, located by di
shaft, the first shaft started, was abandoned at 100′, but
No. 1 shaft is 9x14′ in size, sunk in the footwall of the Winon
angle of 72°. Crosscuts and drifts on the 500′ level show a 3
ing copper in unpayable quantities. On the 800′ level no
showed a healthy bed of 12′ to 16′ width, but no profitable
there. In crosscutting west from the Winona bed 12 othe
diabases were cut, but none were found of commercial valu

In 1907 the equipment was moved from No. 1 shaft
2 [illegible] of the Winona bed, and No. 7 shaft was started
[illegible] unidentified stratum, from which a core showi
[illegible] respectively.

[illegible] shaft in search of the Lake

rtheast of the former workings, being located north of the ¼ of Section 11, somewhat west of the hypothetical horizon of is was sunk vertically, circa 200′, and a crosscut sent 800′ to s of the property, without finding anything of value, though a one, 1910, on a bed cut by the crosscut. It seems evident that and Adventure lodes do not cross the Elm River tract, unless h, as these beds were not disclosed by the crosscut from the toward the Eastern sandstone, although a drill-hole, bored gdaloid, in the hypothetical horizon of the Lake bed, that per.

cludes a duplex hoist good for 1,000′, two Burt marine boilers ompressor. Water is taken from a dam by a Blake pump. a 40x40′ carpenter-shop, a 28x65′ two-story warehouse, a th accommodations for 100 men, a schoolhouse and a number

being organized under the laws of New Jersey, with nonas- l having practically exhausted its funds, a special meeting of 20, 1910, authorized the directors to sell its property to a new d under the laws of Michigan, upon such terms and conditions he company's best interests. In accordance with this authori- t Copper Co. was organized, under the laws of Michigan, the also taking an option on 800 acres immediately southeast of act, on which exploratory work was done, 1910, 4 drill-holes othing of especial promise. Shareholders of the Elm River portunity of exchanging their stock for Contact stock, pari lm River shareholders bought new Contact stock to the extent rmer Elm River holdings, at $2 per share.

E MINING CO. **NEW MEXICO.**

er office was El Paso, Tex. Martin Fishback was general y was the old Ivanhoe mine, at the northern end of the Black nhoe, once owned by Col. Robt. G. Ingersoll, has been an inter- ince 1885, mainly from work of lessees, yielding considerable ferous copper ore, with occasional gold values, and the mine is derable ore of medium grade on the dump. The old Phillips- odeled, 1910. Formerly at Chloride, Sierra Co., N. M.

NG CO. **NEW MEXICO.**

ed unclaimed from former office, El Paso, Tex. Mine office: Co., N. M. W. M. Bartlett, president; M. Nachtweih, vice- vard Leech, secretary; A. F. Schneider, treasurer. Organized ization $600,000, shares $1 par. Mine has a 72′ shaft, on the wing, at bottom, a 5′ vein, and there are 20′ and 40′ shafts on , with other shallow pits and trenches. Presumably idle.

TER. **TEXAS.**

nerican Smelting & Refining Co., at El Paso, El Paso Co., Tex.

MINING & MILLING CO. **MÉXICO.**

erly at Cuatro Ciénegas, Monclova, Coahuila, Mex. Described

COPPER MINING CO. **MÉXICO.**

holders were given shares of Imperial Corona Gold Mining Formerly at Ayutla, Autlán, Jalisco, Mex. Described Vol. III.

& COPPER MINING CO. **WYOMING.**

rs were E. C. Poorman, Wm. E. Johnson, John Peterson, D. A. Moore, A. H. Howe and E. R. Miller, directors; J. W. Hedding, were 93 acres, patented, in Purgatory Gulch, near Encamp- me desultory mining work was done, at intervals, last in 1905, s mainly in gold. Formerly at Encampment, Carbon Co., Wyo.

EL RICO COPPER MINING CO.

Dead. J. Frank Gray was secretary and treasurer. Or
Colorado, with capitalization $1,000,000. No trace of ope
merly at Tepezalá, Ocampo, Aguascalientes, Mex.

ELSIE ADAIR COPPER MINING CO.

Dead. Formerly at Port Augusta, South Australia.

ELSIE MINING CO.

Dead. Formerly at Winfield, Chaffee Co., Colo.

GEWERKSCHAFT ELSIE I.

Office: Dortmund, Germany. Letter returned unclai
office, Taunus, Westfalen, Germany. Wilhelm Samm
manager; preceding officer, W. Bellwinkel and Herr von
committee. Property carries lead and copper ores. Presu

EL SUEÑO MINING CO.

Mine office: Tijuana, Norte, Baja California, Mex.
intendent. Property has auriferous and argentiferous copp
power and a Huntington mill, and is said to have a very s
as El Cuero de Venado. Idle.

EL TIRO COPPER CO.

Office: 5 Nassau St., New York, N. Y. Mine office:
Ariz. Franklin B. Richards, president; Edw. B. Kurtz, v
E. Ellis, secretary and treasurer; preceding officers, Wm
Griscom, Jr., Henry G. Moore and Geo. K. Barnes, directo
eral manager; Louis S. Noble, consulting engineer; Jos. G
ent, at last accounts. Organized May 22, 1907, under la
capitalization $4,500,000, shares $10 par, fully issued. Bo
mortgage, at 6% authorized; issued, $550,000. Was promo
Finance & Securities Co., practically as successor of Cleve
Co. Annual meeting, third Thursday of April.

Lands, 14 claims, 10 patented, area 250 acres, and a
Silver Bell Mountains, adjoining the Imperial and suppose
sion of the porphyry ore bodies found on the Imperial pro
contact deposits between quartz-porphyry and limeston
melaconite, chalcocite and chalcopyrite, mainly the latter
composed porphyry and limestone. Two ore bodies, und
irregular in shape, apparently of about 10 acres in combine
proven to a depth of 400′.

The mine has several shafts of 50′ to 400′ depth, incl
shaft, 120′ Burtis shaft and the 283′ three-compartment K
transportation tunnel connecting the Kurtz shaft with the
other tunnels of 750′, 350′, 250′ and 200′, with several sho
mine has about 6,000′ of workings, estimated to have blocke
3% copper ore, mainly chalcopyrite, though there is a cons
dized ore on the 120′ level, mainly cuprite and melaconite.
considerable 3% ore on the dumps. The Kurtz shaft has

Equipment includes a 600-h. p. steam plant, 150-kw.
120-h. p. gasoline plant, with a 16x20″ 250-h. p. double-
1,000′; 3 gasoline hoists, and Nordberg and Sullivan air-co
aggregate capacity. There are 18 buildings in all.

A 50-ton 60x60′ frame concentrator, built 1907, for ex
was increased later to 100 tons daily capacity, and equippe
crusher, 30-ton Huntington mill, 2 rolls, a Vezin automati
5 Wilfley tables and 1 Richards pulsator and hydraulic
better than 75% of assay values is reported. It was plan
trates and smelting ore to the Sasco smelter, 10 miles distan
by the Arizona Southern railway.

f ore, said to have been mine-run, averaged 9.92% copper in nquestionably was carefully selected. Production was 68,023 907; 51,536 lbs. in 1908, and 221,419 lbs. in 1909. Property to the Imperial Copper Co., and it was planned prospecting id by churn drills.

NSOLIDATED MINING CO. **MÉXICO.**

oadway, New York, N. Y. Mine office: Bacoachi, Añzpe, C. Charlot, president and general manager; Dr. S. Newton ; A. L. King, treasurer; preceding officers, T. B. Johnstone, Julius G. Miller, Henry Stern, Wm. H. Freystadt, I. Neuber- . Powdermaker, Dr. Moritz Gross, Adolph Oltmann and John rs; John Martin, superintendent. Organized under laws of alization $2,000,000, shares $1 par. Property is held through ion having a capitalization of 10,000 pesos, shares 100 pesos ue of which is owned by El Triunfo. Company reports circa Annual meeting, first Monday in October.

tenencias, area 136 acres, in 12 different groups, principal iles from the Picacho mines, lying about 8 miles southwest of om the Sonora River, and about 75 miles by wagon-road from erties carry 5 ore bodies, under development, of 2′ to 5′ aver- said to be traceable 2 miles, and said to carry argentiferous bornite, chalcopyrite and chrysocolla, all silicious, and occa- , with a claimed average value of 5% copper, 25 to 600 oz. per ton, which figures are considered excessive.

re said 1910, to have about 7,000′ of workings, main shaft nnecting with a tunnel, for extraction. There are 5 shafts, 6 s opencuts. The main vein is a fissure of 4′ to 5′ width, and dip, carrying oxidized ores to shallow depth, succeeded by

ludes a 90-h. p. steam plant at the mine, and a small sawmill, Wells provide water for boilers and potable use.

has a 25-h. p. steam engine and 4 Behrend tables, with a he Sonora River, where there is a small pumping station.

ae-half mile from the tunnel portal, has a 30-ton reverberatory ace, and a 30-ton Medbery rotary furnace. Smelter was l, 1908, but has made only intermittent runs, of a few days, e worked well, and at last accounts was planned to be blown 11. A shipment of 2 tons of matte, 1910, to the Cananea ,260 oz. silver and 7 oz. gold per ton. Transportation facili- t railroad station being at Cos, 38 miles distant by mule-trail. ned, 1908, to have expended about $150,000, and to be out of ugust, 1908, that it expected to pay a dividend in the Decem- f course, failed to pay any dividend, such prediction necessa- ed on ignorance, or intent to deceive, the property being in no ction at that time. Is not regarded favorably.

CO., S. A. **MÉXICO.**

d unclaimed from former mine office, Nacozari, Moctezuma, L. Van Dusen, president and general manager; Fritz Kohl- ent. Organized under laws of México. Mine, about 3 miles d 12 miles from Nacozari, carries streaks of rich ore, of about and is said to have considerable concentrating ore carrying Mine has 4 tunnels. Idle and apparently moribund.

DE COPPER CO. **MÉXICO.**

ly at Imuris, Magdalena, Sonora, Mex. Described Vol. VIII.

TED COPPER CO. **NEVADA.**

ckson Bldg., Denver, Colo. Letter returned unclaimed from

former mine office, Ely, White Pine Co., Nev. F. H. Hardi
Romer, vice-president; G. A. Killan, secretary and treasurer
Fred L. Humphrey and Matthew R. Root, directors. Or
1906, under laws of Arizona, with capitalization $2,500,000,
no relation to the other company of same title. Lands, 6 c
in the northwestern section of the Ely district. Operat
mainly to very lurid advertising. Is regarded with suspicion.
ably moribund.

ELY AMALGAMATED COPPER CO.

Office: 30 South Main St., Salt Lake City, Utah. Letter
from former mine office, McGill, White Pine Co., Nev. B.
Jos. R. Murdock, vice-president; Samuel Y. Taylor, secre
preceding officers, J. B. Taylor and A. B. Kingsbury, directors
intendent. Organized 1907, under laws of Utah, with capi
shares 10 cents par. Is no relation to the other company o

Lands, formerly reported as 30 claims, are now reported
townsite, about a mile from the Steptoe works, reported in
veins of 40′ to 50′ width, which seems too good to be true.
pute with Steptoe Valley Mining & Smelting Co., apparently
Several carloads of ore have been shipped. Idle, but was sai
1909, that some of the claims had been leased to President

ELY ARCH COPPER CO.

Office: 204 Virginia St., Reno, Nev. Mine office: Ely, W
Fred L. Small, president; F. M. Lee and Oscar J. Smith, vi
O'Sullivan, secretary; D. P. Bartley, superintendent; prece
Humphries and R. L. Fulton, directors; Nixon National Ba
ganized circa March, 1907, under laws of South Dakota,
$5,000,000, shares $5 par; issued, $3,200,000. Apparently
been done. Idle.

ELY BELL MINING CO. N

Office: Salt Lake City, Utah. Letter returned unclaime
office, Ely, White Pine Co., Nev. F. O. McFall, president a
W. T. Binford, vice-president; J. E. Hanway, secretary and
ized April, 1907, under laws of Arizona, with capitalization $
par.

Lands formerly were 3 claims unpatented, in the Ely dis
area 300 acres, in the Draper district, adjoining the Little C
of Salt Lake county, Utah, held under bond and lease, said t

Company was "merged," circa 1908, in the Corona Cons
but the consolidation, not proving a success, individual shar
Bell were requested, early 1910, to send in their certificates,
property was lost, through foreclosure, on account of nonper
ment work, and was relocated, 1908, the Ely Bell Mining C
and its stock utterly worthless, unless new property be secur

ELY BLACKHORSE MINING CO.

Dead. Formerly at Blackhorse, White Pine Co., Nev.

ELY-BONANZA COPPER CO.

Dead. Formerly at Ely, White Pine Co., Nev. Descri

ELY-CALUMET COPPER CO.

Office and mine: Ely, White Pine Co., Nev. Al. D. Mye
Turner, secretary, treasurer and general manager; preced
Rickard and Thos. Rockwell, directors. Organized under la
capitalization $5,000,000, shares $5 par. A stock control is s
tion to Thos. F. Cole and associates. Stock is listed on t
exchange.

Lands, 32 claims, unpatented, area circa 600 acres, said t

of Ely, and at the extreme eastern end of the known copper
ows limestone and monzonite, traversed by EW. fault-veins of
, much crushed and brecciated. Mine has a 450′ two-com-
nd 500′ of tunnels, with about a quarter-mile of workings,
arrying auriferous and argentiferous chalcocite. Management
king the shaft to 1,000′ and drifting at 100′ intervals. Several
rking on the Wildcat and adjoining claims, have shipped a
nent, 1910, by Strelke Bros., returning 42.6% copper and 3 oz.

AL COPPER CO. **NEVADA.**

ed unclaimed from former office, Salt Lake City, Utah. Mine
Pine Co., Nev. Employs about 15 men. Samuel Newhouse,
anderhoff, vice-president; Gilbert F. Boreman, secretary and
Griffiths, manager; preceding officers, Windsor V. Rice, Chas.
D. Carpenter, directors. Organized December, 1909, with
00,000, shares $1 par.

5 acres, in the city limits of Ely, between the McDonald-Ely
in the eastern portion of the Robinson or Ely district, said to
ns. Mine has a 50′ shaft, on a vein about 18″ wide at surface,
iden to 14′ at 50′ depth, and to carry 5 to 7% copper, which
re exaggerated. Development is mainly by the 1,300′ New-
ing auriferous and argentiferous copper and lead ore. Prop-
e yielded some ore, under former ownership. Equipment in-
pressor and lighting plant.

COPPER CO. **NEVADA.**

0 Wall St., New York, N. Y. Mine office: Ely, White Pine
E. Drucker, secretary; Chas. S. Herzig, consulting engineer;
nager. Management and officers were changed, circa June,
of a receiver. Organized March 31, 1906, under laws of Dela-
lization $12,000,000, shares $10 par, increased, 1909, to
$10 par, nonassessable. Is said to have about 3,000 deluded
ust Co. of North America, Philadelphia, registrar. Bonds,
d; outstanding, circa $55,000.

ms, unpatented, area 471 acres, centrally located, in the Rob-
t east of the Copper Flat mine of the Nevada Consolidated.
was claimed to have a monzonite-porphyry dyke of 3,000′
verage values of 3% copper, 1 oz. silver and 40 cents gold per
gerated claim was put forth by the original management, and
nagement, which was infinitely worse, is not responsible for
version of the truth. The property also was claimed, by those
e original management, to have an ore body of 20′ to 95′ esti-
dth, and to have native copper and chalcocite giving assays of
As a matter of fact, the Ely Central tract shows a few acres of
ry, with about half of the tract covered by rhyolite, balance
and shale. It is hoped, by those who believe in the property,
s a surface flow of later age, and is underlaid by enriched por-
ial tenor, which is a hypothesis that is supported by consider-
dence, and it seems probable that the rhyolitic flow actually is
zonite, but whether the monzonite does or does not carry dis-
sulphides of workable tenor is a question. The property shows
te and cupriferous pyrrhotite, both argentiferous and aurifer-

drilling has been done on the lands, though nothing like the
laimed. Principal development is by the 625′ three-compart-
, having 348′ of laterals on the 465′ level, and 116′ on the 600′
effort to open what was hoped to be a continuation of the Cop-

per Flat ore body of the Nevada Consolidated. The Weber
said to show copper sulphides. The 235′ three-compartme
some crosscutting and drifting, in auriferous copper ore,
probably below commercial tenor. Mine was filled with w

Equipment includes a steam plant, with hoist, engines
are a number of buildings, including an office, warehouse, l
bins.

This company fell into the hands of "Geo. Graham R
through the purchase of a stock control. On July 1, 1909, w
under the control of "Rice," the company had indebtedne
with 72,000 shares of stock in the treasury. The capitalizati
$4,000,000, or 400,000 shares, and apparently nearly all of t
stock was sold. A $600,000 issue of 6% convertible bonds w
26, 1909, and $55,000 of bonds placed, netting the company
The expenditures, for 14 months, to Oct. 1, 1910, were about
or approximately $200,000, yet the treasury was bare at the e
there was an outstanding indebtedness of circa $75,000.
indebtedness remained practically unchanged, and the co
expenses, of probably about $200,000, were met by the issu
472,000 shares of stock, which sold, in the open market, a
share, but obviously netted the company a very small fracti
addition, the gang handling the property had a much larg
taken over from the original holders, under contract. It seem
that the public holds about 1,500,000 shares of this stock, b
price of around $2, giving a total of about $3,000,000 "invest
$200,000 went into the property, for actual exploration an
balance going to the thieves in control, and their virtuous alli
papers that printed the lying advertisements of the gang, and
but are now highly indignant, if accused of being in anywi
crime against public morals and the public pocket.

"Geo. Graham Rice" was born Jacob Simon Herzig.
was convicted and sent to the Elmira penitentiary, where h
No. 4018, until September, 1892. In 1895 Herzig was convi
sentenced to Sing Sing, where he was known as convict B-
Sing in 1899, he took the alias of "Geo. Graham," which ali
to "Geo. Graham Rice." After leaving Sing Sing he becam
track tout, or tipster, operating under the name of Maxim &
of business as a fraud by the postal authorities. He then tur
and combined his abilities with those of "Shanghai" Larry S
crimp, of Portland, Oregon, under the name of the L. M.
This concern failed, under disgraceful circumstances, and "R
at Reno, Nevada, as editor of the Nevada Mining News, a
He next turned up in New York, where he joined forces w
shady reputation and notoriously loose morals, known as Na
this pair operated under the name of Nat. C. Goodwin & C
own pockets at the expense of their dupes. When the
went to pot finally, "Rice" blossomed forth anew, as B.
There actually was and is, a B. H. Scheftels, now under in
but "Rice" furnished the brains and crooked management fo
The Scheftels gang was put out of business when Scheftels
October, 1910, and Ely Central, which was operated merely
bucket-shop, rather than as a mine, immediately collapsed,
cially and physically.

Various reorganization plans have been put out, but all
partly through the vigilance of the federal postal authorit
Geo. Bruce Cortelyou left public life to engage in the gas bus

y of masterly inactivity, and have put a considerable number
rels out of business. The government refused to permit the
ion plans to go through, sequestrating money paid therefor,
movement. The recent reorganization plan, of February,
company, with capitalization $8,000,000, shares $5 par, and
of 6% bonds, interest not to begin until 2 years later, with
t on shareholders, who are to take bonds for their cash pay-
stock is not worth 25 cents per share, it would be folly for
ow good money after bad. The property is by no means
out is a prospect, rather than a mine, and will require much
nagement, to be made a mine, if it is capable of being made
is plastered with liens, and the company apparently is in a
As conducted by "Geo. Graham Rice" the Ely Central was

TED COPPER CO. NEVADA.
dge Bldg., Salt Lake City, Utah. Mine office: Ely, White
M. Levy, president and general manager; Gideon Snyder,
rer; preceding officers, Grant Snyder and Daniel B. Shields,
n, superintendent. Organized Oct. 2, 1906, under laws of
ation $10,000,000, shares $1 par, assessable. Stock is listed
ock exchange and the New York curb.
is, area circa 300 acres, on the south side of the mineral belt,
Jupiter groups of the Nevada Consolidated, bought for circa

vertical shafts, and, during the first 5 months of 1910, made
ngs. Principal shaft is the Zack, 360′ deep, at last accounts,
pened. The 625′ Brilliant shaft has silver-lead ore on the
the bottom is said to show a 100′ bed of disseminated copper
cial grade. The American shaft was 500′ deep, at last ac-
shipped a little ore, one shipment, 1907, netting $81.99 per
m a smelter shipment April, 1910, were 5.76% copper, 6%
nd $15.50 gold per ton. The mine is wet.
several hoists, an office, boarding-house and bunkhouse.
dling the shares of this company on the New York curb have
nto rather poor repute.

TED MINING CO. NEVADA.
Ely, White Pine Co., Nev. Organized under laws of Califor-
ion $5,000,000, shares $5 par. Is no relation to Ely Consol-
Lands, 15 claims, and a half interest in 4 additional claims,
Only assessment work has been done on the property.
August, 1910, by E. P. Vandercook, of San Francisco, on a
Apparently a dead one.

NEVADA.
rnest & Cranmer Bldg., Denver, Colo. Letter returned
mer mine office, Ely, White Pine Co., Nev. Geo. F. Fry,
Berchy, vice president; R. J. Grant, secretary; E. C. New-
receding officers and F. J. Shipman, directors. Organized
der laws of Wyoming, with capitalization $5,000,000, shares

s, 2 fractional, area 125 acres, lying west of the Giroux
e has some opencuts, and a shaft, reported by company as
-h. p. hoist. Stock was placed by the General Finance Co.
% commission. Is not regarded favorably. Idle.

EEN MINING CO. NEVADA.
ly at Ely, White Pine Co., Nev. Described Vol. VIII.

ELY-COPPERTON MINING CO.

Dead. Formerly at McGill, White Pine Co., Nev.

ELY-DUCK CREEK LEAD & COPPER CO.

Office: Provo, Utah. Letter returned unclaimed fro
Ely, White Pine Co., Nev. Chas. F. Ruffner, presiden
secretary and treasurer. Organized circa December, 190
$50,000, shares 10 cents par. Lands are in the Duck Cree
of operations secured. Idle and presumably moribund.

ELY-GIBRALTAR COPPER CO.

Office: 310 Scott Bldg., Salt Lake City, Utah. Lette
from former mine office, McGill, White Pine Co., Nev.
president; D. C. McDonald, vice-president; Chas. E. Street
and general manager; C. O. Bloomquist, superintendent.
1906, under laws of Utah, with capitalization $600,000, shar

Lands, 18 claims, unpatented, about 2 miles northeast o
Mine has a 300′ tunnel, on a vein about 8′ wide at surface, ca
galena, with assays up to 75% lead and 10 to 30 oz. silver per to

ELY-GIROUX EXTENSION COPPER CO.

Dead. Lands were sold, October, 1909, to Giroux Cor
Formerly at Ely, White Pine Co., Nev. Described Vol. VI

ELY GLOBE COPPER CO.

Dead. Formerly at Ely, White Pine Co., Nev. Desc

ELY GOLDEN LEDGE MINING CO.

Dead. Formerly at Ely, White Pine Co., Nev., an
Utah. Described Vol. VIII.

ELY-GRAND CENTRAL COPPER MINING CO.

Office: Denver, Colo. Letter returned from form
White Pine Co., Nev. Organized 1906, under laws of Ariz
tion $1,000,000, shares $1 par. No trace of operations secu
sumably moribund.

ELY-HERCULES MINING CO. COLOR

Dead. Formerly at Lake City, Hinsdale Co., Colo., an
Pine Co., Nev. Fully described Vol. VIII.

ELY HIDDEN TREASURE CONSOLIDATED MINING

Office: Carson City, Nev. Mine office: Ely, White
J. Harris, president; D. C. McDonald, vice-president and ge
F. Mills, secretary; Eugene Howell, treasurer. Organized
laws of Nevada, with capitalization $1,500,000, shares $1 pa

Lands, 6 claims, patented, area 63 acres, lying betwee
Chainman and Nevada Consolidated properties, carrying 4
3, under development, are estimated by company as of 4′ t
auriferous and argentiferous copper and lead ores, carrying
22% lead, 2% zinc, 34 oz. silver and $40 to $150 gold per ton,
too high for anything but carefully selected ore. Mine has
40′, 60′ and 102′, and tunnels of 400′, 110′ and 68′, with about
A little production, mainly of silver lead ore, was secured,
Leasing Co. Presumably idle.

ELY-HOMESTAKE COPPER CO.

Dead. Office was Cripple Creek, Colo. Thos. Murray
J. T. Cone, superintendent. Mine had a shallow shaft, sun
at Ely, White Pine Co., Nev.

ELY-JACKPOT MINING CO.

Dead. Formerly at Ely, White Pine Co., Nev. Desc

ELY-JUMBO COPPER CO.

Dead. Was promoted by G. L. Rickard, and merged,
National Copper Co. Formerly at Ely, White Pine Co., N

ER & LEAD CO. **NEVADA.**
rly at Ely, White Pine Co., Nev. Described Vol. VIII.

COPPER CO. **NEVADA.**
Ely, White Pine Co., Nev. Lands, about 9 miles north of Ely, ut 20' width, slightly developed, giving ore assaying 7 to 9% ly idle.

NEVADA.
rganized circa 1906, with capitalization $1,000,000, shares ty was sold, Aug. 8, 1907, to the Consolidated Copper Co. White Pine Co., Nev.

NEVADA.
rly at Ely, White Pine Co., Nev. Described Vol. VIII.

MILLING CO. **NEVADA.**
were sold, 1906. Formerly at Ely, White Pine Co., Nev.

PPER CO. **NEVADA.**
mmonwealth Bldg., Denver, Colo. Letter returned unclaimed ffice, 10 Ely Trust Bldg., Ely, White Pine Co., Nev. Geo. D. Jas. D. Conway, vice-president; A. M. Kearns, secretary. 1907, under laws of Arizona, with capitalization, $2,000,000, ds, 7 claims, area 140 acres, known as the Modoc group, near a 4 miles southeast of Ely, on which only assessment work has l also to have 4 claims near Goldfield, Esmeralda county, ed with suspicion. Idle and apparently moribund.

COPPER CO. **NEVADA.**
ntury Blk., Denver, Colo. Letter returned unclaimed from Ely, White Pine Co., Nev. Max Straus, president; Hon. Jas. dent; Edw. B. Morgan, secretary; Thos. Keeley, treasurer; dent manager; John D. Murphy, mine manager; preceding Wood, A. B. Whitcher and Hon. Samuel D. Crump, directors; consulting engineer. Organized circa 1907, as successor of the ah Verde and Anaconda companies, with capitalization $2.50 par; issued, $3,750,000.
ns, patented area 480 acres, including the Cowen group of 4 e Nevada Consolidated on the south, property being located vada Consolidated, and immediately south of the Manhattan Idle several years.

PPER CO. **NEVADA.**
ll St., New York, N. Y. Letter returned unclaimed from for- y, White Pine Co., Nev. Volney D. Williamson, president; vice-president; Chester S. Bonham, second vice-president milton H. Durand, treasurer; R. H. Eggleston, assistant officers, G. L. Rickard, E. A. Davidson and J. Markham Organized May 17, 1906, under laws of Maine, with capital- hares $1 par. Trust Company of America, New York, trans- 9 claims, area 170 acres, near the Cumberland-Ely, consid- Idle and apparently moribund.

PLORATION CO. **NEVADA.**
rganized circa 1907, with capitalization $250,000, shares $5 ing one of the numerous group of Ely flotations of that to sell stock, as no trace of operations has been secured. White Pine Co., Nev.

COPPER CO. **NEVADA.**
rly at Ely, White Pine Co., Nev. Described Vol. VIII.

ING CO. **NEVADA.**
ganized circa 1906, with capitalization $1,000,000, shares $1

par. No trace of mining operations secured, and comp promoted for stock-selling purposes. Formerly at Ely, **ELY & OSCEOLA LEDGE MINING & MILLING CO.**

Dead. Formerly at Ely, White Pine Co., Nev., and Co., Nev. Described Vol. VIII.

ELY-PHŒNIX COPPER MINING CO.

Dead. Formerly at Ely, White Pine Co., Nev. Desc

ELY-RAND COPPER CO.

Dead. Was organized 1907, under laws of Arizona $2,000,000, by Alfred Adams, Norton Adams and Hunter B. no work ever done. Formerly at Ely, White Pine Co., Ne

ELY-RESURRECTION COPPER CO.

Dead. Deeded property, Jan. 14, 1911, to Claude W judgment of $13,408.07. Formerly at Ely, White Pine C Vol. VIII.

ELY REVENUE COPPER CO.

Office: Durango, Colo. Letter returned unclaimed fro Ely, White Pine Co., Nev. C. E. McConnell, president. C ary, 1907, with capitalization $1,000,000, shares $1 par. Revenue group, are near the Chainman and Altman mines.

ELY-ROCHELLE COPPER CO.

Dead. Was organized Nov. 23, 1906, under laws of M tion $1,000,000, shares $1 par. Lands were near Kimberle very little work was done thereon, 1907. Formerly at Ely,

ELY SILVER LEAD COPPER CO.

Office: Whinery Blk., Union, Iowa. Letter return former mine office, Ely, White Pine Co., Nev. H. J. Bens Long, vice-president; R. L. Bixby, secretary; H. H. Barne ing officers, J. D. Cundiff, H. Cundiff and R. Bavender, dir general manager. Organized Nov. 21, 1908, under laws of N zation $1,500,000, shares $1 par, nonassessable, in $500 $1,000,000 common stock; issued, $500,000.

Mine, which was a small silver-lead producer, many yea ite dikes of 450′ and 600′ estimated width, separated by stone, with a porphyry cross-dike. Mine has a 360′ tunnel, 1,200′, and a number of shallow pits. Selected samples hav copper with good silver values. The company states that was mined, 1880-1884, just above the tunnel now being dri

ELY STANDARD COPPER CO.

Dead. Former office was Salt Lake City, Utah. W. nager. Organized circa January, 1907. Lands were abou vicinity of Ely. Formerly at Ely, White Pine Co., Nev.

ELY STAR MINING CO.

Office: Columbus, Ga. Letter returned unclaimed fro Cherry Creek, White Pine Co., Nev. J. F. Weathers, presid vice-president; A. C. Chancellor, secretary and treasu $1,000,000, shares $1 par. Lands, 3 claims, known as the and a millsite, in Silver Cañon, about 5 miles north of Cher by a 195′ shaft and a 675′ tunnel. Company claimed, 1907 ore on the dump, averaging about 70 oz. silver per ton. I moribund.

ELY SULPHIDE COPPER CO.

Dead. Was organized 1907, with capitalization $1,00 presumably to sell stock, as no trace of operations ever was at Ely, White Pine Co., Nev.

COPPER CO. **NEVADA.**
r office was 64 Wall St., New York, N. Y. Organized under th capitalization $1,000,000, shares $1 par. Company appar- d by Clarence M. Smith & Co., who were selling stock, 1909, re. Lands were claimed to be 10 claims, area 200 acres, near ed. Formerly at Ely, White Pine Co., Nev.

PPER CO. **NEVADA.**
ld, Nev. Letter returned unclaimed from former mine office, Co., Nev. C. L. Lyman, president; Morris Roberts, vice- agner, secretary and treasurer; preceding officers, Walter H. n Berry, directors. Organized 1906, under laws of South lization $5,000,000, shares $5 par; issued, $3,000,000. Stock w York curb. Lands adjoin the Ely Consolidated and are la Consolidated. Management planned churn drilling. Idle.

INING & MILLING CO. **NEVADA.**
sh Fort, Utah. Letter returned unclaimed from former mine Pine Co., Nev. Organized circa March, 1907. Lands, in parently have little or no development. Idle and apparently

COPPER CO. **NEVADA.**
d unclaimed from former mine office, Ely, White Pine Co., une, 1906, with capitalization $1,000,000, shares $1 par. Is n ownership of about two-thirds of stock, by Boston-Ely , 40 acres, developed by tunnel, said to show a fair body of d silver ore. Idle.

E COPPER CO. **NEVADA.**
rly at Ely, White Pine Co., Nev. Described Vol. VIII.

PPER CO. **NEVADA.**
32 Broadway, New York, N. Y. Mine office: Ely, White . E. Bamberger, president; D. M. Hyman, vice-president; tary; Ernest Bamberger, treasurer and general manager; nd W. W. Armstrong, directors; L. D. Osborne, superintend- Nov. 22, 1906, under laws of Maine, with capitalization $5 par.
s, 1 fractional, area 54 acres, patents applied for, said to have 5,000, lying in the porphyry zone between the Ruth and Cum- of the Nevada Consolidated, showing large blowouts of ferru- Development is by a 300′ shaft, with levels at 100′ intervals, ,200′, 600′ and 1,050′, with 3,500′ of workings, showing ores, nd chalcopyrite, assaying up to 25% copper and 2 oz. silver of gold. Some good ore is shown on the dumps. Equipment notion hoist, good for 500′ depth, a boarding-house, bunk- nine buildings. Company is popularly reputed to have a fair its treasury. Idle.

ER CO. **MÉXICO.**
Llano, Magdalena, Sonora, Mex. F. C. Emery, president; superintendent, at last accounts. Lands, 88 hectares, on begun January, 1907, shows ore assaying 10 to 25% copper, nd up to $6 gold per metric ton, silver values increasing with

AUSTRALIA.
amworth, Inglis Co., N. S. W., Australia. Rev. Father Cur- er, at last accounts. Property, at Trough Gully, 15 miles ows ore said to average about 7.5% copper, with a trace of ludes a small reverberatory furnace, built 1908. Presumably

EMERALD MINING CO.

Office: 1102 Boston Bldg., Salt Lake City, Utah. Mine Juab Co., Utah. W. E. Earles, president; H. C. Hoffman, vi Oglesby, secretary and treasurer; J. L. Yundt, general m officers and E. E. Hoffman, directors. Organized 1896, under capitalization $300,000, shares $1 par, assessable; fully issu claims, and additional property was bought, 1910. Mine h with about 4,000′ of workings, on a narrow but rich vein, and argentiferous copper and lead ores.

EMERALD MINING CO.

Office and mine: Wheatland, Laramie Co., Wyo. H. ager, at last accounts. Lands include the Cooney Hill mine, the Cooney Hill Gold & Copper Mining & Milling Co., and on Slate Creek, the properties showing a prominent gossan a 60′ shaft in ore, and a 100′ shaft bottomed in a gossan showi sulphides Presumably idle.

EMERALD MINING & SMELTING CO.

Dead. Was succeeded by Esmeralda Copper Mining & S merly at Santa Catarina del Norte, Baja California, Mex.

EMMA COPPER CO.

Office: Salt Lake City, Utah. Letter returned unclai mine office, Alta, Salt Lake Co., Utah. John A. Kirby, presid vice-president; W. M. Wantland, secretary; E. O. Howard, tr officers, D. H. Peery, Rufus K. Cobb, S. A. Baugh and L. D. Jas. E. Beveridge, superintendent, at last accounts. Organize 1906, under laws of Utah, with capitalization $1,000,000, sh assessable, but stock was made assessable August, 1909, and levied immediately, to pay pressing debts. Property was sold for less than $2,000, but was redeemed. The corporation with the Old Emma Mining Co.

Lands, 8 claims, area 160 acres, with bond and lease on 3 near the Columbus Consolidated. Property is the Old Emma a considerable producer in early days, and is said to have b opened in Utah, with claimed production of about $5,000,000. through the Flagstaff tunnel, showing a 15′ vein, carrying a pa width, giving assays of 2.5% copper, 11.8% lead, 40 oz. silver per ton. There also is a tunnel on the Montezuma claim. good ore, though apparently not in commercial quantities. a tempestous career. Idle since November, 1907, with rathe pects.

SOCIEDAD MINERA EMMA LUISA.

Mine office: Taltal, Antofagasta, Chile. Has aurifer with steam power. Idle several years.

EMMA MINE. **BRITI**

Mine office: Eholt, Yale district, B. C. Is controlled, t of a three-fourths interest, by the British Columbia Copper maining fourth interest being owned by the Hall Mining & S Property carries a practically vertical vein, between limestone ore body being 18′ to 40′ and averaging 25′ in width, with m along both walls, and with bands of garnetite, in addition to garnetiferous zone, of about 20′ to 25′ width, occasionally car Values are mainly in slightly auriferous and argentiferous c ciated with magnetite. The mine, first worked for iron flu compartment shaft, sunk at 60°, and a glory-hole, or quarry.

Power is exclusively electric, equipment including a 20 Westinghouse motor, 8x10″ Lidgerwood hoist, and a 12-drill Ra

aw-crusher is driven by a 100-h. p. motor, ore therefrom conveyor to a 1,000-ton ore-bin on the railway, property the Canadian Pacific and Great Northern railways.

MONTANA.

Copper & Zinc Co., at Butte, Silver Bow Co., Mont., at ges hands so frequently it is difficult to keep track of.

NEW MEXICO.

nta Rita, Grant Co., N. M. Property, owned by Phelps, der lease, 1908, to P. C. Cramer, who was producing 2 to 3 y. Presumably idle.

DEVELOPMENT CO. **MONTANA.**

y at Butte, Silver Bow Co., Mont.

EMMANUEL. **GERMANY.**

unclaimed from former mine office, Wülfrath, Rheinprovinz, Emil Küppers, agent. Capitalization 100 shares, without perty is the Emmanuel, Opus II, Marienglück and Carl der by one shaft, showing chalcopyrite, galena and sphalerite. ne years, but work was resumed, circa 1910.

CO. **IDAHO.**

unclaimed from former office, 1 Wall St., New York, N. Y. ce: Mackay, Custer Co., Ida. Frank M. Leland, presi- ohn H. Hobbs, vice-president; Robt. Leslie Moffett, secre- n, general manager; preceding officers and Thos. J. Barbour, isch, consulting engineer. Organized May 29, 1907, under capitalization $6,000,000, shares $5 par, reduced, July 16, shares $1 par; issued, $1,000,000. Stock is listed on the nual meeting, third Tuesday in May.

t the Mackay property of the White Knob Copper & d., taking over also a 5-year lease on the property from the , giving 250,000 shares of stock to the White Knob and e MacBeth, and began business without any cash in the 0,000 shares of stock.

s, 6 fractional, 6 patented, area 700 acres, also mill and res, and a railroad right-of-way, in the Alder Creek district. ge number of lenticular contact deposits, between granite- ne, of which 31 are more or less developed, these being erratic , carrying all of the ordinary copper oxides, carbonates and wners claimed a 23′ vein carrying 3 to 9% copper and $1.75 and silver values per ton, but present owners merely claim give the average of one year's ore extraction as 3.9% copper, cents gold per ton.

ened circa 1884, and worked at various times. For some e control of a succession of White Knob corporations, which with deadly monotony, each making a flat failure of the rty was leased, circa July 1, 1905, to the MacBeth Lease, he mine on a business basis, at a profit, something the old ed in doing.

lory-hole of 125′ to 200′ width, but extraction is mainly by shaft connecting with the Albert tunnel, of circa 1,500′ ing about 7 miles of workings, estimated to show 60,000 00 tons blocked out for stoping The mine is dry.

des steam, electric, gasoline, water and air power, with a he mine and 125 h. p. at the smelter. There are 20-h. p., hoists, and an 8-drill air-compressor. Buildings include with a sawmill, 20x30′ carpenter-shop and 20x30′ smithy machine-shop at the smelter.

The mine is reached by a 96-mile branch of the Oregon S running from Blackfoot to Houston, and is connected with 7¾-mile Empire railroad, owned by the company, of 36″ gau two 23-ton Shay mountain climbing locomotives, and 38 car maximum gradient of 6%, with a rise of 2,000′, and has one curve.

The smelter has two 125-ton water-jacket blast-furnace tuyeres, with Connersville blowers, making matte carrying a 26 oz. silver and 1 oz. gold per ton, sent to the Murray smelter did occasional custom smelting, when in blast, but has been id

The Empire Copper Co. was promoted just in time to be panic, but every share of stock sold to the public was scription price, for which the promoters deserve great credit. considered valuable, notwithstanding its bad record under Knob companies. While the mine proper has been idle since 19 begin the production, at any time desired, of circa 200 to 250 Some of the outlying properties were leased, October, 1909, a these leases were made, 1910, to the Garfield smelter, with for 1911. Production was circa 3,200,000 lbs. fine copper, u agement, in 1906; circa 2,750,000 lbs. in 1907, and 834,000 lb

EMPIRE COPPER CO.

Dead. Formerly at Reno, Washoe Co., Nev. Describe

EMPIRE COPPER CO.

Letter returned unclaimed from former office, Silver City former mine office, Santa Rita, Grant Co., N. M., but compa ence. Geo. O. Hilzinger, president and treasurer; John Asher F. C. Knolenberg, secretary. Organized July, 1909. Lands the Chino, previously worked under bond and lease by the Col

EMPIRE COPPER & GOLD MINING CO.

Office: 216 Henne Bldg., Los Angeles, Cal. Mine offic chise Co., Ariz. M. J. Gress, president; Seth Merrill, vice-pre manager; H. H. Morrow, secretary and treasurer; preceding manson, T. E. Morgan, Hiram Bashore and Geo. A. Cox, dire Jan. 31, 1905, under laws of Arizona, with capitalization $1,5 par, nonassessable. Annual meeting, second Monday in Jan

Lands, 36 claims, unpatented, area 720 acres, in the Littl tains, including the Empire group of 16 claims, the Cowboy and the Princess or O. T. Smith group of 12 claims, all sepa distance of 8 miles, the main group being about 2 miles west property shows granite, schist, quartzite and limestone, carryi which 5 have been more or less developed, these carrying bornite and chalcocite. Lands show a good gossan carrying

Principal development is on the Empire group, which ha partment incline shaft, with about 500′ of drifts, so wet that i temporarily, and a new shaft started. Mine shows auriferous copper ore. Some ore shipped, November, 1909, to the Copp gave good returns in copper and silver, with fair gold valu group has the 125′ two-compartment Bridge shaft, the 150′ C and the 115′ Princess shaft, all showing oxidized ores, with sul The Cowboy group has indications of gold. Management is mond drilling.

Equipment includes a 25-h. p. hoist and a 1-drill Fairba compressor. Buildings include an engine-house, 14x16′ smith boarding-house.

EMPIRE COPPER MINING & MILLING CO.

Dead. Property, known as the H. S. P. mine, under de

show good ore from surface to bottom, equipped with a steam
t Tusas, Rio Arriba Co., N. M.

R SYNDICATE, LTD. **BRITISH COLUMBIA.**

rly at Rainy Hollow, Atlin division, Cassiar district, B. C.
I.

UG MINING CO. **COLORADO.**

rly at Empire, Clear Creek Co., Colo. Described Vol. VI.

t COPPER CO. **COLORADO.**

rly at Central City, Gilpin Co., Colo. Described Vol. VIII.

CO. **NEW MEXICO.**

rly at Hanover, Grant Co., N. M. Described Vol. V.

G CO. **MICHIGAN.**

were sold, 1905, to Keweenaw Copper Co. Formerly at
eweenaw Co., Mich.

G CO. **ONTARIO.**

ty, slightly developed by tunnel, showed nickel and copper
d circa 1901. Formerly at Whitefish, Algoma, Ont.

G & DEVELOPMENT CO. **ARIZONA.**

f Col. Epes Randolph, president, Los Angeles, Cal. Mine
ima Co., Ariz. C. F. Richards, vice-president; Wm. M. Grif-
treasurer; preceding officers, E. P. Drew and L. J. F. Iaeger,
Pike, superintendent. Capitalization $1,500,000, shares $1
ims, 1 patented, area 300 acres, known as the Total Wreck,
ict, 8 miles from a railroad. Mine is opened to depth of 600′,
of workings, carrying argentiferous lead and copper ores.
all mill, and made small ore shipments, 1908, to El Paso
ly idle.

A COPPER MINING & SMELTING CO. **NEVADA.**

adway, New York, N. Y. Mine office: Yerington, Lyon Co.,
r, president; L. R. Bittman, secretary. Organized under
th capitalization $5,000,000, shares $5 par. Lands, circa 500
f Yerington, having numerous pits, and 4 shafts of about 100′
is said to have produced upwards of $100,000 worth of ore,
erships, and considerable drilling has been done. Company
of cuprite more than 1,000′ wide, but might as easily have
p to be solid copper, and 10,000′ wide. Was said to have a
hich was untrue. Is not regarded favorably. Idle several
bly moribund.

ING CO. **ARIZONA.**

ty was sold, under foreclosure, Sept. 15, 1906, to Walter F.
Formerly at Benson, Cochise Co., Ariz. Described Vol. V.

MINING, MILLING & SMELTING CO. **WYOMING.**

ceeded by Hecla Mining Co. Formerly at Hecla, Laramie
bed Vol. V.

MINING CO. **ARIZONA.**

Bldg., Utica, N. Y. Mine office: Bisbee, Cochise Co., Ariz.
dent; A. W. Daggett, treasurer; preceding officers, F. L.
pron, Y. P. Langford, J. A. Losee, F. M. Penny, W. A. Fenn
directors; O. P. Zane, consulting engineer and superintend-
une 27, 1904, under laws of Arizona, with capitalization
$1 par.

s, area 200 acres, near the Modern mine, about 9 miles north-
ng a 1,000′ tunnel, said to show about 150′ of low grade copper
ous and argentiferous, estimated to average about $8 per ton
erly claimed to average circa $14 per ton. Ore is found in
cal of the district, and property is not considered well located.

Fronteras, Arizpe, Sonora, Mex. W. F. Nihart, general mar counts. Organized 1906, under laws of Arizona, with capital shares $1 par. Lands, circa 20 miles from a railroad, in the No trict of Arizpe, have an 80′ shaft, showing ore assaying up to 2 55 oz. silver per ton. Idle several years and apparently mor

EQUATOR MINING & SMELTING CO.

Office: 20 Exchange Place, New York, N. Y. Mine office pai Co., Ariz. Hon. Wm. A. Clark, president; Jas. A. Macd dent; Harry H. St. Clair, secretary and treasurer; preceding Clark and Jas. H. Anderson, directors. Organized March 19, of West Virginia, with capitalization $500,000, shares $5 par; Annual meeting, third Monday in February.

Property, the Iron King mine, on Equator Hill, in the Agu 4 miles by trail, or 6 miles by wagon-road, south of Jerome. mineralized zone up to 600′ in width, with north and south str upwards of 1,000′. It was feared that the ore body was a blan mond drill borings proved it to hold to depth, carrying aurifer erous copper ores. Mine has a 300′ main shaft, and a 5,000′ connecting the portal of the upper tunnel with the roast-yard plant.

There was a 250-ton smelter, and production, 1904, was fine copper, but operations were suspended August, 1905, sm and machinery removed, since which time the property has bee

EQUITABLE COPPER CO.

Office: Altoona, Pa. Letter returned unclaimed from fo Encampment, Carbon Co., Wyo. A. Brile, president; Geo. Jr., secretary and general manager; A. L. Ritchie, superintend 1907. Lands, 9 lode claims, area 180 acres, and 320 acres of plac as the Mountain View group, between Battle Creek and Roarin Itmay mine, showing a vein with gossan capping, in limestone, shaft. Has a 30-h. p. steam plant, and several mine buildings.

EQUITY COPPER & GOLD MINING CO.

Office: 2441 Center St., Baker City, Ore. Mine office: Pr Co., Ore. Rev. W. J. Hughes, president and general manager vice-president; Mrs. Kate Palmer, secretary; G. J. Bowman, ceding officers, Hon. T. E. Johns and Rev. R. W. Hughes, direct 1901, under laws of Oregon, with capitalization $150,000, sha nonassessable. Paid a dividend of $3,000.

Lands, 16 claims, unpatented, area 320 acres, with a 5-acr Quartzburg district, 7 miles north of Prairie City, reported to sh with 3, under development, traceable one-half mile, developed by 500′, 400′, 350′, 500′, 260′, 80′, 90′, 100′ and 75′, showing sulphi by company to average 2 to 3% copper, 2% lead, 2% zinc, 4 o gold per ton.

The 80x120′ frame mill has 5 stamps, a 9x12″ Blake crushe tables and 3 slime-tables.

ERIE CONSOLIDATED MINING & REDUCTION CO.

Dead. Name was changed from Wahnita Copper Co. E ulent. Formerly at Matchwood, Ontonagon Co., Mich.

ERIE COPPER MINING CO.

Dead. Formerly at Milford, Beaver Co., Utah. Fully des

ERIEGA COPPER & COAL MINING & SMELTING CO.

Dead. Formerly at Bozeman, Gallatin Co., Mont. Fully d

ERIE GOLD & COPPER MINING CO.

Office: 616 American Bank Bldg., Los Angeles, Cal. Mine San Bernardino Co., Cal. E. L. Moody, president; A. L. Thom

capitalization $100,000. Lands, 5 claims, area 500 acres. ns secured.

UTAH.

Second South St., Salt Lake City, Utah. Letter returned er mine office, Newhouse, Beaver Co., Utah. Capt. W. C. S. Grow, vice-president and manager; G. D. Anson, secre- easurer. Organized Jan. 14, 1910, under laws of Utah, with 0, shares 10 cents par.

, adjoining the Utah Gold & Copper Co. on the north, in the of the Needle Range. Mine, on which work was begun compartment shaft, and a 100′ drift tunnel on No. 3 vein, e carrying copper, lead and zinc sulphides. A copper vein is

EVELOPMENT CO. **MICHIGAN.**

uidated voluntarily. Formerly at Winona, Houghton Co., ol. VIII.

MÉXICO.

y at La Cananea, Arizpe, Sonora, Mex. Described Vol. VIII.

RA ESCUADRA, S. A. **MÉXICO.**

cotlán de Morelos, Oaxaca, Mex. Thos. A. Hamilton, man- er and copper ores, latter being practically a by-product out 150 men at last accounts.

R MINES, LTD. **SPAIN.**

Court, London, E. C., Eng. Operating office: Pelayo 2, Mine office: Calmenarijos, Madrid, Spain. Albert F. Col- ceding officer and W. Stewart Lane, directors; Joaquin r; Henry N. Gardiner, secretary. Organized Oct. 17, 1901, Britain, with capitalization £125,000, shares £1 par; issued, 42 acres, held under perpetual lease from the Spanish Gov- e Gloria, Ramón, Jaime and Nuestra Señora del Pilar mines. he latter, which shows 8 ore bodies and was worked by the ans or those who preceded them, to a depth of 135′, by 3 rifts. Small shipments of selected ore from the Pilar mine f 7.73 to 20.36% copper. Property is said to have been a French syndicate. Presumably idle.

NERA ESMERALDA. **MÉXICO.**

halchihuites, Sombrerete, Zacatecas, Mex. Leopoldo Via- st accounts. Property includes the Anaconda, Esmeralda eveloped by shafts and tunnels, carrying argentiferous and opper ores. Presumably idle.

PER CO. **MÉXICO.**

ano, Magdalena, Sonora, Mex. F. C. Emery, president; anager. Lands, 88 hectares, said to have surface outcrops 25% copper, 15 to 20. oz. silver and $6 to $20 gold per ton, lected samples. Mine, on which work was begun January, of workings, showing argentiferous copper ore, with silver epth.

PER CO. **NEVADA.**

y at Luning, Esmeralda Co., Nev. Described Vol. VIII.

PER MINING & SMELTING CO. **MÉXICO.**

nta Catarina del Norte, Baja California, Mex. Fred W. t, at last accounts. Mine, known as La Esmeralda, is considerable development, and shipped some ore previous l years and presumably moribund.

PER PRECIPITATING CO. **ARIZONA.**

y at Ryan, Coconino Co., Ariz. Described Vol. VII.

COMPAÑÍA MINERA ESMERALDA DE COLLAHUASI.

Office: Iquique, Chile. Mine office: Collahuasi, Tarapa
ized Dec. 21, 1905, under laws of Chile, with capitalization 20
100 pesos par. Presumably idle.

ESMERALDA MINE.

Office: Rockley, Georgiana Co., N. S. W., Australia.
Flat district, has a 150′ shaft, bottomed in a vein of 3′ width, f
10′, with first level at 100′, carrying ore of 8 to 10% copper ten
ing on a small scale at last accounts.

ESPAÑOLA COPPER SYNDICATE, LTD.

Dead. Property was sold to Esperanza Copper & Sulphu
merly at Almonáster, Huelva, Spain. Described Vol. VIII.

COMPAÑÍA MINERA ESPERANZA y CONSTANCIA.

Mine office: Sierra Mojada, Monclova, Coahuila, Mex.
mann, manager. Property includes La Fortuna and San Anto
opened by a 350′ shaft, equipped with steam power. Mines c
lead and copper ores.

ESPERANZA COPPER CO.

Letter returned unclaimed from former office, Tucson, A
Twin Buttes, Pima Co., Ariz. M. G. Samaniego, president;
vice-president; H. C. Young, secretary; Francis M. Hartman
C. T. Roberts, manager; E. W. Pike, superintendent. Capita
shares $1 par. Lands, 6 claims, area 90 acres, 35 miles from
Cañada del Oro district of the Catalina Mountains. Mine, very
a new shaft sinking, having about 1,000′ of workings, was wo
silver, copper sulphides coming in at depth of 100′. Wor
100′ depth carry argentiferous lead, copper and zinc sulph
power, and shipped about 200 tons of ore, of good grade, lat
ably idle.

ESPERANZA COPPER & SULPHUR CO., LTD.

Office: 74 Palmerston House, London, E. C., Eng. Min
la Real, Huelva, Spain. Sir Robt. J. Price, M. P., chairman
secretary and general manager; preceding officers, Stanlake I
G. Muir Ritchie, Rhys Williams and T. S. Marshall, directo
consulting engineer. Organized Feb. 14, 1906, under laws
as successor of Spanish Minerals Development Co., Ltd., w
£350,000, shares £1 par; fully issued and fully paid. Debent
£81,840, at 5%, redeemable, not later than 1916, at £110, by
of 20% of profits. Net earnings were £27,553 in 1908, and
Dividends were 5% in 1908; 3% in 1909; 4% in 1910.

Lands, 1,833 acres, including 833 acres of mining rights,
the port of Huelva. Holdings include the Esperanza, Nueva
tura and Forzosa mines, which are being worked; the Mos
Tomás mines, which are under development, and the Palmira r
Some of these properties were worked in very ancient times,
small scale, showing characteristic narrow Roman shafts, wit
nately, on either side, for ingress and egress of miners.

The Esperanza mine is estimated to show circa 800,000
and the Angostura mine 350,000 tons of ore of all grades, lo
but averaging 48.5% sulphur. Ore is divided into 3 classes,
carrying mainly sulphur values. The overburden has been
Angostura, for opencast working.

There is a small leaching plant, and the company shippe
cement copper, 1908, and 21 long tons in the first quarter
lixiviation plant is needed.

The property is served by the Castillo del Buitron railway

-gauge line, connecting therewith. The electrification of the s under consideration.

: consists of 3 Premier gas engine units, each with a suitable with electric generators, the plant giving economical and

un July, 1906, has been as follows: 20,421 long tons of ore in n 1907; 87,894 tons in 1908; 103,140 tons in 1909; circa Production of refined copper is estimated at 1,000,000 lbs. ,500,000 lbs. in 1908; 1,750,000 lbs. in 1909, and 2,000,000 lbs. considered promising, and the management has made sub- der considerable disadvantages.

NG CO. **MÉXICO.**

d Title Bldg., Philadelphia, Pa. Operating office: P. O. , Cal. Letter returned unclaimed from former mine office, aja California, Mex. E. W. Nicholson, secretary; Geo. P. ager.

res, and 40 acres miscellaneous lands, on Cedros Island, Country rock is diorite, showing 3 lenticular ore bodies, and sulphide ores, estimated by company to average 40′ d 1,100′ length, and to contain an average of 2.5% copper, and $3.50 gold per ton. Mine has been extensively devel- 8,500′ of workings, showing circa 150,000 tons of low-grade 000 tons blocked out for stoping, surface gold ores changing at depth. Property has produced about $450,000 in values, igh grade ores to the Denver, Pueblo, San Francisco and Production, 1905, was circa 275,000 lbs. fine copper. Idle sale.

NING CO. **MÉXICO.**

stación Symón, San Juan de Guadalupe, Durango, Mex. manager, at last accounts. Capitalization $200,000. Prop- ntaña de Cobre, Esperanza and other claims. Idle.

S DEVELOPMENT **TURKEY IN ASIA.**

LTD.

ound up, voluntarily, June, 1904. Formerly at Tereboli, in Asia.

PINOZA. **CHILE.**

s: Petorca, Aconcagua, Chile. Mine office: Las Palmas, Chile. Works office: Pedegua, Petorca, Aconcagua, Chile. Reices mine, 60 meters deep, which in 1903 produced 537 f 13% copper tenor, and La Maria Luisa mine, 150 meters roduced 300 metric tons of 5% copper ore. Cement copper, ine waters, also is produced, in small quantities. Mines, how large quantities of low grade ore, unavailable commer- transportation, now lacking, is secured.

owns 3 small smelters. El Hueso, sometimes known as Las edegua, 24 kilometers north of the railway station of Cabildo, burning reverberatory furnaces, formerly employing about g only 10 men, 1907, at average wages of 2.4 pesos per day. onsiderable gold and silver values, occasionally ranging up to 25 grams gold per ton. Product is Chile bars of 97 to 98% uction of El Hueso smelter was 264,243 lbs. fine copper in 1907; 109,568 lbs. in 1908; 166,903 lbs. in 1909.

elter, 13 miles north of Cabildo, has 1 reverberatory and 1 urning wood, costing 6 pesos per long ton, nearly 3 tons of to smelt one ton of mineral. Product is Chile bars of 97% % slags. This plant has been idle since 1905.

El Peñon smelter, about 30 kilometers from Cabildo, on t
built circa 1906, has a cylindrical blast-furnace of 75 cm. inte
a Connersville blower, and was practically idle, 1907, produ
50% matte, and producing matte carrying 79,365 lbs. fine
is planned installing a 30" pipeline to this plant, to develop

ALEXANDER ESQUER y CA.

Mine office: Baroyeca, Alamos, Sonora, Mex. J. J.
Property is the Mexicana, Esperanza and other mines, devel
tunnels, carrying auriferous and argentiferous copper ores.

ESSEX COPPER CO.

Dead. Formerly at Matchwood, Ontonagon Co., Mich.

ESTERBROOK MINING CO.

Dead. Property was sold to Boston-Wyoming Copper
Esterbrook, Albany Co., Wyo. Described Vol. VIII.

ESTEY MINING & MILLING CO.

Dead. Was succeeded, circa 1902, by Dividend Mining
merly at Estey, Socorro Co., N. M. Described Vol. V.

SOCIÉTÉ ANONYME LA ESTRELLA.

Office: 161 Boulevard Haussmann, Paris, France. Min
tires, Grenada, Spain. Capitalization, 200,000 francs. Liza
president; Louis Vardón, agent; Huberto Meersmans, gen
tonio Melián, superintendent, at last accounts.

Lands, 1,222 acres, in 3 groups, formerly under option to
Mines, Ltd. Lands include La Jerezana, El Ensueño and oth
Los Martires, which are of some promise, but development is h
transportation facilities, and very high freight rates on the F
de España. There also are argentiferous copper groups at
jara, Granada. The English company planned building a
and a 10-stamp mill, but apparently failed to do so. Presum

SOCIEDAD GRANADINA LA ESTRELLA.

Dead. Lands were sold, circa 1907, to La Estrella C
Formerly at Los Martires, Granada, Spain.

NUEVA SOCIEDAD PROPRIETARIA LA ESTRELLA.

Dead. Formerly at Los Martires, Granada, Spain. Fully

ESTRELLA MINING CO.

Dead. Formerly at Milford, Beaver Co., Utah. Descri

ETHEL CONSOLIDATED MINES CO.

Office and mine: Index, Snohomish Co., Wash. Mori
cribed Vol. VIII.

ETHEL COPPER MINING CO.

Dead. Was succeeded, 1902, by Ethel Consolidated Mi
at Index, Snohomish Co., Wash. Fully described Vol. II.

ETHEL GOLD MINING CO.

Dead. Formerly at Turret, Chaffee Co., Colo. Descri

ETHEL MINING CO.

Office: 408 South State St., Salt Lake City, Utah. M
Juab Co., Utah. W. S. King, president; J. J. Gerster, vice-p
agent; Fred A. Shepard, secretary; Richard B. Shepard, tr
officers and J. P. Magnan, directors. Organized 1908, under
capitalization $10,000, shares 1 cent par, assessable. Lands
cated, circa 45 miles from a railroad, slightly developed by
auriferous and argentiferous copper and lead ores.

ETRUSCAN COPPER ESTATES, LTD.

Dead. Was liquidated January, 1910. Was a colossal b
at Campiglia Marittima, Tuscany, Italy. Exhaustively de

ISE DE ETUDIOS. **SPAIN.**
office was Paris, France. Property was sundry old mines of
eased from Compañía de Minas Ferrocobrizas, and surren-
ny, circa 1909. Formerly El Carpio, Cortegana, Huelva,

MENT CO. **ARIZONA.**
y at Benson, Cochise Co., Ariz. Described Vol. VI.

NING CO. **UTAH.**
oly Blk., Salt Lake City, Utah. Mine office: American
n. Philip S. Shaughnessy, president, treasurer and general
Cullen, vice-president; preceding officers, Dr. T. A. Mona-
wrence, directors; John Chadwick, superintendent. Capi-
shares $1 par.
known as the Silver Bell mine, and 2 millsites, in American
has a 900′ crosscut tunnel, begun 1910, planned to be driven
it 1,000′, showing values mainly in silver and lead, with con-
ides, and small copper and gold values.

NING CO. **UTAH.**
: Eureka, Juab Co., Utah. Walter Fitch, president and
rank B. Kimball, vice-president; Aubrey Fitch, secretary
Fitch, superintendent; preceding officers, Patrick Donnelly,
Mrs. T. D. Sullivan, directors; Walter Fitch, Jr., assistant
ganized July 9, 1909, under laws of Arizona, with capitaliza-
es $1 par; issued, $847,623. Is controlled, through owner-
% of stock issue, by Chief Consolidated Mining Co., and is
property turned over to the Chief Consolidated.
acres, being the mineral rights under the city of Eureka.
hrough the shaft of the Chief Consolidated, by a long drift
d, to all practical intents and purposes, is a part of the Chief
company paid the city of Eureka $10,000 for the mineral
s, public buildings and schoolhouses, and gave its shares for
private property.

IDATED COPPER CO. **NORTH CAROLINA.**
ld Hill, Rowan Co., N. C. J. E. Manter, president; P. E.
alter George Newman, manager. Organized Dec. 1, 1906,
with capitalization $10,000,000. Lands, circa 3,500 acres,
an and Stockton mines, near the Gold Hill Copper Co. Idle.

IDATED MINING CO. **MÉXICO.**
ceeded by Don Carlos & Eureka Consolidated Copper Co.
de Dios, Durango, Mex.

IDATED MINING CO. **MÉXICO.**
n Felipe, Arizpe, Sonora, Mex. Ernest G. Locke, manager.
ha Buena and San Francisco mines, carrying auriferous
pper and lead ores, opened by shafts. Equipment includes
air-compressor, with a 10-stamp mill and a 15-ton smelter.

IDATED MINING CO. **NEVADA.**
rged, 1905, in Richmond-Eureka Mining Co. Formerly at
, Nev.

CO. **ARIZONA.**
y at Globe, Gila Co., Ariz. Described Vol. V.

MINES, LTD. **BRITISH COLUMBIA.**
Nelson, Kootenay district, B. C. J. J. Malone, president;
resident; H. Y. Anderson, secretary and treasurer; L. B.
director; preceding officers, R. Bowlby and J. E. Egelson,
l March 2, 1906, under laws of British Columbia, with capi-
hares 25 cents par, nonassessable; issued, $231,250.

Lands, 8 claims, 3 fractional, crown-granted, area 250 ac railway and 36 miles from Trail. Property shows 5 metan posits, in limestone and granite, of which one, under developm average 30" in width and to be traceable 3,700', carrying cop bonates, chrysocolla, chalcopyrite, bornite and chalcocite. 200' shaft and a 1,625' tunnel, the 900' level showing 2' to 9', 5', of copper carbonates, with a limestone footwall impre sulphides. Management estimates 20,000 tons of ore in sigh blocked out for stoping, averaging 5.5% copper, 1 to 36 oz. gold per ton.

There are 6 buildings, but the mine has no power plan shipments were made, 1906–1910, average returns being 5.5% oz. silver and 0.17 to 0.27 oz. gold, with net smelter returns 890 tons of ore shipped. Property has been managed conserv opment now seems to warrant the machinery equipment th stalling, 1911.

EUREKA COPPER MINING CO.

Dead. Was a bad egg. Property was alleged to be so but location not discovered.

EUREKA COPPER MINING CO.

Dead. Formerly at Encampment, Carbon Co., Wyo.

EUREKA DEVELOPMENT CO.

Dead. Formerly at Bisbee, Cochise Co., Ariz. Descri

EUREKA DEVELOPMENT CO.

Dead. H. F. Allen was superintendent. Former office w Property, near Tucson, was slightly prospected, circa 19 Tucson, Pima Co., Ariz.

EUREKA DIAMOND DRILL MINING CO.

Office: 303 Union Savings Bank Bldg., Oakland, Cal. claimed from former mine office, Jackson, Amador Co., C $75,000, in $25,000 preferred and $50,000 common shares, claims, area 150 acres, 4 miles west of Jackson, having a 60' assaying 20% copper, 5 oz. silver and $20 gold per ton. Idl and apparently moribund.

EUREKA EXPLORATION CO.

Office: Sioux City, Iowa. Mine office: Eureka, San Theodore Ivens, manager, at last accounts. Property, know group, carries auriferous and argentiferous lead and copper ore water power, a 10-stamp mill, and a small concentrator.

EUREKA GOLD & COPPER MINING CO.

Mine office: Jerome, Yavapai Co., Ariz. C. W. Woods, Gibbs, secretary and treasurer; Thos. Taylor, general ma Lands, 8 claims, 7 miles south of Jerome, near the Iron Kin tunnels, showing a 30' vein with an 8' paystreak carrying auri chalcopyrite, with occasional visible gold, but has not develop cial quantities. Mainly idle for some years, but was working, e

EUREKA HILL MINING CO.

Office: 11 East First South St., Salt Lake City, Utah. Mi Juab Co., Utah. Moylan C. Fox, president; Geo. W. Riter, s aging engineer; Chas. Weisboker, superintendent. Organize under laws of Utah, with capitalization $1,000,000, shares $1(corporation, and has paid considerable dividends, but accounts Annual meeting, third Tuesday in February.

Lands, 5 claims, area 27 acres, patented, also a 25-acre mil miscellaneous lands, in the Tintic district. Mine, extensively 1,500' main working shaft, and about 25 miles of workings. C

ying cuprite, malachite and enargite, with average values of
% lead, 25 oz. silver and $3 gold per ton.
. p. steam plant at the mine, with several hoists, largest
00′ depth, and a 30-drill Norwalk air-compressor. There
dings, including shops, foundry and a 240x250′ frame 250-
, fully described in Vol. VIII, which was dismantled.
erly treated at the mill, has been shipped to smelters in Salt
04, and is mainly silver-lead ore. Latest reported copper
00 lbs., 1904, and presumably is now trivial.

NING CO. **UTAH.**

reka, Juab Co., Utah. Grant Snyder, president; Thos. Bar-
R. S. Bowman, secretary and treasurer. Capitalization,
par. Controls the Lily Mining Co. through ownership of
ssued stock; also controls the Provo Mining Co., and has
on Mineral Mountain, adjoining the Iron King claim, said
lues, with considerable gold and silver, principal working

O. **NEW MEXICO.**

rgan zed, circa January, 1910, as Eureka Mines Co., Con-
at Orogrande, Otero Co., N. M. Fully described Vol. IX.

O., CONSOLIDATED. **NEW MEXICO.**

ate St., Boston, Mass. Mine office: Orogrande, Otero Co.,
on, president; John S. Lamprey, vice-president; Edgar A.
Varren W. C. Spencer, treasurer and general manager; pre-
I. Bradford, I. N. Crozier, Dr. Geo. C. Hale and Jos. Elwell,
Leech, superintendent; Fayette A. Jones, consulting engi-
vember, 1909, under laws of Arizona, with capitalization
par, nonassessable; issued and pledged, $3,200,000. Bonds,
at 6%; issued, $50,000. International Trust Co., Boston,
sfer Co., New York, registrars and transfer agents. Stock
York curb. Annual meeting, third Monday in January.
as organized as a reconstruction of the Eureka Mines Co.,
nble, having been promoted by M. C. Barnard, a bucket-
on who left liabilities of $252,141, with "estimated" assets
company paid old company's indebtedness of $8,000, and
sue of $1,000,000 preferred stock. This corporation is a
ntrolling the Boston-Jarilla Copper Co., Amarilla Mining
lining Co., and Molly Gibson Mining Co. and also suppos-
erest in 360 acres of placer ground in Humboldt county,
reports holdings of 41 claims, area 820 acres, in the Silver
lexico, with a vein estimated to average 10′ to 20′ in width,
ying sulphide ore averaging 8% copper and $2 gold per ton,
ely too high. Property is in 11 groups, a mile and upwards
ade smelter, in the Jarilla Mountains, and includes some
r claims. The Amarilla group shows a vein carrying occa-
coarse gold, and there is a 170′ shaft on the Harvey vein.
silver-lead ores, and some turquoise. Is not regarded

CO. **ARIZONA.**

y succeeded the Eureka Development Co., and sold its
09, to the Bisbee Coalition Mining Co. Lands were 13
ern and Empire mines, in Tombstone Cañon, about 7 miles
Formerly at Bisbee, Cochise Co., Ariz.

CO. **MÉXICO.**

alchihuites, Sombrerete, Zacatecas, Mex. J. M. Hardy,
includes the Eureka mine and the Libertad mill. Ores

include silver-lead deposits of good average value, with sever
per veins, and numerous zinc outcroppings. There also is a l
grade iron ore, suitable for flux, and a little tin ore has been f

EUREKA MINING CO.

Office and mine: Eureka, Juab Co., Utah. Robt. A Br
manager; Geo. A. Udall, vice-president; Ralph A. Badger, se
man, Jr., treasurer. Organized Apr. 2, 1909, under laws of Ut
tion $10,000, shares 1 cent par, assessable. Stock is listed on
change. Lands, 8 claims, unpatented, in the East Tintic dis
shaft, showing silver-lead and gold ores.

EUREKA MINING & MILLING CO.

Letter returned unclaimed from former office, P. O. Bo
Ariz. Mine office: Ft. Huachuca, Cochise Co., Ariz. O. B
E. P. Draper, vice-president; F. W. Goodbody, secretary
treasurer. Lands, 7 claims, in 2 groups. The Copper Glanc
tunnels, is claimed to have shipped more than $100,000 worth
trates averaging 27% copper, 184 oz. silver and $6 gold per
group has produced about $15,000 worth of ore. Property
ing, but idle several years. Company is a dead-beat, and app

EUREKA MINING, SMELTING & POWER CO.

Office: P. O. Box 53, Clarkston, Wash. Mine office:
Co., Ore. W. E. Howard, secretary; G. E. Nehrhood, superin
counts. Lands, 40 claims, patents applied for, but adverses fi
for transportation. Properties were claimed to include well
with much ore in sight, and on the dump, but these statemen
untrue. A judgment of $24,970 was given against the origin
affirmed by the Supreme Court, August, 1910. Idle since 190

EUREKA-SWANSEA EXTENSION MINING CO.

Letter returned from former office, Provo, Utah. Mi
Juab Co., Utah. Jesse Knight, president; Geo. A. Shepa
R. E. Allen, secretary and treasurer; preceding officers, Jacob
Knight, directors. Organized 1906, under laws of Utah, v
$100,000, shares 10 cents par, assessable. Lands, 140 acres, p
the Centennial-Eureka, showing a little silver-lead ore. Idle

EUSTIS MINING CO.

Office: 131 State St., Boston, Mass. Mine office: Eust
Que. Col. W. E. C. Eustis, president, secretary and treasu
superintendent. Organized under laws of Quebec, and is o
corporation.

Lands, near Sherbrooke, carry interbedded lenses of cup
schist, the ore channel being traceable about 2 miles in length,
about 3,000' on the incline, with an average dip of 45°. Len
width, averaging about 2.5% copper, up to $3 per ton in combi
values, and 35% sulphur, but with considerable variations, or
rying up to 45% sulphur. Property is primarily a producer
manufacture of acid, and also carries appreciable copper valu
gold and silver values. The ore is of low average grade, but th

The mine, opened 1870, has a 7x7' crosscut tunnel, 1,00
shaft of 2,800', sunk at 20° to 45°, with double skip-tracks.
most of the water coming from surface and the upper stope
quantity of mine-water is very acid, and contains copper in
precipitated as cement copper, on scrap iron, as it leaves th
which it is conducted by a launder. Mine is served by the
railway. About 150 men are employed in the mine and mill.

There is a 400-kw. hydro-electric power plant on the
miles from the mine, and a 250-h. p. auxiliary hydro-elec

miles distant. The main plant has 2 alternators mounted
ıd run in parallel, driven by turbine water-wheels. There
generators, with a 3-phase 25-cycle current at 2,200 volts,
cy of 90 to 93% for the alternators, and efficiency of 60 to
wheels, according to load.
ıdes a 150-h. p. Westinghouse electric hoist, with 6′ drums,
good for 3,500′ depth. There are two 8-drill 2-stage Rand
run by steam and one by electricity.
l, three-fourths of a mile from the mine, is connected there-
am, equipped with three 2-ton ars. The mill has a 150-h. p.
Ore is dumped into grizzlies, coarse ore falling to the sorting
belts, where hand-picked and cobbed. Ore sufficiently rich
ed to ¾″ size, and concentrated ore is reduced to ¼″ size, by
3 double rolls, going thence to a 6-compartment classifier,
e to one of 8 Wilfley tables, middlings from the tables being
e classifiers.
concentrates are shipped to the Cochrane Chemical Works,
re burned for sulphur, the cupriferous cinder remaining then
Norfolk smelter, where treated for copper. Production is
upriferous pyrite yearly, and copper production is estimated
1910.

. VIRGINIA.

nia Smelting Co., at Norfolk, Norfolk Co., Va.

PPER MINING CO. MÉXICO.

o. Broadway, Los Angeles, Cal. Mine office: Santa Cata-
California, Mex. D. R. Wilder, president; J. H. Coleman,
phine H. Wilder, secretary and treasurer; Tomás Vidaur-
at last accounts. Lands, circa 150 acres, carrying a fissure
h. Has steam power. Idle several years.

ONSOLIDATED COPPER CO. CALIFORNIA.

y at Lavic, San Bernardino Co., Cal. Described Vol. V.

NG CO. MÉXICO.

briel, San Juan del Rio, Durango, Mex. J. B. Davis, man-
perintendent. Property, known as La Purísima group, car-
r and argentiferous lead ores, and, circa 1907, employed a
Presumably idle.

& LEASING CO. COLORADO.

adville, Lake Co., Colo. Morris Sterne, manager, at last
ntiferous and auriferous lead, copper and zinc sulphides.
steam power. Presumably idle.

INING CO. WYOMING.

y at Riverside, Carbon Co., Wyo. Described Vol. VII.

ER. WASHINGTON.

Sound Reduction Co., at Everett, Snohomish Co., Wash.

FF MINING CO. MICHIGAN.

iam St., New York, N.Y. Mine office: Mass, Ontonagon
Gay, president; John R. Stanton, secretary. Organized
der laws of Michigan, with capitalization $500,000, shares
756¾ shares. Is controlled, through ownership of about
Mass Consolidated Mining Co.

charter expiring in August, 1883, the management endeav-
g March, to extend its corporate life by compliance with an
ect that year, but the Supreme Court of Michigan rendered
case, that this act of 1883 had no application to a corpora-
exercised corporate powers for the constitutional period of
eorganization planned, with a capitalization of $1,000,000,

shares $25 par, was not effected. In April, 1889, the cons
was amended, to permit legislation that would cover this ca
did not take advantage of this act to reincorporate. By a r
Michigan Supreme Court, the company has no legal existe
since 1883, due to the defective law under which the charter
ident J. W. Linnell, Jr., of the Mass Consolidated Mining Co
wind this corporation up, and it will be liquidated, and its pr
the Mass Consolidated, which already owns a stock interest

Lands are about 1,400 acres, of which 600 acres adjoi
dated on the east, and the Ridge mine of the Mass Consolid

In 1862 this company deeded to the Ogima company,
later by the Mass Consolidated, 16 acres of land, from the n
its territory, adjoining the Ridge mine, to enable the Ridge
work the bed lying north of the Evergreen bed, in exchange f
transferred all right and title to the Evergreen bed, under th
tory, to the Evergreen, hence it follows that the Evergreen c
Evergreen amygdaloid on the property of the Mass Consoli

The mine was worked at intervals, 1854 to 1870, and pro
fine copper, at a cost of $223,582.24. Idle since 1863, excep
tion, by tributors, as late as 1870.

EVERGREEN-EUREKA GOLD & COPPER CO.

Dead. Was a fake that peddled stock, accompanied b
anty" of 5% dividends, and a 10-year "bond" against loss
office at 31 Union Square, New York, N. Y.

EVERGREEN GOLD & COPPER MINES CO.

Office: 205 Empire Bldg., Denver, Colo. Mine office
Colo. J. S. Tapp, president; Geo. E. Bell, vice-president;
secretary and treasurer; Etienne A. Ritter, general manager
intendent. Organized March 8, 1904, under laws of Colora
tion $500,000, shares $1 par, nonassessable.

Lands, 6 claims, 3 patented, area 33 acres, also a 10-acre
quarter-acre millsite, in the Pine Creek district.

The property shows Archæan gneiss and crystalline sch
tite dykes, with another eruptive dyke called "evergreenit
this consisting of quartz, feldspar, orthoclase, albite, augite
ently of Tertiary age. This dike is 3′ to 12′ in width, bounde
contact zones of about 60′ width, in which the crystallin
changed into pseudo-quartzites and pseudo-gneisses. Th
tunnel and shafts of 100′, 150′ and 200′, latter showing, at
20 to 30% copper tenor. There are 4 known ore bodies, ca
bornite and covellite, estimated by management to average
8 oz. silver and 50 cents to $4 gold per ton. The upper w
malachite and tetrahedrite. Carload shipments, 1905, gave re
and 24 oz. silver per ton from first grade ores, and 15% copp
from second grade ores.

Equipment includes steam power, with a 45-h. p. hoist
air-compressor. A 60-ton mill, 40x40′, has one 9x15″ Blak
rolls, 1 Richards jig and 2 Card tables.

EVERGREEN MINING & TUNNEL CO.

Dead. Formerly at Alta, Salt Lake Co., Utah. Des

EVOLUTION-KEYSTONE MINING CO.

Office and mine: Wallace, Shoshone Co., Idaho. Mrs.
president; Hon. N. W. Woods, vice-president; A. E. Robi
general manager; preceding officers, John H. Nordquist and
ors. Organized January, 1903, under laws of Idaho,

cents par, nonassessable; fully issued. Annual meeting, anuary.

area 20 acres, adjoining the Mineral Point and Nellie mines, in the Evolution district. Property has contact deposits d diabase, showing outcrops carrying rich stringers of silver- trenches. Development is by crosscut tunnels of 35′ and utting ore.

ER CO. **ARIZONA.**

swindle, perpetrated by the notorious Wm. F. Wernse gang, erly at Pima, Graham Co., Ariz. Described Vol. V.

ER CO. **QUEBEC.**

est Broughton, Megantic Co., Que. Mine is developed afts. Idle several years.

ER & GOLD MINING CO. **WYOMING.**

ly at Riverside, Carbon Co., Wyo.

& COPPER MINING CO. **ARIZONA.**

ly at Flagstaff, Coconino Co., Ariz.

& COPPER MINING CO. **ARIZONA.**

lersbach was manager. Lands were 23 claims, known as the 0 miles south of Bouse and 2 miles of the main Quartzite was begun circa 1903, and property was sold, 1910, for a en $250,000, to the Record Mines Co. Formerly at Bouse,

NG CO. **IDAHO.**

urke, Shoshone Co., Idaho. Chas. Chriswell, superintend- s, carrying a 15′ vein showing, at surface, copper carbonates pment is by 2 tunnels, upper 150′, and lower planned to be yed 5 men, at last accounts.

NG CO. **NEW MEXICO.**

ly at Organ, Donna Ana Co., N. M. Described Vol. V.

NG & DEVELOPMENT CO. **NEW MEXICO.**

unclaimed from former office, St. Joseph, Mo. Mine office: ., N. M. A. D. Warnock, general manager. Lands include hree Friends claims, said to carry a 4′ vein of 4% silver-cop- bonate up to 50% in tenor. Idle and presumably moribund.

NG & SMELTING CO. **NEVADA.**

ly at Yerington, Lynn Co., Nev. Described Vol. VI.

NTAIN COPPER CO. **NEVADA.**

awthorne, Esmeralda Co., Nev. F. D. Qualey, president and H. Suits, secretary. Lands, 13 claims, area 260 acres, in 16 miles southeast of Hawthorne and 16 miles from Soda- road point, giving promising surface showings of copper for a 00′, along a contact between granite and limestone. Has ts, and about a dozen short tunnels, with one 500′ tunnel ng circa $8 gold per ton. Has a good power plant, with a or, and 15 mine buildings. Presumably idle.

NING CO. **MÉXICO.**

W. R. Ramsdell, Guadalajara, Jal., Mex. Mine office: . Lands, 10 miles southwest of Ameca, show auriferous and and lead ores, assaying up to 27% copper. Presumably

O. OF ENGLAND & MÉXICO. **MÉXICO.**

hill, London, E. C., Eng. Mine office: Sultepec, México, ond, resident managing director; preceding officer, R. T. , F. A. Lucas, J. R. Maguire, H. Mosenthal, John E. Dudley O. E. Warburg, and J. H. M. Shaw, directors; H. F. Wre-

ford, secretary; Robt. Musgrave, superintendent. Organ
under laws of Great Britain, with capitalization £250,000,
issued, 3s. 6d. paid. Property includes the Buena Tierra
said to have been bought for $600,000; various lands in the
of Oaxaca, and the Química and Malacate mines at Sult
auriferous and argentiferous copper and lead ores, devel
equipped with steam and water power, a 20-stamp mill, 5
and 10-ton smelter.

FAEO GRUBE.

Mine office: Haugsund, Christiania, Norway. Propert
small mines, having ore averaging about 4% copper tenor.

FAIRVIEW MINING CO.

Office and mine: Benson, Cochise Co., Ariz. Joaqu
dent; Baptiste Curetto, vice-president; W. E. Wright, sec
general manager; preceding officers, C. Houston, Frank Trask
J. E. Morrison, directors. Organized Dec. 3, 1909, under l
capitalization $400,000, shares $1 par, nonassessable, in $2
$200,000 common stock; issued, $100,000. Annual meeti
year.

Lands, 17 claims, unpatented, with a 15-acre millsite, c
Dragoon and 15 miles north of Tombstone. Property ca
over an ore body in limestone, developed by shafts of 20
malachite and sulphide ores, estimated to average 0.8% copp
$1.60 gold per ton. Has 2 mine buildings. Idle, but hoped t

FAIRVIEW MINING CO.

Mine office: Relief Hill, Nevada Co., Cal. C. M. Wil
at last accounts. Lands, 8 claims, area 160 acres, 21 miles
City, nearest rail point. Property has a schist hanging-wall
wall, with a vein up to 12' in width, carrying an iron-stain
Development is by a 375' tunnel on the vein, with a back of
cuprite and chalcopyrite, with some gold, with gangue of qua
giving average assays of 1.1% copper, 16 cents silver and $
openeut on the hill was worked for gold, by sluicing, some y
ably idle.

FAIRVIEW MINING CO.

Dead. Formerly at Basin, Jefferson Co., Mont.

FALLS CREEK COPPER MINING CO., LTD. BRI

Office: Spokane, Wash. Letter returned unclaimed
office, Nelson, Kootenay district, B. C. L. H. Snyder, pres
J. M. Porter, vice-president; R. H. Finley, secretary; M.
manager, at last accounts; preceding officers and J. P. S
Organized 1907, under laws of Washington, with capitalizatio
$1 par, and registered under laws of British Columbia.
crown-granted, area circa 240 acres, adjoining the Queen Vi
miles from Kootenay Lake, having a 30' vein giving average
copper, with small gold values. Presumably idle.

FALUN MINES.

Owned by Stora Kopparberg Berslags Aktiebolag.

FAMATINA COPPER & GOLD SYNDICATE, LTD.

Dead. Was succeeded, Jan. 21, 1903, by Famatina De
tion, Ltd. Formerly at Chilecito, Rioja, Argentina. Desc

FAMATINA DEVELOPMENT CORPORATION, LTD.

Offices: 56 Clarmon St., London, E. C., Eng. Mine offic
Argentina. Capt. Wm. Bell McTaggart, D. L., J. P., ch
officer; Harry John Meyerstein, D. H. Baylden, R. F. Bu
Rottenburg and Lionel Sartoris, directors; A. Dangerfield

nt general manager; Hooper, Speak & Fielding, consulting

1, 1903, under laws of Great Britain, as a reconstruction of Gold Syndicate, Ltd., with capitalization £400,000, shares ecember, 1908, to £700,000, shares £1 par; issued, £561,534. 00 first mortgage 6% bonds authorized, redeemable at 105,); £120,000 authorized August, 1910, at 10%, issued at 95, outstanding 6% bonds, with option of redemption at 105, or new bonds, in lieu of the old 6% bonds; £50,000 income ,200 have been converted into debentures, and £1,800 are planned paying outstanding debentures of older issues from ssue of £120,000. Company holds a large share interest poration, known as Forastera Mines, Ltd., organized to e Famatina properties.

) acres, in 4 groups, including the 6 principal mines of the ese being the Upulungos group of 7 acres, the Mellizas group mpañía group of 15 acres, and the San Pedro group of 45 at an elevation of more than 16,000′, in the Mexicana dis- matina, paralleling the Andes, in a district very rugged and d transport. The property shows an intricate network of ng metamorphic slate, with 14 auriferous and argentiferous estimated average width, traceable circa 2 miles, the veins row and rich, with ore occurring in irregular shoots. The Pedro are the principal veins, these being about 1,000′ apart. was estimated to show 31,357 long tons of ore, averaging silver and 14.34 dwts. gold, the San Pedro ore being materi- al minor veins are the Anduesa, Esperanza, Placilla and re estimated to average 7.6% copper, 12.4 oz. silver and 10.5 ton, which figures are about double the actual average of r values.

f this property have been worked, spasmodically, since circa t is mainly by the Sacovón Anita, but there are other tun- Estaudora, Pacifica and Forastera. New openings for fiscal 1906, and only 2,943′ in 1909. Company estimated, Sep- 137,214 long tons of ore were developed, and apparently bout 200,000 tons of ore developed, of good average assay f reduction.

between the mine and mill is by a Bleichert aërial tram, ine government, at a reputed cost of about £200,000, con- lhead of the state line. This aërial tram, of 35 kilometers gest in existence, has its upper terminal 4,400 meters and its meters above sea-level. There are 7 intermediate stations, r is available, for control and assisting up-bound traffic, but, ions the line works by gravity, except one section, on which d traffic of wood, coke, lime and smelter supplies. Capacity our on down-freight, and 20 tons on up-freight, and cost of d at about 5s. per metric ton, as against a former cost of 50s. s 40 meters, and longest span is 870 meters, with 500-kg. s said to be working satisfactorily.

installation, near the works, completed circa 1909, has had gh deficient water supply.

own as the Santa Florentina works, is at Chilecito, about a Amarillo, with perpetual water-rights. The smelter has a y, and was blown in March 20, 1908. Equipment includes ting plant, and converters, latter installed 1910. Pyritic ted, 1909, and proved a complete failure, yielding matte of

only 18% copper tenor. Apparently the works treated lar well as low grade ore, under a former management.

About 300 men are employed, normally. Native labor efficiency, costing 75 cents to $1 gold per day for common lab and $1.75 for carpenters and smeltermen.

Production, 1908, was 2,704 long tons of very low gra 875,840 lbs. fine copper, 103,087 oz. silver and 6,622 oz. gold tion November, 1910, was 1,890 long tons of ore treated, yie of matte assaying 36.2% copper, 54 oz. silver and 3.06 oz. gol tion June, 1908, was 3.13% copper, 6.98 oz. silver and 0.42 o

The predecessor of this company was launched with a gre pets, but the property has failed signally in making good, the have been expended. Notwithstanding the troubles of the is of some promise, and, under the capable management of M chance of developing into a profitable mine, providing funds c the directors do not see fit to change managements again, at

FANNY FERN MINING CO.

Mine office: Lake City, Hinsdale Co., Colo. A. O. Egbe at last accounts. Property carries copper and silver-lead or

COMPAÑÍA MINERA FARELLÓN DE PÚQUIOS.

Dead. Was succeeded Nov. 7, 1908, by Compañía M Formerly at Rancagua, Atacama, Chile.

SOCIEDAD MINERA FARELLÓN DE TONGOY.

Office: Valparaiso, Chile. Mine office: Tongoi, Coquin office: Ovalle, Coquimbo, Chile. Organized Jan. 21, 1901, u with capitalization 150,000 pesos, shares 1,500 pesos par.

FARGO GOLD & COPPER MINING CO.

Dead. Formerly at Imnaha, Wallowa Co., Ore. Des

FARMINGTON GOLD & COPPER MINING & MILLIN

Office: Paris, Ky. Letter returned from former mine Davis Co., Utah. H. C. White, president; J. Stuart Walling treasurer. Organized under laws of Wyoming, with capit shares $1 par. Fred H. Perkins, the former manager, was a charge of embezzling $2,000 from the company. Idle severa ently moribund.

FARRELL COPPER CO.

Dead. Was succeeded, circa 1902, by Pittsburg & Mo Formerly at Butte, Silver Bow Co., Mont. Described Vol. I

FARRELL COPPER CO.

Letter returned unclaimed from former office and mine Butte, Silver Bow Co., Mont. W. C. Lewis, president; Carl president; J. D. Slemons, secretary and treasurer; preced Morgan, Walter C. Lewis, Donald Campbell, W. H. Hall directors. Organized July 24, 1906, under laws of Montana, $1,000,000, shares $2.50 par. Indebtedness, as per statement January, 1910, was $21. Lands, 17 acres, in the southeaster district, having a 200′ shaft, sunk jointly with the Alliance crosscut on the 200′ level showing a little ore carrying cop silver values. Idle several years.

FARWELL MOUNTAIN COPPER CO.

Office: Lawrence, Mass. Letter returned unclaimed Springs, Routt Co., Colo. J. A. Ouimet, president; J. R. S dent; W. H. Moison, secretary; J. U. Emard, treasurer; manager; D. J. Freeman, superintendent. Organized 19 Colorado, with capitalization $5,000,000. Lands, 42 lode clai placer claims, on Farwell Mountain, 3 miles from Hahn's Peak

rings. Property includes a water-right on Elk Creek, and ed a hydro-electric power installation. Mine has several ', claimed to show ore averaging 10% copper. Idle.

ER CO. **VIRGINIA.**

Palmer was superintendent. Development work on a small us, 1902, but apparently was suspended immediately there- power. Formerly at Warrenton, Fauquier Co., Va.

& COPPER MINING CO. **WASHINGTON.**

ville, Ohio. Mine office: Nighthawk, Okanogan Co., Wash. sident; Henry Loudenslager, vice-presdent and treasurer; ry; preceding officers, Alois Thurn, E. R. F. Peterfish, J. E. ssex, John T. Meredith and Wm. F. Bort, directors; Edw. ident. Organized December, 1902, under laws of Washing- tion $2,000,000, shares $1 par, nonassessable.

ns, 14 fractional, area circa 300 acres, adjoining the Night- othills of Mount Ellemeham, in the Wannicutt Lake district, anadian Pacific railway.

as 3 veins, one, of 7′ width, carrying copper, and 2 carrying ies mainly in lead. The principal silver-lead vein, of 1′ to 5′ per tunnel, and a 650′ lower tunnel. Presumably idle.

DPPER CO. **MÉXICO.**

ast Superior St., Duluth, Minn. Letter returned unclaimed ffice, La Cananea, Arizpe, Sonora, Mex. Marcus L. Fay, al manager; G. A. Daugherty, vice-president and treasurer; tary; preceding officers, Wm. J. Schulze, John McDaniels directors. Organized Sept. 4, 1904, under laws of Arizona, $3,000,000, shares $5 par. Company holds title to its lands ea-Eastern Mining Co., S. A., organized under the laws of

y aggregated 2,127 acres, in 2 tracts, about 2 miles apart, but reduced, the company retaining only the Cananea-Eastern t claims, latter circa 40 miles south of La Cananea. Former described Vol. VIII.

group has a strong vein, claimed to average about 150′ in robable that the full width will be found workable. This ligua mine, with two 100′ shafts, from which more or less e was stoped in the past. New work includes 2 permanent at last accounts, and the beginning of a tunnel, planned to be 20 or more veins. A 26′ shaft on the Azurite claim shows ssays of 6% copper, 10% lead and 30 oz. silver per ton.

nt planned beginning shipments July, 1907, but failed to do ember, 1908, and does not plan resumption until copper price.

RA LA FÉ, CARIDAD y ANEXAS. **MÉXICO.**

unclaimed from former office, México, D. F. Mine office: ota, Jalisco, Mex. Adolf Marx, president; Andrés Goebel, re, secretary; Richard Guenther, general manager. Organ- léxico, with capitalization 250,000 pesos. Ore carries values gold, and occasional small shipments of high grade ore have nably idle.

R CO. **MICHIGAN.**

were sold to the Ojibway Mining Co. Formerly at Phœnix, h. Described Vol. VII.

R CO. **WYOMING.**

ly at Laramie, Albany Co., Wyo.

FEDERAL COPPER CO., LTD.

Dead. Was succeeded, circa 1902, by Federal Gold
merly at Superior, Douglas Co., Wis. Described Vol. IV.

FEDERAL COPPER MINING & SMELTING CO. **ARIZONA, NEW**

Dead. Was wound up by receiver, 1907, and propert
El Paso, El Paso Co., Tex. Described Vol. VI.

FEDERAL-ELY COPPER CO.

Office: 26 Stock Exchange Bldg., Salt Lake City,
Ely, White Pine Co., Nev. J. A. Cunningham, president;
vice-president; C. T. Strong, secretary; L. L. Farnsworth
Craig, manager; preceding officers, R. J. Evans, John T.
Bradley, directors; Geo. W. Kessler, superintendent.
articles of association amended, 1908, to render the stock as
assessment was levied.

Lands, 21 claims, 3 fractional, area circa 400 acres, also
600 acres, near Lane, bought 1906. Mining lands are the Pa
circa 1909, for $10,000, lying about one-half mile north of t
of the Nevada Consolidated; 8 claims north of the Neva
claims between the Cumberland-Ely and Turner-Ely, and t
group, in Robinson Cañon. Company is said to have paid $

The property north of the Nevada Consolidated shows
pitching to the east, said to be underlaid by cupriferous mo
3 parallel fissures, about 600′ apart, the fissures also being s
shear zones, each about 400′ in width, showing a little copp
argentiferous and auriferous. The limestone capping on the
to carry argentiferous lead ore. Churn drill borings were
satisfactory showing of ore, and there also was some test
trenching.

Development is by tunnels aggregating about 1,000′ le
shafts, 3 said to show copper sulphides at depth of 100′, the
to be near the contact of 3 ore-zones, which seems peculiar
parallel, as claimed.

The Queen of the West shaft shows, at depth of 110′, a
considerable size, averaging circa 3% copper, 1 to 2 oz. silve
gold per ton.

The Kessler shaft, about 100′ deep, near the tunnel, sho
fair tenor.

The main tunnel, planned to be driven 1,500′, starts fr
connect with the shaft to give a 400′ back. It is believed th
cut cupriferous porphyry, before reaching the shaft.

The mine has a steam plant, and a water supply estim
inches in the dry season, more than sufficient for the company
stituting a valuable asset, as water is scarce in the camp.

A railroad passes the mouth of the tunnel. Company
mill for 1907, which was premature. Resumed work circa N
about 2 years idleness.

FEDERAL EXPLORATION CO.

Office: 370 Bullitt Bldg., Philadelphia, Pa. Letter
from former mine office, Ingot, Shasta Co., Cal. Lands ar
ship 33 North, Range 6 West, adjoining the Mammoth min
outcrop, on which an incline shaft has been started. Id
presumably moribund.

FEDERAL GOLD & COPPER CO. **NEVAD**

Dead. Formerly at Eureka, Eureka Co., Nev. Fully

& COPPER MINING CO. UTAH.
y at Blue Acre, Beaver Co., Utah. Fully described Vol. VII.
CORPORATION. COLORADO.
daho Springs, Clear Creek Co., Colo. Mine has argentiferous
and copper sulphides, and is equipped with steam power.

G CO. ARIZONA
bad egg. Was reorganized, 1905, as Gila Valley Copper Co.
, Graham Co., Ariz. Fully described Vol. V.
RE DELLA FENICE MASSETANA. ITALY.
were sold to Società Anonima delle Miniere di Montecatini.
Marittima, Grosseto, Tuscany, Italy. Described Vol. VI.
NG CO. MÉXICO.
ly at Magdalena, Sonora, Mex. Described Vol. IV.
NG CO. NORTH CAROLINA.
eceeded by Century Development Co. Formerly at Center,
Described Vol. VI.
NG & SMELTING CO., LTD. NEW ZEALAND.
dly mismanaged, and was liquidated May 25, 1910, and
onowai Gold Mining Co., Ltd. Formerly at Whangaroa,
Described Vol. VIII.
RNANDEZ. PERÚ.
d works: Huaraucaca, Cerro de Pasco, Junín, Perú. Em-
. Lands include the Colquijirca and Santa Catalina mines
per ore, the San Gregorio bismuth mine, idle at last accounts,
perties employing about 50 men. Works include a concen-
ng plant and a small smelter of about 60 tons aggregate
; circa 100 men.
NG CO. MÉXICO.
ly at San Fernando, Tamazula, Durango, Mex. Described

ING CO. IDAHO,
unclaimed from former office, Detroit, Mich. Mine office:
Idaho. Malcolm J. McLeod, president. Lands, 4 claims,
e Cabinet Range Mining Co., near the Priest Lake Mining
e western side of Priest River, property, lying only 4 miles
national boundary, being difficult of access. Lands carry
f a mineralized zone of about 25' estimated width, proven by
ching at the extreme ends. A 120' crosscut tunnel, with a
shows argentiferous lead and copper ores, assaying up to 87
d copper ores assaying up to 20% copper, 1% lead and 100
A good water-power is available.
TY COPPER MINING CO. WYOMING.
udefeha, Carbon Co., Wyo. Is controlled, through stock
-Wyoming Copper Co. Idle several years.
TD. PERÚ.
isbury House, London, E. C., Eng. Operating office: Are-
office: Ferrobamba, Catobambos, Apurimac, Perú. M. F.
n; Claude Vautin, managing director and consulting engi-
ers, E. M. Touzeau, A. C. Burrage and A. E. Beechens, di-
r, secretary; W. E. Gordon Firebrace, general manager;
superintendent; Agusto Zimmermann, local secretary. Or-
, under laws of Great Britain, with capitalization £120,000,
issued. Is registered in Perú.
ires, about 40 miles west of Cuzco in an air-line, or 75 miles
iles in an air-line from the Pacific coast, and about 500 miles

by rail from Mollendo, Chile, the nearest seaport. Lands
13,000′, and the climate is said to be good. Property is in
Ferrobamba Nos. 1, 2, 3, 4 and 5, Bonanza Nos. 1, 2 and
tanga, or Reina de Cobre, which are divided by the manage
groups. There also is a smelter-site, on the Rio Chalhuaht
below Ferrobamba, at easy distance from all groups, with do

Property includes valuable water-right concessions, fron
to develop hydro-electric power, the rivers being fed by the
Andes. The company's plans call for the operation of mines,
tion works exclusively by electric power. The concessions
to the Rio Chalhuahuacho and several affluents, and applic
for similar rights on the Rio Apurimac, about 25 miles in ar
bamba No. 1. Including the last named concession, whi
secured, the available water power is rated at 120,000 h. p.

For purposes of development the property has been div
groups, known as Ferrobamba No. 1, Ferrobamba No. 2, K
Bonanza. Conditions are much the same at these different
thought that all can be worked opencast.

Ferrobamba No. 1 has been the site of the principal de
bamba No. 1, as a mine, includes Ferrobamba Nos. 1, 4 and 5
900 acres. This property shows an enormous mass of garne
contact metamorphic intrusion, rocks being hornblendic
limestone altered into wollastonite by contact metamorphis
distance, in many places up to 3,000′ from any recognized igr
robamba No. 1 is stated to carry 34 hectares of known copp
having a combined east and west length of 2,300′, and north
1,640′, and is estimated by the management to carry ore o
depth of 200′, the contents being carefully calculated, by
27,635,700 cubic yards, or approximately 12,000,000 tons of
is by a 100′ shaft in chalcopyrite and bornite assaying up to 2
bottom shows 13′ of ore said to give average assays of 24%.
average assays from this shaft at 6% copper, 3 oz. silver a
ton. There also is a tunnel, used for a powder magazine, s
4.5 to 9% copper, and samples, at 2-meter intervals, for 1
5.8% copper, 3 oz. silver and 9 grains gold per ton. Copp
determined by prospecting, are quite uniform, the average
and 9 grains gold per long ton being remarkably constant.
Keystone drills was in progress, late 1910, on Ferrobamba No
working this property opencast, on an extensive scale.

Ferrobamba claims Nos. 2 and 3, area circa 300 acres,
robamba No. 2 mine. This property has copper carbonat
chalcopyrite and bornite that have given assays up to 20%
and 20 grains gold per ton. Development is very limited.

The Katanga or Reina de Cobre mine, area 300 acres,
Vautin as likely to rival Ferrobamba No. 1 in tonnage, thoug
been done thereon. Surface ores, chalcopyrite and bornite,
2 to 7% copper, 2 to 4 oz. silver and 8 to 16 grains gold per
The Charcas, which is the fourth group, is small, hav
about 35 acres. Mr. Vautin reports an ore body of 100 m
meters length, carrying exclusively chalcopyrite, associated
for opencast workings, the whole visible face of a bluff of ore
copper, with an average of 5% copper, 3 oz. silver and 9 grai
The Bonanza claims Nos. 1, 2 and 3, area 420 acres ly
Ferrobamba No. 1, constitute the fifth group, known as the B
face conditions apparently are much the same as at the othe
mining has been undertaken.

as a whole is reported to carry veritable mountains of ore,
o 25% copper, and an average of 3 to 5 oz. silver and 9 grains
include both carbonates and sulphides at surface, with car-
ting, changing, at little depth, to exclusively sulphide ores.
rphyry mines of the United States, the oxidized ores at and
t, because too low in grade for direct smelting, and not amen-
on, but if the carbonate ores of this property run 5% or better
all likelihood they can be treated profitably by direct smelt-
the part of safety, however, to make a liberal allowance for
d near surface, that, very possibly, instead of being an asset,
a liability, because too low in average tenor for smelting, and
a capping that must be removed, at heavy cost, in order to
xtraction of the sulphides lying below. The management,
sitively that the ore is of payable tenor from surface, hence
ping, and is suitable for steam-shovel mining. There also is
ather the strong probability, of finding occasional deposits of
igh grade, and probably the shaft at Ferrobamba No. 1 is in
n this respect Ferrobamba resembles the country-rock mines
have narrow fissure veins carrying medium and high grade

garnetiferous, concentration is likely to prove a considerable
ciently high in average grade, the ore could be smelted direct.
is an engineer of excellent reputation, estimates 400,000,000
t these figures are unduly optimistic, both as to tonnage,
ther than proven, and also as to copper tenor, the evidence at
average tenor not likely to exceed about 5%, while under the
l extraction, it is probable that average copper values may be
han 5%, and possibly even lower. It seems altogether prob-
the tonnage of commercial ore will be enormous.
buildings have been constructed, and roads graded. Trans-
are poor, and rail connection, which may be secured from the
f the Peruvian Corporation, is absolutely essential to produc-
e, though merely a hindrance to exploratory work of the sort

given until May 1, 1911, to Albert C. Burrage, of Boston,
w company, to be organized under the laws of New Jersey,
of $7,000,000, shares $5 par, such new corporation to give to
td. 420,000 shares, or $2,100,000 in stock, and £250,000 cash,
000 shares, or $3,650,000, to be subscribed, at par, for working
art of the consideration, £250,000, to be payable in 4 equal
s, secured by mortgage debentures. Mr. Burrage is gener-
aking this option in behalf of the Amalgamated Copper Co.,

e allowances for overestimates, it is obvious that the Ferro-
y of entirely exceptional promise, with good prospects of mak-
grade mine, if adequately financed and skillfully managed.

MINAS FERROCOBRIZAS. **SPAIN.**

sidro 16, Sevilla, Spain. Mine office: El Carpio, Cortegana,
. Salvador Sánchez Castañer, agent. Lands, 139 hectares, 16
uelva, including El Carpio and Santa Maria de Gracias mines,
ry ancient days.
es, area 73 hectares, were opened 1856, and have been worked
ith numerous interruptions. Property was owned, 1890, by
cisco de Paula, and later was held by Bede Metal Co., Ltd.,
hands of this company, and being leased, until 1909, to Société
os. Ore is cupriferous pyrite, in a lens 400 meters in length,

apparently split, at depth, into 2 ore bodies, separated by ground. Ores apparently average only 0.75 to 1% copper, sulphur, and the lower grade ores, of which there are large q per, lead, zinc and bismuth sulphides to the combined extent also are considerable arsenic and antimony, with alumina gangue, rendering the ore most refractory for the recover El Carpio mines have 11 old shafts. Equipment inclu pump, and an electric hoist raising 600-kg. cages. Producti metric tons of cupriferous pyrite, estimated to have yield fine copper.

SOCIÉTÉ ANONYME DES MINES DE CUIVRE DU

Office: 13 Rue Auber, Paris, France. Mine office: Fe M. Biver, J. de Catelin, L. A. Claudot, P. Dubois, L. Jum and G. de Montrichard, directors; H. Dufresne and R. d saires. Organized Jan. 25, 1907, under laws of France, f5,000,000, shares f100 par. At last accounts, 1909, was s of capital to f3,000,000. Company was said, 1909, to hav

Lands, in the vicinity of Cerdido and Moeche, are 28 k way, with carriage rate of 15 pesetas per metric ton. Mi venir, is opened to depth of about 50 meters, on a 6′ vein ca erous pyrite, claimed by owners to average 50% sulphur. 15-h. p. gas producer plant, and a 16-h. p. electric light plan included circa 300 metric tons of cupriferous pyrite, averag per tenor.

F. G. D. COPPER MINING CO.

Mine office: Heazlewood, Russell Co., Tasmania. tember, 1909. Lands are near Heazlewood, about 14 mi Bischoff, and circa 16 miles west of Waratah. Mine has a mated average width, from which a small test shipment, smelter, gave returns of 26% copper, 14 oz. silver and 7 dwt developing with a small force, 1910.

FIDALGO-ALASKA COPPER CO.

Mine office: Cordova, Alaska. C. W. Harrington, sup 24 claims, about one-half mile east of Irish Cove, on the so Bay. Mine has a little stripping and trenching, and seve 450′ main tunnel following a well defined fracture zone, in s ular ore shoots, said to be 5x50′ in cross-section, cut at 200′ a with many small stringers. Ore, mainly chalcopyrite, assays of about 10% copper, occurs as the cementing m irregular stringers, as disseminated grains, and also largely ments of country-rock, the fracture zones being very erra Mine has several buildings, and was said, July, 1910, to ha shipment.

FIDELITY COPPER CO.

Office: 541 Umatilla Ave., Portland, Ore. Mine offic ington Co., Idaho. Jos. M. Healy, president; L. B. Re Proudfoot, treasurer; T. J. Senfurth, manager; R. A. Chi Organized under laws of Oregon, with capitalization $1,00

Lands, 17 claims, area 340 acres, near the Iron Dyk Homestead, in the Seven Devils district, having a contact porphyry and limestone, carrying native copper, azurite, cite, mainly the latter, claimed to give assays up to 60% copper tenor. Mine has a 700′ main tunnel, planned to b of about 1,000′, showing ore assaying 8% copper, 5 oz. silv Mine has about 1,500′ of workings. Company hopes to h shortly.

NG CO., LTD. **MICHIGAN.**
erly at Victoria, Ontonagon Co., Mich. Described Vol. VIII.
D. **BRITISH COLUMBIA.**
Fife, Yale district, B. C. Chas. Dempster, general manager.
men. Lands, 30 miles east of Phœnix, show a vein up to 30′
about 6′ of smelting ore, with balance of concentrating grade,
ry-hole, an 80′ shaft and a main tunnel having a 235′ winze.
copyrite, carrying gold and silver values, claimed to average
d $4 to $8 gold per ton. Average of 30 assays of ore from the
copper and $4.20 gold per ton, and the mine has some ore
o assay 5% copper and $4 to $6 gold per ton. Some ore was
he Trail smelter. Equipment includes necessary mine build-
Rand air-compressor. Property considered promising.
ENTRAL SILVER & COPPER **AUSTRALIA.**
., N. L.
Fifth Creek, Adelaide Co., South Australia. To the end of
received subsidies of £253 2s. 4d., from the South Australian
ds, 147 acres, freehold, about 9 miles from Adelaide. Prop-
arrying malachite and azurite. Mine is developed by 3 tun-
in tunnel, 460′ long, with a 90′ winze from the end, showing a
nall stringers of rich ore, including chalcocite. Ore shipped to
smelter returned 11.75% copper and 45 oz. silver per ton, and
t the ore could be dressed to average 30% copper and 240 oz.
No. 2 tunnel, above No. 1, is 145′, and there also is a No. 3
a whole makes a rather poor showing of ore.
ROA. **PERÚ.**
ne: Morococha, Junín, Perú. Property is the Santo Toribio
a little ore was extracted, 1905, in development work. Pre-

NG CO. **NEVADA.**
ne: St. Thomas, Lincoln Co., Nev. Levi Syphus, president;
e-president; Robert O. Gibson, secretary; E. H. Syphus, treas-
Oct. 23, 1906, under laws of Nevada, with capitalization
par, nonassessable. Lands, 4 claims, unpatented, in the Gold
miles from a railroad, having a 120′ shaft, with hand-whim,
ng copper, lead, silver and gold values.
ER CHIEF MINING CO. **NEVADA.**
lay, Ohio. Mine office: Las Vegas, Clark Co., Nev. John
t; P. M. Cox, secretary; R. E. Taylor, treasurer; J. E.
lent, at last accounts. Organized 1907, with capitalization
$1 par. Lands, 2 claims, in the Yellow Pine district, circa
of Las Vegas, having a 30′ shaft and a 60′ tunnel, said to
ably idle.
& COPPER MINING & MILLING CO. **UTAH.**
erly at Castleton, Grand Co., Utah. Described Vol. VI.
ICAN MINING CO. **FINLAND.**
net State Bank, Calumet, Mich. Operating office: Fennia
Finland. Mine offices: Kisko, Åbo, Finland and Joensuu,
John Daniell, president; Edw. Ulseth, first vice-president;
ond vice-president; Chas. O. Jackola, secretary; J. H. Jasberg,
auanheimo, assistant secretary; Oscar J. Larson, counsel; pre-
n Saari and Chas. J. Wickstrom, directors; Capt. Jacob Wilson,
dent; Herman Saari, fiscal agent; Capt. Jas. Inch, superin-
ine; Paul Ruottinen, master mechanic.
cember, 1906, under laws of Minnesota, with capitalization
par, as successor of Sampo Mining & Development Co. Bal-

ance sheet, of Jan. 1, 1910, gave cash in banks, $131,750.6
receivable, secured, and cash due on stock, $48,605.15,
$224,645.75 available quick assets.

Lands, 4 groups, bought of the Fiskars Aktiebolag, inclu
without royalty, to all ores and minerals except iron ore, for
about 90 square miles, and an additional tract, adjoining the
bought, 1910, from the same company. Property has both w
portation.

The Orijarvi mine, about 50 miles from Helsingfors, wh
property, was opened A. D. 1757, and mining was contin
mission, until 1875. The property is popularly credited w
$5,000,000, in copper and silver. The Orijarvi shows slight
of the large ore bodies below, these lying in silicious limeston
quartz-diorite contact, ore being chalcopyrite, sphalerite and
all more or less auriferous and argentiferous, associated wit
Orijarvi tract is a parallelogram of approximately 2 by 5
mine was opened very peculiarly, by a series of truncated
apexes at surface, openings gradually increasing in diameter
being no drifting. The old workings show stopes up to 60′ wi
borings, with 8 holes, have shown the ore bodies to continue b
of the old workings. The mine has 9 shafts, deepest 500′, with
vals. The old stockpile carries upwards of 30,000 tons of zinc
carded from previous operations, but probably of presen
smelter could be built at a reasonable cost, if shipping were fo
Equipment at the Orijarvi includes a steam plant, with a goo
air-compressor.

The Illijarvi mine, area 3 square miles, fairly timbered, bo
the Orijarvi, and about 40 additional mining claims were
protect the company. The old workings of the Illijarvi, about
the Orijarvi, show a well mineralized vein, carrying silicious ch
to that of the Orijarvi, but with higher gold values. The Illi
lent site for a mill, on the shore of a lake, and a good locatio

The Hokka and Kykka mines are included in the miner
in connection with the Illijarvi. The Hokka mine, carrying
the Orijarvi ore body, was opened 1850, and has two 125′
slightly argentiferous and auriferous chalcopyrite of good a
quartz gangue, and the company has made 650′ of new opening
The Kykka shows conditions much similar to the Hokka.

The Brödthrop mine, 4 miles from the Orijarvi, in the pa
Skuru, has an area of 20 square miles, being the mineral rights
for all ores and minerals other than iron ore. The Brödthrop,
deposit between diorite and quartzite, has a 100′ shaft, sho
copper, lead and zinc sulphides, zinc apparently predomin
throp shows numerous ancient pits and trenches, with one s
depth.

The Kerkela mine, in the parish of Enare, Finnish La
miles from a railroad, has a fissure vein carrying free milling
average assay tenor. Apparently the Kerkela is idle.

The company also has options on iron properties in northe
ing magnetic ore assaying up to 69.5% iron.

The Orijarvi mine is 10 miles from the state railroad at Tu
agement expects the building of a government railway, failing
building a private line, of either 5 or 10 miles, to a seaport, th
ing a wharf at its terminus. The millsite is on Lake Orijarvi
Orijarvi mine, and mill equipment was ordered, and expecte
before the close of 1910.

n are employed, at wages of 50 to 80 cents per day, labor being nd cheap. Property considered promising and management

MINING CO. **WASHINGTON.**

. Lewis was president. Mine, developed circa 1906, in the rict, had low grade ores, with mainly gold and silver values, nent, and management planned crushing and roasting. Equip- mall stamp-mill. Formerly at Excelsior, Pierce Co., Wash.

MINING & MILLING CO. **UTAH.**

Lake City, Utah. Mine office: Ibapah, Tooele Co., Utah. president; Sören Nielsen, vice-president; John Jensen, secre- Organized Nov. 17. 1909, under laws of Utah, with capital- hares 20 cents par. Lands, 7 claims, unpatented, in the Dug- ly developed.

L COPPER CO. **CALIFORNIA.**

roadway, New York, N. Y. Mine and works office: Coram, Thos. W. Lawson, president; Thos. J. Barbour, vice-president; etary; T. M. T. Raborg, treasurer; preceding officers, Edgar H. Brevoort and H. Mason Raborg, directors. Organized nder laws of Maine, with capitalization $3,000,000, shares $5 aid in, $3.75, an assessment of $1.25 having been levied May to have circa 5,500 shareholders. Stock is listed on the New curbs. Empire Trust Co., New York, and State Street Trust rars; Windsor Trust Co., New York, and International Trust fer agents.

ion is a holding company only, owning the entire capital stock onsolidated Copper Co., which in turn owns the entire capital klala Copper Mining & Smelting Co., Coram Water Co. and

a Consolidated Copper Co. had a bond issue of $1,500,000, the First National, in 4 annual installments of $375,000 each. l authorized, 1909, a $1,000,000 bond issue, flotation of which pledged some of these bonds for a loan of $375,000, which loan aid by the proceeds of the 1910 assessment. Balance sheet, gave no information, except as to amount of stock issued, 000, and listed among its assets $1,500,000 on account of the reholders to that amount, which is a devil of an asset. The ort, issued late 1910, showed a surplus of $11,236. The com- ca May, 1910, to have $300,000 in cash, and was said, June, rking capital of $600,000, with no debts, these statements not n the figures issued by the company. The company also was ning about $20,000 per month, and immediately thereafter an 5 per share was levied. There has been considerable talk, in net earnings, but these have not been substantiated. The up to $8 per share, by Lawson manipulation, but broke, like all s. The Guggenheim Exploration Co. owns 80,000 shares of e property is fully described under the title of its owner, the lated Copper Co.

L MINING CO. **NEW MEXICO.**

kasha, Okla. Mine office: Orogrande, Otero Co., N. M. J. A. John Wells, vice-president; S. Howard Leech, secretary; rer; preceding officers, Wilton M. Bartlett, N. H. Ledford, E. Burson, directors. Property includes some placer ground, and nine, said to show a 20′ vein, opened by tunnel and a 50′ shaft, aving good assay values in lead, copper and silver, with a little the Monte Cristo claim is sunk on a fissure vein, and there is a

tunnel on the Ruby claim. Company issued a booklet on completely filled with misinformation and wrong data reg

FIRST TRANSBAIKALIAN MINING CO.

Office and mine: corner Sofeyska and Soongareyska S kalia, Siberia. Company advertised that it possesses g including copper, but the principal mining values undoubt ore that the company claims to possess. As pewter ore before, the company's prospects seem bright. Perhaps mor wonderful property would show brass ore also, or native bum sap.

FISKUM SYNDICATE, LTD.

Dead. Was liquidated Feb. 25, 1910. Formerly at ania, Norway. Described Vol. VIII.

FITTS COPPER CO.

Dead. Formerly, circa 1898, at Clifton, Graham Co.,

FITZROY COPPER MINES, LTD.

Dead. Was succeeded, 1907, by Great Fitzroy Gold & Formerly at Mount Chalmers, Rockhampton Co., Qu Described Vol. VII.

FIVE BEARS MINING CO.

Office: 234 La Salle St., Chicago, Ills. Mine office: Cal. F. A. Meidinger, president and general manager; C president and superintendent; A. Vermaas, secretary; J. urer; preceding officers and E. C. Goeckel, directors. Org under laws of South Dakota, with capitalization $2,500,000 assessable; issued, $2,350,000.

Lands, 10 claims, patented, area 200 acres, well timber Western Pacific railway. The property shows 6 ore bodies veins in talcose schist, and as contact replacement deposit porphyry, of which 2 have been developed, to some exte worked, 1876–1893, for gold. Main vein, of 14′ estimated a chalcopyrite, associated with pyrite, estimated by manage copper, 1.5 oz. silver and $1.40 gold per ton. There are 4 t 380′ and 60′, latter a drift-tunnel, following the vein fault- grade chalcopyrite for an average of about 12′ width. Min ings, estimated to show 80,000 tons of ore, with 9,500 tons bl

Equipment includes a 50-h. p. water plant, and a 2-dri sor. There are 11 buildings. A 25-ton mill has ten 850-lb. plans continuous development.

FIVE POINTS COPPER MINING CO.

Office and mine: Globe, Gila Co., Ariz. A. T. Hamm Lockwood, manager; J. C. Britt, superintendent. Lands, the Peabody group of 5 claims, near Bloody Tanks. The C Van Wagenen groups, aggregating 34 claims, are near the head of Pinto Creek, circa 14 miles west of Globe. Prope near surface, with some azurite and chalcocite at shallow claims assays of 38% copper and 49 oz. silver per ton, with velopment is by the 150′ Solace incline shaft, and the 35 circa. 1,500′ apart, latter showing a vein of 29′ estimated wi 4 to 12% copper, a 20′ paystreak being claimed to give av copper, 4.15 oz. silver and 38.5 oz. gold per ton, which is en true, with balance of vein carrying chalcopyrite of circa 4 tenor; the paystreak figures being gross exaggerations. E small steam plant and hoist, and management planned a 3 which did not materialize. A little ore was shipped, 1906, smelter. Idle several years, but reorganization planned, M

OPPER MINING CO., LTD. WESTERN AUSTRALIA.
s St., Ravensthorpe, Western Australia. Mine office: Kun- Goldfield, Western Australia. Walter Dunn, chairman; manager; preceding officers and John T. Hassell, directors; retary. Organized March 14, 1907, under laws of Western alization £25,000, shares 5s. par.
held under a gold mining lease, and 5 acres held under a tail- ine has a 6′ vein, from which former owners shipped 1,222 ding 39 long tons fine copper and 889 oz. gold. Copper ore, s and strongly auriferous, carrying 4 to 15 dwts. gold per s a 325′ main shaft, with 2 other shallow shafts, poorly laid ng an 8″ Cornish pump with 48″ stroke, and pumping engines ers. There is an old 5-stamp mill. Production, for April, ons of ore raised, of which 136 tons were copper ore of smelt- o the Phillips River smelter, and 477 tons were milling ore, rning 146 oz. bullion from the plates. Copper production 00 lbs. for 1910.

PER MINING CO. **UTAH.**
Wells Bldg., Milwaukee, Wis. Operating office: 17 West alt Lake City, Utah. Letter returned unclaimed from for- a, Salt Lake Co., Utah. Thos. J. Pringle, president; Chas. lent; Paul D. Durant, secretary; Kenneth W. Jacobs, treas- ers, Wm. P. Harlow, Bishop Canfield, F. G. Gaston and ors; Jas. E. Beveridge, superintendent. Organized Apr. 22, Arizona, as successor of Consolidated Flagstaff Mines Co., $2,000,000, shares $5 par. Much stock has reverted to the unpaid assessments. Annual meeting, first Tuesday in

s, partly patented, area circa 500 acres, with 400 acres mis- joining the Old Emma mine, and including part of the former Emma, in Little Cottonwood and Big Cottonwood cañons. eral ore bodies, of which one, ranging up to 300′ in claimed e circa 2,000′, is developed by the 2,850′ Tom Moore tunnel, naller veins, and has a 450′ crosscut to the northeast, with rkings, including the old mines with which connections were er workings include the 500′ Burgess tunnel, 1,200′ Burns- Flagstaff tunnel, and the 700′ Flagstaff shaft, latter to be Moore tunnel. Property shows chalcopyrite, with occas-

ed circa 1869, was operated extensively by the Flagstaff the Alta Consolidated Mining Co., and is claimed to have 00,000 worth of ore, from above the 990′ level, mainly in es, the copper sulphides being unprofitable in early days. tenor has been shipped from the old dumps.
udes electric power, with 3-drill and 7-drill Ingersoll air- cessary mine buildings. Idle since 1909, and reorganization

RICT SILVER MINING CO., LTD. **UTAH.**
ganized under laws of Great Britain, with office in London. the undeveloped holdings of the Old Emma mine, owned by o., an English corporation, and this company sold its lands, Consolidated Flagstaff Mining Co., which was reorganized as ning Co. Formerly at Alta, Salt Lake Co., Utah.

NG CO., LTD. **IDAHO.**
, Idaho. Letter returned unclaimed from former mine one Co., Idaho. F. T. Millichamp, president; F. Stanley

Millichamp, secretary. Capitalization $1,000,000, shares
claims, 3 miles from a railroad. Development includes a 2
tunnel. Traces of lead, copper, silver and gold have been en

FLATIRON MINE.

Office: 42 Broadway, New York, N. Y. Letter return
former mine office, Butte, Silver Bow Co., Mont. Is owned
Lewisohn and the Leonard Lewisohn Estate. Lands are
being a triangular fraction just east of the Mountain Chief
conda Copper Mining Co. Property, though small, is cons
and promising. Idle since 1908.

FLEMING-FOX MINING & SMELTING CO.

Office: 3 Exchange Ave., Chicago, Ills. Mine office: Jic
N. M. W. G. Fleming, president; Edwin Fox, manager. L
Honey Bee group, are developed by shaft. Equipment incl
plant.

COMPAÑÍA MINERA EL FLOR DE NIEVE.

Dead. Formerly at Concepción del Oro, Mazapil, Zac
scribed Vol. IX.

FLOREDIA COPPER MINING CO. COLORADO &

Office: care of Financial Security & Trust Co., Den
returned unclaimed from former mine office, Deming, Luning
Wahl, president; C. A. Hubbard, vice-president; W. E. K
Organized May, 1907, under laws of Arizona, with capital
shares $1 par. Lands are claimed to be 3 claims, in the Flore
3 claims 25 miles west of Canyon City, Frémont Co., Colo., w
acres. Company was promoted by the notorious Financial
Co., which was responsible for the Lost Bullion Spanish Mine
larcenies. Idle, and is considered a swindle.

FLORENCE COPPER CO.

Dead. Lands were 4 claims, near the Utah Amalgamate
a little work was done, 1907, on a tunnel from the Utah Amal
planned to be driven 2,000'. Formerly at Newhouse, Beav

FLORENCE MINING CO.

Dead. Lands, 640 acres, in the extreme eastern part of
Reservation, secured under special permit from the governm
Uteland Mining Co. A little work was done, circa 1906, an
specimens were secured, the property being said to have a pr
low grade disseminated copper ore. Formerly at Ouray, Ui

FLORENCE MINING, MILLING, SMELTING & REFINING CO.

Office: Florence, Colo. Letter returned unclaimed from
Westcliffe, Custer Co., Idaho. Lands, 18 claims, showing a
ing ore giving good assays in copper. Idle some years and pres

FLORENCE-RAE COPPER CO.

Mine office: Index, Snohomish Co., Wash. N. Ru
Lands, on the North Fork, above Galena, about 4 miles eas
tunnel, entering a 5' vein showing ore assaying well in copper
with a small force, at last accounts, 1910.

FLORENCE SMELTING, MINING & MILLING CO.

Office: Phoenix, Ariz. Mine office: Price, Pinal Co., A
calve, president and manager. Lands include the Mineral
Blue Bell, Alice and other properties, having lead and coppe
has a smelter, with a 35-ton lead stack, apparently moved fro
and was said to plan erection of a copper stack. Apparent
and moribund.

ING CO. **MÉXICO.**
ed unclaimed from former office, Chihuahua, Chih., Mex.
4, Santa Eulalia, Iturbide, Chihuahua, Mex. R. J. de Mor-
S. G. Burn, general manager, at last accounts. Lands, 15
er option from Enrique C. Creel, showing limestone cut by
h metalliferous caves in lime, developed by a 125′ two-com-
anned to be sunk 1,000′. Idle and presumably moribund.

MAN MINING CO. **UTAH.**
erly at Ibapah, Tooele Co., Utah.

PER MINING CO. **COLORADO.**
r, Colo. Letter returned unclaimed from former mine office,
n Co., Colo. Bernard McCaffrey, deceased, was manager.
patented, near Bear Creek, about 8 miles west of Morrison,
tunnels and a 165′ main shaft, upper 150′ passing through a
15′ to 30′ width, carrying small gold values, and showing
ow, mainly sulphide, with some malachite, said to carry circa
3.50 gold and silver per ton. Idle.

R & SULPHUR CO., LTD. **NORWAY.**
Jewry, London, E. C., Eng. Mine office: Foldal, Lille-
em, Norway. Alex. Davidson, chairman; Leigh Hoskyns,
. Steadman, J. A. Stirling and J. C. Williamson, directors;
etary; W. A. Carlyle, consulting engineer; Worm H. Lund,
Organized Jan. 27, 1906, under laws of Great Britain, with
0,000, shares £1 par, in £150,000 preferred and £200,000
ompany has invested circa £377,500 in its property, develop-
nt. Accounts, for year ending Feb. 28, 1909, showed a profit

3,000 acres, on the west bank of the Foldal River, carrying
er, and including 4 old mines, known as the Juliana Marie,
Moltke and Grimsdal, worked for about 150 years, during
50,000 tons of ore were produced. Mine, opened mainly by
meters of workings, show a vein of about 12′ average width,
upriferous pyrite, with only traces of arsenic, vein giving every
tence, and ore being estimated to average 2% copper and 46%
y also has some ore of high copper tenor, that eventually may
portance. Ore reserves were estimated, 1910, at 400,000 long
ed is divided into 3 classes, first grade averaging 2.12% copper
r, the other grades carrying less copper and slightly less sulphur.
ncludes an excellent mining plant, installed at a cost of
mpany has expended about £22,000 for substantial mine

all, on the Einuna River, held under a 25-year lease, subject to
rental of £25, has been improved with a hydro-electric power
gon-roads have been built.
lig aërial tram, which is one of the longest in the world, built
2, runs from the mines to the Lille-Elvedal railway, and has a
tric tons per hour. Miscellaneous improvements include a
a quay at Trondhjem, for ore shipments.
s 41,680 metric tons of cupriferous pyrite for fiscal year ending
was circa 71,000 metric tons in 1909. Equipment has been
e production of about 100,000 tons yearly. Copper produc-
at 1,500,000 lbs, 1909. Property considered promising and

YME DES FONDERIES ET LAMINOIRS. **FRANCE.**
Biache, St. Vaast, France. Property is an electrolytic cop-
t having five 6-kw. generators and 100 tanks, in multiple ar-

rangement of electrodes, with an estimated daily capacity copper.

FORASTERA MINES, LTD.

Office: 56 Cannon St., London, E. C., Eng. Mine offi Argentina. Is a subsidiary of the Famatina Developmer and was organized to acquire certain of the properties of controls this company through stock ownership. Presum

FORD COPPER CO.

Mine office: Georgetown, El Dorado Co., Cal. Has h per ores. Idle since circa 1903, and apparently moribund.

FOREST HILL CONSOLIDATED MINING & MILLING

Dead. Formerly at Tin Cup, Gunnison Co., Colo.

FOREST HOME MINING CO.

Office: Redlands, Cal. Letter returned unclaimed fro Forest Home, San Bernardino Co., Cal. W. H. Bradley, ag Property, about one-half mile north of Forest Home, has fo indications of copper. Idle several years and presumably n

FOREST QUEEN COPPER CO.

Office: El Paso, Tex. Mine office: Silver City, Gran Kettler, president and general manager; M. S. Pittman, v Sloss, secretary; W. C. Morton, treasurer. Organized 190 Mexico, with capitalization 1,000,000 shares, increased late presumably $1 par. The Cleveland group of 6 claims, he bond and lease, was forfeited, leaving the company only 4 on which assessment work was not done, 1910, and, early planned reorganization and changing its name. Idle and

KUPFER- UND ZINKGRUBE FORST.

Letter returned unclaimed from former mine office, C provinz, Prussia, Germany. Wilhelm Huppertz, owner. phide complex of copper, lead, zinc and iron, more or less aurif is but slightly developed.

FORT BOURKE COPPER MINING CO., N. L.

Mine office: Cobar, Robinson Co., N. S. W., Austral with capitalization £5,250. Mine has a 104′ shaft, deve difficult of reduction, and a mill, erected circa 1908, has n results. Presumably idle.

FORT HALL MINING & MILLING CO., LTD.

Office and mine: Pocatello, Bannock Co., Idaho. Ge W. A. Hyde, vice-president; W. H. Witty, secretary; L. F ceding officers and A. Fitzgerald, directors; H. M. Pal Lands, 7 miles from Pocatello, are said to show medium gr ore, and silver-lead ore. Has steam power.

FORT HENRY MINING CO.

Office: care of R. G. Hourtienne, president, Pasaden Constellation, Yavapai Co., Ariz. John R. Dobler, sup in the Black Rock district, have a 55′ shaft in a 2′ vein of or copper, with some gold values.

FORT PITT COPPER CO.

Office: 1402 Oliver Bldg, Pittsburg, Pa. Mine office: N. M. Jared Sater, president; C. L. Mohney, vice-presi secretary; Dr. W. W. Wolfe, treasurer. Organized Jan. 22 Delaware, with capitalization $2,500,000, shares $5 par, be to have been organized "to acquire mines of gold, silver, No brass mine is needed, however, as the president has all one stockjobbing concern ever could utilize. The Fort ceeded the Sater Copper Co., which succeeded the Copp

eeded the Old Hickory Copper Mining Co., all of the dead ones his life accompanied by the curses of deluded shareholders.
ims, area 540 acres, also a 5-acre millsite, in the Black Mesa how 7 fissure veins in sandstone, of which 2, slightly develto be of 6′ average width, and are claimed to carry melaconite, and chalcopyrite, claimed to average 14% copper and 15 oz. mine is claimed to show 60,000 tons of ore, which figures are ment is by shafts of 85′ and 225′, and by tunnels of 25′, 50′ and is claimed to include a 190-h. p. steam plant, with 2 hoists, imed to have 4 buildings and an 18x70′ mill. The prospectus ritten by a cheerful liar, states that not one of the great mines tes has as great a percentage of copper as the Fort Pitt, and ter value back of this stock than any stock on the market, and as real estate, with ten times the earning power, all of which mitigated prevarications. By reason of its bad antecedents company is considered a swindle.

NERA LA FORTUNA, S. A. **MÉXICO.**

Aguascalientes, Ags., Mex. Mine office: Tepezalá, Ocampo, Mex. Geo. B. Wardman, president and general manager; O. F. esident; DeWitt Crevelling, secretary and treasurer; Alberto nt. Organized 1902, with capitalisation 200,000 pesos, shares ands, 20 hectares, including La Fortuna and adjoining mines, and a 100-meter blind shaft, mines having a vertical depth of reatest horizontal length of 600 meters of workings, showing rgentiferous copper ores of good average tenor in both metals. r, employing circa 200 men, and shipped, 1905, about 200 tons

PER CO. **CALIFORNIA.**

ne: Fortuna, Humboldt Co., Cal. P. J. Mulley, president and Frank Legg, vice-president; C. A. Eastman, secretary; Foring Co., treasurer; A. E. Purdy, superintendent. Organized er laws of California, with capitalization $70,000, shares $5 par. , unpatented, area 380 acres, in Trinity county, California, s of 60′ and 270′, showing ores that have assayed 28% copper on, in veins of 12″ to 16″ width. Idle.

D & COPPER CO. **ARIZONA.**

ed unclaimed from former office, Pittsburg, Pa. Mine office: icopa Co., Ariz. C. M. Clark, president; Maj. R. N. Whitney, Wm. H. Simpson, Jr., secretary; F. E. Miller, treasurer; J. B. r; Frank B. Good, superintendent. Organized under laws of pitalization $500,000, shares $1 par. Old management was Lands, 12 claims, including the Scarlet mine, circa 28 miles said to have a promising ore showing. Equipment includes d an air-compressor, and there is said to be a 50-ton concentra-

NDE COPPER CO. **NEVADA.**

erty was the Pilot Knob group, carrying auriferous copper ores, ment work was done, 1904, with a force of about 10 men. Had ormerly at Ely, White Pine Co., Nev.

ING CO. **MÉXICO.**

ner office was Bisbee, Cochise Co., Ariz. J. A. Daugherty was eral manager. Organized July 4, 1905, under laws of Arizona, n $1,500,000, shares $5 par. Lands, 124 hectares, circa 20 Cananea, showing argentiferous lead ore, with values mainly in at La Cananea, Arizpe, Sonora, Mex.

FORTUNA MINING CO.

Office: 161 South Main St., Salt Lake City, Utah. M
Canyon, Salt Lake Co., Utah. Simon Bamberger, presiden
tary; Sidney M. Bamberger, general manager; Jas. St
Organized March 10, 1904, under laws of Utah, with cap
shares $1 par, nonassessable; fully issued.

Lands, 23 claims, mainly fractional, area 175 acres, a
Keystone Gulch. Property shows monzonite-porphyry,
stone, with a series of 4 nearly parallel veins following the
quartzite bedding, occasionally cutting across, and with
crushing. The veins, of 2′ to 5′ width, carry films and veinl
with occasional chalcocite. The mine carries silver-lead ore
ings, with argentiferous and auriferous copper sulphides at
assays. Mine has shafts of 150′, 300′, 200′ and 1,100′; 2
400′ each, and drift-tunnels of 1,700′, 4,200′, 1,900′, 900′
16,000′ of workings. Mine was opened 1875 and closed 190

Equipment includes electric power, with 2 hoists, goo
and an air-compressor. The 50-ton mill was sold, 1910, to
removed to Park City. Idle.

FORTY-FIVE CONSOLIDATED MINING CO.

Dead. Lands were sold to Magus Mining Co. For
Snohomish Co., Utah.

FOSGRUBE KOBBERGRUBER.

Office: care of H. & F. Baehke, owners, Trondhjem, No
Röros, Soudre Trondhjem, Norway. Mine, about 20 miles
carries cupriferous pyrite of better than average grade, an
ment. A nearby waterfall has been improved with a h
Property considered promising.

FOSS RIVER CONSOLIDATED COPPER CO.

Office: 315 American National Bank Bldg., Everett,
turned unclaimed from former mine office, Berlin, King Co
bert W. McIntire, president and general manager; E. A. N
dent; F. P. Smith, secretary; Leighton Howard-Smith, tr
Dec. 10, 1901, under laws of Washington, with capitalizatio
$1 par.

Lands, 18 claims, area 328 acres, also a 30-acre millsite
lands, in the Foss River district, opened by a 55′ shaft and tu
and 310′, showing several veins, of which the largest, estim
carries bornite and chalcopyrite giving assays of 3 to 54% co
silver and 80 cents to $44 gold per ton. Management pla
water power and a 4-drill air compressor. Property co
Presumably idle.

FOUR B'S MINING CO.

Dead. Formerly at Turret, Chaffee Co., Colo.

FOUR LEDGE MINING CO.

Office: Spokane, Wash. Mine office: Osburn, Sho
W. C. Reeder, president; John Hall, vice-president; Hen
Ben E. Hervey, general manager. Lands, 5 claims, on the e
Mile Creek, about 2 miles north of Osburn, having 4 vein
limited several surface width carrying argentiferous copper
has about 900′ of tunnels, including a 160′ drift-tunnel and a 1

FOUR METALS MINING CO.

Dead. Formerly at Washington, Santa Cruz Co., Ariz.

FOUR METALS MINING CO.

Office: Equitable Bldg., St. Louis, Mo. Mine office: T
Co., Colo. Letter returned unclaimed from former mine o

. Frank Carter, president; R. M. Scruggs, secretary and
d Jan. 17, 1899, under laws of Colorado, with capitaliza-
es $1 par. Lands were 47 claims, area 516 acres, at Silver-
y, and claims, known as the Andrus mine, in Ingraham
. Had a mill at the Palmyra mine, and a steam plant at the

INING CO. **UTAH.**
unclaimed from former office, Salt Lake City, Utah. Mine
Co., Utah. H. Hugo Brandeis, president; R. P. Hill, secre-
Dugway district, carry auriferous and argentiferous copper,
Mine is opened to depth of 400′ and has a small concentra-
s and presumably moribund.

MELTER & MINING CO. **CALIFORNIA.**
é, Cal. Mine and works office: Keeler, Inyo Co., Cal.
esident; A. R. Short, secretary; E. O. McGrath, manager.
iles from Keeler, including the Union mine, on Cerro Gordo
er on Lone Pine Creek.
e is an antigua, worked by Mexicans in early days, and is
of 600′, carrying a complex of argentiferous chalcopyrite,
e, occasionally with some very high grade silver ore, values
copper and gold in about the order named. There is a large
ore and slag, from former smelters, said to assay up to $25

between the mine and smelter is by a 27,000′ Montgomery
op of 4,850′. The line has 5 tension stations, with weight-
slack in the track-cable, and has 97 towers, with 6 spans of
gest being 1,260′. There are 90 half-ton buckets, each with
nd the tram is estimated to have a capacity of 200 tons of

nelter, built, circa 1906, at Keeler, and removed later to
the north, has one 50-ton furnace, and was blown in 1909,
business when in blast, but ran a short time only, and has
Production, at last accounts, was about one carload of ore
United States Smelting Co., at Salt Lake. The company's
1909 apparently have been fully settled. Property consid-

' MINING & MILLING CO. **COLORADO.**
lora, Boulder Co., Colo. Mine is opened by shafts, and has
d to cut the Olympic and Fourth of July veins, from which
copper, occasional lead, 50 to 125 oz. silver, and $30 to $80
en secured. Idle some years and apparently moribund.

IING & MILLING CO. **MONTANA.**
Idaho. Mine office: Saltese, Missoula Co., Mont. O. W.
m. Schierding, vice-president; Wm. G. Newbury, secretary
ling officers, John E. Sherrard and Wm. J. Hughes, direct-
s, manager.
circa 6 miles east of Saltese, having a vein of 15′ estimated
ntiferous and auriferous chalcopyrite, giving assays up to
lver and $5 gold per ton. Lands also show lead ore, occur-
nations in quartz-porphyry. Development is by 2 tunnels,
od values in copper and lead, and a 64′ shaft, planned to be
ortal of the lower tunnel. A one-mile flume furnishes water,
a water-wheel actuating a 4-drill air-compressor.

NES ET FONDERIES DE FRANCARDO. **CORSICA.**
e Londres, Paris, France. Mine office: Francardo, Ajaccio,
rne, manager, at last accounts. Organized Oct. 30, 1905,

under laws of France, with capitalization f600,000, increase
shares f100 par. Paid, 1906, a 10% dividend.

Lands are extensive, including the Morosaglia, San L
copper mines, claimed to carry an average of 7% ore, which
Apparently the production of cupriferous pyrite is sent to
matting. About 600 men were employed, 1907.

COMPAÑÍA MINERA DE FRANCISCO DEL AZUL.

Mine office: Matehuala, Catorce, San Luis Potosí, Me
developed by tunnel. Idle several years and presumably m

FRANK HOUGH MINING CO.

Office: 830 Equitable Bldg., Denver, Colo. Mine offi
dale Co., Colo. A. E. Reynolds, manager; J. D. Fisher, supe
ized 1907, under laws of Colorado. Mine, on Engineer Mo
tunnel, developing a large body of slightly argentiferous a
sulphides, including bornite, with assays up to 27% copper,
gold per ton. Mine shipped several hundred tons of high
copper ore, under former ownership. Equipment includes 8
Production, 1909, was about 450 tons, shipped to the Dura
to have averaged about 35% copper, which is considered a
fair values in silver, and small gold values. Mine was shippi
10 tons of ore daily, to the Durango smelter, and is said to
Production is estimated at 250,000 lbs. fine copper in 1909
1910. Property considered promising.

FRANKLIN JUNIOR MINE.

Owned by Franklin Mining Co., at Demmon, Houghto

FRANKLIN MINING CO.

Office: 60 Congress St., Boston, Mass. Mine office:
Co., Mich. Mill office: Point Mills, Houghton Co., Mich.
men. Stephen R. Dow, president; Alvin R. Bailey, secr
Richard M. Edwards, superintendent; preceding officers, Jol
Tolman and Harry M. Howard, directors; Enoch Hender
intendent; Arno Jaenig, clerk; Edward Warne, mill su
Truan and John Doney, mining captains.

Organized Apr. 3, 1857, under laws of Michigan,
$500,000, and reincorporated, 1887, for 30 years, with capi
1899, to $2,500,000, and again increased, November, 1908,
$25 par; issued, $4,166,650, paid in, $12.20, to Feb. 1, 191
33,334 shares, has been set aside for the purpose of acquir
pation of 100,000 shares of the Rhode Island Copper Co.
of $1,240,000, and has levied assessments of $1,420,000, i
ment called January, 1911. Federal Trust Co., Boston,
Trust Co., Boston, transfer agent. Annual meeting, third

Lands, 5,280 acres of mineral property, and a 217-acre
mile of frontage on Portage Lake. The old Franklin mine
sold, July, 1908, to the Quincy Mining Co., for $170,000
55 N., R. 33 W., area 640 acres, lying directly north of the
west of the Rhode Island, was bought from St. Mary's Mi
1909, for 50,000 shares of stock. Property carries 2 miles
Develops amygdaloid and other cupriferous beds of the Ke
additions to the main tract, there are 3 other tracts of mine
and 640 acres. The company also controls, and is absorbi
Copper Co., which has 800 acres immediately north of the F
The old Franklin mine, sold to the Quincy Mining Co., was

The Franklin Junior mine, bought 1885, was opened,
& Boston, and was reopened, 1882, as the Peninsula. T
consists of two distinct mines on parallel beds, these bein

ned on the Allouez conglomerate, and an amygdaloid mine, he Pewabic bed, the Pewabic lying 475′ west of and parallel conglomerate.

on the Franklin Junior mine was done on the Pewabic amyg- n returned an average of only about 0.45%, or 9 lbs. fine copper nped, hence the amygdaloid shafts were abandoned, February, nsferred to the old Albany & Boston workings, the reopening n in 1900. Owing to unfavorable development, and continued pper content of the conglomerate bed, as well as a gradual epth, work was abandoned on the conglomerate mine, circa erations again transferred to the Pewabic amygdaloidal bed.

onglomerate in the upper workings averaged 18′ to 22′ width, 30′ in the upper workings, but grew narrower at depth. The an on the hanging-wall, 3′ to 5′ being left unmined, and very of rock was attempted. The conglomerate is somewhat s copper contents than to the northward, where it is very l workings of the Allouez mine, but is distressingly low in ll points.

the conglomerate mine, size 7x20′ over all, with inside meas- 18′ 6″, has 3 compartments, and is 2,300′ deep. Water was h pump with 10′ lift, the largest of its size in the Lake district, er very cheaply. The shaft has a wooden combination shaft- on the ground and 96′ high. A direct-motion hoist, good for d 6-ton skips.

erate shaft, 1,200′ south of No. 1, is 7x18′ 4″ over all, and 1,200′ under the footwall, to secure solidity. Equipment includes st good for 3,000′ depth, and a steel circular combination shaft- to that at No. 2 Centennial, built, 1906, by the Wisconsin which is to be removed.

o the two conglomerate shafts opened, there is room for two one to the north and one to the south, on the same bed.

workings were reopened, 1908, after 6 years idleness, and all were transferred to this bed, in 1909. The amygdaloid ed from north to south, and are sunk at an angle of 48° 30′. ngs to determine the foot and hanging, and test the ground for n that the bed splits into 2 and occasionally into 3 parts, of d there are 2 clearly defined portions, known as the East bed width, and the West bed of 10′ to 12′ width, the two being arying width of trap.

hafts on the Pewabic bed, of which 2 are idle, Nos. 1 and 3 shafts. The North shaft, about 900′ south of the Rhode 1,000′ in depth. No. 3 shaft, 1,500′ south of No. 2, and 1,100′ about 1,200′ deep.

unk about 20′ in the footwall, was sinking for the 31st level, at nd was showing considerable improvement below a depth of st drift, on the 20th level, is about 1,700′, and a limited amount ess from the 23d level down. The mine was estimated, July, 0,000 tons of stoping ground blocked out. This shaft has a en the 26th and 27th levels, receiving rock from the various

600′ south of No. 1, is sunk about 40′ in the footwall, and was ned at the 16th level, Dec. 31, 1910. Shafts Nos. 1 and 3 are on the 15th level, above which depth very little ground of pened, the better ground coming in below a depth of 2,000′. 3 includes a wooden shafthouse and a temporary hoist.

In addition to the Allouez conglomerate and Pewabic Franklin Junior tract carries the Mesnard epidote, Calu Osceola and Kearsarge amygdaloids, all supposed to have crosscut driven west on the Pewabic lode, many years ago, one conglomerate and several amygdaloidal beds carrying tities. The ground opened was disturbed, and a crosscut might give better results. The Kearsarge bed is suppos 1906, by diamond drill borings, and also by a crosscut, bu where opened. Dr. L. L. Hubbard estimates, on data furn Pryor, that the Kearsarge amygdaloid should lie 1,308' be Allouez conglomerate, which would indicate that the old 1894, did not reach the Kearsarge, and, in consequence, extended eastward, 1906, but the Kearsarge bed, or wha been such, was not found to carry workable values, at tha

Several diamond drill holes were bored, 1910, in the te 2,000' and 3,000' west of the Pewabic bed, in the hypoth Hancock amygdaloid, but nothing of promise was disclose

Surface equipment includes substantial and well eq penter and blacksmith shops, engine-houses, boiler-houses, house, office and a considerable number of substantial dwel compressors of 10, 12 and 36 drill capacities.

The steel rockhouse at No. 2 conglomerate shaft is erected, somewhat enlarged, at No. 1 shaft. A new boiler No. 1, and a new hoist installed. This hoist, to be built by is to embody several novel engineering ideas, furnished by hoist 10-ton skips in counterbalance, and is to have special ders, storing up energy, otherwise wasted, in compressed ai air is to be mixed with steam, in the cylinders, as a prime

The 177x194' mill, of steel, on stone foundations, is re Range railroad. Equipment includes 5 Allis-Chalmers 2-w cylinders, each capable of crushing 350 tons of conglomerate loid rock daily. Each stamp is fed from a 1,000-ton rockb hydraulic separators, which remove considerable heavy c plant includes, for each head, 20 roughing jigs, 15 finisher 1 Overstrom table. The jigs are of the Hodge eccentric t copper discharges, obviating skimming. Two heads have

Power for the mill is furnished by a 16x32" Allis-Chalm is supplied by two 500-h. p. Stirling boilers. The boiler-ho ing brick-lined smoke-stack of 7' diameter, 165' high, on a Water is furnished by a 15,000,000-gallon Allis-Chalme pump, having 12x42" high pressure and 42x42" low-pressu stroke and plungers of 37 1/2" diameter. Water is drawn t running 200' under the rock to a crib protected by quart mill has a 5x12" duplex fire-pump with fire-hose, and elect 267' wharf at the millsite, equipped with coal-hoist and sh water alongside. The millsite has about 20 dwellings for e

In 1905 the recovery of copper was 15.25 lbs. per ton in 1907 was only 11.48 lbs., falling, 1909, to 9.47 lbs. per The largest production ever secured by the mine was 5,2 in 1902, and recent production has been: 4,206,085 lbs. i in 1906; 4,401,248 lbs. in 1907; 3,703,421 lbs. in 1908; 966,353 lbs. in 1910.

GEWERKSCHAFT FRANZ III.

Office: Ulrichstr. 109, Köln, Germany. Mine office: provinz, Prussia, Germany. Alfred von Perlstein and Ch tive committee. The Kupferberg-Goldstollln mine has

oping argentiferous lead, zinc and copper sulphides. Em-

AIN COPPER CO. **NEW MEXICO.**
rly at Twining, Taos Co., N. M. Fully described Vol. VI.
COPPER MINING CO. **BRITISH COLUMBIA.**
rly at Kamloops, Yale district, B. C. Described Vol. VIII.
PPER CO. **NEVADA.**
stockjobbing enterprise, promoted by I. W. Dumm. For-
e Pine Co., Nev. Described Vol. VIII.
RDE GOLD & COPPER MINING CO. **NEVADA.**
unclaimed from former office, Salt Lake City, Utah. Mine
, Lincoln Co., Nev. Frederick Warde, president; A. W.
; Jacob Myers, treasurer. Organized March 1, 1904, with
000, shares $1 par. Lands are in the Yellow Pine district.
nd apparently moribund.
MINING & MILLING CO. **UTAH.**
mmercial Bldg., Salt Lake City, Utah. Letter returned
ner mine office, Alta, Salt Lake Co., Utah. L. A. Evans, presi-
er, secretary and treasurer. Organized 1896, under laws of
ation $125,000, shares 25 cents par, assessable, with 2 assess-
ds, 4 claims, 3 patented, in Little Cottonwood Cañon, 2 miles
ing a 50′ shaft and tunnels of 100′ and 525′, showing aurifer-
us lead and copper ores. Idle.
PER PROPERTIES, LTD. **AUSTRALIA.**
rly at Shuttleton, Mouramba Co., N. S. W., Australia. De-

SOLIDATED MINES CO. **COLORADO.**
ucceeded, 1904, by Freeland Development & Transportation
Freeland, Clear Creek Co., Colo. Described Vol. IV.
SOLIDATED MINING CO. **OREGON.**
Ore. Mine office: Elkhorn, Marion Co., Ore. J. E. Sibley,
ummins, vice-president; J. L. Freeland, secretary and treas-
nd, general manager; preceding officers and J. E. Sibley,
ed 1901, under laws of Oregon, with capitalization $2,000,000,
ssessable; issued, circa $1,625,000 Annual meeting, third

ms, unpatented, area circa 200 acres, with about 100 acres
Creek, a tributary of the Little North Fork of the Santiam
n Gates, the nearest rail point. Lands show porphyry, syen-
occasional Tertiary sedimentary rocks, having 5 fissure veins,
development, are estimated by the company at 17′ average
aceable 2,000′. Veins have 1″ to 6″ stringers carrying chal-
ional native copper, and the pyrite adjoining carries gold.
y the company to range 1 to 14% copper, and circa $2 gold per
s a 175′ crosscut tunnel, and about 1,300′ of workings, esti-
ent to show 2,000,000 tons of ore, which is out of the ques-
locked out for stoping 11,200 tons. There are 4 buildings,
er power is under development.
ENSION MINING & MILLING CO. **COLORADO.**
ell, S. D. Mine office: Idaho Springs, Clear Creek Co., Colo.
t; Hon. Warren A. Haggott, resident agent; Jas. A. Wilson,
ands, 4 claims, 7 miles from Idaho Springs, having a 400′
carrying values mainly in lead, with considerable gold, and
ver. Idle since circa 1902 and apparently moribund.
CANTILE & MINING CO. **COLORADO.**
rly at Freeland, Clear Creek Co., Colo. Described Vol. V.

FREMANTLE SMELTERS & MINES, LTD. WEST

Dead. Was succeeded July 28, 1909, by Freemantl
Formerly at Freemantle, Western Australia. Described V

FREMANTLE TRADING CO., LTD. WEST

Office: Salisbury House, London, E. C., Eng. Mine o
Western Australia. Works office: Freemantle, Wester
Jones, A. E. Lund and C. Kaufman, directors; E. H. Woolc
Sutherland, manager. Organized July 28, 1909, under la
with capitalization £50,000, shares £1 par, in £20,000 pre
ordinary shares, fully issued; ordinary shares fully paid,
paid. Mines, at Northampton, were discovered 1842, and
allel with basic igneous dikes, carrying copper and lead s
sional sphalerite. Mines, which are shallow, were filled
accounts. The smelter, at Robb's Anchorage, near Freem
custom business.

FRÉMONT COPPER CO.

Dead. Former office was Frémont, Neb. Thos. Carr
general manager. Organized 1909, as successor of St. Joe M
which was organized 1905, as successor of Frémont Copper
5 claims, unpatented, on the south fork of Purgatory Gulc
cline shaft, variously reported as of 225′ and 362′ depth, sho
per ore. Equipment included a small steam plant, and se
Formerly at Riverside, Carbon Co., Wyo.

FRÉMONT COPPER MINES CO.

Dead. Was organized under laws of Arizona, wi
$3,000,000, and was merged, November, 1909, in the Copp
Copper Co. Was a twin of the Queen Princess Copper Mi
at Copperfield, Frémont Co., Colo.

FRÉMONT COPPER MINING CO.

Dead. Lands were sold, circa 1905, to St. Joe Mining
merly at Riverside, Carbon Co., Wyo. Described Vol. V

FRÉMONT DEVELOPMENT CO.

Office: Houghton, Mich. Mine office: Shoshoni, Frém
H. Hodgson, president; Wm. D. Calverley, vice-president
J. H. Rice, Deen L. Robinson, John T. Reeder, Geo. H. M
penter, directors; Thos. Mullen, secretary and treasurer; Ge
intendent; Wm. A. Hodgson, engineer; Frank Meyer, f
Dec. 9, 1909, under laws of Wyoming, with capitalization
par, in $25,000 full paid and $175,000 part paid stock, lat
1911. Houghton National Bank, registrar. Lands are h
lease, with final payment of $65,000 due Nov. 10, 1911, and
to have adequate funds until that date.

Lands, 3 claims, patented, known as the McGrath gr
north of Shoshoni, the nearest rail station, showing granite
and hornblende schists, carrying a fissure vein in quartzit
carrying the vein for entire length of 4,500′, vein having s
with dip of about 80°, varying 20° from the strike of the sch
has a surface width of 6″ to 4′, increasing, at shallow depth,
width, and at its widest point gave average assays of 5.
carries oxidized ores, silicates and sulphides, with a 6″ fo
banded massive chalcocite and quartz. All ore is more
and auriferous, giving assays up to 7 oz. silver and $4 gold p

The mine has a 94′ two-compartment shaft, with 350′ of
deepened to 200′, with crosscutting and drifting. Mine is w
pump. There also are several exploratory pits and shafts, d

cludes a 35-h. p. Fairbanks & Morse gasoline hoist, pump and pects to take power from the Asmus Boysen dam, at Thermop- are several mine structures, including a bunkhouse. Com- uous development. Property considered promising and man-

ING & MILLING CO. **ARIZONA.**

er, Colo. Letter returned unclaimed from former mine office, vapai Co., Ariz. C. F. Cabeen, president; B. E. Dunbeck, F. Dawson, secretary and treasurer. Organized under laws capitalization $3,000,000, shares $1 par. Mine has two 50′ be sunk to 500′, one showing an 18″ vein, carrying ore said to er and $8 gold per ton, which estimate is considered excessive.

ICAN MINING CO. **NEVADA.**

Lane, White Pine Co., Nev. Louis Symon, general manager, Lands include the Macon City group, 3 claims, near Lane, and p, said to have produced circa 400,000 tons of lead ore, under a nt, ore so produced averaging 22% lead, 8 oz. silver and $2 gold l and variable copper values. Property shows ore assaying up oz. silver and $14 gold per ton. Presumably idle.

K COPPER CO. **PENNSYLVANIA.**

erly at French Creek, Chester Co., Pa.

K MINING CO. **WYOMING.**

erly at Centennial, Albany Co., Wyo. Described Vol. VIII.

ER CO., LTD. **CALIFORNIA.**

St. Vincent St., Glasgow, Scotland. Mine office: Clovis, Sir John H. N. Graham, Bart., chairman; preceding officer, N. r. R. Jackson, T. Hannay, W. B. Rankin and W. Lindsay, direct- y, secretary; C. C. Leavitt, Jr., general manager; Jas. Miller, Apr. 2, 1902, under laws of Great Britain, with capitalization £1 par, and reorganized, under same title, Feb. 12, 1907, with 0,000, shares 4s. par; issued, 399,178 shares, 3s. 6d. paid in. ,000 mortgage, and gave a $40,000 trust deed as security for a the California Title Insurance & Trust Co.

ires, freehold, and 2,040 acres leasehold, former including 3 he Blue Rock mine.

Vercoe bought, for about $12,000, a ranch in Fresno county, shaft, called a copper mine. This ranch was made the basis lifornia Copper Syndicate, which, in April, 1902, sold 80 acres per Co., Ltd., for £105,000 in fully paid shares, company hav- alization in shares of £1 par, which went to a market premium %, giving a market valuation of nearly £1,000,000 for a prop- ally only about £2,400. Mr. Vercoe claimed an average of 6% d per long ton, but an honest sampling of the ore-dumps, by average assays of 1.04% copper and 13 cents per ton in com- ver values. Property carries 3 veins, in mica-schist and dia- ein, which is the only one developed, having a heavy gossan, 8′ vein carrying oxidized ores to depth of 50′ succeeded by rm of narrow streaks of chalcopyrite. The mine has shafts of nd 530′, with drifts on the 200′ and 300′ levels, showing a vein ge width, carrying solid sulphides, mainly slightly cupriferous ore is low in copper, but high in iron and sulphur, being free enic, making an excellent flux.

steam power, and also takes commercial electric current from Power Co. Equipment includes a hoist, air-compressor and and buildings include a machine-shop, assay office and sawmill. ilway, partly completed, has a locomotive and several ore cars.

The smelter, poorly constructed and never in blast, has blast-furnaces, the converter department being an open stand with 3 shells of the Leghorn type. The smelter po h. p. engine.

Ore formerly was shipped to the Tacoma smelter, and which is not responsible for past rascalities, has settled dow basis, and has succeeded in shipping about 75,000 tons of fl and apparently has a chance of making something out of ingly bad bargain.

FRIDAY-LOWDEN COPPER CO.

Mine office: Redding, Shasta Co., Cal. T. H. Bent Bretherton, vice-president; John R. Lowden, secretary, t manager; preceding officers, Walter Friday and Geo. O. P ganized 1909, with capitalization $2,000,000.

Lands, 15 claims, partly patented, area 300 acres, near moth and Trinity mines. Considerable diamond drilling proven extensive ore bodies, and there are 5 tunnels, of 8 Idle at last accounts, but planned resumption.

SILBER- UND BLEIERZBERGWERK FRIEDRICHSSEGEN A.-G.

Dead. Was succeeded by Bergbau-Aktiengesellsch Formerly at Friedrichssegen a/d Lahn, Hessen-Nassau, Ge

BERGBAU-AKTIENGESELLSCHAFT FRIEDRICHS-SEGEN a/d LAHN.

Mine office: Friedrichssegen an den Lahn, Hesse Otto Müller, Dr. Max Hirschel, Max Rosenthal, W. Kocks Jacques Zeilenziger, directors; Carl Leuschner, general m under laws of Germany, with capitalization 4,000,000 m 2,300,000 marks. An increase of capitalization to 7,000,00 upon, 1910.

Lands, at Overlahnstein, Braubach, Frücht Hinterwald St. Goarshausen and Unterlahn, carry copper, silver, lead, nese and spathic iron ore, developed by shafts of 195, 290, a air-shaft. Property also includes the Laura zinc mine, n Apr. 1, 1910, for 175,000 marks, having a present yearly ca metric tons of zinc ores and 270 tons of lead ore, whic increased to 5,000 tons of zinc and 400 tons of lead ore. It 3 principal properties will be brought to a productive capa tons of zinc ore, and from 1,500 to 2,000 tons of lead ore yea duction of copper sulphides and spathic iron ore.

There is a concentrator, treating mainly zinc ores, als Company employed 320 men, 1910.

FRISCO CONSOLIDATED MINING CO.

Office: Deseret National Bank Bldg., Salt Lake City turned unclaimed from former mine office, Frisco, Beaver Rohlfing, president and general manager; H. S. Young, sec preceding officers, Patrick Ryan, N. S. Hills and J. Sharp ized 1909, with capitalization $1,500,000, shares $5 par, as a Contact Mining Co. and North Horn Silver & Copper Minin

Lands, 31 claims, mainly patented, area 580 acres, c strike of a wide mineralized zone, supposedly the extensio contact zone. Lands include the Frisco Contact, North Hope, Glorious and D. G. & J. groups.

The mine has several short tunnels, and 4 shafts, with a workings, said to show 4 contact deposits, between limesto being estimated to range up to 115′ in width, and to carry 15

er and 80 cents gold per ton, which assays obviously were
ted ore. The main shaft, of circa 700′ depth, with about
hows, on the 600′ level, ore impregnations assaying about
125′ Kruse shaft is about 2,000′ northeast of the main work-
re zone.
ludes an 80-h. p. hoist and a 4-drill air-compressor at the
o 60-h. p. boilers and a 50-h. p. hoist at the Kruse shaft.
mine buildings. The Horn Silver mine, adjoining, has been
d the Frisco Consolidated property is considered promising,
portant ore bodies have been developed.

T MINING CO. **UTAH.**

erged, circa March, 1909, in Frisco Consolidated Mining Co.
Beaver Co., Utah. Fully described Vol. VIII.

CO. **UTAH.**

as changed, circa 1903, to Frisco Contact Mining Co. For-
ver Co., Utah.

NSOLIDATED MINES, LTD. **COLORADO.**

v Broad St., London, E. C., Eng. Mine and works office:
n Co., Colo. Sir Chas. Allen, chairman; preceding officer,
ristram Harper and J. J. Stein, directors; Henry P. Lowe,
A. E. Rigden, secretary; Sidney B. Tyler, general superin-
l Apr. 22, 1910, under laws of Great Britain, with capitaliza-
es £1 par; issued, £278,000. Was a merger of Frontenac
d Aduddell Mines Co. Annual meeting, June 30th.
ional claims, patented, area 40 acres, and 3 millsites, aggre-
e Russell district. Property shows gneiss and metamorphic
e veins, of 4′ to 6′ width, carrying auriferous and argentiferous
rahedrite, estimated by management to average 0.5% cop-
oz. silver and $6 to $8 gold per ton. Mine has tunnels of
d shafts of 710′, 853′, 462′, 120′, 80′, 350′, 250′ and 140′,
0′ of workings, estimated to show 200,000 tons of ore. Mine
losed 1894, on account of water, and reopened 1907, when
whouse tunnel. An automatic conveyor delivers ore into

ludes electric and steam plants, with 10-h. p., 40-h. p. and
a 20-drill Rand Imperial 2-stage belt-driven air-compressor.
ildings.
me concentrator, of 9,000 square feet area, completed early
″ Blake crusher, 2 tube mills, 3 sets of 16x36″ rolls, 4 Hartz
5 Deister tables, and three 8′ Callow tanks, and is electric-
motors, aggregating 275-h. p. The mine has been under
nt since 1907, and is to begin production, with a good equip-

PPER CO. **MICHIGAN.**

nburton Place, Boston, Mass. Operating office: Calumet,
ned unclaimed from former mine office, Eagle River, Kewee-
uincy A. Shaw, Jr., president; Rodolphe L. Agassiz, vice-
acNaughton, general manager; Geo. A. Flagg, secretary and
g officers and F. W. Hunnewell, directors. Organized June
s of Michigan, with capitalization $500,000, shares $25 par.
gh ownership of entire stock issue, by the Calumet & Hecla
ial statement of Aug. 17, 1910, gave cash and bills receivable,
ng debt of $111,425.
acres, in Keweenaw County, Michigan, lying mainly south
nitou, with the old Central mine as the nucleus. The Cen-
854–1897, on a fissure vein, was a large producer for many

years and paid dividends of more than $2,000,000. Prop
Winthrop mine, area 800 acres, in Sections 22, 23, 26 and
Range 39 West, adjoining the Central. Lands were slight
mond drill borings, but nothing of especial value found, an
The tract, however, is very extensive, and, in view of devel
is altogether probable that payable mines will be opened
Frontenac holdings.

FRONTENAC MINING CO., LTD.

Dead. Was succeeded, Apr. 22, 1910, by Frontenac
Ltd. Formerly at Central City, Gilpin Co., Colo. Descri

COMPAÑÍA MINERA LA FRONTERIZA.

Mine office: Sierra Mojada, Monclova, Coahuila, M
Fronteriza mine, carrying argentiferous and auriferous c
developed by shafts, 3 of which have hoists. Employed ab
a small producer, at last accounts.

COMPAÑÍA MINERA LA FRONTERIZA.

Mine office: Lampazos de Naranjo, Décimo, Nuevo L
is the Buena Vista mine, carrying argentiferous chalcopyr

FRONTERIZA COPPER MINING CO.

Dead. Formerly at Ascensión, Galeana, Chihuahua,

MINA FRONTON.

Owned by Société des Mines et Usines de Cuivre de Cl

FUJITA-GUMI & CO.

Office: 180 Dojima-Kitamachi, Osaka, Japan. Mine
Kazuno-gori, Rikuchu, Japan. Denzaburo Fujita, chairm
vice-chairman; Yoichi Katsura, general manager; Kennos
sulting engineer; Yoji Kimura, mine manager; Saichi Sait
ent; Manroku Yonezawa, smelter superintendent. Comp
Osaka, 1869, by Denzaburo Fujita, still president, and
under laws of Japan, and capitalization increased later
6,000,000 yen. Profits, 1906, were estimated at circa 3,0
was begun in 1880, and this is one of the largest private com

Lands are extensive, including the Kosaka, Omori, To
Matsuoka and Zuiho mines, with some 25 other mines th
exploratory stage. The company also is engaged extensi
agriculture. In 1910 the company employed 8,295 mine
1,377 were underground and 6,918 on surface.

The Kosaka mine, located at the extreme northern end
island of Nippon, is a very important producer, yielding ne
silver supply, nearly one-fifth of the copper supply, and o
supply of the empire. The mine, lying in a very rugged di
from the government railway, was discovered and opened
until 1897 as a silver mine, passing, 1884, into the prese
Kosaka employed 7,642 hands, 1908. Country rock is
tuff, ranging from a fine conglomerate to a coarse grit, of
covering of volcanic ash, and with intrusions of liparite an
liparite dyke cutting the breccia and sedimentary rocks.
stitute a fine example of metasomatic replacement, occurri
mine between the tuff and andesite, as impregnations of tu
occurring apparently as blanket veins, lying at an angl
with footwall and hanging of andesite tuff, latter well def
imperceptibly into the footwall. There are 5 of these ore
sizes, ranging from 20' to 270' in thickness, and proven for
mile, while drill-borings have proven the formation to co
1,700'. So far as explored and developed, the ore zone is al
wide, and is opened to about 500' depth. Ore is a sulphide

d galena, forming the nucleus of irregular massive deposits of re constituting the outer crusts, with gangue carrying con- sulphate. There is a zone of mixed sulphides, immediately -wall, followed by a zone of cupriferous pyrite, associated with rite, succeeded by low grade silicious ore. All ores are more or and the product is divided into 3 grades. First grade ore, the , averages 2.43% copper, 2.28% lead, 9.8% zinc and 15.64% silver per ton, and from a trace to 65 cents gold per ton, the 0 to 45% barium sulphate. The pyritic ore, which is the sec- es 2.34% copper, 0.47% lead, 3.15% zinc and 26.83% iron. which is the third grade, averages 1.27% copper, 0.26% lead, .44% iron.

as 9 shallow shafts, of 41′ to 221′ depth, and 5 tunnels, of 250′, and 2,080′. The slicing and filling system is used, but under- s practically abandoned, 1908, for opencast workings, similar o Tinto. From 1,000 to 1,800 cubic yards of overburden are e entire overburden being estimated at about 4,000,000 cubic is by manual labor, with the aid of electric trolleys for re-

is of funnel shape, about 1,000x2,000′ in size, with the edges s hand-cobbed and picked. The Kosaka was estimated, 1908, 00,000 in ore values developed. Owing to extraction of ore by ast workings, only about 200 h. p. is required at the mine. es two 8-drill Leyner air-compressors, and an electric pump

1¼ miles from the mine, with electric rail connection, is of laily capacity, and is thoroughly modern in design and equip- 3 Herreshoff calcining furnaces, of which 6 are used on ore, 1 on gs. There are 7 rectangular water-jacket blast-furnaces, 6 of a monster of 3′ 6″ width and 60′ length, 28′ 6″ in height, with ′ high. Of the smaller blast-furnaces, 2 are used for matte, 2 1 for casting blister copper and 1 for casting ingots and cakes. ing is employed, fuel charges averaging only about 3%, with a sure of 10 oz. per square inch. A judicious mixture of the 3 ced affords a self-fluxing furnace-charge, the average of all ores 2% copper, with small gold and silver values. The ore being pper slags contain considerable zinc values, now lost, on which is in progress. The first-fusion product is a copper-lead matte llic tenor, carrying about 20% copper and 10% lead, which is econd-fusion product of about 50% metallic tenor. The slag atte contains quantities of lead and copper, and is resmelted, cted as bottoms, which are taken to a liquation hearth, and ized in a Parks sintering pot, while the zinc scum, containing ues, is retreated, and the residue, together with the slimes from nks, are treated in a cupel furnace, producing doré bullion. matte is crushed, calcined in Herreshoff roasters, and re- eratory furnaces to blister copper, but a converter plant was 910, to replace the reverberatories. The slag from the final isily an iron and barium silicate. Blister copper from the aces is cast into anodes, and taken to the electrolytic refinery

plant, under erection 1910, has 2 stands, with 8 shells. There erie-Rateau air-compressors, a complete lining department, tric crane. Power is furnished to the converter department ctric plant.

Blister copper from the reverberatories is refined elect
being copper of the exceptional purity of 99.95%.

The Kosaka has installations aggregating 12,450 h. p
shops and rail lines. Electric power, used extensively, is
electric stations, on the river Oyu, near the mine. The
ates 3,800 h. p., transmitted at a high voltage, and stepp
h. p. being required for various stationary motors, 880 h
refinery, and 600 h. p. for the electric railway. There
actuating a hoist at the mine.

The company owns and operates a private electric r
main line, equipped with 10 locomotives and 400 three-
trolley lines reach all principal points at the mine, smelt
nect with the government railway at Odate. Fuel for t
brought by aërial tram.

Buildings include a foundry of 1,538 square yards ar
1,332 square yards, and a boiler-shop of 812 square yards,
There also are well equipped smithies and minor shops,
Sugi forest. The town has electric lights, and a water sy
and hydrants. The company also maintains 2 well equ
elementary schools, for the benefit of the workmen and t

Recent production of the Kosaka has been as follow
copper in 1905; 14,811,152 lbs. in 1906; 16,397,061 lbs. in
copper, 835,174 lbs. lead, 1,127,000 oz. silver and 10,9
13,702,000 lbs. copper, 1,024,000 lbs. lead, 1,048,632 oz. sil
in 1909; 13,594,000 lbs. copper, 1,428,000 lbs. lead, 1,2
13,180 oz. gold in 1910.

The Tokito mine is at Nanatini-mura, Kazuno-gori, R
of the Kosaka. The mine has a 165-h. p. installation
average of 375 hands, produced 619,090 lbs. fine copper,
values, and 1,105,232 kwan of copper ore, in 1908.

The Daiji mine, at Nanatini-mura, Kazuno-gori, Ri
h. p. steam installation, employing an average of 234 ha
hands in 1908, and produces copper ore without gold or si
tion was 219,650 lbs. fine copper in 1907, and 165,158 lbs.

The Towada mine, also near the Kosaka, was opened
vein of 30′ to 100′ width, carrying disseminated aurife
argentite.

The Omori mine is at Omori-mura, Nima-gori, Iwa
was opened circa A. D. 1300, and reopened A. D. 1525.
highly productive, but was closed, 1872, by an earthquak
by the present company. The Omori, in a rugged distric
Tertiary tuffs and sandstone, with andesite dikes, carryin
of 3′ to 7′ width, some traceable 2,000′, and is divided i
carrying mainly auriferous and argentiferous chalcopyrit
lena and sphalerite, and the Hontani group, carrying ma
with some native silver. Five veins are now being worke
ing an average assay of 7.75% copper, 0.8% lead, 0.056%
gold. Average forces, 1908, were 675 men, including 682 n

The Omori reduction plant includes a mill with crushe
jigs, and a smelter having stall-furnaces for calcining, an
jacket blast-furnace, employing semi-pyritic smelting, ma
blister copper by the Mabuki process. Production, whic
fine copper, 16,202 oz. silver and 381 oz. gold in 1900, has b
and was 506,863 lbs. fine copper, 67,203 oz. silver and 1,10
607,854 lbs. copper, 9,184 lbs. lead, 96,764 oz. silver and 1,

ıine, at Nishitaka-mura Kita-Akita-gori, Uzen, is a small , which was worked in the Eighteenth Century by Sato ıner and metallurgist, to whom modern mining in Japan is roduction, 1908, was gold and silver to the value of only

is 8 miles east of Keelung, in the northern end of the island ine, discovered 1890, was bought by Fujita-Gumi & Co. in leveloped into perhaps the most famous gold mine of the includes a 320-h. p. steam plant, a 165-h. p. water power electric light plant. The mill has a Huntington mill and 908, with an average force of 331 employés, production was elding 4,177 oz. silver and 9,047 oz. gold.

ıe, notwithstanding the extremely low average tenor of its opper producer of Japan, and is one of the greatest copper ld in potential production, owing to the enormous size of its rporation of Fujita-Gumi & Co., or the Gomei Kwaisha es some of the strongest financial and commercial interests exceptionally enterprising and capable in the management ks.

JAPAN.

ıkada-mura, Kuma-gori, Higo, Japan. Country rocks are andstone and clay-slate, of Paleozoic age, ore body having ponding to country rocks, and ranging 5′ to 10′ in thickness. ıssociated with pyrite, averaging 5 to 6% copper. Produc- 18,266 lbs. fine copper. Idle several years.

JAPAN.

ınatsu, Yoshiki-gori, Hida, Japan. Mine has argentiferous erly made circa 500,000 lbs. fine copper yearly. Idle several

CONSOLIDATED COPPER CO. CALIFORNIA.
Broad St., New York, N. Y. Letter returned unclaimed fice, Greenwater, Inyo Co., Cal. O. A. Montgomery, presi- lon, vice-president; Maj. J. W. A. Off, secretary; Col. J. B. ors; preceding officers, Oscar Daube, Sol Bernstein, J. A. r, B. W. Benbaum, Louis Cohen and A. Sartorius, directors. h capitalization $5,000,000, shares $5 par. Lands, circa 500 d camp of Greenwater. Idle and presumably moribund.

COPPER CO. CALIFORNIA.
aders National Bank Bldg., Spokane, Wash. Letter returned ner mine office, Greenwater, Inyo Co., Cal. Patrick Clark, Matteson, vice-president; J. J. Stewart, secretary and treas- st, assistant secretary; A. B. Harvey, general manager. ws of Washington, with capitalization $2,250,000, shares $1 ny of America, New York, transfer agent. Guaranty Trust istrar. Shares are listed on the Butte Stock exchange.
ms, 3 fractional, unpatented, area 250 acres, 2 miles west of camp is entirely deserted, and property, fully described Vol. Idle and moribund.

EXTENSION COPPER MINING CO. CALIFORNIA.
rly at Greenwater, Inyo Co., Cal. Described Vol. VIII.

GOLD & COPPER CO. CALIFORNIA.
rly at Greenwater, Inyo Co., Cal. Described Vol. VIII.

OXIDE COPPER CO. CALIFORNIA.
rly at Greenwater, Inyo Co., Cal. Described Vol. VIII.

SOUTH EXTENSION COPPER CO. CALIFORNIA.
fake, promoted by the joint efforts of Shanghai Larry Sulli-

van and "Geo. Graham Rice." Formerly at Green
Described Vol. VIII.

FURNACE VALLEY COPPER CO.

Office: Spokane, Wash. Letter returned unclain
office, Greenwater, Inyo Co., Cal. Patrick Clark, pre
vice-president; J. J. Stewart, secretary and treasurer; p
C. Meyer, Fred Birney and H. C. Wakefield, directors.

Organized July, 1906, under laws of Washingto
$6,250,000, shares $5 par. Trust Company of Americ
agent. Shares are listed on the Spokane, Butte and
changes. Company realized $52,525 from stock sale
$30,816, ending the year with 133,750 shares of stock un

Lands, 8 claims, unpatented, circa 2 miles west an
Creek Copper Co., showing 2 fissure veins, carrying ca
15% copper, in a gossan of 200′ claimed width, partly cov
2 shafts, deepest 209′. Property considered worthless,
camp is deserted. Idle several years and presumably mo

FUROKURA MINE.

Owned by Furukawa Mining Co.

FURUKAWA MINING CO.

Office: 1, Yayesucho, Itchome, Kojimachi-ku, T
office: Yama-moto-gori, Akita-ken, Shimotsuke, Japan.
suga-gori, Tochigiken, Japan. Mine offices of the var
follows: Ashio Mine, Kamitsuga-gori, Tochigi-ken, Shi
Mine, Kita-Akita-gori, Akita-ken, Ugo, Japan; Kusaku
bara-gori, Niigata-ken, Echigo, Japan; Furokura Mine, K
Rikuchu, Japan; Nagamatsu Mine, Nishimurayama-gori,
Japan; Mizusawa Mine, Waka-gori, Iwate-ken, Rikuch
Higashi-Tagawa-gori, Yamagata-ken, Uzen, Japan; Ku
Shizuoka-ken, Totomi, Japan; Innai Mine, Okachi-gori, A

Toranosuke Furukawa, president; Choschichi Kimu
preceding officers, Rokusaburo Kondo and Kunisuke Ob
jiro Konda, secretary; Kametaro Iijima, treasurer; Mats
engineering department; Baron Kumakichi Nakashima
department.

Organized April, 1905, under laws of Japan, with c
yen; fully issued and fully paid. The business was foun
late Ichibei Furukawa, who was succeeded, 1903, by Ju
Toranosuke Furukawa succeeding, as head of the firm, in
employs 1,400 officials and 22,000 men. Lands are ab
yearly production, in addition to copper, is about 700,0
little gold, 500,000 tons of coal, and 30,000 tons of coke.
copper mines, one silver mine, an extensive copper manuf
collieries, and a large and modern coke plant. The vari
their works, are described in detail, in the the following

The Ashio mine is at Kamitsuga-gori, Tochigi-ken,
west of Nikko and about 100 miles northwest of Tokio.
manager; [illegible] mine superintendent; Kusaku A
tendent; [illegible], engineer. The Ashio mine
1609, and became a producer in 1611, reaching a produc
[illegible] tons of copper [illegible], during the latter half of the
rendering [illegible] the largest copper
that era, [illegible] was in excess of domestic de
expected [illegible] 1871 the property was in priv
came into the possession of the late Ichibei Furukawa, in
condition that its yield was only about 50 tons of copper

orough development, coupled with the introduction of machinery, was made the foremost copper mine of Japan. hands in 1907, and 7,278 hands in 1908, with 2,750 men

of 1,500 acres, includes 3 mines, known as the Honzan, ying within a distance of 3 miles. The property shows ozoic clay-slate, sandstone and quartzite, with liparite ite forms a volcanic neck of more than 2 miles in diameter, Paleozoic rocks, and carries more than 200 different veins, ups, with different strikes, and mainly sharp dips, averag- ne horizon. There are 2 series of fissures that intersect, of veins, which are narrow, carrying chalcopyrite, sphaler- ciated with arsenopyrite and pyrrhotite, with mainly ut 80 different veins are more or less developed, and are any as averaging about 3′ in width, and 1,200′ in length, proven to depth of 2,000′. Principal veins are the Yoko- id the Kosei, 3,000′ long. The oxidized zone shows occa- cuprite, azurite and malachite, and the secondary zone alcocite, with quartz gangue, and occasional alumina, prin- in the sulphides. The management estimates the ore to pper, with small quantities of silver and gold. Rich ore is and brought up to about 12% in copper tenor, while second erage only about 1% copper.

pment is by 4 long tunnels, and the 3 mines are connected mine is connected, by ground tram, with its own dressing mine has the 6,000′ Honkuchi drift-tunnel,and, 4 shafts, , of 450′; Yokomabu No. 2, of 740′; Yokomabu No. 3, of f 280′. The Kotaki mine has the 7,000′ Ariki drift-tunnel, ift-tunnel, and the 600′ Sunoko-Bashi shaft. The Tsudo sscut tunnel, 11′ high and 13′ wide, with 3 shafts, the Kosei No. 2, of 440′, and Kosei-Maehi, of 550′. The Ashio mines t 100 miles of workings, and produce daily about 800 long mainly by overhand stoping, generally with hand-drilling, water Leyner and Little Wonder power drills for drifting ines are solidly timbered, and the principal workings are ere are 14 pumps, aggregating about 600 h. p. The system is aided by regulating doors, and occasional brattices, with the lower workings. The mine has electric hoists, and s in the Ariki, Kotaki and Tsudo tunnels.

pment at the mine is modern throughout, with mainly an machinery. Each of the 10 shafts has a hoist, 9 having hoists, of 35 to 100 h. p., good for depths of 540′ to 1,000′. pressors of 2 to 7 drill capacity, with aggregate capacity of

nes has its mill or mills, with direct tram connection, there lls, all of frame construction, of the following ground areas, 8, 18,252, 8,064, 5,616, 19,800, 12,000, 11,376, and 25,848. different mills includes 12 grizzlies, 18 picking tables, 78 rushers, 1 Dodge crusher, 5 stamps, 6 sets of rolls, 2 sets of al rolls, 111 Hartz jigs, 24 hydraulic classifiers, 16 settling tables, 11 Overstrom tables, 9 Evans slime tables, 2 Wilfley conveying-belts. The bulk of the ore is concentrated to tenor. In connection with the mills are small leaching ly average of 2,400 kgs. of 58% cement copper.

ter, of 300 tons daily capacity, completed 1904, has three r-jacket blast-furnaces, with 3 No. 8 Connersville blowers.

Lump ores are charged raw, and fines are sintered. The
roasters of conical shape, made of iron plates, with false
charges, which are cooled and crushed after sintering. T
2 rows, used alternately. Furnace product is a 37% mat
0.2% copper. The smelter has a special dust-chamber
fumes, which, after the precipitation of dust, enter a com
bottom of a desulphurizing tower, where sulphurous a
sprays of limewater. Tail-water from the leaching plan
dressing plants, and lime-water from the desulphurizing
milk of lime, and agitated, then sent to precipitating a
charging clear water into the river. Smelter fuel is coke
24 yen per metric ton, with a yearly consumption of circ

The converter department has a 40-ton electric tr
with hydraulic tilting gears and six 72x100″ shells, of barr
each. The converter plant has 2 horizontal blowing engi
and one vertical engine, driven by water power, furnishin
There is a silica-mill, using decomposed liparite for li
cast 70-lb. ingots, averaging 99.108% copper, 0.15% silv

The briquetting plant has 2 processes for briquettin
Japan and the United States, one providing for the m
surrounded, in the moulds, by molten matte, the second
mixture of dried fines and molten matte in the pots.

The Ashio uses electric power throughout, employing
370 kw. at the mills and 450 kw. at the smelter. Th
power plant, built 1905, is 12 miles from the mines, deve
was being enlarged, 1910, to generate 7,500 h. p. In
plant, there are 11 other smaller water power plants, up t
a total capacity of 2,550 h. p. Electric current from th
is transmitted, at high voltage, to 3 stations, and there st
the mine, mills and smelter. The government returns
power installations aggregating 18,884 h. p.

The Ashio is 11 miles west of Nikko, the nearest s
Government railway, a very rugged country intervenin
Nikko and Ashio formerly was by bullock-wagons and aë
1910, by an electric line, built by the Ashio Tramway Co
with the Kiryu station on the government line, the trol
main line of transportation. The aërial tram system in
about 19,500′ length, having some very long and high sp
of the mountains between Nikko and Ashio. There al
trams, including lines of Bleichert, Hallidie and Tamamu
total capacity of about 1,300,000 ton-miles yearly. Th
controlled by the Furukawa Mining Co., has 25 miles of

Buildings include a 30x60′ carpenter-shop, 30x13
machine-shop, and there is a sawmill, with modern equi
has a general store, and maintains 3 hospitals for its empl
and provides 2 elementary schools for the rising generatio

Cost of the Ashio copper is probably a trifle above
ished. Production has increased but slightly during the
been 13,402,730 lbs. in 1900; 14,830,192 lbs. in 1906;
15,467,578 lbs. copper and 82,903 oz. silver in 1908, an
fine copper in 1910.

The Ani mines are at Kita-Akita-gori, Akita-ken, Up
of the Moriyoshi Mountains. Shigeo Kasai, mine ma
group of 5 old mines, known as the Kosawa, Kayaku
Ichinomata. These mines have an area of upwards of 3,
of about 5 miles, and were modernized about the beg

oup shows Tertiary sedimentaries, liparite and andesite, the
ng chiefly altered tuffs and tuffaceous shale, with 2 series of
e entire formation, one with EW. strike, and the other with
each other, the former with numerous veins, not wide nor
h few but strong veins. The oxidized zone is deep, carrying
achite and chrysocolla, succeeded by a secondary zone carry-
and chalcocite, the primary zone carrying chalcopyrite with
and sphalerite, associated with pyrite, with gangue mainly
ional quartzite and barite. Both copper and lead ores are
siderable silver being secured as a by-product. In 1907 the
ed an average of 3,108 persons. The Kosawa mine was dis-
0, the others a little later, and the group was purchased by
in 1885. The Kosawa mine has 2 tunnels and a blind shaft,
mine also has 2 tunnels and a blind shaft. The Magi mine
the Sammai mine has 3 tunnels. The Ichinomata mine has
hich is the main transportation and drainage tunnel for the

10 small dressing plants, producing 10% concentrates, with
of only 54 tons of ore daily.
er, known as the Shinonome works, at Yamamoto-gori, Akita-
ns daily capacity, has stall furnaces for roasting, the process
There is a 45-ton 36x100″ oval blast-furnace, and a 30-ton
r water-jacket blast-furnace, with 2 No. 6 Connersville
air to the blast-furnaces and Mabuki hearths. First-fusion
matte, which is tapped into matte-pots, and charged into 7
each taking 7,000-lb. matte charges, requiring 24 hours for
rning out blister copper averaging 98% copper and 0.11%
Nikko works for electrolytic refining. This plant also pro-
lbs. of pig-lead yearly.

Ani mines and works is furnished by a 400-h. p. hydro-electric
p. hydraulic plant, with an auxiliary steam plant, but a 1,000-
plant was being built, 1910, at Hitachinai. There is a light
the mine and works, by the Ani River, with the station of
nperial railway.

the Ani was 2,498,646 lbs. fine copper and 44,610 oz. silver in
s. copper and 49,630 oz. silver in 1908, and circa 3,000,000
000 oz. silver in 1910.

mine is at Higashikambara-gori, Niigata-ken, Echigo. S.
Lands are circa 600 acres. The mine was discovered A. D.
1876, by Ichibei Furukawa, being his first venture in copper
kura has Tertiary sandstone, shale and tuff, with liparite and
sheets, carrying 4 nearly parallel main veins, which are richest
d leanest in shale and tuff. There are 3 veins, longest 2,500′,
th an average of 12″, having numerous branches. The upper
ve copper and cuprite, succeeded by bornite and chalcocite
e, followed by chalcopyrite, associated with pyrite, and but
nd sphalerite, with scanty quartz gangue, ores carrying no
silver values. The mine is developed by 4 tunnels, and
average of 489 hands.

has small steam and hydro-electric plants, aggregating 253
on is by boat, on the river Aga, but a railway was under con-
here is a small mill, with hand-dressing, giving a daily product
selected ore. The 40-ton smelter has two 20-ton 30x60″
ing 40% matte, and 3 Mabuki hearths, using heavy petro-
first smelter in Japan to use liquid fuel for metallurgical
No. 4 Connersville blower. Production has shown a little

change during the past decade, having been 578,544 lbs. f
527,406 lbs. in 1908.

The Furokura group is at Kazuno-gori, Akita-ken,
circa 2,200 acres, including the Furokura and Hosoji mine
discovered A. D. 1681, and purchased 1887 by I. Furuka
opened in 1904. The Furokura was idle, 1794 to 1868, v
erty is 22 miles from the nearest railway, with a good w
Forces averaged 552 hands in 1907, and 734 hands in 1908
power installation. Lands show Tertiary tuffs, shale and
numerous fissure veins, carrying chalcopyrite associated
with sphalerite and galena, with quartz gangue and clay
mine is opened by 2 tunnels and 2 incline shafts, and t
levels, 70′ to 80′ apart, connected by winzes.

The Furokura works, on the opposite side of the mou
include a mill and smelter. High grade ores are screened
grade ores being washed and concentrated, with an avera
48 tons of 8% concentrates. The smelter has two 30-to
blast-furnaces, yielding 45% matte with 0.4% slags. Fin
roasted with lump ores in open stalls, and roasted ores ar
furnaces. There are 6 Mabuki hearths, and a No. 6 Co
steam and water power. Production of the Furokura wa
per in 1906; 1,021,314 lbs. in 1907, and 1,283,253 lbs. in

The Mizusawa mine, at Waka-gori, Iwate-ken, Rik
acres, was discovered A. D. 1717, opened 1737, and purch
kawa. The property has two 3′ veins, at the junction o
carrying mainly chalcopyrite, with occasional galena and
with pyrite, with scanty quartz gangue. The ores carry
silver values. The mine is opened by 2 tunnels, the 1,40
tunnel being on the sixth level. The mine and works have
employed, 1908, an average of 733 persons.

The Mizusawa reduction plant includes a small mill, t
ous concentrates, and a small smelter, having a 25-ton 23x
jacket blast-furnace, making 40% matte, which is refine
A No. 5 Connersville blower furnishes blast. Production
copper in 1906; 490,047 lbs. in 1907, and 561,114 lbs. in

The Naganatsu mine, at Nishimurayama-gori, Yam
circa 1,000 acres, was discovered during the latter half of
tury. The property shows Tertiary tuff and shale, traver
carrying numerous veins, mainly parallel, with nearly NS
to the east. The Okubi, which is the main vein, has an ave
only, with maximum of 24″, carrying mainly chalcopyrite a
ite and galena, associated with pyrite, in a scanty quartz g
barite. Development is by 2 tunnels, longest 5,000′. Th
h. p. power plant, and employed an average of 832 hands in

The Naganatsu reduction plant includes a very smal
of 12.4% copper concentrates daily, and a small old smelt
open stalls, smelted to matte in Japanese hearths, and bl
with blast from a No. 4 Connersville blower, in the same
take 5,000-lb. charges of roasted ores, requiring 1,500 lbs
charge, with 10 hours for smelting, yielding 35% matte
stalls, and resmelted to 60% matte, which is again roasted,
copper of 97% average tenor, in Mabuki hearths. Produ
fine copper and 12,203 oz. silver in 1907, and 575,036 lbs.
silver in 1908.

The Kune mine, at Sakuma-mura, Iwate-gori, Shizuo
an area of upwards of 3,000 acres, was opened A. D. 1731,

n over by I. Furukawa. The property shows graphitic
probably of the Algonkian series, with 3 horizons of ore
clinal step faults, and one diagonal fault. The upper or
gest, being 45′ to 100′ wide, 1,500′ long, and opened to
The middle bed is about 12′ wide, and the lowest bed, of
, splits into 2 seams at the bottom. Ore is mainly chal-
th pyrite, with compact granular texture, and occasional
r scanty quartz gangue. Richer portions of the veins
r tenor, with a range of 3 to 8% for the entire mine. The
d 2 tunnels, a 2,000′ tunnel having double tracks, with 9
nined by overhand stoping, and the mine is timbered with
e has no power plant, and no reduction works, shipping
g, but has a small leaching plant, yielding about 60 tons of
. An aërial tram leads from the spalling-house to bins on
re ore is loaded on boats, and carried to the government
es were 661 hands in 1907, and 438 hands in 1908. Pro-
ns of copper ore, valued at 765,623 yen, with estimated
50,000 lbs. in 1907, and 48,285 tons of copper ore and
pper, estimated to carry 1,300,000 lbs. fine copper, in 1908.
at Oizuma-mura, Higashi-Tagawa-gori, Yamagata-ken,
an area of 100 acres, and forces, 1907, averaged 635 hands.
vein of 1′ to 6′ width, and circa 2,500′ length, carrying
ll quantities of tin, arsenic, antimony and bismuth, asso-
a quartz gangue. Development is by a 1,600′ main
ter uses Mabuki hearths, on the same plan as the Naga-
action was 264,526 lbs. fine copper and 8,067 oz. silver in
copper and circa 10,000 oz. silver in 1908.
s at Okachi-gori, Akita-ken, Ugo. This mine, with an
res, was discovered A. D. 1696, and became important
the Nineteenth Century, silver production rising, circa
momme monthly, and was purchased, 1882, by Ichibei
rty shows augite-andesite and propylite, having numerous
, the main vein carrying chalcopyrite, pyrargyrite, argen-
h quartz gangue. A second vein, of 1′ to 4′ width, carries
lition galena, sphalerite and pyrite, while a third vein car-
na and sphalerite only. Equipment includes a 500-h. p.
nd a stamp-mill. Forces averaged 1,080 hands in 1907,
1908. Production was 573,692 lbs. fine copper, 145,791
gold in 1907, and 338,820 lbs. copper, 95,942 oz. silver
8.
e at Nishikawa-mura, Niigata-ken, Echigo, has only a
nd employed 239 hands in 1907 and 139 hands in 1908.
able gold or silver values. Production was 237,587 lbs.
d 137,053 lbs. in 1908.
works, at Kamitsuga-gori, Tochigi-ken, Shimotsuke, were
e copper from the Ashio mine of the Furukawa Copper
Honjyo works, at Yanagiwaramachi, Honjyoku, Tokyo,
has 4 reverberatory furnaces, 2 with casting machines, 1
ing blister copper not containing appreciable gold and
or casting anodes. Blister copper before refining has the
nor of about 99.7%. The electrolytic refinery, of about
apacity, uses the series system. There is an extensive
es & Peard annealing furnace, and 8 continuous drawing
single drawing-blocks. Yearly production of the Nikko
ns of copper wire, 2,000 tons of copper ingots, and 500,000
old.

In addition to its metalliferous mines, the company
mines, including the Shakanoo and Shiogashira coal mines
gori, Fukuoka-ken, and the Shinshakanoo coal mines at N
oka-ken, with an annual productive capacity of about 3
the Shimoyamada mines at Kumada-mura, Fukuoka-ke
duction of about 120,000 tons. The Fukagawa coke worl
ka-gori, Fukagawa-ken, Tokio, built by Ichibei Furukaw
40 beehive ovens, but were rebuilt, 1906, to allow the ext
and ammonium sulphate, as by-products, and now hav
metric tons of coal yearly, yielding circa 30,000 tons of c
tar, and 400 tons of ammonium sulphate.

The management of the Furukawa Mining Co. is l
responsible heads of departments are encouraged to tra
expense, through the principal mining and metallurgical
America, thus keeping the company fully abreast of int
every branch of its business. Recent production has beer
lbs. fine copper in 1904; 23,780,573 lbs. in 1905; circa 2
20,303,378 lbs. in 1907; circa 17,500,000 lbs. in 1908, ar
in 1909.

FUTURITY MINING & MILLING CO.

Dead. Formerly at Newett, Chaffee Co., Colo. D

COMPAÑÍA GADITANA DE MINAS.

Office: Cadiz, Spain. Mine office: Aznalcóllar, Se
zation, 3,000,000 pesetas, shares 500 pesetas par; debent
authorized. Marquis de Fiel Pérez Calixto, president;
treasurer; D. Salvador Viniegra, secretary. Property i
mines, carrying large bodies of cupriferous pyrite
development. Company built and owns a 34-kilometer
cóllar to the Guadalquivir River. Property considered p
ment good.

GAGNON MINE.

Owned by Anaconda Copper Mining Co., at Butte,

GALENA COPPER MINING CO.

Office: 115 Marion St., Seattle, Wash. Letter ret
former mine office, Index, Snohomish Co., Wash. L. E. F
M. Williams, vice-president; John M. Snook, secretary;
treasurer; Judson C. Hubbart, manager. Organized Jan
Washington, with capitalization $1,000,000, shares $1 pa

Lands, 16 claims, in the Silver Creek district, showin
in veins of 3' to 18' width, said to have given assays of 18
ver and $4 gold per ton. Development is said to be by t
of ore to the Tacoma smelter is said to have given net r
Idle several years and presumably moribund.

GALENA MINE. B

Mine office: Howe Sound, New Westminster distric
manager, at last accounts. Lands are about 6 miles s
mine, and one-half mile from tidewater, on Howe Sou
deep cut on a 5' vein of copper ore. Idle several yea

GALENA MINING CO.

Office: 207 Templeton Bldg., Salt Lake City, Ut
abandoned from former mine office, Milford, Beaver Co.,
president; S. N. Slaughter, vice-president; Alice Farm
treasurer. Organized July 16, 1897, under laws of Uta
$10,000, shares 1.5 cents par, assessable; has levied 9 a
claims patented, 8 miles from a railroad, in the Beaver
shafts of 100 and 250

IINING CO. **WYOMING.**
leteetse, Big Horn Co., Wyo. Lands, circa 1,200 acres,
er lands and water-rights, having 5 veins of good width,
150′ Oregon tunnel shows ores carrying copper, lead, silver
n quartz gangue. Small sample shipments to Denver are
ood returns. Development is by a 1,400′ crosscut-tunnel,
about 5,000′. Has a Pelton water-wheel and 10-drill air-
veral years.

DATED MINING CO. **OREGON.**
y at Galice, Josephine Co., Ore.

KS. **RUSSIA.**
alizursk, Zangezhur, Elizabethpol, Russia. S. Varavov,
orked irregularly since very ancient times, is on the Galisur
f and circa 15 miles north of the river Arax, which is the
n Russia and Persia. Ore occurs in a number of veins with
having erratic strike and traversing crystalline rocks, largely
e, much crushed and silicified, and occasionally faulted.
width, with nearly vertical dip, carrying some sphalerite in
which disappears at depth, ores including bornite and covell-
zone, and chalcopyrite at depth. The average mineralized
about 8″, carrying ore of about 15% average copper tenor.
eloped to a depth of circa 350′, by 2 shafts and a tunnel, the
nnel being a combination tunnel, shaft, winze and stope,
n direction and dip, having occasional staircases, and at
rough old stopes on bridges or notched timbers. Formerly
face in baskets, and water in leather bags, but steam pumps
to be abandoned, owing to the cost of fuel, and are to be
pumps. Forces, 1909, averaged 57 men underground and

ed and sorted on a dressing floor, high grade ore, of 15 to
being sent to the smelter, and middlings hand dressed in
to a concentrate of 15% copper tenor, balance of ore going
The smelter is little more modern than the mine. Maxi-
1,308,796 lbs. fine copper in 1899, and recent production
. fine copper in 1905; 45,000 lbs. in 1906; 65,000 lbs. in
. in 1908.

NG & MILLING CO. **WASHINGTON.**
y was sold by receiver, 1909, for $2,800, to Lee A. Johnson,
reholders, who planned reorganization. Formerly at Cle
Wash. Described Vol. VIII.

TY BASIN COPPER MINING CO. **MONTANA.**
anized January, 1906, under laws of Montana, with capi-
Apparently no mining work was done on the property.
n, Gallatin Co., Mont.

MONTANA.
onda Copper Mining Co., at Butte, Silver Bow Co., Mont.

OS. **PÉRU.**
s: Cerro de Pasco, Junín, Perú. Property is El Carmen
on matting furnace, doing a small local custom business.

MONTANA.
onda Copper Mining Co., at Butte, Silver Bow Co., Mont.

CO., LTD. **NORWAY.**
uidated, 1910. Formerly at Karlsö, Tromsö, Norway.

PENNSYLVANIA.
p, Lancaster Co., Pa. Mine has nickeliferous and cuprif-

erous pyrrhotite, somewhat similar to the ore of the Ontario, and was the principal American nickel produc Idle since 1893.

TIBURCIO GARCÍA.

Mine office: Galeana, Chihuahua, Mex. Jesús Ontiv erty is La Gloria mine, carrying auriferous and argentifero water power and a 20-ton mill with 1 Blake crusher.

GARDINER, WORTHEN & GOSS CO.

Office and works: Tucson, Pima Co., Ariz. B. L. W ager. Has a smelter with 30-ton experimental water- burning crude California petroleum, tests of which were s Idle and apparently moribund.

COMPAÑÍA MINERA GARDUÑO y ANEXAS.

Office: Puente Alvarado 21, México, D. F. Mine offi Mina, Guerrero, Mex. Lawrence F. Bedford, president; ager. Property includes the Pinzán and Garduño mines, ver lead ores, and La Reina de Cobre mine, carrying aurife water power, and employed about 100 men, circa 1907.

GARFIELD MINING CO.

Dead. Formerly at Brigham, Box Elder Co., Utah.

GARFIELD MINING & MILLING CO.

Mine office: Harvard, Latah Co., Idaho. Albert B Property is the Gold Bug mine, developing by shaft, Equipment includes a small steam plant.

GARFIELD-SALVADOR MINING CO.

Dead. Formerly at Butte, Silver Bow Co., Mont.

GARFIELD SMELTING CO.

Office: 165 Broadway, New York, N. Y. Operatin nick Blk., Salt Lake City, Utah. Works office: Garfield, Daniel Guggenheim, president; Edw. Bach, secretary; C. manager; Wm. H. Howard, superintendent. Organized New Jersey, with capitalization $1,000,000. Is controlle of entire stock issue, by American Smelters Securities Garfield Water Co., organized 1905, under laws of New Je tion $300,000, and the Garfield Improvement Co., organi of New Jersey, with capitalization $200,000. The smelter, cost $2,000,000, has cost, complete, about $6,000,000.

Lands, on the eastern shore of Great Salt Lake, 18 m City, have an area of circa 35,000 acres, being a tract 7 mi miles north and south, very extensive holdings having be litigation from smoke-farmers, yet 14 industrious agricul filed suits for damages, in 1910.

The smelter went into blast circa September, 1906, and plan, with a view to eventually doubling its size. The cap at 1,800 tons, has been brought to about 3,000 tons daily 3,500 tons, under pressure. Construction is of steel and being used in the reverberatory furnaces, dust-chambers able trouble was had at first, but the plant has been br efficiency.

There are 2 sampling mills, each 72x82′, and 76 sto each, aggregating 38,000 tons capacity, with twenty 1,00 trates, giving a total bin capacity of 58,000 tons. Charge beds, and distributed by 4 belt-conveyers, with trippers the calcining building, which has 32 McDougal roasters, daily capacity, that reduce the average sulphur contents o from 30% down to 12%. Material treated is very largely

Co. Pot-roasting was installed, 1907, with 25 Huntington-pots, calcining 7-ton charges in 8 hours, yielding a product , sulphur, treating ore previously calcined in the McDougal % sulphur tenor. The Huntington-Heberlein pots are in a y a traveling crane.

er building, 305x360′ in size, covers the blast and reverbera- the converter and bullion departments. The building has ctric cranes, with a 10-ton auxiliary, all of 60′ span, running e building. There are six 275-ton reverberatory furnaces, ize, operated under forced draft. Each reverberatory has water-tube boilers, set tandem, heated by waste gases.

ce department has four 4x20′ blast-furnaces, and considera- to throwing 3 of these together, making an 1,800-ton blast- e. Furnaces are operated with a 24 oz. blast pressure, and Air is furnished by cross-compound piston blowers.

as given an elaborate flue arangement, with independent bers for the blast and reverberatory departments, the dust- e-half mile to the stack. This plan was not entirely success- ous bends that impaired the draft, but the flue system was tened, greatly improving the draft. The stack, with base ce, is of Custodis construction, 300′ high, with outside diam- ′ 6″.

lepartment has 8 stands, with 8x11′ 6″ shells, supplemented 20′ and 10x24′ barrel type shells, of the Pierce & Smith de- neral appearance, are somewhat like a Brückner roasting ned with magnesia brick, to thickness of 18″ at the bottom hell being of capacity to turn out 35 to 60 tons of blister cop- ording to thickness of lining. These shells are said to be ge of about 1,800 tons of copper with each lining.

lepartment has a Kelly slag-casting machine, caring for 500 verter slag daily, which is sent back to the blast-furnaces. t-furnaces are hauled in 15 ten-ton slag-cars, of 27,000 lbs. eumatically, each with bowl in 5 sections.

e has an electric crane with an 80′ span, and the boiler-house tirling boilers, with individual steel chimneys, in addition to waste gases in the reverberatory department. The steel has an electric crane, and a full equipment of modern shop x80′ frame carpenter-shop has a 15-h. p. electric motor, and el frame warehouse.

rfield, 1½ miles from the smelter, is built entirely of brick, ter town. The company has special bunkhouses for Japa- strian workmen, the Japanese having a complete system of gement of a semi-military nature.

creasing the plant to a daily capacity of about 5,000 tons, capacity of about 16,000,000 lbs. finished copper, which largest custom smelter in the world. Management plans erberatory department, and the building of a new 530′ stack. will employ about 2,000 men. The Garfield smelter may be for all other metallurgical plants doing a general custom naged with great technical skill.

ER MINING CO. **WYOMING.**

Vest Cedar St., Kalamazoo, Mich. Letter returned un- r mine office, Encampment, Carbon Co., Wyo. T. J. Up- ; Edwin Gillis, secretary and treasurer; preceding officers, Wickham and D. H. Palmer, directors. Organized July 10, f Wyoming, with capitalization $1,500,000, shares $1 par;

issued, $700,000. Lands, 4 claims, area 80 acres, in the
having a 40′ shaft and a 100′ tunnel, on a vein of 50′ estim
maximum width, carrying a hematite gossan, supposed to
the Itmay vein. Idle several years.

GARNET GOLD MINING CO.

Mine office: Pony, Madison Co., Mont. F. C. Wood,
manager; E. L. Ballou, superintendent. Mine carries au
erous lead and copper ores, copper being merely a by-p
includes a Bacon hoist and 5-drill Ingersoll-Rand air-co
power taken from Willow Creek, mine being idle winter
frozen stream. There is a 20-stamp mill, and about 40 me
active.

GARRETSON-SAHUARIPA CO.

Office: 527 Ellicott Square Bldg., Buffalo, N. Y. Mi
Sahuaripa, Sonora, Mex. W. H. Farnsworth, president;
president; W. H. H. Davenport, secretary; D. B. Sherma
Moore, superintendent. Organized 1903, under laws of Ari
tion $600,000, shares $100 par, nonassessable; issued, circ

Lands, 96 hectares, and 14,000 acres of surface righ
30 miles southeast of Sahuaripa, includes La Calera mine, h
which 2, under development, are of 3′ to 6′ width, estim
average 2% copper, 45 oz. silver and $14 gold per ton, which
Mine has about 1,200′ of workings.

The smelter, 1 mile from the mine, receiving ore by pac
29x48″ Garretson pyritic water-jacket blast-furnace, burnin
which apparently has not worked well. Idle since 1908, a
of the Sonora Central railway from Tonichi, which is surv
this property.

GARRISON GOLD & COPPER MINING CO.

Dead. Was merged, 1907, in Garrison-Monster Mini
Ibapah, Tooele Co., Utah. Described Vol. V.

GARRISON-MONSTER MINING CO.

Office: 202 Utah Savings & Trust Bldg., Salt Lake
office: Ibapah, Tooele Co., Utah. J. P. Gardner, presid
vice-president; H. B. Windsor, secretary; S. W. Morrison
ized June, 1906, under laws of Nevada, with capitalization
par, as a merger of the Garrison Gold & Copper Mining Co.
Co. Lands, 26 claims, patented, on Dutch Mountain, in
circa 40 miles from Wendover, the nearest rail station.
of workings, is said to show considerable bodies of silver-le
idle.

GARVANZA MINING & MILLING CO.

Mine office: Cima, San Bernardino Co., Cal. H. M. B
ent. Lands are on the western side of New York Mounta
tion on the Salt Lake railway, showing a vein of 20′ to 75′ c
ing an argentiferous and auriferous sulphide complex of cop
denum. Work was begun circa 1906, and mine has about 2
what is reported as a series of quartz veins, cutting granite.

A 100-ton mill is equipped with crusher, rolls, trom
tables, and has a 30-ton leaching plant, with three 10-ton
small quantity of thorium nitrate, by means of the hy
process.

GATEHOUSE COPPER CO., LTD.

Office: 62 Robertson St., Glasgow, Scotland. Mine of
cudbrightshire, Scotland. D. Thomson, J. McMillan, W. W
Watson, directors. Organized Nov. 8, 1909, under laws of

,500, shares £1 par. Property is mining rights to the estate of rkcudbright.

NERA DE GATICO. **CHILE.**

Calle Compañía, Santiago de Chile. Mine and works office: Antofagasta, Chile. Luis Claro Solar, president; Luis José tary; preceding officers, Javier Figueroa, Carlos Larrain Claro, and Juan Gatica, directors; Geo. W. Waters and F. D. Aller, ; Daniel Carrazana, mine superintendent; Bancroft Gore, ident; Hervey Gulick, engineer; Julio Arnado, superintendent Luis Alvarez, clerk; Juan Canessa, master mechanic. Organ- 05, under laws of Chile, with capitalization 6,000,000 pesos, par, in 3,000,000 pesos preferred and 3,000,000 pesos common d. Paid a 240,000 peso dividend, 1907, with total dividends, f 480,000 pesos. Shares are listed on the Santiago and Val- anges. Employs about 700 men.

aims, area 453 hectares, including 4 developed mines, also a 15 te. Property, in the Cobija district, in the vicinity of the sea, nment concession, includes 2 groups of prime importance, one Toldo, at Gatico, and the other the Michilla group. Other ortance or promise are the Velarde, Crimea, Argentina, Santo a and California mines. Properties as a whole carry 14 veins ith 8 under development. Management estimates that the average about 11% copper, 0.2 oz. silver and ½ gram gold per eing mainly chalcopyrite, with some bornite. Mines as a whole rs of workings, with 36,000 metric tons of ore blocked out for ncipal mines were opened 1830, closed 1861, and reopened 1887. ne, at Huanillos, 4 kilometers northeast of the smelter, on the ge back of the sea, is favorably situated for economical opera- rable scale. Country rock is syenite, carrying a fissure vein of width, with nearly vertical dip, ore occurring in strong shoots, of with cross veins causing increase of mineralization at points of e is chalcopyrite, entirely free from zinc, lead, antimony and ue mainly of quartz, and a little feldspar. The zone of oxida- eters in depth, is succeeded by a secondary zone carrying sili- e and a little native copper, but with no secondary sulphides, ne being succeeded directly by chalcopyrite, associated with a Toldo mine has 2 shafts, 240 meters apart, deepest 1,300′, ened, at approximately 25-meter distances, and the mine is h of 1,400 meters, including the workings on the Velarde mine, nsion. The mine requires very little timbering, and water quantities, at depth of 125 meters. The Toldo and Velarde ed to have in sight better than 30,000 metric tons of ore, aver- copper, and employ 235 men, miners working 8-hour shifts, on duce an average of 800 kgs. ore per man per shift, with average 7 pesos, which is good work and high pay.

t El Toldo includes a 75-kw. hoist at the main shaft, good for raising 1,100-kg. cages at a velocity of 600 meters per minute. air-compressor, driven by a 60-kw. motor, and the mine uses ower drills, and is experimenting with Murphy and Holman Toldo mine is connected with the smelter by a 3,644-meter ram, having 19 towers, highest 20 meters, with longest span of rop of 372 meters, carrying 160-kg. buckets, with hourly capac- s, operated by electric power, assisted by gravity. Cables last years, and cost of transportation is only about one-half peso

The Michilla group includes the California, Carolina an
an elevation of circa 1,000 meters above sea-level, 6 kilomet
Cove, and circa 26 kilometers from Gatico. Veins of this g
width, ranging 1 to 15 meters in width, carrying bunchy or
California mine, of about 5 meters average width, yields ore,
averages about 10% copper, this mine having a 20-meter v
malacate. La Carolina mine is opened to depth of only 8
zontal length of 300 meters, workings being entirely in oxi
phides expected at a little greater depth. La Carolina
silicate and oxychloride ores, all soluble in weak acids,
phyritic, and insoluble. The greatest part of the ore is
smaller quantities of atacamite, chrysocolla and copper ox
quires no timbering, and this and the adjoining mines of the
about 80,000 metric tons of 5% ore, all ore under 4% ten
Production, 1909, was about 300 metric tons monthly, of
copper.

The Michilla mines have a 5,331-meter Bleichert aëri
Cove, with 50 towers, highest 25.5 meters, longest span bein
line carries 300-kg. buckets, and has an hourly capacity of 20
are 2 intermediate tension stations, and, by reason of the
meters, or nearly 1 in 5, about 50-kw. in electric power is ge
ally, which, with a hydraulic regulator, is used to overcom
only 5 operatives being required for the line. The tram, in co
about £11,000 in Europe, and approximately £20,000 install
from Michilla Cove to Gatico by lighters.

The smelter, at the port of Gatico, 30 miles north of Toc
north of Antofagasta, has two 10-ton reverberatory furnace
been discontinued. There are two 34x140" blast-furnaces,
using sea-water for jackets, and burning Australian coal, co
per metric ton, and Westphalian coke, costing 30 to 65 pesos
nearby limestone quarry provides flux, brought in wagons.
about 40% lump sulphides, 30% briquetted sulphides from
oxidized ores from La Michilla, to which are added 30 pa
parts of slag, for resmelting, a total of 160 parts, requiring
smelting. Product is a matte of 52% average copper teno
launders, to the converters. Slags, assaying 0.35 to 0.5% c
into the sea, granulation not being practicable.

The converter department, working days only, has 4
58x84" barrel-type shells, built in the shops. Shells are rot
there is a hydraulic accumulator for later installation. Co
Chile bars averaging about 98.9% copper, 2.6 oz. silver and 0
shipped to England for electrolytic refining.

The briquetting plant, with a Peek press, takes fines from
fine-dust, using distilled sea-water, briquettes going to the blas
is a small experimental leaching plant, treating La Carolina o
tion has been given to adding an acid plant to provide leachi

The power plant includes three 200-h. p. Babcock & Wi
h. p. electric motor-generator set, a 120-h. p. Allis-Chalmers d
set for the converters, a Connersville blower, direct-connecte
Iron Works engines for the blast-furnaces, and a 120-h.
engine in reserve. There also are minor engines for the
machine-shop and electric light.

Owing to the aridity of the district, it was necessary to so
tion by a distillation plant, furnished by the Mirrielees-Wats
has a capacity of 140 metric tons of distilled water daily.
of 60 metric tons capacity hourly. Sea-water is used for cond

ough the water-jackets of the blast-furnaces. The water ervoir of 50,000 cubic meters capacity.

very complete, being capable of repairing, and, if necessary, nery parts at the mines and smelter. Shops include an iron op, carpenter-shop, boiler-shop and a small brass foundry, mplete chemical laboratory.

old smelter at Michilla Cove, now out of commission, having ket blast-furnace, 2 reverberatories and a small converter

facilities include 3 moles, and a 38-ton tug makes daily Michilla Cove and Gatico, towing four 30-ton ore-lighters. ate railway, with 2 locomotives and 23 cars, connects the s. The company maintains a physician for employés and

been as follows: 2,430,604 lbs. fine copper in 1907; 2,804,808 952 lbs. in 1909, and almost exactly 4,000,000 lbs. in 1910. sidered valuable, and the company is progressive and well

INAS i FUNDICIONES DE GATICO. **CHILE.**

cceeded, March 10, 1905, by Compañía Minera de Gatico. Cobija, Antofagasta, Chile.

NG & MILLING CO. **MÉXICO.**

hamber of Commerce, Chicago, Ills. Letter returned un- r mine office, Gavilanes, Durango, Mex. C. A. Wightman, Boland, secretary and treasurer; James E. Boland, manager. 1904, under laws of Arizona, with capitalization $2,000,000, ds, 500 acres, 30,000 acres of timber and grazing lands, and niles of the Piaxtla and Pilar rivers. Lands include the mine, a property said to have produced, according to official oz. silver, also sundry undeveloped copper veins. Idle esumably moribund.

CISCO GEISSE. **CHILE.**

l works: El Espino, Combarbalá, Coquimbo, Chile. Prop- ino mine, opened 1896, which made about 100,000 lbs. fine working, and the Fundición El Pupio, a small smelter. Idle

OS. **CHILE.**

e, Chile. Mine office: Illapel, Coquimbo, Chile. Works oquimbo, Chile. Property includes the Bella Vista, Los mines. The Bella Vista mine is about 150 meters deep, out 150 meters in horizontal length. The Tongoi mine, at Illapel, has a vein of 2 to 3 meters width, opened to depth of 903, employing 90 men, produced 900 metric tons of ore, r and 25 grams gold per ton. Los Trabos mine in the same netric tons of ore, of 20% copper tenor.

es the Fundición de Illapel, which is idle, having produced copper in 1908, and 42,030 lbs. in 1909, also the Fundición pilla, which has a blast-furnace, and several reverberatories s capacity each. This smelter is said to have worked under erly. Production is matte of about 50% copper tenor, and g 97% copper, with considerable silver and gold values, ; and parting the precious metals. Production was 523,974 908, and 426,288 lbs. in 1909.

.TED MINES CO. **COLORADO.**

th Ave., Pittsburg, Pa. Mine office: Idaho Springs, Clear Col. J. M. Guffey, president; John H. Galey, vice-president;

W. S. Watson, secretary; Henry B. Clifford, resident direc
general manager; J. Kaughman, mill superintendent. Or
under laws of Colorado, with capitalization $5,000,000, sha

Lands, 10 claims, patented, and a millsite, showing a ve
traceable circa 3 miles, carrying sulphide ores assaying up t
silver and $18 gold per ton. Mine has about 5 miles of w
show 1,000,000 tons of ore, with 300,000 tons blocked
550-h. p. hydro-electric plant supplies 350 h. p. to the n
the mill. There are 4 hoists, good for 3,000′ depth, and
Rand air-compressor. Buildings include a 40x50′ machine
smithy,, etc., and a 100-ton stamp mill. Production, 190
company at circa $150,000 in value.

GEM CONSOLIDATED MINING CO.

Dead. Property was sold, circa 1909, to Tenabo Mi
for 450,000 shares of Tenabo stock, and Hiram Tyree, pres
taking possession of this stock, and disposing of a consider
own personal use. Formerly at Tenabo, Lander Co., Nev.

GEMINI MINING CO.

Office: 325 Brooks Arcade, Salt Lake City, Utah.
Juab Co., Utah; E. W. Packard, vice-president; J. E. Berl
Hills, treasurer; Jackson H. McCrystal, general manage
tal, superintendent. Company is said to have paid divide
also has been reported as having paid $2,000,000 in dividend
probably is an exaggeration, though the mine is one of the
district.

The property has 3 fissure veins, in an ore channel
transversely by a number of cross-fissures, making a rathe
ore bodies, the main fissure, of 15′ to 20′ width, having a so
ore-shoots raking to the north. Ore is oxidized to considera
by auriferous and argentiferous lead and copper sulphides,
upper workings averaging about 12% lead and 40 oz. silv
level, at 1,600′ shows a 20′ vein carrying argentiferous cop
tenor. The mine has a 1,600′ shaft, and a 300′ winze, ec
hoist, reaches to the 1,900′ level, the winze being practically
Ridge & Valley mine, adjoining the Gemini on the north, is
Gemini shaft, and yields ore averaging about 35% lead and

The mine has steam and water power, with a good pl
h. p. electric pump on the 1,600′ level, which can fork 300
surface, and an auxiliary pump on the 1,900′ level. Produ
lead ore, is about 10,000 tons yearly, and is sold, under a lo
the United States Smelting Co. Forces average about 75

GEM MINE.

Owned by North Butte Mining Co., at Butte, Silver B

GEM MINING CO.

Mine office: Coolin, Bonner Co., Idaho. Property,
shows an iron capping of about 40′ width, carrying a little co
gold and silver. Presumably idle.

GEM TURQUOISE & COPPER CO.

Office: 37 Maiden Lane, New York, N. Y. Mine office
Co., N. M. Property is a turquoise mine, in the Burro Mo
years.

GENERAL COMPANY OF SPANISH MINES, LTD.

Office: 70 Queen Victoria St., London, E. C., Eng. Mi
Huelva, Spain. G. Auberty, P. Vryrieras, Baron d'Allem
and L. E. Chagniat, directors; T. Greenhill, secretary.
1904, under laws of Great Britain, as Telesforo Copper C

7, to present title, with capitalization £50,000, shares £1 par; O,200 being fully paid, and 550 shares being 1s. paid. Prop- and La Segura mines. Idle several years, and presumably

LOPMENT CO. U. S. A., CANADA & MÉXICO.
oadway, New York, N. Y. Adolph Lewisohn, president; , secretary; Julius H. Susmann, treasurer; J. Parke Chan- ngineer; preceding officers, H. Ruhlender, W. H. Nichols, Samuel Untermeyer, Herman Sielcken, D. M. Hyman, H. M. eedman, W. I. Rosen, I. L. Hermann, J. A. Lewisohn, A. S. Lewisohn, directors.
06, under laws of Delaware, with capitalization $2,000,000, $2,500,000, and again increased, 1909, to $2,600,000, shares eable. Paid a 60% dividend, circa June, 1909; a 10% divi- , and a special dividend of 10%, January, 1910, making a total ds to that date.
ontrolled by the Lewisohn interests, and is operated as a close olling, through stock ownership, the Colorado Gold Dredging r Co., New Keystone Copper Co. and San Cayetano Mines, upposedly has extensive stock interests in the British Colum- ew Dominion Copper Co., New Planet Copper Co. and Kerr with other mining interests in Montana, Colorado, Arizona, o.

IT MINING CO. COLORADO.
erly at West Creek, Douglas Co., Colo.

ES CO. MONTANA.
road St., New York, N. Y. Letter returned unclaimed from , Helena, Lewis & Clark Co., Mont. Geo. Hyatt Robinson, B. Tipton, vice-president; F. J. Chipman, secretary and k Johnston, manager. Lands, in Avalanche Gulch, across the m Helena, have a 28′ vein, opened by a 500′ crosscut tunnel, and argentiferous copper sulphides. Idle.

ER CO. CALIFORNIA.
Genesee, Plumas Co., Cal. Lands, 33 claims. Idle since tly moribund.

EY COPPER CO. CALIFORNIA.
ake St., Reno, Nev. Mine office: Genesee, Plumas Co., Cal. resident; Henry Metz, vice-president; Mel. J. Smith, secre- ; W. G. Lummis, superintendent; preceding officers and J. E. Organized Nov. 1, 1909, under laws of Nevada, with capitali- shares $1 par, nonassessable; issued, $1,000,000. Annual st, each year.
ims, unpatented, area 300 acres, in 3 groups, and a 120-acre ndesite-porphyry, having 5 wide veins, with 3 under develop- ed to average 50′ width, carrying bornite, chalcocite and na- ng 5 to 10% copper, 3 oz. silver and $1.50 gold per ton. The f 20′ estimated average width, traced 4,000′ by surface cuts, e, giving assays of 5 to 10% copper, with small gold and silver is opencast, and company estimates 50,000 tons of ore exposed. s an aërial tram and a 100-ton concentrator. Property con-

EADWELL MINING CO. ARIZONA.
illiam St., New York, N. Y. Mine office: Mayer, Yavapai indle, promoted by the late "Gen." Walter S. Logan, "Prof." l and "Miss" Myra B. Martin. Moribund. Exhaustively L.

GEORGE THIRD MINING, MILLING & SMELTING
Dead. Formerly at Carson, Hinsdale Co., Colo. D

GEORGETOWN GOLD MINING CO.
Dead. Frank B. Branham was superintendent. M
Fourth Street shaft, carrying auriferous and argentiferous l
was worked, circa 1903, in a small way. Formerly at Geor
Co., Colo.

GEORGIA & TENNESSEE COPPER CO. **GEO**
Office: care of H. G. Brooks, 35 Congress St., Bosto
turned unclaimed from former mine office, Temple, Harak
Sutro, president; Otis Kimball, vice-president; Wm. Tudo
ing officers, L. V. Briggs and John T. Coolidge, Jr., director
superintendent. Organized Jan. 24, 1905, as a merger of
Mines and Georgia Pyrites Co., with capitalization $1,000
Lands, 447 acres of copper lands, in Georgia, and 800
lands, in Marion and Levy counties, Florida, latter claimed t
of phosphate. Copper lands show country rocks of Laure
contact veins of 4′ to 19′ width, between slate and sandsto
shaft, with 1,250′ of workings, estimated to show 85,00
45,000 tons blocked out for stoping, said to give average assa
oz. silver and $2 gold per ton. Ore is chalcopyrite, dissemin
aging 41% sulphur. Company planned installing an acid
turing superphosphate for fertilizer, but failed to do so.
moribund.

GERMAN-AMERICAN COPPER CO.
Office: Leesville, La. Mine office: Alamos, Sonora, M
land, president; G. H. Schweitzer, vice-president and treas
barth, secretary. Organized 1909, under laws of Arizona,
$100,000. No trace of operations secured.

COMPAGNIE DES MINES DE CUIVRE ET DE PLOMB DE GERONA.
Dead. Was dissolved, 1906. Formerly at Susqueda,

GERONA COPPER CO., LTD.
Dead. Was wound up, voluntarily, February, 1903.
rich, Gerona, Spain. Described Vol. V.

GERONA COPPER & LEAD MINES, LTD.
Dead. Was dissolved, Feb. 20, 1906. Formerly at
Spain. Described Vol. VI.

GERONIMO COPPER MINING CO.
Dead. Was a swindle. Was "succeeded," circa 1
Development, Mining & Reduction Co. Formerly at Silv
N. M. Described Vol. VIII.

GERTRUDE MINING CO.
Dead. Was succeeded by Eagle Copper Co. Formerl
Co., Wyo.

MINA GERTRUDIS.
Mine office: San Tadeo, Yauli, Junín, Perú. Is owned
cha Mining Co. and Mendieich y Valentine. Mine, opened
San Marcelo, sharply west of Lake Morococha. Property
beds having ore impregnations following the bedding plane
strike of N. 60° E. and nearly vertical dip, of about 2 meters
a paystreak of 60 cm. to 1 meter, carrying argentiferous gr
copyrite, averaging about 14% copper and 1,000 grams sil
balance of vein carrying circa 5% copper and 300 grams sil
The mine has a 12-meter shaft, but is developed mainly
above the level of Lake Morococha, mining through winz

anging. Ore is hand-cobbed at the portal of the tunnel. Em-
1908. Production was 2,189,400 kgs. fine copper and 1,689
897–1903; 2,455 metric tons of ore, yielding 757,950 lbs. fine
,416,461 lbs. in 1905; 191,227 lbs. in 1906; 370,372 lbs. copper
in 1907.

NG CO. MONTANA.
erly at Butte, Silver Bow Co., Mont. Described Vol. VIII.

RNIA MINING CO., LTD. BRITISH COLUMBIA.
ed unclaimed from former office and mine, Rossland, Trail
ay P. Graves, president; A. L. White, vice-president; Chas. H.
Geo. Wooster, treasurer; Wm. Yolen Williams, general man-
fficers, A. H. McNiel and R. L. Cumberland, directors; J. A.
dent. Organized 1907, under laws of British Columbia, as
Mining Co., Ltd., with capitalization $5,000,000, shares $100
of 7% preferred, and $4,600,000 ordinary stock. Lands, 2
the Giant and California, adjoining Le Roi No. 2, on Red
Giant mine has about 500′ of workings, and shipped 4,344 tons
pending, 1903. The California has a 1,000′ tunnel with a 200′
etically a blind shaft, planned to be sunk to 550′. Equipment
ower, with a small hoist and 10-drill duplex Rand air-compres-

CONSOLIDATED MINING CO. UTAH.
organized circa April, 1906, as successor of Giant Chief Min-
erty was sold, early 1908, to Utah-Bingham Mining Co. Ap-
was done by this company. Formerly at Bingham Canyon,
tah.

MINING CO. UTAH.
ls were sold, circa April, 1906, to Willard F. Snyder, et al., and
etically reorganized as Giant Chief Consolidated Mining Co.,
operty, 1908, to the Utah Bingham Copper Mining Co. For-
n Canyon, Salt Lake Co., Utah.

E CONSOLIDATED MINING CO. COLORADO.
Salida, Chaffee Co., Colo. W. L. England, president; F. L.
and general manager. Mine, in the Monarch district, has a
veloping argentiferous lead and zinc ores, from which small
nade, 1910, and the mine also has a 2′ vein of copper ore, on
tle development.

GOLD & COPPER CO. CALIFORNIA.
Frost Bldg., Los Angeles, Cal. Mine office: Manvel, San
Cal. L. M. Gregory, president and general manager; Andrew
y; R. W. Kenny, treasurer; Edward Brough, mine superin-
ized July, 1901, under laws of Arizona, with capitalization
ased, circa 1910, to $1,500,000, shares $1 par. Company has

aims, a 40-acre millsite and miscellaneous holdings giving total
of 800 acres, in the New York district, about 5 miles from Man-
ins, of which 2 are under development, one being a fissure in
a contact deposit between limestone and granite, with average
, giving average assays of 5% copper, 5% lead, 10 oz. silver and
per ton, from carbonate and oxide ores near surface and sul-
Mine has 1 shallow shaft and 2 tunnels, longest circa 700′, with
kings, developing a considerable amount of ore. Company is
th leaching and electric precipitation, having about 5,000 tons
available for this process, which is planned to yield electrolytic
peroxide as a by-product.

GIANT MINING CO., LTD. BR

Dead. Stuart Charles, Arthur Peacock and C. J. Ro H. C. Newsom, secretary and liquidator. Organized Aug. of Great Britain, with capitalization £150,000, shares £ debentures. Was merged, 1907, in Giant-California Mini holders receiving $11 in stock of Giant-California for eac Giant, and company went into liquidation May 8, 1907. F Trail district, B. C.

GIBB COPPER MINES, LTD.

Mine office: Boolboonda, Bowen Co., Queensland, Au manager. Lands, circa 10 miles northeast of Mt. Perry, sl of about 12″ width, carrying high grade auriferous and arge There is a small concentrator. Several small shipments the Mount Perry smelter, shipments of 30 tons, September, 1 copper, 14.5 oz. silver and 3.5 dwts. gold per ton. Was wo men, at last accounts, late 1909.

COMPAÑÍA MINERA LA GIBOSA y ANEXAS.

Dead. Lands were sold to American Smelters Securi at Jiménez, Chihuahua, Mex.

GIBRALTAR COPPER MINING CO.

Office and mine: Encampment, Carbon Co., Wyo. W Chas. E. Winter, secretary. Mine has a 4′ vein, opened by ore giving assays up to 20% copper, with good gold and silve power. Idle some years and apparently moribund.

GIBSON COPPER CO.

Office and mine: Globe, Gila Co., Ariz. Samuel L. Wm. Henderson, vice-president; F. F. Towle, secretary; Geo. K. Stoneman and J. L. Alexander, directors. Organiz of Arizona, with capitalization $2,500,000, shares $25 par; Has authorized a $500,000 issue of 6% bonds, but appa Property is under bond and lease to the Summit Copper C under that title. Recent production has been as follows: copper in 1906; 3,340,777 lbs. in 1907; 1,270,211 lbs. in 1 1909.

GILA CAÑON COPPER CO.

Office: 214 East St., New Haven, Conn. Mine offi Ariz. H. Stuart Hotchkiss, president; Milton J. Warner, urer; preceding officers, Geo. B. Chittenden and Erroll M Organized 1907, under laws of Arizona, with capitalization $ par. Is operated as a close corporation. Lands, 16 clai known as the Schneider group, in the Banner district, 4 mile Pacific railway. Mine, having a limited amount of developm ore, circa 1907, to the Saddle Mountain smelter. Proper expiring Dec. 31, 1911, to Development Company of Americ

GILA CANYON COPPER CO.

Letter returned unclaimed from former office, Globe, Winkelman, Gila Co., Ariz. H. H. Bru, W. P. Reynolds directors. Organized circa October, 1910, under laws of Ari zation $200,000, shares $10 par. Is no relation to Gila Lands, 7 claims, area 140 acres, circa 25 miles southwest practically inaccessible, until the San Carlos cutoff of th now surveyed, is built. Property shows 2 fissure veins, of 30 width, crossing at nearly right angles, in limestone and qu eruptive rocks. Apparently only assessment work has be

GILA COPPER CO.

Dead. Office was Mining Exchange Bldg., Colorado S

ood Aldrich, president; C. M. MacNeill, vice-president; E. P. and treasurer; Philip Wiseman, general manager; preceding W. Mudd, Chas. H. Cutting and Spencer Penrose, directors. 25, 1907, under laws of Maine, with capitalization $10,000,000, nonassessable. Lands were circa 1,000 acres, and a 120-acre a twin of the Ray Consolidated Copper Co., and was merged n the basis of 1 share of Ray Consolidated for 3 of Gila. For- Pinal Co., Ariz.

SULPHIDE CO. ARIZONA.

Pine St., New York, N. Y. Mine office: Winkelman, Gila Co., heney, president; Victor L. Mason, vice-president; A. W. ary and treasurer; preceding officers, Hon. Frank M. Murphy, ss, Paul Brooks, E. P. Cruise, E. W. Powers and E. E. Jejeune, ett Goodwin, manager. Organized 1909, under laws of Arizona, ion $2,500,000, shares $10 par, nonassessable. Has authorized 60,000 first-mortgage 6-year 6% bonds, convertible into stock, of bondholder. Is controlled by the Development Company of pany bought the property of the Saddle Mountain Mining Co., $300,000 in stock, and the assumption of the Saddle Mountain ere scaled down to $420,000.

55 acres, patented, known as the Saddle Mountain group, well s from Winkelman, the nearest rail point, lying on both sides of Property includes copper claims lying north of the river and coal claims directly opposite, on the southern side of the river, ng within a radius of 6 miles.

lver lands are 15 claims, patented, area 266 acres, showing base little lead and zinc and traces of copper, the average of upwards ving a trifle better than $13 per ton in combined gold and silver ld and silver claims have 3,450′ of workings.

40 acres of patented coal lands, in the lower basin of Deer Creek, n of low grade bituminous coal, developed by a 175′ incline shaft, of workings, equipped with a small steam hoist and pump. ive coke-oven on the property, for testing, as the coal may or available for coking, but is adapted to making producer gas.

group, at the junction of Disappointment Valley and the Gila orth side of the stream, was opened, 1883, by the San Carlos t closed, 1884, because found to be located on the San Carlos ion, and remained idle until the lands were restored to the public cutive order of the president, Dec. 2, 1902. The property shows upper Carboniferous limestone, in various stages of alteration, porphyry contact, ores occurring along the irregular line of con- miles on the company's lands, mainly as replacements in lime- ipally as carbonate ores, with garnetiferous gangue, on the lime- as sulphides along the porphyry contact, at depth. The contact n copper ore wherever opened, and the porphyry also carries w workable tenor. Four main ore bodies are under development, rom 4′ to 60′ in width, carrying cuprite, malachite, chalcocite, lcopyrite, latter disseminated in pyrite, all slightly auriferous and nd self-fluxing throughout. Ore mined gave average wet assays pper and 30 to 40 cents per ton in combined gold and silver values. nt is by shafts of 430′, 340′, 300′ and 175′, all showing oxidized res, and the company has planned a tunnel of circa one mile ct with the 300′ main working shaft. The 300′ Christmas shaft ents, each 4x5′ in the clear, and is planned for the main working r Hackberry shaft, the deepest, shows good ore on the 120′ level, 3.75% copper, with considerable heavy sulphide ore on the 300′

... The upper wo...

GIANT MINING CO., LTD ...en for 300' in wid...

Dead. Stuart Charl... ...s, with a large qu...
H. C. Newsom, secretary ... ...ematically, but con...
of Great Britain, with ... ...rt. The mine also h...
debentures. Was m... ...owing carbonate ores.
holders receiving $1 ... ...-h. p. steam plant, with 4...
Giant, and compar... ...rger hoists on the grou...
Trail district, B... ...ous uses.

GIBB COPPER ... ...e mine, receives ore by wago...

Mine of ... ...San Carlos Copper Co., wa...
manager. ... ...n Mitchell economic hot-blas...
of about ... ...2" Colorado Iron Works blast...
There is ... ...ron furnace, 44x200" in size, h...
the M... ...ning, and the slags carry about ...
copp... ...e carrying 60 to 65% copper, 1...
mo... ...on. A little custom smelting was ...
C... ...some grading, 1907, for a narrow ...
... ...and works at Christmas, having c...
... ...or 4 short bridges, with rails, tie...

... ...ne Saddle Mountain was circa 445,...
... ...per, 16,410 oz. silver and 437 oz. go...
... ...ver and 254 oz. gold in 1907. Pro...
... ...promise, if given further mine de...
... ...es and increased smelting capacity, ...

... MINING CO.
...west the Emeline mine. Formerly at ...

... COPPER CO.
...n, Pinal Co., Ariz. Lands, know...
...00' of underground openings, show aur...
... and various oxidized ores. Prope...
... apparently moribund.

... MINES CO. ALAS...
... Washington, D. C. Mine of...
... Morrose, president; O. J. Moat, vi...
... Thos. Evans, treasurer; preced...
..., M. H. Ramage, Gen. Geo. C. Re...
..., superintendent. Organized Jul...
...ation $5,000,000, shares $1 pa...
... assessments of about $70,000. ...
... in the Howard Copper Co., of...
... July. Lands, 8 claims, area 160 ...
... the Liberty group of gold clai...
..., having about 450' of tunnel wor...

... CO.
... way, New York, N. Y. Mine ...
... Wilson, president; C. S. Gilpin, ...
... Mining Co., which was a reco...
... name was changed back to ...
... management, former offic...

... 9 acres, and a 5-acre millsi...
... in the Lone Star distri...
... have 3 ore bodies of about 9...

claims this statement. The San Juan mine has a 280′ o 500′, cutting a 28′ vein on the 230′ level that shows copper and 4 oz. silver per ton. There also are 2 t, at Walnut Springs, supplies a reservoir at the n-road, destroyed by a cloudburst, was rebuilt,

built 1906, shipped, 1907, some concentrates to the one carload returning 29.95% copper, circa 2 oz. silver per ton. Production, 1907, was 110,858 lbs. fine copper, 223 gold. Idle.

NING & MILLING CO. **COLORADO.**

Ward, Boulder Co., Colo. H. F. Llewellyn, superintendent, Mine has auriferous and argentiferous copper ore, and is m power and a 10-stamp mill. Idle several years and appar-

COPPER MINING CO., LTD. **AUSTRALIA.**

y, Australia. Mine office: Girilambone, Canbelego Co., G. A. Richards, manager; W. Blakemore, mine manager. der this title, reconstructed, February, 1902, under title of r Mining Co., N. L., and reorganized 1907, under the original £12,400.

ned 1880, carries numerous quartz veins and intrusions, ore as disseminations and replacements, lacking clearly defined s slate and sandstone having occasional hard bands of quartz- ily sulphide, with quartz gangue, though the mine carries nate ore of high grade, in the oxidized zone, of about 200′ t is 544′. Ores are divided into 3 classes for treatment, the rbonates and cuprite of about 4.6% average tenor, second nposed of oxides from the transition zone, while sulphides kings constitute the third class, each being smelted separately. es, 1900, was 3.85% copper.

as 2 reverberatory furnaces and a refining furnace, turning of the remarkable purity of 99.95%. Ores are difficult of o their deficiency in sulphur and iron, and excess of silica. ce, the property having a dam, and filtering and reusing the The reduction plant includes lixiviation works, where tailings grade oxidized ores are leached. Magnetic separation was

was reopened, 1906, employing circa 60 men, and smelted re, yielding 293,440 lbs. fine copper. Idle since 1907.

MINING CO., N. L. **AUSTRALIA.**

eded, and was succeeded by the Girilambone Copper Mining ly at Girilambone, Canbelego Co., N. S. W., Australia. l. VI.

LIDATED MINES CO. **NEVADA & MÉXICO.**

Alworth Bldg., Duluth, Minn. Mine offices: Kimberly, ev., and Carbó, Ures, Sonora, Mex. Thos. F. Cole, president; s, vice-president; Jos. B. Cotton, vice-president and general Maney, treasurer; preceding officers, Geo. G. Barnum, Jas. Geo. F. Piper, John H. McLean and Ralph C. Lupton, direct- Kennedy, secretary; Frank P. Mills, general manager; S. L. perintendent Mexican mines; R. M. Atwater, Jr., consulting . Paull, auditor.

r. 14, 1903, under laws of Delaware, with capitalization ed, Feb. 25, 1908, to $6,500,000, and again increased, circa $7,500,000, shares $5 par; issued, $7,003,600, with $496,400

in the treasury for the conversion and retirement of converti
outstanding, $496,400 first and second issues, at 6%. Ameri
ton, registrar; Boston Safe Deposit & Trust Co., transfer ag
ing, first Tuesday in February.

The Giroux controls the Butte & Ely Copper Co. th
239,175 shares, bought at $1 per share. Expenditures were
and $692,817.66 in 1910. Cash on hand, Dec. 31, 1910, wa

The Mexican property, area 459 acres, includes the Su
mines, about one mile west of the Copete, in the Sierra de Oro
of Carbó and about 35 miles from Hermosillo. Property sho
50′ to 100′ width, between limestone and porphyry, opened by
No. 1 is circa 200′ deep, Sultana No. 2, the main working sh
cline, is 1,200′ deep, and the San José shaft is circa 500′ deep.
shows, in the bottom level, a vein of circa 40′ width, carryi
shallow depth, succeeded by sulphides. About 15% of the o
San José is of smelting grade, balance, of 6% estimated o
stocked. The Mexican property as a whole shows ore of 3 t
with variable gold values, latter ranging from very small to ve
proportion of high grade ore. Shipments of Sultana ore to E
returned combined gold and silver values ranging from 92 o
ton.

The Sultana mill, apparently of 100 tons daily capaci
managment as the first unit of a 200-ton concentrator, has
an amalgamation plant and a cyanide plant. Production a
the Sultana are said to have about balanced, at circa $450,
Idle since circa 1908.

The Nevada mineral lands, originally 52 claims, patente
were largely increased, 1909–1910, by the acquisition of t
Giroux-Ely Extension Copper Co., which were 130 acres, s
Consolidated and east of the Ely-Central; the Rickard-Ely
ings, 5 claims, adjoining the Veteran-Ely on the west; the
claims, adjoining the Giroux, and various other adjoining pr
$226,551.40 was expended in 1909. The main holdings const
2½ miles in length, and a half-mile to mile in width, lying
of the Nevada Consolidated. The company also owns 1,800
ous lands, including the townsite of Kimberly, 7 miles west o
water-rights in the Steptoe Valley.

The ore bodies of the Giroux are of great extent and co
The first series of ore measures, on the contact between plu
tary rocks, shows enormous areas of replacement in the ls
gangue of quartz, talc and clay. In places these series hav
width of fully 1,000′, though not workable throughout, fair or
or more having been found at points. A second series of ore
the Giroux shaft, immediately above the water-level, where t
of 30′ to 40′ thickness, carrying oxidized ores, claimed by t
ment to average 7% or upwards. The third and apparent
series is in the country rock, of porphyry.

The Giroux carries a quartz-porphyry dike, for a distan
miles. This ore body is of monzonite, a highly altered acid
carrying upwards of 60% silica. The exposed surface has
leached, and shows carbonate stains, and, at depth, sometim
carries melaconite and chalcocite, succeeded at greater dept
the principal values being in chalcocite. The monzonite ore
veins of 3′ to 20′ width, giving little evidence of faulting, and
been mineralized from solutions coursing along the lines o
The porphyritic ore is comparatively friable, and readily ar

ecessarily somewhat given to sliming. The principal monzonite
e Giroux shaft, was estimated, by the old management, as 1,500′
but apparently is about 400′ wide, with a proven length of about
′ to 175′ thick. Most of this deposit lies too deep for econom-
team-shovel work, and probably would have to be mined by the
There also is another monzonite ore body, estimated by the old
00′ wide and 1,400′ long, extending along Old Glory Hill, from
of the property, in a course between the Alpha and Giroux
ldition, lands bought, 1909–1910, carry cupriferous monzonite.
e bodies have been tested by 6 Keystone churn-drills, and these
considerable work also on the Butte & Ely ground. The mon-
were platted in blocks 200′ square on known mineral ground,
n uncertain ground. A large number of holes have been bored,
of about 500′, with one hole of 1,035′ put down, 1909. The
nsive that a comparatively small part of the property has been
d. Many wild statements were put out regarding the tonnage
f ore developed by the former management, for which the pres-
is in nowise responsible, and many unduly inflated estimates
the press since the present management secured control, in
ly official statement given out by the present management,
1911, estimated 9,620,000 tons of porphyry ore developed,
a net recovery of 1.36% copper, 20 cents silver and 40 cents
asmuch as estimates of net recovery are hypothetical, it would
had the management given the actual average assay, instead
estimated recovery. The management, in this statement to
orted the following bodies of porphyry ore: 4,200,000 tons in
th of Butte & Ely, predicated on 13 holes, with overburden of
, and an average of 108′, carrying 15′ to 130′ of commercial ore,
of 79′, ranging 0.81% to 1.38%, with an average of 1.11%
se figures being an estimate for net recovery, and not actual
hich would have been preferable. The Morris ore body, of
is predicated on 16 drill holes, 2 showing no overburden,
burden 30′ to 270′ in depth, with an average of 82′, showing 20′
ercial ore, with an average of 127′, assaying 0.92% to 3.62%,
ore given at 1.7% and at 1.3%. The Bunker Hill ore body is
30,000 tons, with an average of 114′ of capping, and 120′ of ore,
.65% copper. Company also estimates 650,000 tons of 1.61%
e on Old Glory Hill, and 120,000 tons of 3.5% smelting ore in
ne.

number of old and shallow shafts, of little present importance,
ing shafts. The ore bodies, other than the porphyry ores, show
surface, followed by a zone of secondary enrichment to a depth
carrying considerable native copper, in addition to the usual
l secondary sulphides. A site has been surveyed for a 5-com-
n the Rickard-Ely tract, circa 3,300′ northwest of the Giroux
y ores have been developed in the Brooks, Bunker Hill and
d the Alpha shaft has both porphyry and vein ores. The prop-
for nearly a mile in distance by the Giroux, Brooks, Morris and
ts. During 1909 new underground openings were 948′ of rais-
laterals, with 1,032′ of diamond drilling and 27,849′ of churn
for 1910 included 72 churn drill holes, averaging 274′ in depth,
,725′ of holes, costing $34,723.23, an average of $1.76 per foot.
artment Morris shaft, circa 275′ in depth, has a hoist and is
d ore, but has been idle for some time.
artment Brooks shaft, 1,200′ from the Morris, is said to show
s a hoist, but is idle.

The 2-compartment Bunker Hill shaft, the easternmos
about 1,500′ from the company's south line, is circa 500′ i
hoist operating 3-ton self-dumping skips.

The Old Glory shaft, about 1,500′ northeast of the Alph
26′ vein of ore of high-grade smelting grade, and from this sha
run in the direction of the Alpha shaft, shows leached ore.

Miscellaneous shafts of importance include the 300′
Taylor shaft, which is idle, and the two-compartment Pilot K
300′ depth, also idle.

The 1,200′ three-compartment Alpha shaft formerly
working, under the old management, but caved, January, 1908
loss, and rendering the sinking of a new main shaft necessa
about 800′ from the Cumberland-Ely mine, and is connecte
shaft on the 770′ level, and is to be connected on the 1,200
Alpha has been retimbered, and put in as good order as possi
is now only an air-shaft, and an extra exit from the mine. Or
level are mainly leached, but the lower level shows 5 veins, v
The 10th and 12th levels show carbonates, with bunches of cu
able native copper, the Alpha having developed a considerabl
ing ore, of probably 8 to 10% copper tenor. The former ma
210 tons, 1907, to the Garfield smelter, that returned 12.2
The Alpha mine makes about 100,000 gallons of water daily, a
agement foolishly figured on running a concentrator with wat
The Alpha has an electric pump, and the surface plant include
gear, three 150-h. p. boilers, a first-motion double-drum hois
Corliss engine driving a 150-kw. generator.

The 1,400′ vertical Giroux shaft, 700′ west of the Alpha,
two compartments, but, owing to the caving of the Alpha, u
agement, the Giroux has been made the main shaft. The sh
the clear, with 5 compartments, these being a 10x5′ 8″ comp
double-deck cage to handle men and timber, with capacity f
compartments, each 5x5′ 6″, and 2 compartments for pipes and
5x4′ 6″. Timbers are unusually heavy, being 12x14″, with w
and 12x12″ and 14x14″ end-plates. The shaft was sunk th
stone, at the rate of 120′ per month, a record for Nevada s
exclusively by raising, at an average cost of $71.25 per foot.
made very little water while in the limestone, but became
tomed, and is equipped with unusual pumping facilities, havi
gallons and one of 1,200 gallons capacity per minute. The
tion, on the 1,200′ level, is finished with cement, requiring a
material. The 1,200 gallon pump is one of the largest underg
built, and has a 7-ton fly wheel, with a 16″ discharge pipe.
is 40x120′ in size, with sides and ends concreted, having a heig
concrete arch, the concrete averaging 30″ in thickness. The
level is 20x22′, and 11′ high, timbered with 14x14″ creosoted
Giroux shaft, at a depth of 770′, passed through carbonate o
copper, with small gold and silver values, and a drift on this
330′ of iron and lime contact, carrying copper carbonates,
average assay of 5.2% copper, with small gold and silver valu
borings have been made from the bottom of the shaft. Very
has been done from the Giroux shaft, as yet, the task of sinkin
having occupied all available energy, but, judging from res
shaft, the Giroux should open large ore bodies, of high aver

The principal mining equipment is at the Giroux shaf
steel headgear, with two 12′ sheave-wheels. The engine
house are 400′ from the shaft. The engine-house, 47x120′, o

ement floors, has a 26x48" Allis-Chalmers duplex-cylinder hoist
m with 9' face, capable of handling 5-ton skips in counter-
of 2,000', at a hoisting speed of 1,500' per minute. There also is
almers hoist for the cage.
ouse at the Giroux shaft is 53x103', of steel, ironclad, with
d has eight 150-h. p. tubular boilers, with a brick smokestack
in diameter. The matter of using commercial electric power
c Power Co. has been given consideration.
s necessary shops, smithy, and timber framing mill.
vate railway, connecting the principal shafts with the Nevada
s grades averaging about 1.5%. Equipment includes a Porter
ns tractive power, and 75 Ingoldsby ore-cars.
ated at the mine, of wood, stone and concrete, with all machin-
concrete foundations, was completed September, 1907, at a cost
. The mill was planned to handle ore automatically through-
)-ton receiving bins, from which ore goes to a 10x24" crusher,
or and 40" trommel. Equipment includes 6 Frue vanners and
. Power is furnished by 125-h. p. and 200-h. p. Corliss engines,
p. boilers, and the mill is heated by steam and lighted by elec-
was furnished from the Alpha shaft, being pumped into concrete
00 and 110,000 gallons capacity, and thence to eight 8,000-gal-
mill. This mill was run for a short time, beginning Novem-
as then given additional equipment, including a 6' Chilean mill
imed to bring the capacity up to 600 tons daily. Concentrates
age about 30% copper and $6 gold per ton. This mill has not
e the change in management.
-ton smelter was burned December, 1908, never having been in
as a small loss. This was described Vol. VIII. The company
l in the press with planning to erect a 1,000-ton smelter, and is
secured a very advantageous freight rate to the Tooele smelter,
e.
y owns the water rights to Steptoe Creek, about 9 miles from
57' lower, with a static and frictional head of 1,105'. A ditch
er the old management, for a 12" pipeline, of 1,125,000 gallons
pacity, to cost about $250,000. The company also has rights to
vaters of Cleveland Creek, 27 miles distant, said to be capable of
h. p. electrically.
x is to be made a mine of the first magnitude, it will be necessary
the disseminated porphyry ores, but the results to date do not
ly established the possession of ore bodies at all comparable in
with those of the Nevada Consolidated, its great neighbor to
lpha shaft, however, shows some good ore bodies of unusually
de. About 300 men are employed. The present management,
ge January, 1909, is considered good.

EXTENSION COPPER CO. **NEVADA.**

s organized circa 1907, with capitalization $1,000,000, shares $1
e 130 acres, south of and adjoining the Giroux Consolidated
were sold thereto, circa 1910. Very little mining work was
at Ely, White Pine Co., Nev.

K MINING CO. **WASHINGTON.**

lyn, Wash. Letter returned unclaimed from former mine office,
Co., Wash. Organized 1908, as a close corporation, with only
Mine, slightly developed, carries copper ore, and management
a reduction plant.

MINE. **ALASKA.**

llamar Mining Co., at Ellamar, Prince William Sound, Alaska.

GLADSTONE DEVELOPMENT CO.

Office: care of N. J. Morrisey, superintendent, Pick
office: Iron Bridge, Algoma, Ont. Lands, circa 3 miles fro
opened by several shallow shafts showing copper ore. Idle.

GLADSTONE-GREENWATER COPPER DEVELOPMENT CO.

Dead. Formerly at Greenwater, Inyo Co., Cal. Desc

GLADSTONE MINE.

Mine office: Wrightville, Robinson Co., N. S. W., Au
miles south of the Great Cobar mine, supposedly carry the ex
of that property. Development is by a 186′ shaft, on a 6″
copper ore assaying up to 40% in tenor. Idle.

GLADYS MINING CO. **BRIT**

Dead. Formerly at Alberni, Vancouver Island, B. C. D

GLADYS PROPRIETARY GOLD MINES, LTD.

Dead. Formerly at Vencedora, Hidalgo, Chihuahua,
scribed Vol. IX.

GLASDIR COPPER MINES, LTD.

Dead. Was reorganized Oct. 17, 1903, as Glasdir Cop
Ltd. Formerly at Dolgelly, Merionethshire, Wales.

GLASDIR COPPER MINES (1903), LTD.

Dead. Was dissolved March 5, 1909. Formerly at Do
shire, Wales.

GLASGOW & WESTERN EXPLORATION CO., LTD.

Office: 33 Renfield St., Glasgow, Scotland. Operating o
nick Bldg., Salt Lake City, Utah. Mine office: Golconda, H
Geo. McFarlane Reid, chairman; preceding officers, A. P. St
and Ernest S. Coats, directors; D. Macpherson Boyd, secr
mann, general manager; Jos. Farren, mine superintendent.
28, 1896, under laws of Great Britain, with capitalization £6,00
to £30,000, shares £1 par; fully issued. Manages and is the
the Adelaide Star Mines, Ltd.

GLASSFORD CREEK COPPER MINING CO., LTD.

Dead. Formerly at Glassford Creek, Curtis Co., Quee
Fully described Vol. VIII.

GLASSFORD CREEK MINE.

Mine office: Glassford Creek, Curtis Co., Queensland,
Willcocks and Jas. Stewart, owners. Lands, leasehold, incl
mine, discovered 1897, in the Dawes range. Nearest rail poi
miles north. Traction engines were tried for transport, but
of bad roads. Mine was developed opencast, but this syste
1907, for underground workings, by tunnel and a 75′ shaft.
vein of 30′ to 100′ width, with slate foot and granite hanging,
ores.

The reduction plant includes a 300-ton Blake-Marsden cr
tables. The smelter, near the mine, has a small reverberatory
ton 42x72″ rectangular blast-furnace, installed 1906, with a C
making, when in operation, matte of 40 to 45% copper tenor,
ing 0.3%. Production, under old ownership, secured with a
183 men, was 913,366 lbs. fine copper, 13,699 oz. silver and 4,71
and was 787 long tons of ore, yielding 223,200 lbs. fine copper, 3
653 oz. gold in 1907, giving an average extraction of about 2
silver and 2.75 dwts. gold per ton. Production was suspend
and the old company liquidated, property passing into the han
ers, on the basis of their assumption of both assets and liabil
£30,000. Was working, with a force of 15 to 20 men, at last a

INE. MONTANA.
aconda Copper Mining Co., at Butte, Silver Bow Co., Mont.
S COPPER MINING CO. WYOMING.
Encampment, Carbon Co., Wyo. Idle some years and appar-

INING CO. UTAH.
West Seventh South St., Salt Lake City, Utah. Mine office:
ke Co., Utah. Abel Grovenor, president; E. P. Mowers, vice-
eral manager; M. L. Grovenor, secretary and treasurer. Or-
1901, under laws of Utah, with capitalization $30,000, shares 10
ble; fully issued. Lands, 8 claims, one patented, in Big Cot-
6 miles from a railroad, opened by shafts and tunnels, with
orkings.
AMATED COPPER CO. ARIZONA.
nerly at Globe, Gila Co., Ariz. Described Vol. VIII.
A COPPER CO. ARIZONA.
Globe, Gila Co., Ariz. Samuel L. Gibson, manager, at last
, lying southeast of the Old Dominion and Globe Consolidated,
obe, are opened by a 115′ tunnel and 290′ shaft, showing a 5′
ging 6 to 7% copper, with small silver values. Began produc-
nd shipped about 15 tons of ore daily to Old Dominion smelter,
s, employing circa 30 men. Production, 1907, was 57,231
nd 430 oz. silver. Idle several years.
ONA DEVELOPMENT CO. ARIZONA.
ed unclaimed from former mine office, Globe, Gila Co., Ariz.
sident; J. H. Hamill, vice-president; Chas. T. Martin, secre-
Solomon, treasurer. Capitalization $600,000, shares $10 par.
holdings of the United Globe and Arizona Commercial, have a
g a 2′ vein, carrying ore estimated at 12% copper tenor, and a
ng 16% copper ore. Idle several years and presumably mori-

ONA DEVELOPMENT CO. ARIZONA.
ls were sold, 1906, to Superior & Boston Copper Co. For-
Gila Co., Ariz. Described Vol. VI.
NA & EL PASO COPPER MINING ARIZONA.
NG CO.
ed unclaimed from former office, El Paso, Tex. Mine office:
Ariz. David G. Baldwin, president; W. D. Mayfield, secre-
erson, treasurer; John O'Keefe, managing director; preceding
Keefe and M. A. Dolan, directors; H. Vincent Wallace, con-
Organized 1910, with capitalization $3,000,000, shares $1 par.
in 2 groups, 10 miles northwest of Globe, held under bond and
n group of 20 claims, held under bond from the Dixon Copper
m Globe, at the foot of the Sleeping Beauty Mountains. The
laims, is held under bond from Matteo Giacomo. The Dixon
nd 400′ tunnels, showing ore assaying up to 18% copper, in
and quartzite, capped in some places by diabase, and the
veral small iron blowouts. The Dixon has bunkhouses. Was
a small force, early 1911.
N COPPER MINING CO. ARIZONA.
ls were sold, circa 1906, to Globe Consolidated Copper Co.
e, Gila Co., Ariz. Fully described Vol. V.
LIDATED COPPER CO. ARIZONA.
merged, May, 1909, in Cordova Copper Co. Formerly at
Ariz. Fully described Vol. VIII.

GLOBE COPPER CO.

Dead. Formerly at Ely, White Pine Co., Nev.

GLOBE COPPER MINING CO.

Dead. Property was sold to Old Dominion Mining & merly at Globe, Gila Co., Ariz.

GLOBE COPPER MINING CO.

Dead. Formerly at Hecla, Laramie Co., Wyo. Descri

GLOBE & LOST GULCH SILVER-COPPER MINES CO

Office: 21-1928 Grant Ave., Denver, Colo. Mine offi Gila Co., Ariz. M. E. Brooke, president; John A. Myrberg, superintendent; H. A. Wimbush, secretary and treasurer. 1907, under laws of Arizona, with capitalization $1,000,000, assessable. Lands, 10 claims, in process of patenting, are millsite, at the head of Lost Gulch, northwest of Globe, show ite and limestone, cut by porphyritic dikes. Mine, but shows auriferous and argentiferous lead and copper ores.

GLOBE MINE.

Office: care of John R. Stanton, general manager, 15 Will N. Y. Mine office: Painesdale, Houghton Co., Mich. Th intendent. Lands, 3,200 acres, being Sections 1, 2, 3, 4 and 5, extending entirely across the Keweenawan trap formation, the western sandstone. Property lies next south of the Chan ately north of the Challenge, carrying about 6,000′ of the and all parallel beds. Mine was developed by the Copper R Co, under option, but option was relinquished, Feb. 1, 1909, ture of upwards of $500,000.

Diamond drill borings, to locate the Baltic bed, gave son lent values, but disclosed a heavy overburden of sand and bo necessary to reach the solid rock by a vertical shaft. Wor 1905, but the first shaft was abandoned, owing to quicksand by a new vertical shaft, about 700′ south of the Champion bou is telescopic, inside measurements of timbers at the collar bein a second section below of 9x19′ 6″, and a third section of still drop-shaft was started October, 1905, and reached the rock depth of 228′, after 19 months of extremely difficult and trying months being required to get the shaft into the ledge, and making a total of nearly two years for the work, which was m concerned, this being the deepest sand-shaft ever sunk. The weight to 150′ depth, and for the balance of the distance of 7 by hydraulic jacks, with the aid of 64 steel shoes, each bui having an opening of one square inch, with water supplied und lbs. Weight of the shoes was 37,000 lbs., and they were p hydraulic jacks, each exerting a pressure of 100 tons. The sh ing 800 gallons of water per minute, and there was much troub while the terrific pressure of the hydraulic jacks caused occ buckling the framing of the shaft.

The shaft is 1,040′ deep, with first level 356′ below surfa cut thereafter at 100′ intervals. The Baltic amygdaloidal some diamond drill boring, and about 900′ of drifting on the s is about 1,000′ from surface, and showed a little copper, in p whole was unpayable, and work was suspended Jan. 31, 1909, been idle since. Notwithstanding the unfavorable results s done so far, the property is by no means devoid of promise.

GLOBE MINES EXPLORATION CO.

Dead. Former office was 504 Phœnix Bldg., Butte, Mo Dr. T. B. Moore, president; C. S. Jackman, vice-presiden

surer; D. C. Bard, manager; preceding officers, A. L. Yongley, Bert Hawley and Dr. G. E. Blackburn, directors. Organized ıccessor of Western Exploration Co., which was formed the th capitalization $500,000, shares $100 par. Company held te & Yerington Copper Co., and Butte & Ely Copper Co. White Pine Co., Nev.

G CO. **ARIZONA.**

Schiller Bldg., Chicago, Ills. Mine office: Globe, Gila Co., Hechtman, president and general manager; M. A. Patterson, Walter M. DeKalb, secretary; Geo. L. Beach, treasurer; pre- B. Walker, L. E. West and R. A. Jamison, directors. Organ-, under laws of Arizona, with capitalization $2,500,000, shares

ims, patented, area 335 acres, circa 2½ miles north of Globe. ite-porphyry, syenite, quartzite and diorite, carrying fissure 2′ to 100′ width, with gossans giving assays of 2 to 6% copper, and $2 to $28 gold per ton. The Mineral Farm group of 21 al, includes the Vacey-Constance mine, worked circa 1886 for have produced upwards of $100,000 worth of ore under former roup having upwards of 20 old pits and shafts, of 10′ to 165′ eral Farm group shows altered sedimentary and igneous rocks, and a complex fissure system. The Mineral Farm vein, of ives assays of 4.8% copper and up to 132 oz. silver and $7.44 the group also shows a 20′ vein, said to sample 22% copper, 9% nd $4.96 gold per ton, which seems excessive. The Eagle Pass two-compartment shaft, between two iron outcrops. ncludes a 60-h. p. boiler, 8x10″ hoist and an air-compressor. buildings.

optioned, circa May, 1910, to W. A. Canode, until Jan. 1, 1911, rently with $10,000 paid, the option calling for the expenditure 00 on development, and the organization of a new company, to new stock for 4 shares of Globe stock. Idle since circa 1907.

O MINING CO. **ARIZONA.**

nerly at Globe, Gila Co., Ariz. Described Vol. VIII.

ARD MINING CO. **ARIZONA.**

nerly at Globe, Gila Co., Ariz. Described Vol. VIII.

DE COPPER CO. **ARIZONA.**

nerly at Globe, Gila Co., Ariz. Described Vol. VIII.

RN COPPER CO. **ARIZONA.**

lands, 1908. Formerly at Globe, Gila Co., Ariz. Fully de-

FIELDS MINING CO. **ARIZONA.**

nerly at Globe, Gila Co., Ariz. Described Vol. VIII.

NERA GLORIA DEL INCA. **CHILE.**

que, Chile. Mine offices: Chañaral, Atacama, Chile, and a, Chile. Organized Oct. 25, 1906, under laws of Chile, with ,000, later increased to £30,000. Property is 3 groups of mines, lel Inca district, and one in the Mineral del Chivato district. group, 8 claims, 12 kilometers from the station of San Pedro hañaral railway, at an elevation of 2,000 meters above sea-level, with andesite dikes, developed by the Fortuna tunnel, driven and carries 2 practically parallel veins, known as the Fortuna tter being crossed by the Crucero vein. The Tres Puntas e Dos Hermanos mine and the Sierra del Chivato group, of 3 h of Estación Angostura, on the Chañaral railway.

GLORISO GOLD & COPPER MINING CO.

Office: Phœnix, Ariz. Mine office: Wendendale, Yu
Court, president and general manager. Lands, 11 claims,
the Cunningham Pass Copper Mining Co., on the northv
Harcúvar Mountains, 9 miles from Wendendale. Mine sho
ore, carrying small copper values, and estimated to carry $7
Equipment includes a hoist, and a 50-ton mill having a 10′ I
gamating plates, Frue vanners and Deister tables. A 3,00
20,000-gallon tank and 40,000-gallon reservoir, at the mill.

GEWERKSCHAFT VEREIN GLÜCKAUF-NEVIGES.

Mine office: Neviges, Rheinprovinz, Prussia, Germa
L. Kannengeiser, G. Engels, Herman Heymann and Herr
Julius Leverkus, manager. Organized under laws of Germ
tion 1,000 shares, without assigned value.

Lands include mines carrying lead and copper ores, Velb
rail point. Mines have 2 shafts, and produce circa 17,00
yearly, with values mainly in lead. The mines have a sma
employ about 70 men.

GOAT CREEK MINING CO.

Mine office: Methow, Okanogan Co., Wash. Ores c
copper. Idle several years and apparently moribund.

GODIVA MINING CO.

Office: 325 Brooks Arcade, Salt Lake City, Utah. M
Juab Co., Utah. Edw. Packard, vice-president and gene
Berkley, secretary; L. S. Hills, treasurer; Jackson H. McC
ent; preceding officers and Robt. Harkness, directors.
increased, 1908, from $100,000 to $1,000,000, shares $1 pa
Gemini Mining Co., and is operated as close corporation, sup
considerable dividends, but figures are not made public. Sh
Salt Lake stock exchange. The mine is one of the pioneers
and once was a considerable producer. Production, 1907, w
ore. Mine, carrying auriferous and argentiferous copper
shaft of circa 1,000′ depth, with steam power. Presumabl

GODIVA-SIOUX MOUNTAIN MINING CO.

Office and mine: Eureka, Juab Co., Utah. B. N. C.
general manager; Hon. C. S. Tingey, vice-president; E.
Heber M. Wells, treasurer. Organized March 4, 1901, unde
capitalization $150,000, shares 15 cents par, nonassessabl
Lands, 35 acres, patented, adjoining the Plutus mine, sho
having auriferous and argentiferous lead and copper ores,
centages of copper, circa 20% lead, up to 40 oz. silver, and $
Development is by the 550′ Smuggler tunnel. Idle since

GOLCONDA CONSOLIDATED CO., LTD.

Dead. Title was changed, February, 1909, to Silverfiel
Formerly at Golconda, Humboldt Co., Nev. Described V

GOLCONDA-NEVADA COPPER CO.

Mine office: Golconda, Humboldt Co., Nev. J. H. I
ent, at last accounts. Property is the Etchert & Gomes
and a two-thirds interest in the Honolulu group, balance of w
Silverfields Mining Co., Ltd. The Honolulu group has a s
shaft and several opencuts.

GOLD ANCHOR MINING CO.

Mine office: Alice, Clear Creek Co., Colo. Thos. I. Sla
carry gold, silver and copper. Has gasoline power. Idle.

GEWERKSCHAFT GOLDBACH.

Office: Oberrossbach, Nassau, Germany. Mine offi

Germany. Ernst Giebeler, general manager; Herr Bluner, Organized 1898, under laws of Prussia, with capitalization 100 signed value. Mine, near Haiger, developed by tunnels, has of workings, on a 30″ vein carrying chalcopyrite giving assays er. Property is for sale.

INING CO. COLORADO.

erly at Montrose, Montrose Co., Colo. Described Vol. VIII.

VELOPMENT & REDUCTION CO. ARIZONA.

ne: Morenci, Graham Co., Ariz. J. Bachstein, president and Andress, vice-president; J. F. Nicholls, secretary and treas- superintendent; preceding officers, A. A. Anderson and Geo. rs; Paul G. Wuerschund, mill superintendent. Organized ona, with capitalization $750,000.

ms, circa 4 miles northwest of Morenci. Mine has 8 shafts, 265′, and a tunnel, latter showing a 3′ vein of carbonate ore, copper. Mine also has chrysocolla, associated with pyro- nal malachite and chalcocite, and some sphalerite. Principal and the mine is said to have a 6′ ore body, averaging $20 gold 0′ level, which figure is considered too high. Mine shipped 08, to the Shannon smelter, and is said to have 15,000 tons of

cludes a 15-h. p. Fairbanks & Morse gasoline hoist, and a e since June, 1910.

NING CO. MONTANA.

rly at Empire, Lewis & Clark Co., Mont. Described Vol. VIII.

INING & MILLING CO. UTAH.

atimer Bldg., Salt Lake City, Utah. Mine office: Tooele, Mark Stanley, president; H. J. Jones, vice-president; Wm. and treasurer. Organized 1898, under laws of Utah, with 000, shares 5 cents par, assessable; has levied 9 assessments. patented, 4 miles from a railroad, having a shallow shaft and about 300′ of workings, showing gold, silver and copper ores.

SOLIDATED MINING CO. WASHINGTON.

erly at Bossburg, Stevens Co., Wash.

INING CO. UTAH.

Dooly Bldg., Salt Lake City, Utah. Mine office: Robinson, Col. C. Edw. Loose, general manager. Company absorbed, he Ajax Mining Co., giving share for share. The Ajax was upwards of $1,000,000 in dividends, last having been paid

e has an 1,100′ main shaft, and produced ore averaging circa silver and $7 gold per ton, production, 1907, having been 123 rying circa 150,000 lbs. fine copper. The Gold Chain Group, rous and auriferous copper and lead ores, has considerable ne Gold Chain is connected with the Opohongo on the 300′ go ore is to be extracted through this shaft. Equipment pressor. Production, September, 1910, was at rate of circa 5 ekly.

NING CO. WYOMING.

Sundance, Crook Co., Wyo. Wm. McMillan, general man- claims, in the Kirwin district, carrying several veins of ore s in copper, gold and silver. Development work was in counts, early 1910.

R CO. OF BINGHAM. UTAH.

ucceeded, 1901, by Bingham Consolidated Mining & Smelting Bingham Canyon, Salt Lake Co., Utah.

GOLD & COPPER CONSOLIDATED MINING & MILLI

Dead. Was a bad egg. Was succeeded, 1907, by Ha Formerly at Groom Creek, Yavapai Co., Ariz. Fully de

GOLD & COPPER CROWN MINING CO.

Mine office: Needles, San Bernardino Co., Cal. E. J. E. Walford, secretary; H. A. Norton, treasurer. Lands, rise Mountains, 10 miles south of Needles, showing fissure outcrops. Development, at depth of 60′ shows a wide vei up to 60% copper, a mill test giving returns of 18.3% copp

GOLD & COPPER DEEP TUNNEL MINING & MILLING CO.

Office: Beaver Falls, Pa. Mine office: Elizabethtov A. T. McIntyre, president; Jas. E. Glasson, vice-president retary and treasurer; W. P. McIntyre, superintendent; p G. J. Kamerer, directors. Organized Oct. 10, 1900, under with capitalization $200,000, shares $1 par, nonassessabl Annual meeting, third Tuesday in July.

Lands, 12 claims, area 110 acres, and a 2½-acre mil slope of Baldy Mountain, in the Moreno district, 3 miles fr ing 8 ore bodies, between slate and quartzite. Mine has 2 2,300′ crosscut tunnel, planned to penetrate the mountain 3,500′, cutting 2 bodies of low grade copper ore. Equipme gasoline air-compressor, and 10 buildings. The 20-ton lumber and logs, has a 5′ Huntington mill and gravity stan

GOLD & COPPER FIELDS SYNDICATE, LTD.

Dead. Formerly at Byng, Bathurst Co., N. S. W., A Vol. III.

GOLD-COPPER MINING CO.

Dead. Lands were sold, circa 1909, to Aztec Mine Prescott, Yavapai Co., Ariz. Described Vol. VIII.

GOLD-COPPER MINING CO.

Letter returned unclaimed from former office, Rocklin Lincoln, Placer Co., Cal. Capitalization $1,000,000, shares acres, supposedly carrying the extension of the Dairy Far developed by shaft. Idle several years.

GOLD & COPPER MINING CO.

Dead. Formerly at Rociada, San Miguel Co., N. M.

GOLD-COPPER MINING & DEVELOPMENT CO.

Dead. Formerly at Deadwood, Lawrence Co., S. D.

GOLD CRAG MINING CO.

Letter returned unclaimed from former mine office, S Mont. Reuben J. Fuller, president and general manager; intendent, at last accounts. Mine, at the head of Cedar C line, has an 1,100′ tunnel, cutting a 5′ vein carrying aurifero chalcopyrite, of good assay value, with quartz gangue. Id

GOLD CROSS MINING & MILLING CO.

Dead. Formerly at Pitkin, Gunnison Co., Colo. De

GOLD CROWN MINING CO., LTD.

Office: Wallace, Idaho. Mine office: St. Regis, M A. A. Mayo, president; L. P. Wolfe, secretary. Capita shares $1 par. Lands, 5 claims, 7 miles from a railroad, sho 15′ width, with quartzite footwall, carrying ore giving ass silver and gold. Development is by 125′ and 500′ tunnels

GOLDEN BELL MINING CO.

Mine office: Kelvin, Pinal Co., Ariz. L. W. St. Cha H. Sarrick, vice-president and general manager; G. L. Sarri

urer. Organized circa 1910, with capitalization $1,000,000.
ear the Southern Pacific railway, circa 5 miles west of Kelvin,
s copper ore. Presumably idle.

MINING CO. **NEW MEXICO.**

Hachita, Grant Co., N. M. W. H. Hare, president; W. T.
dent; Fred E. Emery, secretary and treasurer. Mine has sev-
s of 10′ to 85′ depth, showing a vein claimed to give average
per and 20% lead, with gold and silver values. Idle.

Y CONSOLIDATED MINING CO. **MONTANA.**

Elkhorn, Jefferson Co., Mont. John Rothfus, superintendent,
Mine carries auriferous copper ore, with values mainly in gold.
es a hydro-electric power installation, crushing rolls and a 100-

RT MINING & MILLING CO. **ARIZONA.**

erly at Quartzite, Yuma Co., Nev.

E COPPER CO. **CALIFORNIA.**

ona, Cal. Mine office: Cima, San Bernardino Co., Cal. Prop-
Keiser mine, near Cima, having auriferous and argentiferous
ng up to $200 per ton, with values mainly in silver. Pre-

E GOLD MINING CO. **CALIFORNIA.**

rst St., Portland, Ore. Letter returned unclaimed from former
y, Shasta Co., Cal. R. J. Jennings, president and general
Martin, vice-president; Jas. E. Isaacs, secretary; C. C. Bush,
ceding officers, A. Newlands and I. Theodore Jennings, direct-
nder laws of Arizona, with capitalization $1,000,000, shares

ns, area 160 acres, held under bond and lease expiring 1910,
stone group, on the eastern side of the Sacramento River, circa
of the Iron Mountain mine. Property, developed by tunnel,
old-bearing quartz veins, of 2′ to 20′ width, assaying $5 to $20
copper vein, claimed to be 6′ to 50′ wide and traceable 2,200′,
o 22% copper tenor, with $1.50 to $7.80 gold per ton, which
ered excessive. Idle and presumably moribund.

MINING CO. **WYOMING.**

erly at Rambler, Carbon Co., Wyo.

MINING & DEVELOPMENT CO. **WASHINGTON.**

erly at Cle Elum, Kittitas Co., Wash. Described Vol. VIII.

MINING CO. **UTAH.**

East Sixth South St., Salt Lake City, Utah. Mine office:
ake Co., Utah. Leonard Hilpert, president; C. L. Vesely,
L. Palmquist, secretary and treasurer. Organized Nov. 20,
of Utah, with capitalization $500,000, shares 50 cents par, in
ssessable treasury stock and $375,000 of assessable stock.
, unpatented, 9 miles from a railroad, in Big Cottonwood
by tunnels and shafts, having about 1,500′ of workings, show-
d argentiferous copper ore.

GUERITE SILVER & COPPER MINING CO. **IDAHO.**

erly at Mullan, Shoshone Co., Idaho. Described Vol. VIII.

MINES, LTD. **NORWAY.**

liquidated, voluntarily, October, 1903. Formerly at Lyngen-
rway. Described Vol. III.

N MINING CO. **IDAHO.**

ed unclaimed from former mine office, Osburn, Shoshone Co.,
P. Fairweather, manager, at last accounts. Lands, located

circa 1890, on Terror Creek, near Osburn, include the Blue
ing copper and gold ores. Idle.

GOLDEN RULE COPPER MINING & SMELTING CO

Dead. Was a swindle. Formerly at Vail, Pima C
scribed Vol. VI.

GOLDEN SHOWER COPPER CO.

Dead. Formerly at Tucson, Pima Co., Ariz. Desc

GOLDEN SMELTER.

Owned by North American Smelter & Mines Co., at G
Colo.

GOLDEN SOVEREIGN MINE. BR

Mine office: Aspen Grove, Cariboo district, B. C.
1887, has a 100′ shaft, said to give a strong showing of nat
some work was done, 1905. Presumably idle.

GOLDEN STAR MINING CO.

Dead. Formerly at Doniphan, Blaine Co., Idaho.

GOLDEN STATES MINES, LTD.

Office: 20 Lawrence Lane, London, E. C., Eng. Mi
Cochise Co., Ariz. Chas. F. Branton, chairman; George T
Organized June 25, 1897, as reconstruction of Geldfont
Mining Co., Ltd., with capitalization £100,000, shares 5s. p
Lands, 120 acres, with questionable title, on Copper Cre
Mountains. Has a small smelter. Idle some years, and

GOLDEN SUN MINING & MILLING CO.

Office: 203 Kittredge Bldg., Denver, Colo. Mine offi
Co., Colo. W. A. Jordan, president; Edgar T. Butler,
and general manager. Mine carries auriferous and argen
and is equipped with a steam plant and air-compressor.
mill, costing $15,000, and, at last accounts, 1910, the com
ning production.

GOLDFIELD-ANACONDA COPPER CO.

Office: Goldfield, Nev. Mine office: Lida, Esmer
O. P. Posey, president; W. F. Mitchell, vice-president a
Mitchell, secretary. Organized under laws of Arizona,
$1,000,000, shares $1 par, nonassessable. Lands, 9 claims,
gold and copper ore, developed by several shallow shafts.

GOLDFIELD COPPER-GOLD MINING CO.

Dead. Formerly at Hawthorne, Esmeralda Co., Nev.

GOLDFIELD COPPEROPOLIS MINING CO.

Office: 1130-11 Broadway, New York, N. Y. Letter
from former mine office, P. O. Box 198, Goldfield, Esmeral
McLisle, president; R. Tidwell, vice-president; H. C. Ham
Marshall, treasurer; preceding officers, G. H. Phillips and G.
Organized under laws of Arizona, with capitalization $1,000
Lands, 6 claims, known as the Comstock group, at Cop
of Lone Mountain, and 3 claims at Phillipsburg, circa 20
Goldfield, showing an outcrop carrying argentiferous coppe
lead ore, opened by a 250′ tunnel. Idle, out of cash and n

GOLDFIELD ELY FAIRVIEW WONDER MINING CO.

Dead. Was a stockjobbing scheme. Formerly at Ely, V

GOLD FLINT MINING CO.

Dead. Was succeeded, circa 1907, by Lion Gulch
Formerly at Homestake, Jefferson Co., Mont.

GOLD HILL CONSOLIDATED CO. NC

Office: 1 Wall St., New York, N. Y. Mine office:
Co., N. C. Walter George Newman, president; C. A. Smit

r. Organized circa 1910, as successor of Gold Hill Copper Co., anagement, which became bankrupt, and property was sold at 1910, for $45,000. It was claimed, in the press, June, 1910, ent of this company had practically completed arrangements capital of between $50,000 and $125,000.
cres, in Rowan and Stanley counties, well watered and timbered d Hill mine, where gold was discovered A. D. 1799. Auriferous were discovered 1831, and circa 1845 this mine was the largest in the United States. Development is by shafts of 105′, 150′, imated formerly to show ore reserves of 60,000 tons, carrying r, and 60 cents to $1.60 gold per ton, which figures are too high. shipped, 1908, to the Perth Amboy smelter, returned 1.5% 30 gold per ton, with small silver values. Equipment includes rs and a 10-stamp mill.
y and its predecessors have enjoyed decidedly checkered ons were conducted on a considerable scale, 1901–1903, mine 250 men, but financial difficulties resulted, 1903, in a receiver- 1906, but a receiver was again appointed, August, 1906, for on the application of Walter George Newman, the former ns aggregating circa $352,000. Mr. Newman apparently has solely for stockjobbing purposes. The property is considered ately and honestly financed and well managed, but the com- with suspicion, owing to its extremely bad antecedents.

PPER CO. NORTH CAROLINA.
sold by receiver Jan. 27, 1909, for $45,000 to Wm. H. Ger- Van Wagenen. Formerly at Gold Hill, Rowan Co., N. C. ol. VIII.

ARTZ MINING CO. OREGON.
Fifth Ave., New York, N. Y. Mine office: Gold Hill, Jackson Ray, superintendent, at last accounts. Property includes the nd Elk Creek mines, having argentiferous and auriferous cop- Has steam power and a 10-stamp mill. Presumably idle.

MINING CO. IDAHO.
ed unclaimed from former office, St. Paul, Minn. Mine office: Co., Idaho. Dennis Ryan, general manager. The mine, nter, or Gold Hunter, discovered 1885, about 1 mile east of ome copper ore, but values are mainly in lead and silver. y several tunnels, longest 4,380′, cutting a silver-lead vein with Management plans a 2-mile tunnel, utilizing the old 2,000′ l Mining Co. Equipment includes steam power, and manage- 10, installing a $7,000 electric hoist. There are necessary mine 250-ton mill. Mine employed about 100 men, August, 1910, at the rate of about 600 tons monthly.

TH MINING CO. CALIFORNIA.
ner office was Los Angeles, Cal. Officers were T. Piacentini, asurer; M. Osborn, vice-president; Walter X. Osborn, secre- manager. Capitalization was $1,000,000. Company had f Needles, Vanderbilt, Harroun and Ivanpah, San Bernardino rly at Needles, San Bernardino Co., Cal.

ONSOLIDATED MINES CO. COLORADO.
succeeded by New Gold King Mines. Formerly at Silverton, olo. Described Vol. VIII.

INES CO. COLORADO.
Red Mountain, Ouray Co., Colo. H. Y. Russell, superintend- nts. The mine has auriferous and argentiferous ores of lead s equipped with steam power.

GOLD MINING CO.

Mine office: Silverton, San Juan Co., Colo. E. C. C. Scott, superintendent, at last accounts. Property in Ariadne mines, carrying auriferous and argentiferous cop includes a water power plant and a small Leyner air-comp

GOLD MOUNTAIN MINING CO.

Mine office: Berlin, King Co., Wash. F. Karl, sup 18 claims, well watered and timbered, on Money Creek, 2,200′ aggregate length, showing antimonial gold-copper mainly in antimony. Has hydro-electric power and plann plant, which apparently failed to materialize. Presumably

GOLD QUARTZ MINING CO.

Office: 33 Hirbour Bldg., Butte, Mont. Letter retu former mine office, Bullion, Elko Co., Nev. W. W. McDo has given ores assaying up to 10.2% copper. Idle and p

GOLD QUEEN MINING CO.

Office: 408-40 Dearborn St., Chicago, Ills. Mine offic Co., Colo. C. Kirchner, president; A. J. Stark, superint tion $100,000. Lands, 13 claims, on Baron Mountain, district. Mine has several tunnels, longest 500′, with 900′ ing a strong vein carrying auriferous and argentiferous co made small shipments in the past, and has secured assays c bined copper, silver and gold values. The president pre daily production of 50 tons of ore, with daily net earnings were given a 10-stamp mill.

GOLD RIDGE MINING CO.

Dead. Former office was Jacobs Bldg., Fairmont. Davis was manager. Company was closely allied with Mining Co., and was merged therewith, July 30, 1910, i Consolidated Mining & Milling Co. of Idaho. Formerl Kootenai Co., Idaho.

GOLD ROSE MINING & MILLING CO.

Dead. Formerly at Helena, Lewis & Clark Co., Mont.

GOLDSMITH COPPER CO., LTD. BR

Dead. Formerly at Howe Sound, New Westminster d

GOLDSMITH MINING CO.

Dead. Formerly at Butte, Silver Bow Co., Mont.

GOLD STAR MINING CO.

Office: 2107 E. Madison St., Seattle, Wash. Letter from former mine office, Index, Snohomish Co., Wash. Ad John Edmond Praul, secretary, treasurer and general m 1903, under laws of Washington, with capitalization $1,00 Lands, 6 claims, area 120 acres, well timbered, in the In from the Great Northern railway, showing a 6′ fissure ve assays of 7% copper and $1.20 gold per ton, from bornite, from an oxidized quartz capping. Idle and apparently m

GOLD TUNNEL & RAILWAY CO.

Mine office: Howardsville, San Juan Co., Colo. Jas. Ora Kirk, superintendent. Mine has ore yielding up to $1 lead and silver values, and has water power.

GOLETA CONSOLIDATED MINES.

Dead. Formerly at Jordan, Mono Co., Cal. Descri

GOLINSKY MINING CO.

Mine office: Kennett, Shasta Co., Cal. Chas. Hartm Company supposedly is controlled by the Guggenheim i claims, adjoining the Mammoth on the east, 4 miles west

oot of about 30′ width, carrying auriferous copper ore of fair hipped, circa 1907–1908, about 2,500 tons of ore, to the Gars electric power. Presumably idle.

ONZALEZ. CHILE.
ks: Labrar, Freirina, Atacama, Chile. Property is a matting urning out the equivalent of 1,250,000 lbs. fine copper yearly.

OLD & COPPER MINING & WASHINGTON.
ENT CO.
a, Ore. Mine office: Index, Snohomish Co., Wash. H. A. Capt. J. F. Boon, vice-president; F. P. Hallinan, secretary eceding officers, H. L. Bent, Gustave Friewald and Fred R. ors; Wm. J. Walters, general manager. Organized under n, with capitalization $1,000,000, shares $1 par. Lands, 10 opencut and 6 tunnels, with about 1,000′ of workings, claimed ns of ore, assaying circa 2% copper and 12% lead, with fair ues. Shipped some ore, 1910, to the Tacoma smelter.

INING & REDUCTION CO. COLORADO.
orte, Colo. Mine office: Vulcan, Saguache Co., Colo. Has gentiferous copper ores. Idle some years.

MINING & MILLING CO. MÉXICO.
succeeded by Sonora Development Co. Formerly at Moctex. Described Vol. VI.

OPRIETARY. AUSTRALIA.
Yeoval, Gordon Co., N. S. W., Australia. F. Pearce, manager, Mine, circa 5 miles from Yeoval, known, at various times in Buckenbar, Gordon and Yeoval, was opened 1868, and first ut gold being succeeded, at depth of only 30′, by chalcopyrite, worked as a copper mine for several years, and had a smelter, ced about 225,000 lbs. fine copper and 130 oz. gold per month. s worked again for gold only, and, circa 1886, had a 20-stamp as reopened 1898, and taken over, 1903, by the present

a quartz vein in granite, of 4′ to 8′ width, carrying a little gnetite near surface, succeeded by auriferous and argentiferous ciated with magnetite, and also has a pipe-vein, about 300′ ng ore assaying up to 18% copper and 4 oz. gold per long ton. y a large open pit, and a 300′ shaft. Underground workings trouble in the past from caving. Mine is said to have about ongly auriferous copper ore in sight. Presumably idle.

. ALASKA.
Kasaan, Alaska. Mine, on the Kasaan Peninsula, said to have opment, carries auriferous copper ore. Shipments were begun d about 3,000 tons of ore were shipped during 1910, and proed at 250,000 lbs. fine copper. Idle at end of 1910, but planned spring of 1911.

CONSOLIDATED MINING & SMELTING CO. NEVADA.
nerly at Goodsprings, Clark Co., Nev. Described Vol. VIII.

SMELTING & DEVELOPMENT CO. NEVADA.
nerly at Goodsprings, Clark Co., Nev. Described Vol. VI.

E COPPER MINING CO. NEW HAMPSHIRE.
nerly at Woodsville, Grafton Co., N. H.

MINING & MILLING CO. WYOMING.
nerly at Hecla, Laramie Co., Wyo.

OR COPPER CO. VIRGINIA.
ine: Front Royal, Warren Co., Va. Hugh E. Naylor, presi-

dent and general manager; R. B. Murphy, vice-president; tary; W. P. King, treasurer; A. J. Sager, superintendent an ized July 12, 1909, under laws of Virginia, with capitalizat $100 par; issued, $30,100. Property apparently is held $3,000, due July, 1911. Annual meeting, first Monday in J

Lands, 84 acres, 5 miles south of Front Royal, reporte vein in porphyry, and contact deposits between limestone generally northeast and southwest strike and dip of about 5 is reported to average 7′ width, and to be traceable 800′, ca chite near surface, with chalcopyrite at depth, giving retu test, of 5.08% copper and 1.36 oz. silver per ton. Ore bo lenticular. Development is by a 45′ opencut, and by shaf without laterals, estimated by company to show 100,000 tons excessive. Equipment includes a 15-h. p. steam plant, with for 800′ depth, and a 1-drill Rand air-compressor. Buildin engine-house, tool-house and dwelling. Company planned body for about 1,000′ in length, and installing a larger hoist Presumably idle.

GOOSE LAKE COPPER CO.

Dead. Formerly at Cooke, Park Co., Mont. Describ

DEUTSCH SÜDWESTAFRIKANISCHE KUPFERMINENGESELLSCHAFT "GOROB."

GERMAN SOU

Office: Berlin, Germany. Mine office: Gorob, Germa Max Schöller, chairman; preceding officer, Max Müller, He Walther, Herr Steinweg, Herr Mohr, Albert Weil and Otto Herr Huser and Herr Etting, mine managers. Organized many, with capitalization 400,000 marks, shares 100 marks consists of one shaft, of circa 50 meters depth.

GOTHIC MILLING, MINING & POWER CO.

Dead. Formerly at Crested Butte, Gunnison Co., Colo.

GOULAIS BAY MINING CO.

Dead. Formerly at Sault Ste. Marie, Algoma, Ont. D

GOULBURN COPPER DEVELOPMENT CO.

Mine office: Breadalbane, Argyle Co., N. S.W., Australi an iron ore body, apparently of promise, on which very li done. Idle.

GOULD COPPER MINING CO.

Mine office: Tucson, Pima Co., Ariz. S. H. Gould, pre manager; C. E. Hutchison, vice-president; W. H. Daily, sec Whitmore, treasurer. Capitalization $1,000,000, shares $1

Lands, 19 claims, in the Tucson Mountains, 18 miles w nearest rail point. Lands carry about 1 mile of the EW. zone of circa 2,000′ width and 5 miles length. Country ro granite and quartzite, the mineral zone carrying a vein of ab ing chalcopyrite, with quartz gangue, said to average about silver and $1.50 gold per ton. Mine has shafts of 50′, 125′ an tunnels, and was claimed, in the press, early 1910, to have tons of ore in sight.

Equipment includes a gasoline hoist and air-compress mine buildings. Plans were made for a 125-ton smelter, to d business, and apparently part of equipment is on the ground 45,036 lbs. fine copper in 1907. Property considered prom

GOULD ISLAND MINE.

Office and mine: Sulzer, Prince of Wales Island, Alas owner and manager. Lands, 1 claim, area 20 acres, showi

ornblende-schist and limestone, up to 40′ in width, giving assays per, 1 to 20% lead, 3% zinc, 1 oz. silver and $4 gold per ton, from lena and sphalerite. Development is by tunnels of 60′ and 70′.

NG CO. **WYOMING.**

merly at Centennial, Albany Co., Wyo. Described Vol. VII.

REENWATER COPPER CO. **CALIFORNIA.**

npany was controlled, through ownership of entire stock issue, Copper Mines & Smelters Co. Very little mining work was at Greenwater, Inyo Co., Cal.

INING CO. **UTAH.**

vo, Utah. Mine office: Eureka, Juab Co., Utah. Jesse Knight, n. Knight, vice-president; R. E. Allen, secretary and treasurer. as a reconstruction, under laws of Utah, with capitalization 10 cents par, assessable; fully issued. Lands, 10 claims, pat- th and west of the Iron Blossom, apparently with fair chances xtension of the Iron Blossom ore bodies. Idle since 1908.

S SYNDICATE, LTD. **COLORADO.**

Fenchurch St., London, E. C., Eng. Mine office: Blackhawk, d. Described Vol. VIII.

PPER MINING CO. **YUKON.**

White Horse, Yukon, Canada. Robt. Lowe, president and ; Fred Whitman, superintendent. Lands, one claim, crown- acres, one mile north of the Arctic Chief. Mine has a 7-mile he terminus of the White Pass & Yukon railway. Property f narrow alternating bands of limestone and diorite, consider- h some aplitic cross-dikes, showing malachite and azurite, with aringly, associated with some magnetite, succeeded, at little te and chalcopyrite, estimated by the Dominion government rry 8% copper and $3 gold per ton, in a garnet-augite-tremolite opened 1900, but idle until 1907, has a shaft of about 90′ depth, t 50′, having 150′ of workings, including some stopes nearly to hipped, 1905, circa 450 tons of ore, of 19 to 30% copper tenor, h Columbia smelters, and, for several months, 1907, shipped 25 to the Tyee smelter. Equipment includes steam power, and the s about 20 men. Production, 1907, was circa 1,500 tons of ore, e yielded 650,000 lbs. fine copper.

PPER MINING CO., LTD. **AUSTRALIA.**

nce St., Grafton, N. S. W., Australia. Mine office: Cangai, W., Australia. Samuel See, chairman; Peter Kritsch, manag- ceding officers, Wm. Zietsch and Geo. Henry Varley, directors; ecretary; Wm. Jas. Mulligan, manager; Jas. Newton, under- ; Wm. Hughes, smelter foreman; Geo. H. Blakemore, consult- rganized Jan. 29, 1906, under laws of New South Wales, with 30,000, shares £1 par, fully issued and fully paid. Dividends 1907; £4,000 in 1909, and £5,000 in 1910, a total of £20,000. re £6,080 in 1909. Shares are listed on the Sydney stock ex- l meeting, last Tuesday in January.

ims, leasehold, area 160 acres, and a 10-acre mill and smelter-site, ck-tram to Copmanhurst, with water transportation from that carries 4 fissure veins, in tuffaceous felsites, of which 3, under e estimated by management to average 10′ width and 400′ in The main vein has an ore channel, with nearly vertical dip, 1′ to 13′ wide, of chalcopyrite, with a little malachite and azur- workings, ore as mined averaging about 10% copper, 0.58 oz. ains gold per long ton. The South Lode, of 3′ to 10′ average p to 6′ of massive chalcopyrite. The mine, opened 1905, has

several shallow shafts, but development is mainly by tunne
800′; "B," of 600′; "C," of 300′; "D," of 700′; "E," of 500′; "F
of about 4,000′ of workings, mine having about 30,000 long
blocked out for stoping, and, in addition, there is about 75,
of 3.5% copper tenor. The main tunnel gives a back of abo
is done by hand-work. Ore is taken by gravity trams, fro
main tunnel, to ore-bins, and thence by carts to the smelter.
circa 1908, building a concentrator, and installing electric
has been done.

The 60-ton smelter, 1¼ miles from the mine, has four
furnaces, and went into commission January, 1906, beginnin
ing May, 1906. A water-jacket blast-furnace is needed. Su
in heaps of 100 to 200 tons, requiring 6 to 8 weeks, according
of the smelter is matte averaging about 63% copper, 5 oz.
gold per ton, sold in Sydney, for export to Germany. Fu
15s. per cord, with a yearly consumption of about 10,000 c
is somewhat uncertain, with a precarious water supply also.
4-mile fuel tramway, at a cost of about £8,000.

Production was 790,840 lbs. fine copper in 1907; 1,
3,994 oz. silver and 249 oz. gold in 1908; 1,630,720 lbs. cop
and 352 oz. gold in 1909, and 1,836,800 lbs. copper in 1910.
valuable, and management good.

GRAHAM COUNTY MINING CO.

Dead. Was succeeded, circa 1906, by Advance Minin
Ft. Grant, Graham Co., Ariz. Described Vol. VIII.

GRAHAM COUNTY MINING & SMELTING CO.

Mine office: Safford, Graham Co., Ariz. H. N.
Lands, 13 claims, west of the Rex Cobre. Idle several y
moribund.

GRANADEÑA MINING CO.

Mine office: Santa Bárbara, Hidalgo, Chihuahua, Me
president; Sewall Truax, general manager; John D. Dalt
Lands, 3 miles northeast of Santa Barbara, include the
Guadalupe and Caiman mines. The Granadeña vein, with
3′ average width, formerly carried high grade oxidized ores
75′, but these are practically all mined out. Ore below the
argentiferous and auriferous complex of galena, sphalerit
pyrite. The Granadeña mine has a 370′ incline shaft at
opened, having about 4,000′ of workings, also a 310′ verti
with the vein on the 4th level, and planned to cut the vein a
1,000′. Ore goes to sorting-bins, where the shipping ore and
concentrating ore going to the mill by a 1,700′ surface-tram.
has a 1,400′ tunnel, developing a vein of about 6′ average wid
lead ore, with a little copper, and has a 350-ton sorting-bin,
mill by a 750′ single-span single-bucket aërial tram.

Equipment includes a steam plant, with 4 boilers aggr
double-drum Ottumwa hoist at the Granadeña vertical shaf
Laidlow-Dunn-Gordon air-compressors.

The mill, variously rated at 75 tons and 225 tons, has a B
mill, rolls, jigs, tables and vanners, but apparently has not giv
results, and was idle at last accounts. Mine employs circa

GRANBY CONSOLIDATED MINING, SMELTING & POWER CO., LTD. BRI

Office: 733-52 Broadway, New York, N. Y. Mine offi
ary district, B. C. Works office: Grand Forks, Boundary d
Martin Luther, president; Jay P. Graves, vice-president an

r, secretary; preceding officers, Sanford H. Steele, Edwin . Nash, A. L. White, Bernard Hochschild, Wm. H. Nichols, ff, Geo. W. Wooster, Wm. Hamlin and E. R. Nichols, directors; ., superintendent; Dr. Otto Sussman, consulting engineer; liams, smelter superintendent; J. C. Morgan, superintendent oup; C. M. Campbell, engineer; J. C. McDonald, master

larch 29, 1901, under special act of the provincial parliament of , with capitalization $15,000,000, shares $10 par, changed, 1906, hares $100 par; issued, $14,849,565. Early 1910 the company s, at $85 per share, shareholders being given pro rata rights to es are listed on the Boston stock exchange. Boston Safe De-., Boston, registrar; American Loan & Trust Co., Boston, and t Trust Co., New York, transfer agents. Annual meeting, first ber.

y owns about 5,000 shares of Crows Nest Pass Coal Co., and den Creek Mining Co. through ownership of 80% of the capital $400,000. Net profits for fiscal year ending June 30, 1910, were vidends have been as follows: $133,630.30 in 1903; $399,991 00 in 1906; $1,215,000 in 1907; $540,000 in 1908; $270,000 in 81 in 1910, a total of $4,027,111.30.

aims, 3 fractional, also 500 acres of mill and smelter-sites, in the ery near the international boundary, with various holdings in ough ownership or bonds. Holdings include the stock interest reek mine, at Observatory Inlet, B. C., the Cliff and St. Elmo d, Trail district, B. C., and the Summit group of 20 claims, area , in the Phœnix camp, taken over, 1910, under a working bond group of circa 50 claims, area 1,000 acres, on Copper Mountain, esaw, Okanogan County, Washington, said to be held under a Diamond drilling was done, 1910, on the Summit group.

al group at Phœnix includes the Old Ironsides, Knob Hill, Eagle, Banner, Tip Top, Triangle, Gold Drop, Curlew, Monarch, te, No. 13 and other claims and groups, forming a compact 000x9,000′ size, carrying 8,000′ of the strike of the mineralized eous landed holdings also include a 61-acre limestone quarry, hundred town-lots at Grand Forks and Phœnix, and 500 acres n, British Columbia.

nsides-Knob Hill group carries the principal ore body, the ore nature in the Gold Drop-Monarch group to the eastward of the g very irregular in shape, and apparently of limited size. The Paleozoic limestone and volcanic tuffs, overlaid by Tertiary nd underlaid by Paleozoic quartzites, breccias and conglomer-ic formation being a basin or trough, with ore bodies occurring The main ore body has an approximately NS. strike, with an 60° at surface and 30° at depth. The main ore body is estimated y as 500′ in average width, and has been developed for about n, and the continuity of the formation has been proven, by orings, to a depth of 1,100′, but, unfortunately, the manage-to state that while the formation continued to 1,100′ depth, the enor cuts off at about 400′ depth. Ore is exclusively chalcopy-veraging about 1.7% copper, 0.5 oz. silver and $2 gold per ton, ages have declined since 1901, to the extent of about 40% in silver, and 60% in gold. The ore carries 14 to 17% iron, 35 to to 20% calcium carbonate, 3 to 4% sulphur, and circa 7% % magnesia, constituting an almost ideal self-fluxing ore. The by an immense pit, or glory-hole, 400x1,000′ in size, which, how-

ever, is pretty well worked out, and present extraction is ma
There are 5 shafts, the more important being the 300′ A
shaft, and the 485′ Victoria shaft. The former No. 1 shaf
the open pit. Principal extraction is by tunnels, includin
tunnel; 250′ No. 1 Gold Drop tunnel; 1,000′ No. 3 Gold
No. 2 tunnel; 3,000′ No. 3 tunnel, and 1,500′ No. 4 tunnel.
of 47,400′ of workings. For the fiscal year 1910 there were
workings, and 6,438′ of diamond drill holes were bored.
pumps, and ore stoped on the various tunnel levels is mill
lower levels, the mine having electric haulage on the 200′,
with double-tracked tunnels, equipped with 75-h. p. locom
ore-cars.

Each of the 3 main haulage tunnels is equipped, at the
ore-crushers, and bins of 2,000 to 3,000 tons capacity. Th
at the portal of No. 3 tunnel, burned August, 1910, was rep
of year, by a new crusher plant, having a 30x42″ Farrell-Ba
a 150-h. p. Westinghouse motor, the crusher being capable
nearly a cubic yard in size to chunks not larger than 7″ to 8
ers weigh 113,000 lbs. each, and have frames of semi-steel,
of 32,000 lbs. to the square inch. A short aërial tram wa
42″ rubber belt-conveyor, with capacity of 250 tons ho
handled automatically, from the time of blasting ore in the
copper is ready for shipping from the smelter.

The 485′ three-compartment Victoria shaft, having
capacity of circa 3,000 tons, has a 250-h. p. Canadian Ran
cal drum hoist, good for 1,000′ depth, operating 7-ton ski
driven by a Westinghouse 3-phase variable-speed inductio
at the Victoria includes a crusher of 150 tons hourly capaci
3,000-ton ore-bins, connected with the Canadian Pacific
railways. The equipment at No. 2 shaft includes a 12x16″

The Gold Drop-Curlew group has been developed
equipped substantially, for a large production.

Electric energy is used at the mine and smelter to the
with only 240 h. p. in steam plants. Commercial curre
Bonnington Falls Power Co. at 2,000 volts. Machinery e
includes two 325-h. p. hoists, good for 1,000′ each. The
house has 2 Canadian Rand electric air-compressors, one
drills capacity, both machines being driven electrically,
from two 700-h. p. Westinghouse type C induction motor
compressor is a 60-drill Rand tandem-compound engine, w
sure cylinders and 28x36″ low-pressure cylinders, with pis
cubic feet of free air per minute, at 70 lbs. pressure per sq

Mine buildings include a 40x120′ brick machine shop, s
a 40x40′ frame carpenter-shop, a general office building, an
a car repairing shop, stables, 3 generator buildings and va
The company also owns, at Phœnix, the Granby hotel, a 3
electric light and steam heat, costing $25,000, the Old In
dwellings.

The mine is connected with the smelter, 24 miles d
the Canadian Pacific and the Great Northern. By mean
at the Victoria shaft and the 3 main tunnels, a train of 35
loaded in 25 minutes, or less.

The smelter, at Grand Forks, is of 4,400 tons daily cap
largest in Canada, and among the largest in the world. S
capacity for 8,000 tons of coke and 13,000 tons of ore.
locomotives, each drawing two 2-ton cars, constituting a

cally self-fluxing, is charged without concentration or assort-
from the mines, with the addition of limestone and fuel.
st-furnace building has eight 4x22′ water-jacket blast-furnaces.
x800′ brick dust-flue. A steel dust-chamber, set 22′ above
, on foundations of steel columns, masonry and concrete, is 13′
d 313′ long, with a floor of 28 hoppers, having a conveyor under-
ast. Slags, formerly granulated, are now dumped hot, being
locomotives traversing a 36″ slag-line.
steel frame converter building stands 100′ from the cupola
first-fusion product, a 40% matte, is taken, in ladles, by a 40-
eling crane, to the converter house, which has 3 stands, elec-
by 25-h. p. motors, with ten 84x126″ shells of barrel type.
ould-carriers under each stand, and the product is blister
tenor, containing an average of 18 oz. silver and 4 oz. gold per
Laurel Hill works of the Nichols Copper Co. for electrolytic
ning department, in the converter building, has a crusher and 2

power-house, of brick and steel, uses electricity throughout.
ides 9 small blowers, and 2 Connersville Jumbo blowers, with
000 cubic feet of free air per minute, driven by two 300-h. p.
rter blast is furnished by an Allis-Chalmers double-cylinder air-
n capacity to reduce 10,000 cubic feet of free air per minute to
lbs. per square inch, driven by a 500-h. p. direct-connected elec-

us buildings at the smelter include a warehouse, roundhouse and
ame, and a 100,000-gallon steel water storage tank.
the serious troubles caused by inadequate coke supply, the
al & Coke Co. was organized, 1903, by Granby interests. The
ldings consist of extensive deposits of high grade coking coal, at
rta, assuring the Granby a fairly regular supply of coke, though
hortages, caused by accidents and labor troubles, have necessi-
ge of smelting for short periods.
local manager stated, September, 1908, that one mine of the
000,000 tons of good ore. The report of the directors, dated
en to the New York stock exchange, when listing 15,000 shares of
sold to shareholders at $85 per share, stated that approximately
000,000 tons of ore were then developed, and ready for extrac-
pany's territory. Dr. Otto Sussman made a critical examina-
erty, early 1910, and, as a result of his prolonged and careful
imated the mine to have 5,595,000 tons of ore, averaging 1.24%
silver and 0.04 oz. gold, and superintendent Smith estimated,
t 6,429,169 tons of ore were blocked out. As the ore reserves of
e estimated, 1904, by the management, at 20,000,000 tons, and as
ements regarding increased ore reserves were given out there-
to time, it was generally believed that the ore reserves of the
be measured by the tens of millions of tons. The information
ting ore reserves was given out immediately after the final pay-
ck sold to shareholders for $85, and in consequence the stock
in the market, and the management became a target for many
ns, Dr. Sussman, whose position was that of an impartial
ng in, undeservedly, for some of the verbal brickbats that were
uite freely. Diam nd drill borings, 1910, have shown a little
ut nothing of great importance. The trouble with the Granby
be that the ore values decrease with depth, as is plainly proven
the last 10 years, and payable ore practically cuts off entirely
th, the material below that depth being below commercial tenor.

In addition, the ore bodies of the Old Iron sides-Knob Hill g
from the 300′ level down to the 500′ level, all diamond d
point showing no ore of commercial tenor, with a bottom lim
about 400′ depth, hence the chances of developing a large a
very poor. The Granby obviously has only a limited life, o
present mine, at the present rate of production, but ore r
doubtless will be, increased by further small additions of pa
to year. The management is not to be commended for allo
of large ore bodies to go uncontradicted, until after selling
an unduly high price. Mr. E. Jacobs, a peripatetic British
ity, holds the Copper Handbook responsible for the lack o
Sussman's examination, but neglects to inform an expectan
original Mr. Jacobs, after repeated personal examinations of
discover the paucity of ore reserves. The Granby has a n
plant, and a mine that is capable of large production for some
every likelihood of the development of an appreciable, th
small tonnage, of further ore, in the Old Ironsides-Knob H
tion, there are fair prospects of a good ore tonnage in the
Phœnix, and the company holds other properties, under bo
or less promise, hence the outlook is by no means so bad as
the first wave of pessimism that followed Dr. Sussman's stag
revelations regarding the ore reserves of the mine.

For fiscal years ending June 30th, the largest net earni
in 1907, and net profits for fiscal year 1910 were $564,946.7
ing that fiscal year with a net surplus of $2,464,370.36.
exclusive of marketing blister copper, was $4.77 per ton for
and only $2.50 per ton for the fiscal year 1910, this latter be
reached. Cost of finished copper, delivered, after deduct
values, was 8.35 cents per lb. in the fiscal year 1906; 10.14
cents in 1908; 10 cents in 1909, and 10.34 cents in 1910. G
to June 30, 1910, was 6,272,714 tons, of which 1,178,853 t
smelted in the fiscal year 1910. Recovery was 31.49 lbs. fi
silver and 0.1003 oz. gold, per ton, in the fiscal year 1901, d
copper, 0.2281 oz. silver and 0.037 oz. gold in 1910, the fa
metals having been most marked in the two last years. Re
been as follows: 16,410,576 lbs. fine copper, 201,337 oz. silve
in 1907; 21,092,288 lbs. copper, 300,204 oz. silver and 40,0
21,901,528 lbs. copper, 335,520 oz. silver and 45,760 oz. gold
lbs. copper, 356,746 oz. silver and 48,752 oz. gold in 1910, wit
to June 30, 1910, of 161,168,537 lbs. copper, 2,589,213 oz. si
gold.

GRAND ARIZONA COPPER CO.

Office and mine: 859 Fourteenth St., Douglas, Cochis
Doff, president and general manager; Leslie A. Skiles, vice
M. Iverson, secretary; Geo. Sargent, treasurer; preceding o
son, Martin Sweder, B. V. Brajevich, C. M. Seaman and A
Organized May 18, 1908, under laws of Arizona, with capita
shares $1 par, nonassessable; issued, $1,220,000. Annu
Tuesday in May.

Lands, 36 claims, area circa 700 acres, unpatented, in t
trict, at the foot of Niggerhead Butte, 10 miles north of D
rail point. The property has a contact deposit, between lime
of 8′ estimated average width, having sulphide ores, carrying
copper and zinc, and up to 46% lead and 28 oz. silver per t
values. The mine, said to show chalcopyrite and bornite
70′ and 325′, with 42′ and 65′ crosscut tunnels, and a 115

orkings. Equipment includes a 72-h. p. steam plant, with 15- hoists, and 7 buildings. Company plans continuous develop- ownsite, and adding power and air-drills.

N COPPER CO. ARIZONA.

nerly at Grand View, Coconino Co., Ariz. Described Vol. VII.

AL MINING CO. ARIZONA.

xchange Place, New York, N. Y. Mine office: Tucson, Pima H. Daily, president; R. W. Langworthy, secretary; Frederick urer. Organized 1905, under laws of Arizona, with capitaliza- hares $5 par, nonassessable.

ims, unpatented, area circa 200 acres, adjoining the old Yuma rthwest of Tucson, in the Amole district of the Tucson Moun- shows granite-porphyry, quartzite and limestone, carrying 4 ch 2 are developed by 10 pits and shafts of 10′ to 75′ depth, and ′ to 40′. Management estimates the main vein to average 40′ carry 1% copper, 7% lead, 5 oz. silver and $6.30 gold per ton. ches of copper and lead carbonates, and argentiferous galena. ns deepening shafts to the water level, and adding gasoline

AL MINING CO. UTAH.

vo, Utah. Mine office: Robinson, Juab Co., Utah. Jos. T. ; Lafayette Holbrook, vice-president; J. R. Twelves, secre- e, treasurer; Col. C. Edw. Loose, manager; Grant Simmons, Organized February, 1902, under laws of Colorado with 50,000, increased, 1909, to $600,000, shares $1 par, nonassess- 0,000. Last dividend was 6 cents, July 15, 1910, giving total at date, of $1,572,500. Shares are listed on the Salt Lake

djoining the Centennial-Eureka, is opened to a depth of 2,200′, to 200′ in width in places, this being the largest ore body in the gh of low average grade. A new ore channel, about 700′ west ith parallel strike, was opened 1910, on the 2,000′ and 2,100′ ly is an extension of the Centennial-Eureka ore channel. Ore in silver and lead, including horn silver in some of the upper nall copper and gold values. Mine was producing, 1910, from levels, inclusive. Equipment includes a good mining plant. ith the Mammoth Mining Co., begun Sept. 9, 1899, was ended hen this company secured a judgment of $176,385.48 for ore y. Production, for April, 1910, was 1,400 tons of ore, carrying , 10% lead, 30 oz. silver and $3 gold per ton, and production, d at 15,000 tons of ore, yielding circa 750,000 lbs. fine copper, d, 300,000 oz. silver and $35,000 gold.

OLIDATED DEVELOPMENT CO. ARIZONA.

e of Col. John T. Firch, secretary, Oakland, Cal. Letter re- d from former mine office, Kingman, Mohave Co., Ariz. Geo. ident and treasurer; Dr. John T. Davis, vice-president and has veins of 3′ to 60′ width, carrying gold, silver and copper gangue, and has secured assays up to 34% copper, 9 oz. silver ton. Also has claims near Cerbat, opened by tunnel, giving lead, 12 oz. silver and $11 gold per ton. Idle and presumably

SIT COPPER CO. NEVADA.

ned unclaimed from former mine office, Cherry Creek, White John Stanton, president; J. S. Page, secretary; Pierre de P. er; E. L. Fletcher, superintendent, at last accounts. Organ- s are said to show considerable ore bodies, giving assays of 7 to

12% copper, and mine, working about 30 men, shipped a l
have given average returns of 21% copper and 22 oz. silv

GRAND DOMINION COPPER CO.

Office: 200 Scott Bldg., Salt Lake City, Utah. Lett
from former mine office, Milford, Beaver Co., Utah. Dav
and general manager; Thos. F. Thomas, vice-president; J
and treasurer; preceding officers, Jos. Melich, W. H. Robe
directors. Organized Nov. 22, 1907, under laws of Utah
$600,000, shares $1 par, nonassessable. Shares are listed
exchange. Lands, 7 claims, unpatented, area circa 140
Mary's on the southeast, and lying near the Red Warrior a
the Star district, 4 miles from a railway. The mine has
300′ tunnel, said to have a 250′ back, developing an 18′ vei
assay up to 26% copper, 10 oz. silver and $1 gold per ton.

GRAND EASTERN MINING CO.

Office and mine: Eureka, Juab Co., Utah. E. R. Hig
manager; C. E. Berry, secretary and treasurer; preceding
W. E. Saintsbury and John A. Allen, directors. Organize
under laws of Utah, with capitalization $100,000, shares 10
11 claims. Presumably idle.

GRAND GULCH MINING CO.

Office: 503 McIntyre Bldg., Salt Lake City, Utah
Thomas, Clark Co., Nev. Wm. H. McIntyre, president;
president; W. P. Jennings, secretary, treasurer and general
officers, Jas. E. Jennings, Wm. C. Jennings, Jos. A. Jennings
directors; S. R. Calloway, superintendent. Organized S
laws of Utah, with capitalization $750,000, shares $2.50 p
Total assessments to end of 1910 were $14,400, with divid
nual meeting, first Monday in February.

Lands, 9 claims, 1 patented, area 180 acres, in the B
conino County, Arizona, but more easily accessible from U
ern or central Arizona, owing to the barrier to access pre
Cañon of the Colorado River. Property shows sandstone
ing an apparently circular zone of copper impregnations,
the bedding planes, ores occurring as cuprite, melaconite, n
chalcocite, all argentiferous, estimated by management to a
4 oz. silver per ton. Development is by a 460′ shaft. Shi
carefully selected ore, to a Salt Lake smelter, returned 48%
opened in 1870, but was idle 25 years, until 1899, owing to
haul then required, the building of the San Pedro railway h
haul to 70 miles. The mine has been in practically contin
1899.

Equipment includes a 22-h. p. gasoline hoist, good for
drill air-compressor. There are 9 buildings, including a b
house and necessary shops, and a small and antiquated s
value. Production, to end of 1909, was 299,154 lbs. fine c
duction is estimated by management at 350,000 lbs. fin
considered promising, but sadly hampered by its singularly
inaccessible location.

GRAND ISLAND MINING CO.

Dead. Lands passed to Louisiana & Arizona Minin
Jerome, Yavapai Co., Ariz. Described Vol. VIII.

GRAND JUNCTION SMELTING CO.

Letter returned unclaimed from former office, 79 Mil
Works office: Grand Junction, Mesa Co., Colo. I. N.
J. V. Howard, secretary; Thos. Osborne, superintendent.

, which it was planned to blow in, 1905. Was closely related
agement of the Western Slope Copper Mining & Smelting Co.
ently inexperienced and reckless. Property mortgaged, and
pparently hopelessly involved. Idle and moribund.

MINING CO. **UTAH.**

rly at Castleton, Grand Co., Utah. Described Vol. VIII.

COPPER MINING CO. **MINNESOTA.**

rly at Grand Marais, Cook Co., Minn.

AIN MINING CO. **ARIZONA.**

McCabe, Yavapai Co., Ariz. F. L. Dwight, general manager.
, is said to have, on the 100′ level, ore averaging 5.5% copper,
old values, and shipped a little ore, 1910, to the Needles smelter.

LYELL COPPER CO., LTD. **TASMANIA.**

rly at Gormanston, Montagu Co., Tasmania. Described

AL SMELTING CO. **MÉXICO.**

San Juan de Allende, Rio Grande, Coahuila, Mex. The mine,
rma, carries auriferous copper ore, but apparently the com-
r. Presumably idle.

OPPER MINING CO. **ARIZONA.**

nds, 1902. Formerly at Payson, Gila Co., Ariz. Described

COPPER CO. **WYOMING.**

ands to Saginaw Valley Copper Mining Co. Formerly at
oon Co., Wyo. Described Vol. III.

OPPER MINING CO. **ARIZONA.**

of Clarence H. Mackay, 253 Broadway, New York, N. Y.
aipa, Graham Co., Ariz. Large sums were expended in
quipment, latter including a 3-stamp mill and 90-ton smelter.

IC COPPER MINING CO. **COLORADO.**

bad egg. Formerly at Pearl, Larimer Co., Colo. Described

SE & ARIZONA MINING CO. **ARIZONA.**

East Front St., Traverse City, Mich. Letter returned un-
ner mine office, Cave Creek, Maricopa Co., Ariz. Thos.
dent; Geo. R. Ray, vice-president; Herbert Montague, sec-
r; preceding officers, O. P. Carver and Walter E. Greilick,
Horner, general manager; A. Scharingron, mine superintend-
nts. Organized May 6, 1903, under laws of Arizona, with
00,000, shares $2 par; issued, $1,670,000. Annual meeting,
January.

ms, area circa 660 acres, 35 miles from a railway, showing
nists, the northern portion carrying a number of stringers and
utherly portion showing one vein of 12′ to 15′ width, with a
stringers, in diorite, carrying oxidized ores and sulphides,
n the northern part of the property, and native copper in the
Development is by shafts of 70′, 392′ and 167′, with 105′ and
ed to show 17,000 tons of ore, with 2,000 tons blocked out, of
eached ore, running 1 to 4% copper, with some ore estimated
rage 6 to 30% copper, 5 oz. silver and $3.50 to $5 gold per ton.
s a gasoline hoist and several small mine buildings. Idle
for annual assessment work.

INING CO. **WASHINGTON.**

were sold, early 1907, to Night Hawk Mining Co. Formerly
an Co., Wash.

GRANITE CONTACT MINES CO.

Office: Rhyolite, Nev. Mine office: Skidoo, I
Seller, president; Clay Tallman, vice-president; J. J. K
Keenan, treasurer. Organized under laws of Arizon
$1,250,000, shares $1 par, nonassessable. Lands, 8 cla
ing auriferous and argentiferous copper ore, on which ve
done. Presumably idle.

GRANITE COPPER CO.

Office and mine: Beaver, Beaver Co., Utah. A. I
dent and manager; Jos. McEwen, vice-president; J. F
treasurer; preceding officers, J. H. Barton and Gideon Sr
talization $1,000,000, shares $1 par. Mine, in the Gr
vein, carrying high grade silver-lead ore, opened by a 2
oping, with a small force, late 1910.

GRANITE CREEK SMELTING & REDUCTION CO.

Dead. Formerly at Golconda, Humboldt Co., Ne

GRANITE WELLS MINING CO.

Dead. Formerly at Daggett, San Bernardino Co., Cal

GRANT CONSOLIDATED COPPER MINING CO.

Office: Spokane, Wash. Mine office: Chesaw, Oka
A. McLeod, manager; A. D. McPhee, superintendent. Org
of Washington, with capitalization $1,650,000. Is said t
$90,000 on the property. Lands, 14 claims, on Copper M
developed by an opencut and a tunnel planned to be d
strong veins carrying medium grade chalcopyrite, in
Shipments, 1907, of circa 200 tons, to the Granby smelt
copper and $3 gold per ton. Equipment includes two
air-compressor.

GRANT COPPER MINING CO.

Dead. Formerly at Pearl, Larimer Co., Colo. De

GRANT MINE.

Letter returned unclaimed from former mine office
N. Y. Ores are decidedly complex, consisting of sulphi
rying copper, quicksilver, gold and iron. The crude ore
gross value of about $25 per ton, but, on account of its re
present commercial value, and cannot be utilized with
Idle some years.

GRASLITZER KUPFERBERGBAU.

Mine office: Eilenberg, Bohemia, Austria. Mines,
and were one of the principal sources of European co
Middle Ages, show a vein of 12′ to 15′ width, in clay-
opened, on a considerable scale, and a new smelter buil
idle since.

GRATIOT MINING CO.

Office: 12 Ashburton Place, Boston, Mass. Oper
Mich. Mine office: Mohawk, Keweenaw Co., Mich.
dent; Rodolphe L. Agassiz, vice-president; Jas. MacN
ager; preceding officers, Francis L. Higginson and H
directors; Geo. A. Flagg, secretary and treasurer. Or
under laws of Maine, with capitalization $300,000, shares
controlled, through ownership of 50,100 shares, by
Mining Co. Ended fiscal year April 30, 1908, with de
increased, 1910, to $266,133.

Lands, 600 acres, being the NW. ¼ of Section 26, N
¼ of Section 23, and SE. ¼ of Section 22, except the I
Town 57 North, Range 32 West. Property lies south

t of the Mohawk, carrying the Kearsarge amygdaloidal bed
acres, to a maximum depth of about 2,700′. Extensive drill
before the shafts were started. The Kearsarge bed averages
h, with strike of N. 42° E., and average dip of 33° to 36°
and its copper contents are painfully low.
is by two 3-compartment shafts, exact duplicates, 9x22′
vith ladderways in the middle, sunk at an angle of 36° on the
o shafts being sufficient to develop the entire tract. Levels
intervals.
bout 1,500′ from the Seneca boundary, is 1,900′ deep, having
n maximum width. Drifting has been done on the alternate
els, from the first to ninth, inclusive.
,475′ southwest of No. 1, and circa 1,800′ north of Mohawk
ep, and drifting has been done on the second, third, fifth and
best showing being on the fifth.
ave duplicate equipments, including 14x18″ duplex-cylinder
, with 5′ drums, good for one-half mile depth each, and 18-drill
Each shaft has a single compartment shaft-rockhouse, which
er. Buildings include a 22x32′ frame smithy, 2 engine-houses
dwellings. Property is served by a 2¼-mile spur of the
lway, built north from the Mohawk mine.
as begun July, 1910, at the rate of 300 tons daily, mainly taken
nd was decreased later to about 50 tons daily, from the mine,
Centennial mill. Returns were very low, and the mine was
, 1911. It is obvious that, owing to its comparatively small
epth, the Gratiot cannot work the Kearsarge bed profitably,
ice of copper, except on a very large scale, and it could be
re advantageously in connection with the Seneca than alone.

MINING CO., LTD. **IDAHO.**

Osburn, Shoshone Co., Idaho. E. F. Hall, president; W. H.
and manager. Capitalization $375,000, shares 25 cents par.
very hard miles from a railroad, on McFarren Gulch, 12 miles
ving a vein of 6′ to 20′ surface width, developed by a combina-
drift tunnel, showing mainly argentiferous and auriferous gray
o average 17% copper, 20 oz. silver and $10 gold per ton. A
e was shipped, 1908, to the Tacoma smelter.

INING CO. **UTAH.**

ka, Juab Co., Utah. Letter returned unclaimed from former
son, Juab Co., Utah. C. C. Griggs, president; C. E. Huish,
. A. Badger, secretary and treasurer. Organized April, 1909,
h, with capitalization $50,000, shares 5 cents par, assessable.
unpatented, in the East Tintic district, 2 miles from a railroad,
by a shaft, showing auriferous and argentiferous copper and
nably idle.

ALIAN MINE. **AUSTRALIA.**

ueensland Exploration Co., Ltd.

ER GOLD & COPPER CO. **ARIZONA.**

merged in Great Belcher of Arizona Co. Formerly at Provi-
o., Ariz. Described Vol. V.

ER OF ARIZONA CO. **ARIZONA.**

erly at Providence, Yavapai Co., Ariz. Described Vol. VIII.

UR COPPER MINING & **AUSTRALIA.**
ENT CO., N. L.

Condobolin, Cunningham Co., N. S. W., Australia. Organized
under laws of New South Wales, with capitalization £1,920,
Lands are at Burra Burra, near Condobolin. Presumably idle.

GREAT BENOWRIE COPPER & SILVER MINING

Dead. Formerly at Mingary, South Australia. D

GREAT BONANZA GOLD MINING CO., LTD.

Office: 235 Finsbury Pavement, London, E. C., En
tral City, Gilpin Co., Colo. W. B. Bishop, chairman;
Ewing and Col. C. R. Rowley, directors; J. McKechni
Morgan, mine manager. Organized Apr. 3, 1891, under
with capitalization £100,000, shares £1 par; issued, £5
bentures, £3,200, at 8%. Property is the Next Preside
on Gregory hill, carrying auriferous and argentiferous co
shafts. Equipment includes steam power and a 35-stan
for £3,200.

GREAT BRAS D'OR GOLD MINING CO.

Office: 616 Old South Bldg., Boston, Mass. Mi
Cape Breton Co., N. S. Theodor Kuntzen, manager.
copper ore, with values mainly in gold. Equipment incl
an air-compressor, with a 10-stamp mill and 40-ton con

GREAT CENTRAL FREEHOLD MINES, LTD.

Office: 31 Queen St., Melbourne, Australia. Mi
Blaxland Co., N. S. W., Australia. John Brandon, liqu
been in liquidation since 1903, and all assets have been
mine, which is for sale. Fully described Vol. IV.

GREAT COBAR COPPER MINING SYNDICATE.

Dead. Property was sold, 1906, to Great Cobar,
bar, Robinson Co., N. S. W., Australia. Very fully de

GREAT COBAR, LTD.

Office: 65 New Broad St., London, E. C., Eng.
Robinson Co., N. S. W., Australia. Works office: Lithgo
Australia. Employs 1,300 men. Andrew Haes, chairm
R. H. Henning, T. S. Horn, Gerard B. Elkington, J. P.,
A. R. Stephenson and W. J. Barnett, directors; Alex
H. C. Bellinger, general manager; V. Farrier, mine
Iaeger, smelter superintendent.

Organized May 22, 1906, under laws of Great Brita
£750,000, increased, July 12, 1910, to £850,000, and ag
1910, to £1,000,000, shares £5 par; issued, £925,000, fu
£750,000 first-mortgage 6% bonds, in denominations o
redeemable, by drawings, at 5% premium, but repurch
sinking fund, created 1908, by setting aside £100,000
Paid a 15% dividend, of £112,500, Sept. 16, 1907. N
£238,431, and for 1908 there was a net loss of £500.

Property bought of the Great Cobar Copper Mining
and taken over September, 1906, cost £1,006,000, of whic
owners, the promoters taking £206,000 in cash, shares
property of the Great Cobar Mines, Ltd., was bought, Jul

Lands, 3,575 acres, of which 1,323 acres are freehol
Cobar mine, area 208 acres, leasehold; the Cobar gold
leasehold; the Cobar Chesney mine, area 198 acres,
leasehold; the Great Peak and Conqueror gold mines
Creek Colliery and coke works, at Singleton, and smeltin
Cobar and Lithgow.

The Great Cobar mine, which is the most important
South Wales, was opened 1869, and closed 1892, after fai
in a reverberatory furnace. Production, 1869–1892, wa
per, made from rich oxides, ores averaging 11.07% in cop
able dividends were paid therefrom. Mine was reopen

d, at the close of 1902 had produced, under their manage-
re giving average returns of 3.27% copper. A long-stand-
e tributors and the fee-owners was settled, 1903, through
perty by the former, who sold to the present corporation.
Silurian clay-slate, carries 3 veins, of nearly vertical dip,
e East, Middle and West lodes, and as the South, Central
cipal workings being on the latter, which ranges 6″ to 52′
ticular ore bodies. One of the principal parallel mineral
other acid, these lying about one-half mile apart. The
e 28′, 38′ and 52′ in extreme width, with lengths of 135′,
o depth of 1,000′. The oxidized zone extends to an aver-
0′, below which the ore is mainly chalcopyrite, associated
etite, with occasional pyrrhotite, ore being highly silicious
niferous, of about 3.5% average copper tenor in the Cobar
sney, carrying an average of 0.5 oz. silver and 1.5 dwts.
e is mined by overhand stoping, with 10′ pillars left beside
ing is by bulkheads, filled with waste, this being known
e" system. Ore is first broken in immense masses, then
e by block-holes and pop-shots.
shaft of the Great Cobar, is 15x7′ 6″ in size, 1,170′
el at 1,150′, and is to be deepened to 1,450′. The Barton
epth, and these shafts are connected on the 1,000′ level.
drilling was done, 1910, from the 6 lower levels. The
3 miles of workings, and the ore body shows no sign of
lue at depth. Ore reserves were estimated, Dec. 31, 1910,
a gain of about 250,000 long tons, averaging a trifle under
verable smelting values of about 2.5%, the reserves not
0 long tons of low grade material near surface, that may be
t later. New levels are to be opened at 150′ intervals,
at each level should develop about 600,000 tons of ore.
has 2 hoisting compartments, using self-dumping vertical
iss hoist. The headgear and shafthouse are of structural
k walls. Buildings at the mine include a power-house,
hops, machine-shop, smithies, office and miscellaneous

mine, which is a continuation of the Great Cobar, has
, apparently showing little ore, and is idle.
ey mine, area 198 acres, half freehold and half leasehold,
t depth of 460′, shows a 40′ vein, carrying 2.5 to 4% copper
d per ton. The mine has about 500,000 long tons of ore
g 20 to 35% of the total ore production of the property.
as opened as a gold mine, the outcrop carrying no copper,
ore was found at depth of 155′, and at 250′ depth there
ed with what was termed melaconite, but which probably
estimated average ore tenor, 1907, of the entire Cobar
1% copper. The Cobar Chesney is worked in connection
r, and has a lenticular ore shoot of 36′ width and about
chalcopyrite, with slate and quartz gangue. The Cobar
p mill and 25-ton concentrator.
ine, area 123 acres, leasehold, also has 50 acres of water-
illsite. Ore is sulphide, averaging 1.25 to 1.30% copper,
l per long ton, but carries much barite in the gangue, and
renders cyaniding difficult for gold recovery, while the low
enders direct smelting unprofitable for that metal. Ore
d, September, 1908, at 181,053 long tons, and August 1,
tons. The mine was idle from September, 1908, until

taken over, July, 1910. The purchase of the Cobar gold
to both seller and purchaser.

The Peak, or Great Peak, gold mine, has a stamp
silicious and free from iron and sulphur, it would seem
the basic ores of the Cobar group.

The mining plant, shops, smelter and yards of the G
of about 80 acres. The entire works have been remo
buildings were erected, 1910–1911, these including a bri
iron shops and warehouses.

The mill of the Cobar gold mine has 100 stamps, a
plant. An Elmore oil flotation plant, while technically
satisfactory work in connection with the old mill.

The mining plant includes a 500-h. p. first-motio
depth, at No. 1 shaft, and two 25-drill air-compressors.

Electric power is used almost exclusively, upwards
quired for the mine and works. The new power-hous
smelter building, is exceptionally well designed and con
of steel, with brick walls, except the boiler-room, which i
because of climatic conditions. There are two 20-ton ov
reaching the full length of the building. Electric pow
300-kw. 3-phase 50-cycle 400-volt alternating curren
directly upon the shafts of 3 Corliss cross-compound
which one is a spare. There is a 250-kw. motor-generat
rent from the main generators, supplying direct curre
operation of the cranes, converter stands, and minor
There are two 2,500 cu. ft. air-compressors, furnishing
and air-hoists. Three Connersville blowers, each direc
tandem-compound engine, furnish blast, at a pressure of
being connected independently with its own blast-furn
header, with suitable valves, permitting blast from any
any furnace, or the pressure of all blast-mains to be
duplex cross-compound air-compressor, with capacity of
per minute, at 15 lbs. terminal pressure, supplies air
engines and blowers are set staggering. The boiler
Babcock & Wilcox water-tube boilers, with self-conta
Green fuel economizers, delivering steam at 170 lbs. thr
are charged by chain-grate stokers, taking coke from st
having a pan-type conveyor running the full length of t
coal-pockets, and outside of the boiler-room, under a rece
coal is discharged from railroad cars. The same convey
under the boiler-room, and ashes from the grates are
hopper, at one end of the building, located over railroa
removed by rail.

The district being arid, dry seasons causing much tro
dams of 80,000,000 and 100,000,000 gallons capacity hav
averaging about 8s. per thousand gallons.

The frame sampling mill, for custom ores, has 50 to
ing every fifth car. Equipment includes a No. 5 gyrato
tory crusher, 2 Heelon crushers, of 120 tons hourly cap
belt-driven rolls, and two 28″ and one 42″ Simplex auton
sample consisting of one part in fifteen hundred. O
delivered to electrically driven belt-conveyors, leading
whence ore is loaded into 30-ton cars, and drawn by ele
main storage plant. New ore bins of 12,000 tons storage c

The new smelter, of upwards of 1,000 tons daily c
increased, 1911, to a maximum capacity of 1,500 tons

Equipment was furnished by the Power & Mining Machin-
gn is good, but, as originally installed, the plant was not
ork, and nearly broke the company, until the appointment
brought order out of chaos, gradually coaxing the plant
ency, though further improvements are possible, and are
furnace building, near the mine, is of steel, with corrugated
side or end walls, except at the gables, where closed in with
he height of the lower chord of the trusses. Ore is taken
ge bins, in hopper-bottom cars, hauled by electric locomo-
ndard gauge, charging being done from V-shape side-dump-
36″ gauge tracks on either side of all furnaces, at the charg-
are handled in 25-ton ladle cars, electrically dumped, with
ping, there being car tracks on either side of each settler.
0″ blast-furnaces, each with 45 tuyeres, set end to end, one
. These furnaces went wrong at first, but are now doing
re 18′ circular steel settlers between each two furnaces, and
outer ends of the two end furnaces, giving each blast-fur-
ischarge, at either end, and also providing an extra settler
ich is an excellent arrangement. About 9% coke charges

y department has 14 calcining furnaces and 4 refining fur-
atories, when used for matting, made a product of about
Each reverberatory furnace is connected, independently,
ke, which is connected to a flue, common to two furnaces,
in underground dust-flue, 6x7′ in section, and 1,400′ long,
stack. This dust-flue also serves as a dust-chamber, hav-
oppers, with draw-gates discharging into steel cars running
going to the briquetting plant.
epartment has a 40-ton electric traveling crane, of 50′ span,
ngth of the smelter building. There are 3 stands, electric-
84x126″ shells of the Copper Queen barrel type. Silicious
obar gold mine are now used, instead of barren quartz, for
ars are sent to the company's refinery, at Lithgow.
rks, 370 miles by rail from the mine, include an old smelter
ter-jacket blast-furnaces, and reverberatories. The prin-
tank electrolytic refinery, installed 1902, which also does a
ess, having a daily capacity of about 25 tons of finished
f 2″ Oregon pine, lined with 6-lb. lead, and inner-lined with
work being boiled in paraffine for one hour, without the use
There are 7 depositing dynamos, 2 caring for 144 tanks
128 tanks each, the tanks for each dynamo being arranged
row having 3 terraces, and each terrace a separate feed of
ng stepped down 3″, to insure proper circulation. Electro-
ng sump is elevated by air-jet, into the storage tanks, for

06, inclusive, the Great Cobar mine yielded 1,592,895 long
ng 138,593,280 lbs. fine copper. Production, under the
as 7,000,000 to 9,000,000 lbs. copper yearly, having been
per in 1906, and production by present company has been
n 1907; 10,586,240 lbs. copper, 64,949 oz. silver and 13,002
762,080 lbs. copper, 83,208 oz. silver and 14,452 oz. gold in
copper, 107,932 oz. silver and 21,524 oz. gold in 1910.
stakes were made in the earlier stages of this company's
ms an undue tendency to blame these troubles upon the
y the way, have an excellent alibi, in the fact that they ran
ly, for some years, with substantial profits. Operations

also were hampered, 1909–1910, by the New South Wa
property was idle from Nov. 4th until the end of 1910.
takes, the company seems working into safer position,
ultimate productive capacity to about 30,000,000 lbs. fi
will require some time, even if this figure be reached at

GREAT COBAR NORTH, LTD.

Offices: 26 Victoria St., London, S. W., Eng., and
ney, N. S. W., Australia. Mine office: Cobar, Robins
tralia. A. Parks-Smith, chairman; preceding officer, All
Pawle, directors; T. Carter, secretary; D. A. Sutherla
hery, mine manager. Organized Nov. 15, 1906, under
with capitalization £350,000, shares £1 par. Lands, 286
acres leasehold, adjoining the Great Cobar, Ltd., opened
732′ deep, at last accounts, and the company is advised,
sink the shaft to 2,100′. Machinery equipment was bo
Mining Estates, Ltd., and there is a 60-stamp mill, boug
gold mine, 3 miles from Cobar.

GREAT CONDURROW TIN & COPPER MINING CO.

Dead. Was dissolved, Jan. 13, 1905. Formerly a
Eng. Fully described Vol. V.

GREAT COPPER FLAT MINING CO.

Mine office: Draper, Salt Lake Co., Utah. Lands,
Cottonwood Cañon, are but slightly developed. Compa
merging in the Verna Mining Co., but apparently such m
Idle several years.

GREAT COPPER KING MINING CO.

Office: 47 South West Temple St., Salt Lake Cit
Draper, Salt Lake Co., Utah. M. O. Froisland, presiden
son, vice-president; Michael Froisland, secretary; Gu
Organized August, 1904, under laws of Utah, with capita
10 cents par; issued, $47,500. Lands, 10 claims, unpater
1 fractional, held under bond and lease, near the mouth
Cañon, 7 miles from Alta. Mine has shallow shafts, a
about 800′ of workings, showing auriferous and argenti
ores. Company planned, July, 1909, merging in the
apparently such merger was not effected.

GREAT DIVIDE GOLD CO.

Dead. Formerly at Redding, Shasta Co., Cal.

GREAT DIVIDE MINES CO.

Office: 422 McCornick Bldg., Salt Lake City, Uta
coln, Tooele Co., Utah. Henry A. McCornick, preside
vice-president and general manager; Jos. H. Hurd,
Badger, treasurer; John B. Taylor, superintendent; pr
directors. Organized Aug. 15, 1903, under laws of Ut
$2,000,000, shares $5 par, nonassessable.

Lands, 110 claims, mainly patented, area 2,000 acres
200 acres in mill and smelter sites, lying on the Tooele sid
tains, shortly west of the holdings of the Utah Consolida
way. Property shows Cambrian quartzite, monzonite
limestone, with a number of fissure veins and contact dep
and quartzite. Work is being done on 6 ore bodies, of
auriferous and argentiferous lead, copper and zinc sulp
8.1% copper, 19.5% lead, 14 oz. silver and $7 gold p
is by the 14 Taylor No. 2 shaft, and 110′ Annie shaft,
tunnels, principal tunnels being the Controversy, of 228′;
of 450′; Spring No. 1, of 710′; and Spring, which is the

begun 1899, and has been continued steadily, with a small

ludes a 35-h. p. electric plant, with a 1-drill Ingersoll air-com-
are 10 buildings, including a small power-house, 2 smithies,
and dwellings. Electric current is taken from the Telluride
is company's private line from the sub-station at Bingham.
continuous development during 1911, with a force of 8 to 20
nsidered promising.

I DEVELOPMENT CO. **ARIZONA.**

White was president and general manager. Organized circa
apitalization $500,000, shares $10 par. Property was a bond
nds of the Arizona-Colorado Copper Belt & Gold Mining &
March, 1910, calling for the payment of $260,000 in cash and
ut the bond was surrendered before the close of 1910. For-
la Co., Ariz.

I MINING & **NEWFOUNDLAND.**
RING CO.

Twillingate, Newfoundland. Property is on Burnt Island,
, opposite the Great Northern Copper Co. Presumably idle.

GOLD & COPPER MINES, LTD. **AUSTRALIA.**

ucceeded, July 17, 1908, by Great Fitzroy Mines, Ltd. For-
ners, Rockhampton Co., Queensland, Australia. Described

MINES, LTD. **AUSTRALIA.**

able Bldg., Melbourne, Australia. English office: 20
don, E. C., Eng. Mine office: Mt. Chalmers, Rockhampton
ustralia. Hon. W. L. Baillieu, chairman; preceding officer,
ey, W. J. Loring, H. C. Hoover, G. P. Doolette, W. S. Robin-
t, directors; D. G. Lumsden, secretary; T. E. Smith, London
Moreing & Co., consulting engineers and general managers;
ne manager.

17, 1908, under laws of Victoria, as a reconstruction of Great
per Mines, Ltd., which was a reconstruction of Fitzroy Cop-
vith capitalization £500,000, increased, 1910, to £600,000,
ued, £450,000, fully paid. Debentures £100,000 first-mort-
bonds, convertible at par. For fiscal year ending June 30,
s £12,187, of which £11,687 was written off for construction
nd for fiscal year 1910 net loss was £19,753.

es, leasehold, known as the Mt. Chalmers mine, circa 10 miles
ampton, also the Tungamull estate, of 5,050 acres, freehold, 3
e, bought for water supply. The mineral property shows a
on up to 300′ in width, carrying large lenses of ore in sedimen-
rite intrusions. Ore is auriferous and slightly argentiferous
nainly chalcopyrite, with small specks of native copper, sili-
verage grade, in a friable quartzose gangue. Below 300′ the
mplex, difficult of satisfactory reduction. The vein on the
ximum width of 120′, and known length of 330′. Develop-
compartment shafts, known as the East shaft, which is at the
est shaft, which is at the new workings, and "A" shaft, all shal-
and 240′ depth. Ore reserves were estimated, January, 1910,
ns, averaging 3.25% copper and 2.66 dwts. gold per ton, but
y 12, 1910, by Mr. Loring, after careful examination, at only
averaging only 2.98% copper and 2.57 dwts. gold per ton.
ludes a steam plant, with hoists, and 8-drill and 20-drill air-
aërial tram connects the smelter with a railway. A dam is
gamull, with a pipe-line to the works.

The concentrator went into commission March, 1910 1910, proving a failure, after 4 months operation, and replaced by a 200-ton oil concentrator, nearing completi which is to use the flotation system of the Minerals Seps

The smelter, formerly having a 100-ton water-jacket matte, was rebuilt, and now has two 200-ton water-jack at the close of 1910, had a nearly completed converter plant, to operate under the Dwight-Lloyd patents, was be smelter makes slag-brick, of about 80 lbs. average weight, ing purposes, which give excellent satisfaction.

Production, for fiscal years ending June 30th, was 2,19 32,499 oz. silver and 5,990 oz. gold in 1909; 2,843,246 l silver and 6,482 oz. gold in 1910. The production for th secured at a cost said to have been 32s. 8d. per long ton of treated, giving a total cost of circa £85,000, against whic £3,500 for silver production, and £26,000 for gold produc at least £55,000 against 1,287.15 long tons of copper, giv mately £42 15s. per long ton for copper, at the mine, i requiring conversion, electrolytic refining, freight and marl ing several cents per pound. In December, 1910, the wo tons of ore, assaying 3.5% copper and 3.7 dwts. gold per tons of very low grade matte, carrying only 131 tons of c and 739 oz. gold. It is obvious that 1910 operations mu siderable loss. The first mill proved a failure, and the min former ore values, while Mr. Loring reported, 1910, tha would be required to complete the plant. All things cons the Great Fitzroy is not especially bright.

GREAT HERMIDALE COPPER CO.

Dead. Was absorbed, circa January, 1908, by Gr Copper Co. Formerly at Hermidale, Canbelego Co., N.

GREAT HERMIDALE SOUTH COPPER CO.

Mine office: Hermidale, Canbelego Co., N. S. W., circa January, 1908, the Great Hermidale Copper Co. H Presumably idle.

GREAT HOPE MINING CO.

Dead. Formerly at Mojave, Kern Co., Cal. Descri

GREAT LAKES COPPER CO.

Office: 51 East 44th St., New York, N. Y. M Algoma, Ont. Moribund. Fully described Vol. VIII.

GREAT LAKES MINING & MILLING CO.

Dead. Formerly at Encampment, Carbon Co., Wyo

GREAT LAKES MINING & SMELTING CO.

Dead. Formerly at Encampment, Carbon Co., Wyo.

GREAT LAXEY, LTD.

Office: 55 Cross St., Manchester, Eng. Mine office: Eng. F. J. Robertshaw, chairman; E. McGee, vice- officers, T. Stuttard, J. P., W. B. Knapman and Thos. S Crossley, secretary; John Roberts, manager. Organized laws of Great Britain, as a reconstruction of Great Laxey M capitalization £30,000, shares 10s. par, in £45,000 priority shares, fully issued and fully paid. The old company pai aggregating £36 15s. on each £4 share. Present compan aggregating 60% on priority shares, and 5% on ordinary sh

Lands, 1,103 acres, held under 31-year leases, expirin royalty of 2½%. Lands carry lead, zinc and copper sulp

heel in the world, but this survived its usefulness, and was
s ago by a new power plant.

TH COPPER MINING CO. **WASHINGTON.**

ked by promoters. Formerly at Index, Snohomish Co., Wash.

LYELL COPPER CO., LTD. **TASMANIA.**

eorganized, Jan. 23, 1903, as Ballarat & Lyell Mines, Ltd.
yell, Montagu Co., Tasmania. Described Vol. III

RN COPPER CO. **MINNESOTA.**

Globe Bldg., Minneapolis, Minn. Mine office: Hinckley,
C. E. Ovenshine, president; Dr. C. D. Snow, vice-president;
secretary; A. H. Cunningham, treasurer and general man-
icers, L. Paulle, Wm. Elliott, E. H. Holbert, Stephen O'Dea
, directors; F. B. Crane, superintendent. Organized Sept.
s of Arizona, with capitalization $1,000,000, shares $1 par,
ed, $670,000.

es, freehold, 4 miles east of Hinckley, at the extreme western
erior Keweenawan copper formation, showing bedded traps,
1 amygdaloidal beds, of which 4, slightly developed, show
occasional malachite from weathering. Two beds, under
out 8′ average width, traceable circa 1,500′, are opened by a
s and shafts of 40′, 14′, 116′ and 172′, developing cupriferous
ted by the company to average 3% copper and 6 oz. silver
es probably are too high.

ludes a 150-h. p. steam plant, with an 8x10″ double-drum
0′, and a 5-drill Sullivan air-compressor. There are 5 build-
20x30′ machine-shop, 10x15′ smithy, 40x60′ engine-house,
′ bunkhouse and 25x60′ boarding-house. Some promising
has been secured. Company plans trenching and deepening

RN COPPER CO. **NEWFOUNDLAND.**

nonwealth Bldg., Pittsburg, Pa. Mine office: Twillingate,
badiah Hodder, president and general manager; W. S. Tan-
nt; Roselle C. Burns, secretary; Geo. B. Klein, treasurer;
Jeremiah Doody, Titus Hodder, Robt. M. Ewing and Chas.
tors. Organized circa 1905, with capitalization $100,000,
s selling stock at $5 per share, January, 1909.

es, freehold, on Twillingate North Island, on the eastern coast
said to be in the vicinity of the Tilt Cove mine. Company
wide, uncovered for one-half mile and tested to depth of 200′,
ite assaying 2 to 27.4% copper, and company claimed, early
being mined averaged 12% copper, which claim is too high
s of this district, as developed elsewhere, average about 4%
ur and $1.50 gold per ton, and are somewhat bunchy, with
tly found in connection with the chalcopyrite. Company
1910, that it had cut a 7′ vein of practically solid ore. Mine is

cludes steam power and a hoist, with a tram-line and 2,000-
sea. Company claimed, January, 1909, to employ about 20
ning about 25 tons of 12% ore daily. Presumably idle.

ERN COPPER & GOLD MINING OF QUEENSLAND. **AUSTRALIA.**

reorganized July 31, 1903, as Rosewood Creek Copper & Gold
Formerly at Rosewood, Churchill Co., Queensland, Australia.

ERN COPPER MINING CO. **UTAH.**

er office was Ogden, Utah. W. McGee, was president; Dan-
resident; S. H. Browne, secretary and treasurer. Organized

1904, under laws of Utah, with capitalization $100,000, s
were in the Sierra Madre district. Apparently little o
Formerly at Utah Hot Springs, Box Elder Co., Utah.

GREAT NORTHERN COPPER SMELTING CO.

Works office: Newcastle, Northumberland Co., N. S.
erty is a small smelter, turning out blister copper of about
carrying varying quantities of gold and silver. Presuma

GREAT NORTHERN DEVELOPMENT CO.

Office: 2 Rector St., New York, N. Y. Operating o
Mine office: Kotsina, Copper River district, Alaska. J
dent; Wm. B. Thompson, vice-president; Walter M. Brigg
urer; Edwin F. Gray, general manager; preceding officer
directors. Organized 1906, under laws of Maine, with cap
shares $10 par, nonassessable; issued, $500,000. Is a h
sumably operating through some subsidiary.

Lands are a solid tract of about 130 claims, are circa
ately south of the camp, which is on the south bank of the
the mouth of Roaring Creek, about 60 miles, as the crow fl
mine of the Kennecott company. Lands apparently lie in
tion. Development is by 5 or 6 tunnels, and about 50 men
Company has expended about $100,000 in development
extremely high, paying $1 per pound for hay for horses
include camp structures, and a sawmill driven by a Pelto
head, taking water from Roaring Creek. Company has a
to Tonsina, the nearest rail station.

GREAT NORTHERN GOLD & COPPER MINING & MILLING CO.

Mine office: Lostine, Wallowa Co., Ore. E. T. Slu
last accounts. Lands, 13 claims, south of Lostine, said
argentiferous copper ore, on which a little work was done,
years and presumably moribund.

GREAT NORTHERN MINING CO.

Office: Los Angeles, Cal. Letter returned unclaim
office, Burke, Shoshone Co., Idaho. Edwin Eisman, su
accounts. Lands, 6 claims, about one-half mile above
Hercules and Great Western mines, traversed by a fissure
width. Development is by a tunnel of circa 400′, with
showing a little chalcopyrite and silver chlorides. Idle.

GREAT NORTHERN MINING CO.

Dead. Formerly at Baring, King Co., Wash.

GREAT PECK MINE CO.

Dead. Formerly at Providence, Yavapai Co., Ariz.

GREAT PYRAMID COPPER & GOLD MINES.

Mine office: Ravenswood, Gladstone Co., Queensla
Rew, manager. Lands include the Malpass property, o
showing a 25′ gossan. Mine, slightly developed, shows
tiferous copper ore, assaying up to 38% copper, 15 oz. sil
per long ton. Was developing with a small force, 1910.

GREAT REPUBLIC COPPER & GOLD MINING CO.

Office: New Philadelphia, Ohio. Mine office: T
Ariz. Michael Siebold, president; L. E. Stegner, vice-p
secretary; C. D. Grimes, treasurer; preceding officers, W
Ballard, directors; Geo. Oakman, general manager. A.
[illegible] ized May 1, 1901, under laws of Arizona
$3[illegible] par; issued, circa $2,300,000. Annu
d[illegible]

s, area 660 acres, and a 20-acre smelter-site, in 3 groups, 2 in the Black Cañon district of the Bradshaw Mountains. itic schists and diorite, carrying fissure veins showing occa- and malachite, but mainly azurite, chalcopyrite and bornite, y to average 4% copper, 3.5 oz. silver and from a trace to $6 mine has a 726′ two-compartment shaft, on the Columbia 00′ shafts, and various pits of 10′ to 40′ depth, and tunnels of out 3,000′ of workings. Equipment includes 15-h. p. and ts, and a small air-compressor, with several mine buildings.

D COPPER MINING CO. **WYOMING.**

Colonial Security Co., 161 Summer St., Boston, Mass. laimed from former mine office, Granite Cañon, Laramie er H. Parker, president; John Laughrey, vice-president and as. B. Lamont, secretary. Organized Sept. 30, 1902, under h capitalization $1,000,000, shares 50 cents par. Lands, ellaneous lands giving total holdings of 640 acres, in the t, said to show 6 veins, of about 8′ average width, opened and pits, claimed to give average assays of circa 7% copper, tes, sulphides and chlorides, with occasional native copper. 04, from lack of funds; has an overdue mortgage, and seems n.

COPPER CO. **ARIZONA.**

, Ia. Mine office: Courtland, Cochise Co., Ariz. Col. president; Edw. A. Young, secretary; C. H. Young, treas- ers, John W. Young and P. B. Warnekross, directors; W. J. perintendent; F. J. Gibbons, engineer. Organized Oct. 22, Arizona, with capitalization $1,000,000, shares $10 par, issued.

s, 23 patented, area 460 acres, in the Turquoise district, in a Mountains. Property shows limestone, intruded by diorite g irregular ore bodies as replacements in limestone, near the e 3 ore bodies, having iron cappings, succeeded by a leached xidized ores, including oxides and carbonates, with occa- chlorides and silicates, succeeded by secondary sulphides, the g irregularly into the secondary sulphides. Mine is opened by 3-compartment vertical shafts: Mary, of 310′; Mamie, of 0′, and Humboldt, of 200′. Management estimates the sul- e about 7% copper. The mine was discovered 1897, opened nd reopened 1908. Some churn drilling was done, 1910. ides a 300-h. p. steam and electric plant, owned jointly with onsolidated Mining Co., with 2 double-drum electric hoists, 1 -drill air-compressor. There are 13 buildings, and shipping- gun circa August, 1908, was 4,300 tons of ore, averaging 5.9% 219 lbs. fine copper in 1909, and circa 2,250,000 lbs. in 1910. so smelter. Company employs about 60 men, and plans development and churn drilling, for 1911.

COPPER CO. **ARIZONA.**

y at Globe, Gila Co., Ariz. Described Vol. VIII.

COPPER CO. **MONTANA.**

y at Butte, Silver Bow Co., Mont. Described Vol. VI.

COPPER CO. **NEVADA.**

tockjobbing enterprise. Formerly at Reno, Washoe Co., l. VI.

COPPER MINING CO. **AUSTRALIA.**

y at Lewis Ponds, Bathurst Co., N. S. W., Australia. De-

GREAT WESTERN GOLD CO.

Dead. Was a stockjobbing enterprise, succeeded, Copper Co. Formerly at Ingot, Shasta Co., Cal. Very fu

GREAT WESTERN GOLD & COPPER CO.

Office: Provo, Utah. Mine office: Park City, Sun Knight, president; W. Lester Mangum, secretary. Lan Cottonwood Cañon, adjoining the Daly Judge, show an width, giving assays of 3 to 5% copper. Idle some years and working the property through the long tunnel of th & Tunnel Co.

GREAT WESTERN GOLD & COPPER MINING CO

Office: Equitable Bldg., New York, N. Y. Lett from former mine office, Butte, Silver Bow Co., Mont. dent. Organized under laws of South Dakota, with c shares $1 par. Lands, 1 claim, area 20 acres, near Butte. and lease on a gold claim at Cripple Creek, Colo. Idle son

GREAT WESTERN GOLD & SILVER CO.

Mine office: Dragoon, Cochise Co., Ariz. Organ Lands, in the Dragoon Mountains, show auriferous and copper ores. Idle.

GREAT WESTERN MINING CO.

Office and mine: Burke, Shoshone Co., Idaho. W. Max Cyr, vice-president; T. H. Scott, secretary and ma treasurer; preceding officers, Jas. Girton and Victor Huo claims, patented, circa 3 miles from Burke, having a vein surface, traced about 1,200′ by trenching, carrying arg The mine has tunnels of 1,270′ and circa 900′, and a 207′ a 30′ blind vein carrying silver-lead ore. Work was About 600′ of diamond drilling was done in 1909. Equi hoist, and a small Rand air-compressor, driven by a 6-h.

GREAT WESTERN MINING, MILLING & SMELTING

Office and mine: Pocatello, Bannock Co., Idaho. dent and manager; M. G. Canlon, vice-president and se treasurer. Organized Oct. 6, 1902, under laws of Idah $1,000,000, shares $1 par, assessable. Lands, 24 claims, from a railroad, in the Ft. Hall district, developed by t about 2,000′ of workings, showing auriferous and argenti ores.

GREENBACK COPPER CO.

Mine office: Woody, Kern Co., Cal. Lands, 1,520 Jasmin, on the Porterville branch of the Southern Paci rock is granodiorite, showing an ore zone carrying lenses with granite walls irregularly impregnated with chalcopy by a 185′ incline shaft, with 3 levels opened. Carbonat upper levels have averaged 19.4% copper and 5.7 oz. silver years.

GREEN COPPER CO.

Dead. Was put out of business, 1906, by an injun Amalgamated Copper Co., restraining the Green from mi by the Amalgamated. Formerly at Butte, Silver Bow Co

GREEN DRAGON COPPER CO.

Dead. Formerly at Greenwater, Inyo Co., Cal.

GREENE CANANEA COPPER CO.

Office: 1400 Alworth Bldg., Duluth, Minn. Mi La Cananea, Arizpe, Sonora, Mex. Thos. F. Cole, presid vice-president and treasurer; Jos. B. Cotton and Chas. D.

, Myron M. Parker, Philip L. Foster, Chester A. Congdon, Jas. as. Hoatson and John D. Ryan, directors; Frederic R. Ken- Jos. W. Allen and Daniel R. Smith, assistant secretaries; Wm. tant treasurer; Dr. L. D. Ricketts, general manager; Arcadius l solicitor; Henry B. Paull, auditor; D. K. Kurtz, assistant Kirk, mine superintendent; Arthur C. Cole, smelter superin- . Strachan, mill superintendent; Geo. Young, superintendent partment; T. Evans, superintendent lumber and fuel depart- gton, consulting mechanical engineer.

Dec. 26, 1906, under laws of Minnesota, with capitalization es $20 par; issued, $50,000,000. New York Trust Co. and Old , Boston, transfer agents; Bankers Trust Co., New York, and t Co., Boston, registrars. Shares are listed on the Boston stock

Cananea Copper Co. is a securities-holding corporation solely, gh stock ownership, the Greene Consolidated Copper Co. and tral Copper Co. The Greene Cananea exchanged its shares he two subsidiary corporations on the basis of 1½ shares for ene Consolidated, and 1⅔ shares for each share of Cananea ange calling for $50,000,000 of stock of the Greene Cananea to the shares of the Greene Consolidated and Cananea Central. nea owned 945,320 shares of Greene Consolidated at the end of same time owned all but 212 shares of the issued stock of the Copper Co.

s of this company with its subsidiaries is as follows: The Copper Co. controls, by stock ownership, the Greene Consoli- ., and the Cananea Central Copper Co. The property of the ted Copper Co. consists exclusively of the entire capital stock Consolidated Copper Co., S. A., organized under the laws of nanea Central Copper Co. owns the entire capital stock of the r Co., S. A., organized under the laws of México; the entire the América Mining Co., S. A., organized under the laws of but a few shares of the capital stock of the Cananea-Duluth e Cananea-Duluth Copper Co. owns the entire capital stock Development Co., S. A., a corporation organized under the The Cananea Consolidated Copper Co., S. A., and the San ., S. A., own, jointly, the property formerly held by the Indiana- Mining Co., which was taken over in 1910, a 60% interest in the belonging to the Cananea Consolidated, and a 40% interest San Pedro. The various subsidiary corporations herein named nd described elsewhere in this volume, under their respective ganization, finances and officers are concerned, but the physical of these various subsidiaries are described hereinafter, in this of the Greene Cananea, for the reason that these properties unit, and no description would be complete, or easily under- properties were segregated and described separately.

ion has arisen in the public mind regarding the financial affairs nanea, because of its interlocking relations with the Greene Cananea Consolidated, financial figures pertaining to the two porations being confused most frequently with the Greene smuch as the Greene Cananea is a securities-holding corpora- ole revenue is from dividends of subsidiary corporations, none n the dividend list, it is evident that confusion is almost una- e circumstances, especially as the Greene Cananea is the com- public is interested, through share ownership. The reader ain a full and satisfactory understanding of the financial rela-

tions and ramifications of this company should read also, i
description, the various descriptions of the different sub
corporations previously named. Because the Greene C
holding corporation only, and none of its subsidiaries ar
balance sheet is extremely brief and unilluminating, inco
loans from subsidiaries, and outgo consisting solely of
eral expenses, of only about $15,000 yearly. The balance
showed cash on hand of $3,327.54, but a statement of th
the consolidated figures of the various subsidiary compa
$4,921,671 in quick assets, above current indebtedness.

Litigation with the Cobre Grande Copper Co., over
Cobre Grande mine, has been dragging since 1899, but all
this company's favor. There was much litigation over tit
redenounced, 1902, and direct title taken from the Mexica
Cananea Consolidated Copper Co., S. A.

The mineral lands of this company and its subsidiaries
the Mexican government, are 12,865 hectares, or 31,776
surface rights to 140,342 hectares, or 346,643 acres. Th
the municipality of Ronquillo, about 20 miles south of the
free zone of northern Sonora, in the Sierra de Cananea, an
mines and prospects. The authentic history of the Can
A. D. 1568, but it is thought that the mines were opened b
to the conquest. All of the mines and buildings of the com
its own lands, and the company also owns valuable reside
townsite of Cananea, on the mesa to the eastward of Ron
located the best public buildings, hotels and dwellings, an
company's local officials. The company holds valuable
municipal, state and federal governments, among which
water supply, electric light and telephone systems, which a
The company also has a franchise for a street railway sy
ment concessions to prospect for oil in the state of Sonora.

The Sierra de Cananea is an isolated mountain range
the Sonoran plateau, rising from the valleys of the headwa
San Pedro rivers, the range having a length of about 25
width of 6 to 10 miles, with a northwesterly strike, div
marked and nearly equal sections, by Puertecitos Pass,
Greene Cananea being south of this pass, and near the cen
on a mineral belt apparently having a strike practically pa
range. In the vicinity of the mines, the mountain range c
tral core of old eruptive granites, on which rest quartzites
bly of Paleozoic age. There is a very complex series of er
11 different occurrences are recognized, but the ore seems
a diorite-porphyry, which is one of the later eruptives,
quartz-porphyry of still later origin. The mines are distri
belt, or series of belts, consisting of sedimentary rocks, dio
porphyry and tuffs, the width of the ore zone, or serie
being about 2 miles, with a length of about 6 miles, in an ai
are distinct, and vary greatly, 3 main classes of ore depo
The first class has secondary deposits of chalcocite, associa
massive or disseminated, along shear-zones in diorite-po
class includes contact deposits carrying chalcopyrite, asso
some sphalerite, in a matrix of altered limestone, while th
of disseminated chalcopyrite, associated with sphalerite,
breccia. Some of the ore bodies have large gossans, but a
tive occasionally, and much of what appears gossan, at a

merely weathered conglomerate, showing reddish-brown stains
the iron colors.

the Cananea Consolidated Copper Co. were divided originally
n as the Cobre Grande, Veta Grande, Esperanza, Capote and
one including a number of different mines, but, with the acqui-
properties, the development of new mines, and the develop-
dies in old mines, this plan of division into zones has fallen into
nines are described hereinafter in the order of their occurrence,
northwest.

ands of the Cananea Central are 3,708 acres, including the
bsidiary corporations, comprising the Cananea-Duluth, Dos
. and Bonanza mines.

Duluth mine has an ore body of circa 1,150′ length, occurring
ars in diorite breccia, which appears to be an intrusion through
being richest near the tuff contacts, and in places upwards of
re is exclusively of concentrating grade, with gross values of
nd 2 oz. silver per ton, with small quantities of gold. Devel-
ts, one having an electric hoist, with several miles of workings.
of the América mine occurs in porphyry intrusions in volcanic
vertical veins and one nearly horizontal shear. Ore is chal-
ooth massive and disseminated in porphyry. The América
s, some showing rich ore. The Bonanza mine of the América
re assaying up to 32% copper, 15 oz. silver and $2 gold per ton,
ore is very much below these figures.

ande mine, which was the original mine of the Cananea dis-
very ancient times, and was worked, in a crude way, by the
for several generations. Ore occurrence is similar to the
obre Grande was reopened, 1910, after 8 years idleness, and
oist. The mine had upwards of a mile of workings when re-
ction, at the end of 1910, was about 100 tons daily, of 3.5 to 4%
dapted to concentration, but used for converter linings. Ores
chalcocite and melaconite, disseminated in porphyry along the
ertical shears, which shears contain some massive sulphides of
e Cobre Grande has an office building, smithy and change-

e has an extensive area of highly altered limestone, capped
yry, cut in places by small irregular dikes and intrusions of
The ore is in contact metamorphic zones of altered limestone
ition, but with large excess of sulphur, and is not amenable to
being hand-picked, as mined, the selected product carrying
ith about ¾ oz. of silver to each unit of copper, with a

nde, Oversight and Capote mines have great deposits of con-
h some ore of smelting grade, in which the values are in chal-
ed or massive, in broad shear-zones through diorite-porphyry.
re is of concentrating grade, averaging about 3% copper, the
ing 2 enormous ore bodies. The Veta Grande proper has a
average width up to 200′, known length of 726′, and known
The Massey ore body, opened 1904, has been proven to 750′
00′ in length, some of the ore assaying up to 7% copper, with
d silver values of about $2 per ton. There also is a 150′ ore
ging-wall, carrying silicious ore used for converter linings.
ble native copper in the upper workings, gangue being talcose,
uartz. Extraction is mainly through the Veta Grande tunnel
ngth, which serves both the Veta Grande and Oversight mines,
ically a continuation of the Veta Grande, this tunnel connect-

ing also with the Capote tunnel. Owing to soft ground, abo
has been concreted. The Veta Grande is timbered with sq
depleted stopes were filled with waste, ore being mined in
100′ slices for mining after worked-out stopes were filled in.
system is by slicing, a modification of the caving plan. The
gave consideration to stripping the felsite capping above t
mated at 850,000 cubic yards. The Veta Grande No. 5
good for 1,000′, operating 2 cages in balance, and there is
7-drill air-compressor, smithy and framing-shop at this mi

The Oversight mine, which is practically a continuatio
is served by Veta Grande tunnel No. 9, and considerable ne
1909–1910. The Oversight produces about 1,000 tons of
being the largest of any of the mines.

The Capote mine differs from the Veta Grande and Ov
only carries disseminated ores in diorite-porphyry, but also
ite, through which the porphyry intrudes. The Capote is a
but has made only a small production for the past 4 years
which is now under control. The mine was allowed to
which extinguished the fire in the lower levels, though th
between the fourth level and surface, but appears to be effe
cut out of the deeper workings. Ore of both smelting and
existed in notable quantities on the seventh level, when th
until recently it was impracticable to work this part of th
deep. Since the fire was gotten under control, fine ore
and concentrating grades have been opened above the s
ment is now being prosecuted on the seventh level, at a dep
at this depth, carrying chalcocite, associated with a very
commercial ore has not been opened on this level as ye
workings are on the seventh level, 300′ above, and a winz
footwall, to connect the seventh and tenth levels, from whi
prospected, 1911. The Capote has 4 main shafts, known
but extraction is mainly by tunnel, the main working level
tunnel connecting with shafts Nos. 2, 4, 5 and 7, at extre
Ore of the Capote consists essentially of pyrite, coated with
cite, occurring in thin crystalline grains, disseminated throu
ore being highly silicious. The Capote has ore-sorting bi
compressor.

The Mina Grande, now idle, is north of the Veta Gra
zone, and southwest of the concentrators.

The Sierra de Cobre mine, area 164 hectares, taken
Indiana-Sonora Copper & Mining Co., has rhyolite, qua
carrying at least 4 large ore bodies, of very irregular outlin
tal dip, the main ore body showing a width up to 300′, with
carrying chalcocite and chalcopyrite. The old workings i
1,800′ Llave tunnel developing the main ore body, on
Capote mine. The Eureka tunnel is about 1,200′ long, a
stone tunnel, is about 4,000′ long. There also are shafts o
100′ and 100′. The mine had about 4 miles of workings,
had been estimated to show about 400,000 tons of silicio
grade. Active ore extraction was begun March, 1910, and
has averaged nearly 7,000 tons monthly, the ore mined
massive sulphide, carrying better than 4.5% copper, very
each unit of copper, and 20 to 40 cents gold per ton, gangu
iron, 30% sulphur and 6% lime, with 12% insoluble. Th
mined was opened, 1910, at vertical depth of 240′ below the
and apparently holds its values at this depth. The Com

ote mine, runs for about one-half mile through the Indiana-
depth of 800′, to the Elisa mine. The old Sierra de Cobre
ed by the América mine. The so-called Eureka mine, at the
f the Sierra de Cobre, is an ore body rather than a separate
the Sierra de Cobre. The Combination tunnel shows notable
lphide ore, 450′ below the present producing level. Three
ave entered 4% ore, and one has penetrated the ore, which
ness of about 50′, the ore body lying nearly flat, and occurring
ts limits as yet unknown. The Sierra de Cobre also has dis-
orite-porphyry, on which no development work has been done
and, in addition, there is an extensive tract of undeveloped
e limestone areas, along which ore of smelting grade has been
nine, and elsewhere.

Cobre has shipping bins at the mouth of the Llave tunnel, and
lway, connecting with the main line of the Greene Cananea.
s 7 hoists, of 25 to 150 h. p., and an air-compressor. There
ngs, including a 20x20′ carpenter-shop, 25x50′ machine-shop,
oratory, office and dwellings.

e, northwest of the Sierra de Cobre, has a number of lenses of
ately parallel to a nearly vertical fault between limestone and
enses occurring in limestone from the point of contact, for a
g a zone of about 1,500′ length, ore being chalcopyrite, asso-
in a garnetiferous gangue. The ore carries fair silver and gold
n self-fluxing, and, in addition to good iron contents, carries
, being a most desirable fluxing smelting ore. Developments
ls, 1910, were exceedingly satisfactory. The Combination
Elisa mine about 3,000′ from its portal, and passes 40′ below
Connections have been made, and ore is now extracted
l, and delivered into bins in the Capote basin, instead of being
ne formerly. The main shaft of the Elisa is 540′ deep, and a
ted, late 1910, to be sunk circa 600′.

l mine is about a mile northwest of the Elisa, and a little work
utcrop, circa 1908.

mine, about one-half mile northwest of the Pavo Real, has
ious ore of fair grade, in a contact apparently between diorite-
rtz-porphyry. The Henrietta was closed, August, 1910, when
was curtailed, but work is to be resumed later, as there is
ry for development, and it is probable that the Combination
ended under this ground, eventually, though the distance is
from the present face of the tunnel.

exicana mine is a small property, about one-half mile south-
tta, and is idle.

os mines, which are the westernmost of the property, are
st, and slightly north, of the Elisa, and show a mammoth out-
width, of lime, iron and garnet, carrying copper carbonates,
yrite and bornite, the oxidized zone, which is comparatively
onsiderable malachite and azurite, with occasional cuprite and
ceeded by chalcopyrite, with some bornite, in a lime-garnet-
Large areas of this outcrop carry minable ore, and great
made. The ore as broken requires cobbing and hand-sorting,
f the material broken being shipped for smelting. The ore
opper, upwards of 3 oz. silver and 40 cents gold per ton. The
ertecitos mines are known as the Ventura on the east, having
árez, 1,200′ next west, and the Elenita, 900′ west of the Juárez.
ded August, 1910.

The mines as a whole have about 60 miles of working
been 65,000′ for 17 months ending 1907; 46,911′ in 190
in addition to sub-drifts and other stoping work. Heavy
made on the mines, and they are now better developed
capable of heavier production, than ever before. Extr
working tunnels, double-tracked and electric-lighted,
pulling 10-ton cars. The mines consume yearly, for timbe
of pine and fir, mainly from Oregon, though a limited sup
Sierra Madre. Considerable ore is mined by the slicing s
fication of the caving plan. The ore bodies lie rather de
unavailable for opencast workings, except in the case of
decrease in copper contents with depth, but the sulphid
silver values in the lower workings. The proportion o
extraction was 28% in 1909, and 34% in 1910, the incre
been due mainly to the ability of the smelter to handle
formerly.

The concentrating department has a daily capaci
consists of a crushing plant, sampling mill, 2 concentrat
with the adjuncts of a boiler plant, machine-shop, s
warehouse, office building and water supply.

The crushing plant, of 200 tons hourly capacity, is
mill, with bin storage capacity for 2,000 tons of ore, fro
brought in 30-ton Ingoldsby side-dumping cars. From
30″ conveying belt, 275′ long, by an automatic plunger
mounted on a horizontal track, which traverses the entire
and can be placed at any of the 8 subdivisions of the m
conveyor belt is delivered to 2 grizzlies, at an angle of 48°,
bars, through product going by 18″ conveyor to a 24″ con
ton mill-bins, oversize going to two 36″ picking belts, e
center, where high grade ore is hand-picked, and steel, we
removed, wood being burned in the boilers, and steel and
mines. Ore after picking is delivered to crusher bins,
plunger feeders to five 10x20″ Blake crushers of Canane
1½″ size, product passing to 16x36″ Allis-Chalmers rolls,
pass a 1″ ring. Product of the rolls passes to an 18″ conve
the machines, and is delivered to a 24″ conveyor at an incli
delivers the ore, together with grizzly undersize, to the m
plant is electrically driven, and an automatic sampler,
conveyor, takes a cut of one-fortieth, which is ground an
samples, rejects dropping to the elevator and returning to

There are 2 concentrators, overhauled 1909–1910, on
given Cole drag classifiers, increasing their capacity by a

The two mills have practically the same flow-sheet,
ing is carried further in rolls, and fewer Chilean mills are
are supplemented by vanner-houses across the gulch, each
Each mill has 4,800-ton storage bins, taking ore from the
received from automatic feeders, and screened, and conce
material coarser than ¾″ ring that has passed from a 1″
crushing rolls. The various coarse sizes are passed to
from jigs coarser than ⅜″ size are passed through rolls
through screens, so that no material coarser than ⅜″ ri
mills. These mills are doing excellent work, putting ab
and saving 75 to 78% of the assay values, at a cost of on
1910. Considering that the gangue is highly silicious an
the pulp from the Chilean mills carries about 60% of n
mesh, and about 50% of colloids that are impalpable,

ene Cananea mills constitute a distinct metallurgical triumph.
wood, covered and roofed with corrugated iron, has concrete
2 sections of circa 650 tons daily capacity each, and has a
50 square feet.
steel frame, terraced throughout, covers 33,320 square feet,
as, of circa 850 tons daily capacity each. The foundation of
on a rock base, independent of the wooden floors. In each
ill the ore passes to two $\frac{5}{8}$″ trommels, and undersize to two
lersize from latter passing to two $\frac{3}{16}$″ trommels, and undersize
r 2-mm. trommels. The coarse screens are 6′, and balance of
, by 4′ in diameter. The coarser material is concentrated on
lings below a $\frac{5}{8}$″ ring pass to 4 Chilean mills, where ground to
reen. Pulp from the Chilean mills is deslimed in Cole drag
arser sands are classified and passed to 30 Wilfley tables, very
es going in part to 36 vanners, tailings from which go to large
middlings therefrom are reconcentrated in the vanner-house
No. 2 mill has a cooling tower, built 1909.
lant at the mills includes a separate boiler-house, with six 250-
rs, and an engine-house for each mill, the power plant for No. 1
400-h. p. 16x36″ Murray tandem compound engine and a 325-
Minneapolis cross-compound engine. Mill No. 2 has a 400-h. p.
3x32x36″ cross-compound engine, and two 600-kw. electric gen-
gines are located on about the center line of each section.
formerly lost, though containing a gross value, in copper, silver
t $2 per ton, are now impounded, this being done by throwing
he cañon, making a dam of the coarse tailings, and allowing the
above this dam. The tailings dam has a float, with a pump
g clear water back to the mill. Slimes from the slum-pond are
nt for converter linings, and precipitation tanks secure consid-
pper from the tailings. Owing to scanty water supply, water
igs is sent to the jig floor and used upon middlings, and water
gs is used upon the sands, and thence back to the coarse jigs
e Wilfley tables the water goes to the thickners, and from the
recovered in settling tanks, the amount of water recovered by
mbination of economies being 87.5%, hence every gallon of
do duty 8 times over.
g plant, of about 3,000 tons daily capacity, includes a calcining
erberatory department, blast-furnace department, converter
briquetting plant, with ore and coke bins, and mixing beds.
ding plant has 3 beds, each 50x450′, and of 9,000 tons capacity,
horoughly mixed by traveling belts that distribute the ore and
eted bed is reclaimed by a machine that advances into the face
lischarges into a conveyor that delivers the mixed charge into
each of the blast-furnaces. The reclaiming machine has a
t 175 tons per hour.
me roaster building has four 18′ six-hearth McDougal calciners,
was being enlarged, early 1911, and 6 additional roasters of the
be added, and a new 115x25x15′ brick dust-chamber installed.
partment also has a bedding system, with 500-ton receiving bins
n beds, 50x250′ in size, equipped with automatic assimilators
rs, to mix and feed concentrates for the roasting plant. The
arge will be reclaimed and delivered, by belt-conveyors, into
he roasters. Calcines are hauled by electric locomotives to the

ratory plant has two 19x100′ furnaces, fired by petroleum. The
under the old management, was built 27x120′ in size, but did

not give satisfactory results, and was cut down in size. reverberatories fire three 300-h. p. and five 250-h. p. boile and then pass through a fuel economizer system of 1,152 then through a 130′ brick flue to a 152′ smokestack of 12′ 6 skimmed into pots of 45 cu. ft. capacity, and hauled to locomotives. The matte is tapped into ladle-cars of 66 cu to the converter building, and transferred by electric cran

The 33x312′ blast-furnace building is of steel frame, roof, and has eight 48x212″ blast-furnaces. The old plant of 7 different types, all of which were scrapped. Char gravity, from 75-ton steel bins above the furnaces, into on pers, of which there are 5 to each furnace, discharging dire man caring for the charging of 2 furnaces. Seven small s have been replaced by 4 large settlers, each serving 2 furns size inside of the brick linings. Settlers skim continuous slag-cars of 75 cu. ft. capacity, and slag-trains of 6 to 8 c dump by two 25-h. p. and two 40-h. p. electric locomotives slag-line. Matte is tapped from the settlers into cast-stee capacity, and transferred to the converters by electric cran building has 3,000-ton coke-bins, coke charges being whe shoveled into furnaces by hand.

Gases from the furnaces discharge into a steel balloon flu thence through 2 cross-flues of circa 12′ diameter and 2 goo eter, into the main brick dust-chamber, which is 60x181x3 main chamber then passing through a brick dust-flue 20x secondary dust-chamber 84x34′ 8″x23′ 6″ in size, and thence supporting steel stack, 16′ 6″ in diameter, standing on a 2 dust is drawn from the dust-chamber and balloon flue, fe trammed to the reverberatory furnaces.

The 65x481′ converter building, of steel frame, with iro 40-ton and 50-ton electric cranes with double auxiliary hoist each with a clear hoist of 40′ to the main blocks. There a electrically, with twenty 96x135″ shells, of barrel type. Co movable hoods, leading to primary and secondary dust-ch course of erection, to care for converter gases, a steel flue 7′ long, discharging into a 26x104x20′ steel dust-chamber lead 12′ diameter. A railroad track runs under each stand, and fitted with six 300-lb. ingot moulds each, there being 24 c Ingots are hauled, in cars, by electric locomotives, to the bu dumped, cleaned, weighed, sampled by electric drills and cars. Converter slag is skimmed direct into 45 cu. ft. pot mixing plant, where the pots are tapped, through holes i cast-iron launder that discharges into a mixing-pot below. launder, just before entering the mixing-pot, a stream of fl from a hopper into the slag. The product from the mixing and reclaimed by hand, loaded into narrow-gauge railwa to the blast-furnaces, through the bedding plant. The mi 15% flue-dust, and makes a porous sintered product that handled. This sintering plant is in 4 units, each containing dust-hopper.

The lining department, at the eastern end of the co 1,500-ton wooden storage-bins, two 10x20″ Blake-Cananea rolls and two 5′ mixing pans, operated by a 125-h. p. crushed, mixed and prepared in this building, and tramme form, where tamped into shells by 3 pneumatic rammers, sh removed to drying stalls, and dried with oil.

ing plant has a 225-ton Mould plunger press, and a 100-ton
press, briquettes being sent by belt-conveyors to the charging
furnaces. Owing to the change in system, by which flue-dust
s, in the sintering plant, little briquetting is done.
ca April, 1911, the Greene Cananea treats Miami concentrates,
ntract, and has built 500-ton bins near the smelter for these
they will be very fine, it is planned using the Miami material
ct into the converters, through the tuyeres.
lant was completely overhauled and rebuilt, 1909–1910, and
m the central plant was substituted for steam throughout the
except in the mills, at the end of 1910. The power plant has
entralized, and the rebuilding of the plant, effected at heavy
a cost of less than $8 per h. p. month in 1910, compared with
th in 1907. The power-house is flanked on one side by the
er plant, and on the other side by a 45x216′ steel frame boiler-
500-h. p. Cahill boiler, four 250-h. p. Stirling water-tube boilers,
Union Iron Works Elephant type boilers, giving a total capac-
for this boiler plant, in addition to 2,300 h. p. from the rever-
The boilers in the main plant are equipped with Kittle oil-
lifornia petroleum, substituted, 1910, for Texas oil, daily con-
out 1,000 bbls. The California oil is so thick that it has to be
. The reverberatory plant has three 300-h. p. Stirling, two
, and three 300-h. p. Cahill boilers, fired with waste gases,
housed in a new steel building, in connection with which is a
of Green fuel economizers, and all water-tube boilers are
ster superheaters. Feed-water is treated for the removal of
terial, carefully measured, and fed to boilers by electrically
pumps. The power-house has 2 counter-current barometric
with separate water pump and dry air pump, latter steam-
steam from the pumping engines is used to heat feed-water,
t for removal of scale. There are three 100,000-gallon oil-
h 6″ pipe-lines for filling from the tank-house, and oil is drawn
y pipelines leading to the boiler-room. The fuel oil storage
0 barrels. The boiler plant has 3,500-ton coal bunkers, with
coal, but these are not in use, owing to the substitution of

main power station engine-house is of steel frame, with iron
d a concrete floor for its entire area. For general power pur-
ree 1,500-kw. Curtis horizontal turbo-generators, delivering a
t at 60 cycles, so arranged that they may be run in parallel with
Intosh-Seymour vertical compound condensing D. C. units.
. Nordberg compound condensing direct-connected D. C. unit,
. C. vertical compound direct-connected unit of the old type,
r to start the electric machines. Furnace blast is supplied by
rdberg cross-compound condensing engine, one 400-h. p. Allis
d condensing engine, and 3 Murray tandem-compound con-
f 100, 325 and 350 h. p., these engines being attached to one
10 Connersville blowers, these and a Nordberg direct-blowing
combined capacity of 120,000 cu. ft. of free air per minute.
l to the furnaces in a new 6′ blast-main, displacing the smaller
sed. The converter blast is furnished by one 500-h. p. Inger-
ompound condensing air-compressor, and two 450-h. p. Allis
condensing air-compressors, converter blast being conveyed
0″ main. All engines, with the exception of the pumping en-
sing, and latter may be operated condensing or not, in accord-
d of steam used for feed-water heating. The power-house also

has a 60-drill Ingersoll-Rand 2-stage cross-compound air-
air to the mines, for power drills, at 90 lbs. initial pre
Ingersoll-Rand air-compressor, operated at 90 lbs. press
for pneumatic tampers to line the converters, and for va
about the plant. Adjacent to the powerhouse is a transfo
the 2,300-volt current generated is stepped up to 11,000 vo
the more distant mines, where again stepped down for use.

Three of the main hoists at the various mines have
electrically operated machines, handling double-deck cag
giving very satisfactory work. All hoisting and pumpin
since late 1910, and all of the old steam plants at the va
abandoned.

In the Capote basin there is a 25-drill Ingersoll-Rand
connected to a 2,300-volt Allis-Chalmers motor, which
in raising pressure in the air-mains for the outlying distric
pressor in the central power station is connected with the
11" main, with 8" and 6" branches leading to the more in

The principal shops, on the slag-dump, near the smelt
and are thoroughly equipped with modern engines and too
a large machine-shop, equipped for heavy work; a larg
hammers; a well equipped plate and boiler shop; a 2-st
full equipment for repairing and winding any electric
main generating units; a foundry, with daily casting cap
and a half-ton of brass; a well equipped pattern shop, w
well equipped framing-mill, for mine timbers; a carpen
mill having a complete equipment for making sash and d
house. All these buildings, and the minor structures al
tracks of both the standard and narrow-gauge railways.

The question of water supply is somewhat pressing,
developed and is using all available water in the vicinity o
and, in addition, has a pumping plant at Ojo de Agua, on
Sonora River, 9 miles from the works. The Ojo de Agu
water-tube boilers and a Riedler high-duty compound co
able of delivering 1,500,000 gallons of water daily, against
head of 967'. A 10" main connects this pumping station
tank, on the top of a hill above the concentrator, and wa
mines, reduction plants and towns, under a substantial
water being used exclusively for domestic purposes an
boilers. Water developed in the territory adjacent to th
wooden pipelines to the concentrators, and there used for w
pressure tanks, on a hill in the vicinity of the Cobre Gran
system having 9,300' of mains, and 4,000' of 2½" fire h
valley water system has about 25 miles of mains, from 2" to

The mine railway system includes about 35 miles o
56" gauge lines, including branches, spurs and sidetracks.
standard gauge for part of this distance, between the
main line is laid with 56-lb
and 9 narrow gauge locomotive
and are 25-ton steel-ore cars. Ra
Cananea, Rio Yaqui
Nacozari.

The construction of a railway leading to Arizona wa
This railway, a narrow gauge of 3-foot, crossed the existing
international boundary at Naco, shortly after construc
was begun, and the company discontinued its railway b

es of wagon-roads, with a 7% maximum grade, and about 35

s brick-yard has a daily productive capacity of 35,000 brick.
ls, with a combined daily capacity of 14,000 feet, board meas-
cut from the company's lands.
e branch does a very extensive business, having a large brick
enormous stock, with a branch store at Chivatera, and ware-
et rail connection. The retail mercantile business amounts to
esos yearly, when full forces are employed.
owns 5 office buildings, 11 dwellings for foremen, boarding-
ity to care for 900 men, 3 lodging-houses of 10 rooms each,
1 of 42 rooms, all of brick, a restaurant, bakery, meat-market,
bins for Mexican miners. A well-appointed clubhouse is
e American employés.
maintains a 40x100′ two-story brick hospital, having a de-
d beds for 59 patients, also a 6-ward emergency hospital at
full force of physicians, surgeons and nurses.
maintains a telephone system having about 200 miles of wire,
ruments, also an independent telephone system used for dis-
narrow-gauge railroad. A scavenger service is maintained
y of Ronquillo.
owns upwards of 400 horses, mules and burros, and has a large
e.
or a power plant on the Yaqui River is held from the Mexican
he installation of a large hydro-electric plant was under con-
ormer management.
s are about 4,000 men, including several hundred American
nd a few Chinese, but about 85% of the labor is native. All
nts and shift-bosses are Americans, but the miners and laborers
exicans. The suspension of operations in 1907, gave the com-
liminate some very undesirable native labor, which had caused
he previous year. Only workmen of the better class were re-
rations was resumed. Owing to the proximity of the property
e is an unduly large proportion of undesirables of both nations
luding Mexicans who stay near the line, in order to get across
ssary, and Americans who already have crossed the line, for
t reasons.
tion, from the beginning of operations, to Dec. 31, 1910, was
ne copper, 5,616,178 oz. silver and 34,890 oz. gold.
figures of production are for fiscal years ending July 31st, until
3, and for calendar years thereafter: 45,388,000 lbs. fine cop-
14,339 lbs. in 1904; 64,211,895 lbs. in 1905; 46,026,938 lbs. in
0,000 lbs. in 1907; 19,128,000 lbs. copper, 449,246 oz. silver
in 1908; 45,547,689 lbs. copper, 933,549 oz. silver and 5,877 oz.
491,500 lbs. copper, 1,159,789 oz. silver and 5,570 oz. gold in

1910 was 977,070 dry tons of ore, of which 332,060 tons went
lter, and 645,010 tons went to the concentrators, the latter
ry tons of concentrates, a ratio of concentration of 3.54 tons
l recovery of 47.6 lbs. copper, 1.186 oz. silver and 0.0057 oz.
re treated. For the 17 months ending Dec. 31, 1907, copper
d 46.58 lbs. per ton of ore treated. Owing to the lavish use of
the average rate of extraction, under the old management,
ecline, being 5.73% copper in 1903; 4.45% in 1904; 3.65% in
n 1906. Under the new management, average extraction was

2.329% in 1907, and 2.38% in 1910, a small gain, in pl
yearly declines noted under the former management.

Costs, under the old management, showed a marked t
increases, but the system of bookkeeping followed was s
actual costs could be ascertained only with great diffic
average cost of copper produced by the old management
than 17 cents per pound. Mining costs were $2.13 per
per ton in 1909. Cost of copper, 1909, was 10.174 cent
11.9093 cents f. o. b. New York, including all charges.
1.084 cents per pound for included gold and silver valu
of small miscellaneous revenues, net cost, of copper delive
which, plus construction charges of 1.6119 cents per poun
including construction, of 11.6403 cents per pound, deli
probably were about 11.2 cents per pound with construc
pound without construction. Operating profit, for 1910
with construction charges of $650,000, but the company i
of its long and costly campaign of construction, which sh
the first half of 1911, after an expenditure of upwards of
pletion of the construction program leaves the compan
substantial profits, even with copper ruling at a low ave
pany has discounted its bills, kept its wages paid regular
generally on a strictly business basis. The property, w
present management, was a magnificent wreck, with lar
gouged of available rich ores, and with a new and costly
only for the scrap-heap, and which has been scrapped
courage. Practically the entire property has been mad
including very extensive mining developments, the substi
for steam throughout, the complete rebuilding of one mill
the other, the enlargement of the reverberatory plant, and
ing of the smelter, with the scrapping of practically all
machinery. The benefit of this drastic policy of rehabilit
more plainly than by the figures of smelting costs, which,
concentrates, were $6.82 in 1907; $3.86 in 1908; $3.09 i
in 1910. The management confidentially predicts that t
tion, per ton of ore and concentrates, will not exceed $2.2
half of 1911. An immense amount of costly and difficul
with great skill and courage, and vast credit is due Dr. Ri
staff for the scientific and thorough rehabilitation of the
similar credit is due the directors for their courage in b
this work, which was necessarily costly and tedious, and
ant by the management being under fire, for much of the
years required for this work, from shareholders, who d
physical situation, and the absolute necessity for the w
long campaign of rejuvenation is practically completed,
has a mine with an annual productive capacity of about
per, 1,750,000 oz. silver and 8,500 oz. gold, at a cost, after
ver values, of less than 10 cents per pound, operating und
9½ cents per pound under full operation.

GREENE CONSOLIDATED COPPER CO.

Office: 2027-42 Broadway, New York, N. Y. Min
Arizpe, Sonora, Mex. Wm. D. Thornton, president; C.
dent; preceding officers, F. E. Searle, Alfred Romer, F
Notman, directors; J. W. Allen, secretary and treasure
general manager. Organized Sept. 16, 1899, under laws
capitalization increased, 1904, and again increased, 1906
$10,000,000, shares $10 par. Has paid dividends of $7,5

February, 1907. Annual meeting, second Tuesday in June. f the Greene Consolidated Copper Co. are the total stock Consolidated Copper Co., S. A., and 60% of the stock of the per & Mining Co., the remaining 40% interest being owned ral Copper Co., which is an affiliated corporation. The is controlled, through ownership of 945,320 shares, by the per Co. Fiscal year, formerly ending July 31st, was l with the calendar year. The company has authorized kilometer for a 52-kilometer railway, to be secured by a line, with principal and interest guaranteed by the Greene Co., but construction of this road was suspended, when ecured from an existing railway. Net earnings, 1909, were which an allowance of $558,451.87 was made for constructs, giving a net profit for the year of $544,107.38. The merly operated, was liquidated, early 1911. The physical ted corporations are described under title of the Greene

as organized and controlled by Col. Wm. C. Greene, and . 18, 1907, when the old board resigned, en masse, and r a new board was elected, under the control of Messrs. os. F. Cole.

ports issued by the former management, there was pracnade between the corporate affairs of the Greene Consoli- onsolidated companies, and none of the reports issued to hareholders were fair, as the statements so issued juggled reene Consolidated and Cananea Consolidated companies manner. Until the new management secured control, the Greene Consolidated had included the accounts of both the nd Cananea Consolidated, without any explanation of the nual meeting Oct. 12, 1907, every question of importance roperly to the Cananea Consolidated Copper Co., S A., eal property of the Greene Consolidated, or else to pertain a Copper Co., which owns upwards of 90% of the stock of ted Copper Co., and neither of these corporations being , the inquiring shareholders were left without information. at were inquired about have been cleared up by subsequent no fully satisfactory statement ever has been furnished. nent has distinguished carefully between the accounts of ed and the Cananea Consolidated, and has given detailed

solidated was supposed, on the strength of a statement management, to own a 51% stock interest in the Sierra r Co., but it transpired that this interest was mythical, as k was owned by the Cananea Consolidated, and this "as- he Cananea Consolidated in a direct net loss of $650,000, s of about $1,000,000, the Sierra Madre stock having been for a consideration afterwards said to have been about ash, but apparently the entire amount, less $200,000 cash, tes, and the Cananea Consolidated was obliged to pay 3 50,000, to protect its interests, these notes having been for advances made by the Greene Consolidated, when he company. This stock interest in the Sierra Madre com- ,000, was placed on the balance sheet—of the wrong com- nation of $7,650,000. At the time of the change in man- adre Land & Lumber Co. owed the Cananea Consolidated monies advanced, and, in addition to this indebtedness,

the Greene Consolidated had become the endorser of $45
Madre. The Sierra Madre stock was sold to Col. Gree
$2,000,000, with 75% of the Sierra Madre company's
further agreed to pay, and did pay, the $1,000,000 adv
Consolidated. Col. Greene also agreed to take up the
dorsed by the Greene Consolidated, and to cancel an on
the Cananea Consolidated and the Sierra Madre, by w
solidated guaranteed to take $1,000,000 worth of lumb
Sierra Madre, for a period of years. Col. Greene was ab
of the notes, and consequently the Greene Consolidated
the remainder of these notes, $300,000, bearing its endo
also was unable to pay anything on the $2,000,000 of pur
sequence the Greene Consolidated and Cananea Consolid
a joint net loss of approximately $1,000,000, this being
of $650,000, for a 51% stock interest in the Sierra Madr
plus $300,000, the balance on the $450,000 notes, and the

The mortgage given by the Sierra Madre Land & Lu
$3,000,000 of outstanding bonds, was foreclosed for nonp
all its property sold, to satisfy its bonded indebtedness
floating indebtedness of the Sierra Madre Land & Lum
this heavy bonded debt, and taking into consideration a
quirements, the management of the Greene Consolidated
be wiser to pocket a net loss of about $1,000,000 than to f
pany to the extent of about $7,000,000, which would ha
its bonds, furnish operating capital and place the prop
producing basis. Efforts were made, before the foreclosu
the Sierra Madre Land & Lumber Co., as an independent
protecting the claims of the Greene Consolidated, but th
cessful. None of the officers or directors of the Greene
its affiliated companies, were in anywise interested in
Pearson syndicate, of the former holdings of the Sierra Ma

The former management of Greene Consolidated iss
1906, stating that stockholders of the Cananea Central
over the 200,000 shares of Cananea Central stock held
dated Copper Co., and pay for same in cash, but it tra
circular was untrue, though issued officially, as the Gree
owned the 200,000 shares of Cananea Central, this stock
and nonassessable, belonging to the Cananea Consolida
The Cananea Consolidated Copper Co., S. A., however
$4,000,000 from the sale of the 200,000 shares of Canane
stock, also approximately $1,000,000, which was repaid
advances to the Sierra Madre Land & Lumber Co. Part
to take up the $300,000 of defaulted notes previously r
company's endorsement, and for necessary expenses of th
Copper Co., but by far the greater part was expended fo
dated Co., in the rehabilitation of that company's mines

The statement given at the company's annual mee
of date July 31, 1906, reporting a surplus of $18,678,1
holding, as the actual surplus, by the company's own fig
more than $1,575,222, even by including an indefini
haul, and practically there was no surplus whatever, as th
its birth until after its change of management, had enou
advantage, and was chronically hard up, even when payi
31, 1907, according to the statement of treasurer Fraser, t
had quick assets of about $7,000,000, but these assets a
Cananea Consolidated. On Dec. 31, 1907, the company

of $5,961,059, but, by reason of the badly muddled accounts agement, it was deemed necessary, later, to deduct from this sum of $5,792,797.85. The accounts of the company were the old management, partly through ignorance and partly ceive, that all figures given out were highly misleading. The uced copper as cheaply as claimed, and it is doubtful if the ew just what the copper was costing, or just where the com-

actual "profits" of the Greene Consolidated, for 17 months 07, were $3,220,247, including income, from various stock ,352,500 showing, by an honest accounting, an actual loss of months, during the most prosperous period that the copper or a generation. These figures show why the Greene Con-nized.

nsolidated Copper Co. was practically wiped out, Dec. 23, zation of the Greene Cananea Copper Co. The company nancially, at the height of a remarkable boom in the metal bout to collapse. Messrs. Thos. F. Cole and John D. Ryan, opper industry, were called in to save the company from drove a hard bargain with the Greene Consolidated, as of t, and, in forming the Greene Cananea Copper Co., put in which are of much less value than those of the Greene Con-igh price. The reason for this laid in the desperate financial ene Consolidated, which was practically bankrupt, although ificent property, while the Cole and Ryan property put into f much less value physically, was backed by strong interests, erty through. The shareholders of the Greene Consolidated bitter feelings, but their grievances lie against the old man-n against Messrs. Cole and Ryan, who were called in as hen the patient was at his last gasp, and saved his life, but s fee for so doing. That the fee was very large cannot be e shareholders of the Greene Consolidated are better off, not directly in cash, but through dilution of their holdings, e been had the property been allowed to go by the board, uld have been trifling, and very possibly nil.

protective committee was organized by a minority of the Greene Consolidated, circa June, 1908, with Samuel Unter-wkirk and Wm. J. MacDonald as counsel. There also is a rs' committee, composed of Wm. J. MacDonald, John A. Taylor, with Louis H. Newkirk as attorney. Suit was directors of the Greene Consolidated, 1910, by Berton A. shares, and Max Sand, owning 100 shares, alleging the 0,000 from the treasury funds, the wrongful waste of assets, o this suit the various officers of the company set forth that ion of 55,943,738 lbs. fine copper, for the fiscal year ending vas reported by the former management, the production ,026,938 lbs., and it was also denied by the directors that the date, in mine, plant, etc., was $16,291,185, as had been er management.

eet of the Cananea Consolidated Copper Co., S. A., of Dec. sets, exclusive of mines, lands, buildings and machinery, of liabilities, in notes and accounts payable, of $1,531,674.43, assets of $4,719,012.09, and fixed assets were inventoried at

ully described under title of Greene Cananea Copper Co.

GREENE GOLD-SILVER CO.

Dead. Was a total smash. Formerly at Temósach hua, Mex. Exhaustively described Vol. VIII.

GREEN HOPE MINING & MILLING CO.

Dead. Formerly at Guernsey, Laramie Co., Wyo.

GREENHORN COPPER MINING CO.

Dead. Formerly at Cañon City, Frémont Co., Colo.

GREENLEAF MINE.

Owned by Anaconda Copper Mining Co., at Butte,

GREEN MONSTER MINE.

Office: care of Mrs. Phœbe Hearst, owner, San Fr returned unclaimed from former mine office, Sandy, Linc opened by a 325′ two-compartment vertical shaft, shows c ores, latter including argentiferous galena and chalco claimed to show about 5,000 tons of $40 ore. Idle some y

GREEN MOUNTAIN COPPER CO.

Dead. Formerly at Raymond, Madera Co., Cal.

GREEN MOUNTAIN COPPER CO.

Dead. Formerly at Rinconada, Rio Arriba Co., N. Vol. VII.

GREEN MOUNTAIN COPPER MINING CO.

Dead. Property was sold, circa 1904, to Saginaw Co. Formerly at Encampment, Carbon Co., Wyo.

GREEN MOUNTAIN GOLD & COPPER MINING C

Office: 432 Judge Bldg., Salt Lake City, Utah. Grand Co., Utah. Samuel E. McGraw, president; W. J. secretary and treasurer; Thos. A. Johnson, superintendent 1909, under laws of Utah, with capitalization $500,000, s 8 claims, unpatented, circa 30 miles from a railroad, opened 450′ of workings. Company ended 1910 in litigation, wit the management, and a special auditor was appointed by t the charges. Idle.

GREEN MOUNTAIN MINE.

Office: Lewis, Cal. Mine office: Raymond, Mad Sydney, manager; preceding officer, W. R. Sundberg and Mine, about 6 miles west of Raymond, has been worked 1863, and has produced considerable high-grade oxidized o gossan outcrop of 300′ to 1,200′ width, between diorite an has 2 main tunnels, the lower, or eastern, being about 6 thousand feet of workings, and there also is a new shaft, sl per ores. Long continued leaching has given many of th coat of bluestone. The eastern tunnel has eastern and w ern drift showing a 125′ body of cupriferous pyrrhotite, has a 60′ ore body, reported to carry chalcocite, associa pyrrhotite. Mine was working, on a small scale, early carbonate ore carrying up to 20% copper and 16 oz. silver has contracted for a considerable tonnage of cupriferous py Arizona smelters, for fluxing. The mine has a number of considered promising.

GREEN MOUNTAIN MINE.

Owned by Anaconda Copper Mining Co., at Butte, S

GREEN MOUNTAIN MINING & MILLING CO.

Office: 1538 H. W. Oliver Bldg., Pittsburg, Pa. M ville, San Juan Co., Colo. Wm. P. DeArmit, president; president; E. E. Dick, secretary; S. J. Cripps, treasurer; p Lee, S. C. Williams, C. S. Crook, J. N. Vance and Jas. G

eral manager; Jas. Angus Snedaker, consulting engineer. 1902, under laws of Oregon, with capitalization $1,250,000, ued, $600,000. Debentures, $600,000 first-mortgage 6% 18, redeemable at company's option, after 1913, at 105, and k at par any time before June 1, 1912.

s, area 209 acres, exclusive of conflicts, and including a placer Cunningham Gulch, 7 miles from Silverton. Property has ng auriferous and argentiferous copper and lead sulphides, , estimated by management to average about 0.5% copper, ilver and 38 cents gold per ton. Development is by the 800' tunnel, 700' Blum tunnel, and 300' Osceola tunnel, with estimated to block out 213,140 tons of ore.

ludes a 280-h. p. central power plant, with steam, compressed r, and a 12-drill Rand compound air-compressor. Buildings chine-shop, 40x80' smithy, boarding-house, warehouse, office 400' aërial tram connects the mine and mill.

frame mill, on concrete foundations, with stone retaining ustin gyratory crusher, a 10x16" Blake reciprocating crusher, sets of 42x14" rolls, 6 two-compartment Hartz jigs, and 10 mill was given a test run, October, 1907, and then closed down, nds, and company passed into hands of a receiver, Novem- being discharged July, 1908.

OPPER CO. **ARIZONA.**

rly at Superior, Pinal Co., Ariz. Described Vol. VIII.

RCTURUS COPPER MINING CO. **CALIFORNIA.**

rly at Greenwater, Inyo Co., Cal. Described Vol. VII.

IMETALLIC COPPER MINING CO. **CALIFORNIA.**

rly at Greenwater, Inyo Co., Cal. Described Vol. VIII.

LACK JACK COPPER MINING CO. **CALIFORNIA.**

rly at Greenwater, Inyo Co., Cal. Described Vol. VIII.

LACK OXIDE COPPER MINING CO. **CALIFORNIA.**

rly at Greenwater, Inyo Co., Cal. Described Vol. VIII.

BOSTON COPPER CO. **CALIFORNIA.**

rly at Greenwater, Inyo Co., Cal.

ALIFORNIA COPPER CO. **CALIFORNIA.**

rly at Greenwater, Inyo Co., Cal. Described Vol. VIII.

ALUMET COPPER CO. **CALIFORNIA.**

rly at Greenwater, Inyo Co., Cal. Described Vol. VIII.

ENTRAL COPPER CO. **CALIFORNIA.**

alvert Bldg., Baltimore, Md. Letter returned unclaimed fice, Greenwater, Inyo Co., Cal. Oscar Adams Turner, presi- nan Schley, vice-president; Addison E. Milliken, secretary; treasurer; Henry G. Merry, general manager. Lands, on a ledge nearly 100' wide, carrying a little carbonate copper years, property worthless, and moribund.

ONSOLIDATED MINING CO. **CALIFORNIA.**

stockjobbing concern. Formerly at Greenwater, Inyo Co., n Bernardino Co., Cal. Fully described Vol. VIII.

OPPER CO. **CALIFORNIA.**

rly at Greenwater, Inyo Co., Cal. Described Vol. VIII.

OPPER HELMET CO. **CALIFORNIA.**

rly at Greenwater, Inyo Co., Cal.

OPPER MINES & SMELTER CO. **CALIFORNIA.**

f Donald B. Gillis, manager, Tonopah, Nev. Letter returned mer mine office, Greenwater, Inyo Co., Cal. Chas. R. Miller,

president; M. R. Ward, vice-president; preceding offic
M. Schwab, W. H. Drayton, L. H. Dessar, Malcolm McL
Frank Keith, directors. Organized Dec. 12, 1906, under
capitalization $25,000,000, shares $5 par. Is a securities
and owns stock in a number of Greenwater promotion
all of which are dead. Company, on Dec. 31, 1910, had
choice bonds, after losing about $170,000 through the fa
heimer & Co., New York brokers, who failed, Oct. 1
understood to be looking about for a good mining prope

GREENWATER COPPER MINING CO.

Dead. Former office was Phœnix, Ariz. Formerly
Co., Cal. Described Vol. VIII.

GREENWATER COPPER MINING CO.

Dead. Former office and mine were at Greenw
Described Vol. VIII.

GREENWATER COPPER MINING SYNDICATE.

Dead. Formerly at Greenwater, Inyo Co., Cal.

GREENWATER COPPER QUEEN MINING CO.

Dead. Formerly at Greenwater, Inyo Co., Cal.

GREENWATER COPPER RANGE MINING CO.

Dead. Formerly at Greenwater, Inyo Co., Cal.

GREENWATER & DEATH VALLEY COPPER CO.

Office: care of Donald B. Gillis, vice-president, T
returned unclaimed from former mine office, Greenwater,
Keith, president; W. L. Carden, secretary; Chas. E. Kno
officers, M. R. Ward, J. Ross Clark, T. L. Oddie, Malcol
Zabriskie, directors. Organized 1906, under laws of Sout
ization $3,000,000, shares $1 par. Is controlled, throug
stock, by Greenwater Copper Mines & Smelters Co.

Lands were 21 claims, 5 fractional, area 400 acres, in t
on which the Queen shaft was sunk 1,500′, showing, belo
low grade copper ore, under commercial tenor. Work
This property was described in Vol. VIII. The lead pr
sold to Graves Brothers. Idle and apparently moribund

GREENWATER DEATH VALLEY COPPER MININ

Dead. Was a stockjobbing enterprise. Formerly at
Cal. Described Vol. VIII.

GREENWATER & DEATH VALLEY EXTENSION C

Dead. Formerly at Greenwater, Inyo Co., Cal.

GREENWATER EL CAPITAN COPPER CO.

Dead. Was controlled, through ownership of ent
founders' shares, by Greenwater Copper Mines & Smelte
mining work was done. Formerly at Greenwater, Inyo C

GREENWATER ELY CONSOLIDATED CALI COPPER CO.

Dead. Was a mere bit of stockjobbery. Formerl
Co., Cal., and Ely, White Pine Co., Nev. Described Vol

GREENWATER-ETNA COPPER CO.

Dead. Formerly at Greenwater, Inyo Co., Cal.

GREENWATER FURNACE CREEK COPPER CO.

Dead. Was a fake, promoted by some of the mos
the crooked mining game. Formerly at Greenwater,
described Vol. VIII.

GREENWATER IBEX COPPER & GOLD MINING

Dead. Formerly at Greenwater, Inyo Co., Cal.

OHAWK MINES CO. **CALIFORNIA.**
oit of stockjobbery. Formerly at Greenwater, Inyo Co., VIII.

Y COPPER CO. **CALIFORNIA.**
y at Greenwater, Inyo Co., Cal. Described Vol. VIII.

LARIS COPPER CO. **CALIFORNIA.**
y at Greenwater, Inyo Co., Cal. Described Vol. VIII.

OSPECTORS EXPLORATION CO. **CALIFORNIA.**
rged, July, 1907, in Copper Mines & Smelters Corporation ly at Greenwater, Inyo Co., Cal. Described Vol. VIII.

D BOY COPPER CO. **CALIFORNIA.**
y at Greenwater, Inyo Co., Cal. Described Vol. VIII.

RATOGA COPPER CO. **CALIFORNIA.**
ox 227, Goldfield, Nev. Letter returned unclaimed from Greenwater, Inyo Co., Cal. Moribund. Described Vol.

NSET COPPER CO. **CALIFORNIA.**
y at Greenwater, Inyo Co. Cal. Described Vol. VIII.

PERIOR COPPER MINING CO. **CALIFORNIA.**
y at Greenwater, Inyo Co., Cal. Described Vol. VIII.

TOR COPPER CO. **CALIFORNIA.**
y at Greenwater, Inyo Co., Cal. Described Vol. VIII.

DICATOR COPPER CO. **CALIFORNIA.**
y at Greenwater, Inyo Co., Cal. Described Vol. VIII.

LLOW CREEK COPPER CO. **CALIFORNIA.**
at Greenwater, Inyo Co., Cal. Described Vol. VIII.

ENIX TRAMWAY CO., LTD. **BRITISH COLUMBIA.**
unclaimed from former office, Chicago, Ills. Mine office: strict, B. C. Richard Armstrong, general manager; Dun- ntendent. Organized 1909, under laws of Illinois, with 000, as a reconstruction of the Greenwood-Phœnix Tunnel of Greenwood has authorized a bonus for this company, 6,000′ tunnel, planned to cost about $3,000,000, running hœnix, the first objective point being about one mile from el. A stringer of galena was cut, April, 1910. The power mpressor, is at the portal. Company ended 1910 working about 12′ daily. The project is a very ambitious under- at doubtful feasibility.

ENIX TUNNEL CO., LTD. **BRITISH COLUMBIA.**
ganized, 1909, as Greenwood-Phœnix Tramway Co., Ltd. Boundary district, B. C. Described Vol. VIII.

LTER. **BRITISH COLUMBIA.**
h Columbia Copper Co., at Greenwood, Boundary dis-

C G. **CHILE.**
office: Combarbalá, Coquimbo, Chile. Property is 2 as the Los Ramadillas and El Durazno. The Durazno s from Puerto Oscuro, with carriage charges of 45.40 pesos x28′ reverberatory furnace, burning wood exclusively, em- and making 97% Chile bars, with slags averaging about ction of both works was 254,477 lbs. fine copper in 1903; 9,661 lbs. in 1907; 71,025 lbs. in 1908; 29,724 lbs. in 1909.

D MINING CO. **BRITISH COLUMBIA.**
ged, March 29, 1901, in Granby Consolidated Mining, , Ltd. Formerly at Phœnix, Boundary district, B. C.

GREYHOUND MINING & MILLING CO., LTD.

Mine office: Ketchum, Blaine Co., Idaho. S. M. S at last accounts. Has auriferous copper ore, with steam have a 50-ton smelter.

GREY ROCK MINES.

The East Grey Rock and West Grey Rock mines are o Copper Mining Co., at Butte, Silver Bow Co., Mont.

GREY ROCK MINING CO.

Mine office: Eureka, Juab Co., Utah. C. C. Grig Badger, secretary; Geo. Udall, managing director; pre Badger and Frank Birch, directors. Organized 1909, pres Utah. Lands, 12 claims, adjoining the Montana mine, h planned to be sunk 200′. Presumably idle.

GREYTON COPPER MINES CO.

Office: care of Thos. Potter, secretary, Denver, C unclaimed from former mine office, Pearl, Larimer Co., C ary, 1902, with capitalization $75,000, shares 5 cents par. dent. Lands, 12 claims, near the Colorado and Wyo several pits and shallow shafts, deepest 70′, showing cu phides. Idle some years and apparently moribund.

GRIBBELL ISLAND COPPER CO. BE

Office: 203 First National Bank Bldg., Bellingha turned unclaimed from former mine office, Gribbell Islan sion, Cassiar district, B. C. Geo. Robertson, president vice-president; W. J. Hughes, secretary and treasurer; Geo. Graham, directors. Organized under laws of Washi tion $170,000, shares 10 cents par, nonassessable; issued,

Lands, 8 claims, crown-granted, area 400 acres, at the bell Island, facing Mackay reach, and 3 miles west of Ur erty shows a fissure zone in syenite, carrying massive bor gray copper, giving assays of 5 to 50% copper, with small a gold values. Development is by several pits and opencut of 275′, No. 2 of 160′, No. 3 of 375′. Idle since 1906, owi

GRINDALL MINING & SMELTING CO.

Dead. Formerly at Kasaan, Alaska. Described Vol.

GRIZZLY RIDGE MINING CO.

Office and mine: North Columbia, Nevada Co., Ca ore assaying 1.25% copper, 17 oz. silver and $40 gold per t

GRÖNLANDSK MINEDRIFTS AKTIESELSKAB.

Office: Raadhuspladsen 37, Copenhagen, Denmark. gorssuak, Julianshaab, South Greenland. E. Glückstad Nyeboe, managing director; preceding officers, Chr. Ha and H. P. Prior, directors; E. Höeg, smelter superintend 31, 1907, under laws of Denmark, with capitalization 400 of 500 kroner and 1,000 kroner par.

Lands, not far from the cryolite mines, at Ivigtut, are cape of a peninsula in the extreme southern part of Gree west of Cape Farewell. Mine, known as the Josua, or bornite, occurring as impregnations in a somewhat breccia stone, near a diabase dike, with slates in the immediate v about 24″ average width, proven to depth of 200′, and hundred feet, carries argentiferous and auriferous bornite, 8% copper, and $2.50 gold per ton, and, by hand-picking 12 to 15% copper tenor. Development is by two 200′ shaf 120′ and 200′, with about 200 tons of ore blocked out for st was discovered 1853, and opened 1905, on a small scale.

ant, at the mine, with a hoist good for 450′ depth, 2 small compressors, and 5 Atlas drills.
r, at the mine, has a 25-ton Fraser & Chalmers water-jacket ng matte of about 45% copper tenor. Fuel is coke, costing

ER CO. **ARIZONA.**
reorganization of the Boston Gold-Copper Co., a dubious a bad odor, practically being succeeded by the Colonial Cop- ll intents and purposes, was a reorganization. Formerly at oa Co., Ariz. Described Vol. VIII.

JNDY. **PERÚ.**
nd works: Musquituni, Lampa, Puno, Perú. Lands, 6 he Limón Verde and Berenguella mines, both carrying argen- , former employing 70 men and latter employing 80 men, with 288 men in the preceding year. Smelter, known as the Maravillas, has a daily capacity of about 40 metric tons, and 1908.

CO. **UTAH.**
mmercial Bldg., Salt Lake City, Utah. Mine office: Eu- tah. John Bestelmeyer, president and manager; H. W. Organized Dec. 10, 1908, under laws of Utah, with capitali- ares 10 cents par. Shares are listed on the Salt Lake stock 7 claims, patented, adjoining the East Tintic Consolidated 2 miles from a railway. Mine has a 250′ shaft, and tunnels nowing values mainly in gold, silver and lead. Equipment ist and air-compressor.

PANAMÁ.
Las Minas, Los Santos, Panamá. Mine, formerly held by Mining Co., has a 70′ shaft, with a crosscut to the east show- ported to carry cuprite and chalcopyrite, and a west crosscut 0″ and 7′ width, both carrying chalcopyrite. Mine is wet.

ALURGICA DE GUADALAJARA, S. A. **MÉXICO.**
rly at Guadalajara, Jalisco, Mex. Described Vol. VIII.

MINING CO. **MÉXICO.**
rly at Torres, Hermosillo, Sonora, Mex.

PE. **MÉXICO.**
Rosalía, Chihuahua, Mex. Mine office: Maturaña, a, Mex. Vicente Visconti, owner. Property is said to show opper ore. Idle several years.

PE. **MÉXICO.**
Muleros, Nombre de Dios, Durango, Mex. José B. Nava, manager, at last accounts. Development is opencast, on a of copper ore. Presumably idle.

ERA DE LA GUADALUPITA. **MÉXICO.**
Santa Engracia, Ciudad Victoria, Tamaulipas, Mex. Organ- s of México, with capitalization 25,000 pesos. Property, the 14 miles from Santa Engracia, the nearest rail station, is an ve been worked, at a profit, some years ago, being claimed to better than 30% in copper tenor. Presumably idle.

NEL CO. **MÉXICO.**
oad St., New York, N. Y. Mine office: Guanaceví, Santi- Durango, Mex. Andrew O. Miles, president; W. W. Flanna- M. Heim, manager. Organized 1904, under laws of Arizona, $5,000,000, shares $5 par.

Lands are 22 properties, area circa 700 hectares, forme
8,000 acres in area, well watered and timbered, said to pos
gold and copper ore. The mine has 3 shafts, of circa 100' d
nels of 1,250' and 1,400', the main tunnel, 7x9', being planne
3 kilometers, management estimating that in this distance
veins carrying auriferous and argentiferous lead and copper
the tunnel being estimated as likely to cost about $1,000,0
1907, the mine had 3,542' of workings.

The management denies, with asperity, that the L. Dian
was ever, at any time, a representative of this corporation, in
that a number of brokers bought this stock, and immediately
it, and unload on the public, at unduly high prices. Compan
the new management no stock has been sold. Presumably ic

GUANAJUATO-JALISCO DEVELOPMENT CO.

Office: 82 Wall St., New York, N. Y. Operating o
Jalisco, Mex. Mine office: Autlán, Jalisco, Mex. Jas. C
dent; Dwight Furness, general manager. Organized circa 19
tion $4,000,000, in $1,000,000 preferred and $3,000,000 con
pany plans operating through subsidiary corporations, an
stock ownership, the Mexican Investment & Development C
Blanca mine. Property includes the Calabaza mine, at Et
the Dolores, Cabrestante, San Antonio de las Minas, San Gre
mines, all in the state of Guanajuato, with a 40-ton mill on th

GUARDIAN COPPER MINING CO.

Dea . Lands were sold, 1906, to Butte Coalition Min
at Butte, Silver Bow Co., Mont. Described Vol. V.

FUNDICIÓN DE GUAYACÁN.

Owned by Sociedad Chilena de Fundiciones.

GUAYMAS SMELTER.

Owned by Mexican-American Smelting Co., Ltd., at Gus

GUAYNOPA DEVELOPMENT CO.

Dead. Formerly at Temósachic, Guerrero, Chihuahua
Vol. VIII.

GUAYNOPA SMELTING & REDUCTION CO.

Dead. Was merged, 1904, in International Consolidate
ing Co. Formerly at Temósachic, Guerrero, Chihuahua
Vol. IV.

GUAYNOPITA COPPER CO.

Dead. Formerly at Temósachic, Guerrero, Chihuahua
Vol. VIII.

GUERNICA SILVER & COPPER MINES (BOLIVIA), L

Office: 28 Victoria St., London, S. W., Eng. Mine offi
Bolivia. Nicol Brown, chairman; preceding officer, T. Hunti
P. Coventry Tarbutt and H. de Winton, directors; F. C.
Organized Dec. 31, 1908, under laws of Great Britain,
£110,000, shares £1 par; issued, £100,007, fully paid.

Lands, 289 acres, 80 miles south of Nyuni, the nearest p
gasta railway, bought for £5,000 cash and £57,500 in fully
deferred payment of £10,000, payable out of the first profits
argentiferous copper ore. The company tried traction engin
work on the exceedingly mountainous roads. There is cons
for the mine, lying at Nyuni, but the mine is idle, and, appare
is at a standstill.

GUERRERO COPPER CO.

Office: Washington, D. C. Letter returned unclaime
office, Chilpancingo, Guerrero, Mex. Nathan Bickford,

dent, at last accounts. Lands are 5 antiguas, circa 8 miles Balsas bridge, on the Mexican Central railway, showing ore copper and 40 grams gold per metric ton. Apparently no e. Idle and presumably moribund.

VELOPMENT CO. **MÉXICO.**

rly at Chilpancingo, Bravos, Guerrero, Mex. Described Vol. VI.

EXPLORATION CO. **U. S. A. & MÉXICO.**

165 Broadway, New York, N. Y. General mine office: co, D. F. Daniel Guggenheim, president; Morris Guggenmt; Chas. K. Lipman, second vice-president and secretary; , treasurer; S. R. Guggenheim and H. P. Whitney, managing eatman, general manager and consulting engineer; preceding s Hammond and Geo. S. Field, directors.

ne, 1899, under laws of New Jersey, with capitalization ased, July, 1906, to $22,000,000, shares $100 par; issued, npany was said, early 1911, to plan increasing capitalization th a 100% stock dividend.

is purely a securities-holding corporation, stock-holdings, sisting of $13,860,000 of Series "A" stock of the American s Co.; $11,249,000, par value of the common stock of the s Securities Co., which is carried on the books at a nominal nd stocks in the following named companies, inventoried at er Co., $9,022,986; Yukon Gold Co., $9,786,409; Esperanza, with $9,510 in miscellaneous investments. Net earnings % on issued stock in 1909, and were 16.1% in 1910. Regu- is 2½% quarterly, and total dividends, to end of 1909, Surplus, Dec. 31, 1910, was $15,124,589.

GREENWATER COPPER CO. **CALIFORNIA & NEVADA.**

a mere stockjobbing enterprise. Property was sold, 1908, ed Mines Co. Formerly at Greenwater, Inyo Co., Cal., and Co., Nev. Described Vol. VIII.

TD. **AUSTRALIA.**

liquidated, voluntarily, November, 1904. Formerly at Co., N. S. W., Australia. Fully described Vol. V.

INE. **AUSTRALIA.**

ondon Metal Banking Co., Ltd., at Barraba, Darling Co., a.

NSOLIDATED MINING & MILLING CO. **COLORADO.**

Idaho Springs, Clear Creek Co., Colo. John Owen, super- accounts. Mine has auriferous and argentiferous copper and uipped with steam power and an air-compressor. Idle several o resume, 1911.

LD MINING & MILLING CO. **COLORADO.**

succeeded by Gum Tree Consolidated Mining & Milling Co. o Springs, Clear Creek Co., Colo. Described Vol. VI.

COPPER MINING CO. **WASHINGTON.**

Columbia St., Seattle, Wash. Mine office: Index, Snohomish id to be controlled by the Index-Bornite Copper Mining Co. owing 3 veins, widest said to be 25′, carrying chalcopyrite and ve average assays of 11% copper and circa 2 oz. silver per ton. 5′ and 800′. Presumably idle.

EVELOPMENT CO. **CALIFORNIA.**

Claus Spreckels Bldg., San Francisco, Cal. Mine office: veras Co., Cal. F. F. Thomas, general manager; David Mc- dent. Organized March 26, 1904, under laws of California, $1,000,000, shares $10 par. Is said to have paid dividends of

$456,500 to Jan. 1, 1906, and levied a $20,000 assessment
gold mine, having steam and water power and a 100-stam
a large undeveloped body of low grade copper ore.

GYMPIE COPPER MINES, LTD.

Dead. Was liquidated voluntarily, May, 1904. Fe
an, Fitzroy Co., Queensland, Australia. Described Vol. V

GYPSY BLAIR MINING CO.

Dead. Sold lands, 1905, to Kennebec Mining Co.
Salt Lake Co., Utah.

HACHITA COPPER DEVELOPMENT CO.

Office: P. O. Box 606, El Paso, Tex. Mine office:
N. M. W. R. Thurston, president. Thos. A. Lister, gene
ized circa 1907, under laws of New Mexico, with capitaliz
$1 par. Lands, 22 claims, partly fractional, adjoining
mine, in the Apache district, 7 miles south of Hachita, said
of the McKinley fault. Mine has 2 shafts, known as the
latter, of 110', said to show a vein of about 40' width, c
seminated copper sulphides. Equipment includes a gasol
pressor.

HACKBERRY MINING, MILLING & DEVELOPING

Dead. Formerly at Dewey, Yavapai Co., Ariz. D

HADLEY CONSOLIDATED COPPER CO.

Dead. Formerly at Ketchikan, Alaska. Fully des

HADLEY SMELTER.

Owned by Alaska Smelting & Refining Co.

HAGGARTY COPPER MINING CO.

Letter returned unclaimed from former office, 73
Chicago, Ills. Mine office: Rudefeha, Carbon Co., Wyo
dent; Andrew Anderson, superintendent, at last accounts.
italization $10,000, increased, Nov. 9, 1908, to $1,500,0
controlled, through ownership of entire stock issue, by P
Co., or by partial successor of latter, the United Smelters,
Idle several years and apparently moribund.

HAGGARTY-JORDAN COPPER MINING CO.

Dead. Was a bad egg. Formerly at Battle, Carbon
Vol. VIII.

HAGUE & HULBERT EXPLORATION CO.

Dead. Formerly at Laurium, Houghton Co., Mich.

HAHN'S PEAK GOLD MINING CO.

Office and mine: Columbine, Routt Co., Colo. E.
Patrick Magill, vice-president and superintendent; H. O
treasurer and general manager; preceding officers, H.
Sibree, directors. Lands, known as the Royal Flush min
tunnels, lower, the Conundrum, with portal 350' below
long, planned to be driven 1,700', showing a high streak
ore. Company shipped, 1909, to the Argo smelter, som
$100 per ton. Was said, circa 1908, to have a custo
struction, but no trace of such smelter secured.

HALE MINING & MILLING CO.

Mine office: Constellation, Yavapai Co., Ariz. Fe
intendent. Has gold and copper ores, with gasoline powe

HALIFAX COPPER CO.

Dead. Property was the Wall mine, slightly develop
ore shipments, 1900, and was closed down immediately
at Virgilina, Halifax Co., Va.

PPER CO. **MICHIGAN.**
rly at Ontonagon, Ontonagon Co., Mich. Described Vol. VIII.

TD. **BRITISH COLUMBIA.**
acceeded, June 6, 1900, by Hall Mining & Smelting Co., Ltd.
a, Kootenay district, B. C.

SMELTING CO., LTD. **BRITISH COLUMBIA.**
Gracechurch St., London, E. C., Eng. Mine office: Nelson, B. C. L. Pratt, receiver, appointed Feb. 1, 1908. Is in described Vol. VIII.

I. **MÉXICO.**
nd works: Promontorios, Alamos, Sonora, Mex. Is a pro-es, which are smelted to matte near the mine. Production, kgs. copper matte. Idle.

RICAN COPPER MINING & MILLING CO. **IDAHO.**
gg, Idaho. Mine office: Wardner, Shoshone Co., Idaho. esident; Louis Lincoln, vice-president; J. A. Waldon, secre- Herman Froelich, superintendent; preceding officers, W. W. own and Frederick Bell, directors. Organized November, Idaho, with capitalization $1,500,000, shares $1 par. Lands, the Handspike and Riverside, on the Little North Fork. egun by tunnel, early 1909. Property shows auriferous and er ore. Management plans developing an available water

PPER MINING CO., LTD. **MONTANA.**
ee, Idaho. Mine office: Hamilton, Ravalli Co., Mont. Nor-ger. Development is by a shallow shaft. Presumably idle.

ING CO. **MICHIGAN.**
were sold to Copper Crown Mining Co. of Michigan. For-od, Ontonagon Co., Mich. Described Vol. II.

ING, MILLING & **COLORADO.**
ATION CO.
erly at Winfield, Chaffee Co., Colo.

G CO. **AUSTRALIA**
ell St., Adelaide, South Australia. Mine office: Moonta, ustralia. John S. Scott, secretary; Wm. Holland, manager, Under various ownerships the mine has paid dividends of d of 1909, the company had received subsidies of £1,000, from an government, and had repaid nothing.

res, leasehold from the crown, in the hundreds of Wallaroo ne, opened 1861, under the name of Karkarilla, has 6 fissure varying from 1′ to 6′ in average width, with occasional widths e veins are practically parallel, with strike of N. 20° E. and ncipal work has been done on the Karkarilla lode, of 8′ to 12′ rrying streaks and stringers of bornite and chalcopyrite, with te, of 1″ to 9″ width, some parallel with the vein and others is quartzose. The ore averages about 3.8% copper. In ad-arilla, considerable work has been done, in the past, on the veins.

has 9 different shafts, sunk at various times, of which only 3 with about 3 miles of openings, the lower workings being filled 3 Karkarilla shafts are inclines, and are connected, at 10-o depth of 540′. No. 1 shaft is 552′ deep; No. 2, 132′ south ep; No. 3, 570′ south of No. 2, is 552′ deep.

cludes a steam plant, with 3 hoists, including a new hoist, No. 2 shaft, and an air-compressor. The mill, a quarter-mile t, and connected therewith by a surface tram, is of about 60

tons daily capacity. Its equipment is antiquated, consist
of Cornish rolls, 1 jig and 3 buddles, but the mill is doing
standing. Ore is dressed to 18 to 20% copper tenor.

Production, to February, 1887, was 41,814 long tons
averaged about 20% copper, with a value of £333,739,
years, 1903–1906, was 17,756 long tons of ore, yielding 3,63
of about 16% average copper tenor. Production was circa
per in 1903; 500,000 lbs. in 1904, and 200,000 lbs. in 190
was confined to stoping, on the Karkarilla lode, from the 40
levels. It seems probable that with adequate capital, and
the mine might be made payable.

HAMPDEN CLONCURRY COPPER MINES, LTD.

Office: 375 Collins St., Melbourne, Australia. En
ston House, London, E. C., Eng. Mine office: Cloncur
Queensland, Australia. Hon. Wm. Knox, chairman;
Baillieu, vice-chairman; preceding officers, H. H. Schlap
Wharton, H. F. C. Keats and D. W. Harvey Patterson, dir
Schackell, secretary; Edwin Habben, London secretary;
manager; T. Warrick, superintendent Hampden mine; J
tendent Duchess mine; F. L. Piddington, metallurgist.

Organized March 2, 1906, under laws of Victoria, as s
Copper Mines, N. L., with capitalization £200,000, incre
to £300,000, shares £1 par, and reorganized July 31, 1909, u
with capitalization £300,000, shares £1 par; issued, £250,
plan of reconstruction, 1909, left the capitalization unchang
the full paid £1 shares to only 15s. paid, and the 5s. remai
called, this seeming a peculiar transaction, by which own
were forced to pay an assessment, that, according to all
be called. The step was necessary, however, and shareho
better by paying the enforced assessment than by letting t
board. The company owns £40,000 of stock, bought at
Smelting & Railway Co., Ltd., which apparently built
from Townsville that now reaches the mine. Shares are
Melbourne, Sydney, Adelaide and Brisbane stock exchang

Lands, 351 acres, leasehold from the crown, including t
8 leases, area 260 acres, and the Duchess mine of 6 leases
Hampden tract, 47 miles south of Cloncurry, carries s
district is arid, though having occasional heavy rainfalls.

The Hampden mine has 3 ore bodies, occurring as bur
in a belt of kaolinized Silurian slate and quartzite, ore bo
strike, with nearly vertical dip. Principal values are in cha
chalcocite, the rich ores being very erratic in occurrence,
being estimated by management at 9% copper and 2 dwts.
Trenches show copper carbonates, disseminated through
to 80' width, this ore being estimated to average about 4%
bly is too high. Ore has been proven, at intervals, for a d
half mile.

The Hampden mine was discovered 1884, and mining
opment is by a number of trenches, 3 opencuts and 9 sha
No. 1 pit is circa 60x80' in size, and about 18' deep.
No. 2 shaft is 365', and No. 3 shaft is 214' deep. No. 2, t
tical, with upper levels opened at 45' and 72', which is pret
lower levels apparently are opened at 50' intervals, the l
350'. Under former ownership the mine was tributed an
level shows 2 ore bodies, of 20' and 30' estimated average
to 4% copper in mineralite. The main ore body carries

doubtedly is chalcocite, and bornite, with kaolin gouge. Ore
npden were estimated, May, 1910, as 96,800 long tons, carry-
per. During 1907 the mine made 1,900′ of new openings.
the Hampden includes a 460-h. p. suction gas plant, burning
p. steam plant and 260-h. p. electric plant. There is a hoist
h, and a number of substantial mine buildings.
mine, 50 miles from the Hampden, bought of the Cloncurry
opment Co., Ltd., for £15,000 cash and 15,000 shares, has 5
′ to 260′, and the main shaft being 460′ deep. There are 2
nite, both under development, showing high grade carbonates
erves being estimated, May, 1910, at 55,000 long tons of ore,
er tenor, and about 50,000 long tons of 5% copper ore, amen-
on. The mines, as a whole, were estimated, by the company,
have in sight 215,100 long tons of ore, containing 20,007 long

of a railway, development has been hampered, and profitable
possible, but at the end of 1910 rail connection was nearly
miles of line built to connect the Duchess mine with the main

e, at the Hampden mine, has iron ore and limestone for flux-
by. The smelter was under construction, at the end of 1910,
be in blast early 1911. The smelter has a 100-ton blast-fur-
. Fuel is very expensive, wood costing £1 2s. 6d. per cord,
5s. per long ton, and coke £4 1s. per ton.
on of the Hampden mine, to August, 1905, was 9,163 long tons
2.7% copper, returning 1,165 long tons fine copper. Produc-
ownership, was 431,692 lbs. fine copper in 1901. The prop-
loped under considerable disadvantages, with many discour-
he expense has been very much greater than was anticipated,
to have been done thoroughly, and, while the new smelter is
e is considered promising, and the company's prospects much

PER MINES, N. L. **AUSTRALIA.**
succeeded, March 2, 1906, by Hampden-Cloncurry Copper
nerly at Cloncurry, Beaconsfield Co., Queensland, Australia.

SOLIDATED MINES CO. **COLORADO.**
Empire Bldg., Denver, Colo. Mine office: Russell Gulch,
H. K. Chittenden, president; Granville I. Chittenden, vice-
Chittenden, secretary and treasurer; preceding officers, H. S.
Ingersoll, directors; Oliver O. App, general manager; Louis
dent. Organized under laws of Colorado, with capitalization
$1 par. Company announced, early 1908, that it would be
emi-annually, declaring its first dividend March 30, 1908, but
dends have been paid.
ns, patented, having bornite, tetrahedrite, pyragyrite, pyrite
rying copper, silver and gold values, giving assays of 2.7 to
5 oz. silver and 0.16 to 5.4 oz. gold per ton. The mine has a
afts aggregating 300′, with about 3,000′ of workings, manage-
908, that the mine had 36,000 tons of ore in sight.
cludes a 16-h. p. gasoline engine. Some ore has been shipped,
er ton. Company is regarded with suspicion, because defi-
ividends while peddling stock.

T. **CALIFORNIA**
ne: Barnwell, San Bernardino Co., Cal. G. H. Hamstadt,
er; J. O'Brien, superintendent. Lands, 8 claims, area 160

acres, in the New York district, showing 3 contact dep
and granite, reported to average 40′ in width, and to be
and 600′ in depth, carrying sulphide ores giving assays
silver and $12.30 gold per ton, developed by tunnels of 9

HANAOKA MINE.

Mine office: Hanaoka-mura, Kita-Akita-gori, Ugo
an average force of 90 employés, production was 1,139,
valued at 46,815 yen, estimated to have yielded circa 2

HANAWA MINE.

Owned by Mitsu Bishi Goshi Kwaisha.

HANCOCK CONSOLIDATED MINING CO.

Office and mine: Hancock, Houghton Co., Mic
president; Capt. Thos. Hoatson, vice-president; John
treasurer; preceding officers, Allen F. Rees, Capt. Samu
Hoatson and Frederick W. Nichols, directors; John L.
John O. Peterson, mining captain; Daniel Fisher, cle
engineer.

Organized June 11, 1906, under laws of Michig
$5,000,000, shares $25 par; issued, $1,800,000, paid $18,
levied February, 1911. Company began business wit
$552,623 for its property. Disbursements were $264,538
in 1908; $279,973.34 in 1909; $383,413.95 in 1910. Co
quick assets of $55,168.88, and accounts payable of $
Trust Co., Boston, registrar. State Street Trust Co.,
Annual meeting, third Wednesday in June.

Lands, 936 acres of mineral territory, all in Town 55
including the original Hancock mine, area 136 acres,
Quincy Mining Co., which reserved the mineral rights to
Pewabic bed, on lands other than the original Hancoc
owned by the Hancock Consolidated. Lands adjoin th
west, and carry the Pewabic, Quincy West and Hanc
bearing beds. While the Quincy Mining Co. claims the
bic bed on the lands of the old Hancock Mining Co., the
claims that the Quincy has done unauthorized mining on
possibility of litigation over mining rights. Perhaps the
mine is tributary to No. 7 shaft, which is immediately
boundary. Company purchased, July, 1909, lots 6 and 7
site, this providing necessary sand-room for the mill, whi
near the center of the northwest quarter of Section 27,
from the shore of Portage Lake.

The old Hancock mine, opened 1859, name changed
back to Hancock, was closed June 1, 1885, on account of th
after producing 5,709,384 lbs. fine copper. The Hanco
loidal bed, which was worked by the old Hancock compa
in width, below the fifth level, to a depth of 1,052′, wher
tomed, and in the latter years of its operation returned
per ton, after selection, making about 50 tons of mineral
an average daily production of 210 tons of rock. Modern
save 2 to 4 lbs. fine copper per ton formerly lost. The old
masses up to 5 tons in weight.

The property carries the Keweenawan series of a
intercalated conglomerates, and has 3 known copper-bea
erty also carries the underlay, but not the outcrop, of th
of the Quincy, these being the Quincy to the eastward, ap
followed by the Pewabic, which is the main bed of the Q
West lode of the Quincy. The known copper-bearing b

re the Hancock or Sumner, mined in the old Hancock
n as No. 1 lode, lying about 1,100′ west of the Pewabic;
w known as No. 2 lode, lying about 300′ west of No. 1, and
now known as No. 3 lode, lying about 75′ west of No. 2.
m 250′ to 300′ distance apart, and No. 3 is 50′ to 100′ west
7′ to 12′ in width, No. 2 is 10′ to 12′ in average width,
14′ in width. Nos. 1 and 2 are opened by No. 1 incline
ds are opened by No. 2 vertical shaft. The two shafts are
h level by a 1,275′ crosscut, and on the 18th level by a 50′
ancock mine, in addition to the main shaft, now known as
ft.

e old main shaft of the Hancock mine, formerly 8x16′, with
k at an angle of 54°, but deepened, below the old workings,
g 3 compartments. Old levels are at 100′ intervals, to depth
hich levels are opened at 125′ intervals, to depth of 1,600′
ere the shaft is bottomed, temporarily. The old mine was
the hanging-wall giving much trouble, and requiring very
e old workings were about 800′ in length, with ground stoped
enth levels, inclusive, on the Hancock or No. 1 bed, and
to ninth levels, inclusive, on the southern drifts in the Old
No. 1 shaft has a remodeled wooden shaft-rockhouse, with a
d for 2,000′ depth.

00′ northwest of No. 1, is vertical, with dimensions 9′ 6″
econd largest in the Lake Superior district, and was 2,668′
The shaft has 4 hoisting compartments, each 7x5′ 2″ in
7′ compartment for ladderway and pipes. The collar is
of 30′ into the rock ledge, with a thickness of 24″ of con-
30″ at the bottom. This shaft intersects No. 3 bed at a
ed here showing a pitch of 37°, compared with 47° in the
flattening of 10°, at depth, corresponding to a similar
the northeast, in the No. 7 shaft of the Quincy. With
ft will intersect various cupriferous beds, including the
at circa 3,500′ depth, proving considerable territory here-
xplored in the Portage Lake district.

lrifting has been done on No. 3 bed, and about 1,300′ on
pened, by a winze, from the 10th to 18th levels inclu-
e 12th to 18th levels, inclusive, several of which are more
was estimated, February, 1910, that over 700,000 tons of
locked out on No. 3 bed. No. 2 shaft has 4 loading sta-
h, 23d and 27th levels, to which rock broken will be sent,
els above. The 13th and 18th levels are to have electric
the 23d and 27th levels will be similarly equipped, later.
begun, late 1910, on the 13th, 14th, 15th and 16th levels,
a mill test at the Allouez-Centennial mill, which was

shaft-rockhouse that is the most modern in the Lake
structure is of steel, resting on concrete abutments 14′
The building has a total height of 128′, with working
d. The bins are of 1,000 tons capacity each. Equip-
Farrell crushers with 24x36″ jaws, and a smaller crusher
red for concrete or macadam. The 2 large crushers are
-belt picking-tables, each about 20′ long and 6′ wide,
slots and 2″ cross-bars, forming a grizzley for all small
y large rock going to the crushers. The large crushers
ction motor, and each picking-table has a 10-h. p. induc-
shift are expected to do all work on the crushing floor.

The main engine-house, at No. 2 shaft, is of steel, wing for the compressor plant. There are 2 hoists, th Sullivan Corliss direct-connected hoist having 36x72″ st 15x15′ straight-face drum, operating 2 skips in counterba lift a cage, with a Kimberly skip swung under, weighing 5 rock, from a depth of 4,000′, at a steam pressure of 15 Sullivan first-motion hoist with 24x48″ cylinders and 2 lo eter with 9′ face, driven by band-friction clutches, with lated to operate 2 pairs of Kimberly skips, in balance, a minute, hoisting with 1¼″ steel cable. The smaller ho engine-house, but is to be installed in new engine-house, already erected, is in commission.

The steel compressor-house having an electric trave 13-drill and 16-drill air-compressors, now temporarily insta pipe-line, and also will have a new 35-drill tandem-compo

The 56x98′ steel boiler-house has 2 batteries of 4 retur 72″ in diameter and 18′ long. The boiler-house smokest concrete, standing on a 12′ base, is 130′ high, of 13′ outsid and inside diameter of 7′ 6″, the first 40′ being brick-lined

Buildings at No. 2 include a 16x44′ temporary engi combination machine-shop and smithy. There also ar house and a number of dwellings. The main plant at No. spur of the Mineral Range railway.

It is planned building a stamp-mill, down the hill, les 2 shaft, but a half-mile back from the lake front, to prov mill is expected to give the company a transportation cos per ton on rock stamped.

The original plans of the company called for beginnin year, but, very wisely, these plans were changed, and the oped very extensively, and given a thoroughly modern an The ground opened, while by no means the richest to be fo rior district, seems of fair average mineralization, and, extensive openings, an exceptionally good equipment, and a management, the Hancock promises to make a successful l

HANCOCK COPPER MINES CO. OF IDAHO, LTD.

Office: 602-79 Milk St., Boston, Mass. Mine offi ington Co., Idaho. Col. C. F. Drake, president and gen Palmer, vice-president; John Sennett, secretary and tres ers, M. C. Drake and Dr. J. E. Stevens, directors; Patri ent. Organized 1905, under laws of Idaho, with capi shares $1 par, nonassessable. Company paid a regular 2%, Oct. 15, 1909, but was advertising stock for sale s money was earned for dividends. The secretary reports th paid from a private fund, on outstanding treasury stock, such dividends has been discontinued.

Lands, 16 claims, area 320 acres, known as the Arka Creek, 2 miles from Landore, in the Seven Devils distr shaft, on the Humboldt claim, and a 380′ tunnel, planned t a number of other shallow shafts and short tunnels, said, develop a 75′ vein, carrying 50′ of auriferous copper ore 20% copper, which, of course, was untrue. Equipment i having a Huntington mill, amalgamating plates and Wilfl concentrates, said, in the press, to average $150 per ton pany also has 6 claims, at Rankin, Idaho, having a 200′ tu worked, late 1910, with the copper claims idle.

R MINING CO. MICHIGAN.
anized, circa 1880, as successor of Hancock Mining Co., and by Hancock Consolidated Mining Co. Formerly at Han- Mich. Described Vol. II.

CO. NEW MEXICO.
y at Organ, Dona Ana Co., N. M. Described Vol. III.

G CO. MICHIGAN.
ganized 1859, and succeeded, 1880, by Hancock Copper ly at Hancock, Houghton Co., Mich.

ER MINING CO. IDAHO.
ceeded by Little North Fork Copper Mining & Milling Co., tchett was manager. Lands, 6 miles above the Horst- ittle North Fork River, somewhat inaccessible, had several r ore, developed by a 1,560′ tunnel, and a shaft having a Formerly at Wardner, Shoshone Co., Idaho.

INING CO. MONTANA.
y at Butte, Silver Bow Co., Mont.

MILLING CO. COLORADO.
apitol City, Hinsdale Co., Colo. G. H. Martin, superin- unts. Has auriferous and argentiferous copper and lead electric power, and a 100-ton concentrator.

OLIDATED MINING CO. UTAH.
y at Silver City, Juab Co., Utah. Described Vol. IX.

R CO. NEW MEXICO.
y at Hanover, Grant Co., N. M. Described Vol. VIII.

R CO. NEW MEXICO.
unclaimed from former office, Duluth, Minn. Mine office: N. M. Geo. A. St. Clair, president; J. S. Dickie, general officers, Wm. Elder, M. E. Riley and Arthur Howell, direct- 1909, with capitalization $50,000, shares $10 par. Lands, oldings of the Philadelphia Copper Co. Mine has shafts of d tunnels of 40′ and 60′, showing copper ore. Presumably

G CO. MICHIGAN.
rmerly was 68 Devonshire St., Boston, Mass. F. H. Ray- C. O. Burbank, secretary and treasurer. Organized 1860, an, and, to Dec. 31, 1871, had levied assessments of about 320 acres, being the west half of Section 8, Town 58 North, 1906, to the Keweenaw Copper Co. A little work was done the property never was a producer. Formerly at Copper o., Mich.

G & MILLING CO. NEW MEXICO.
y at Hanover, Grant Co., N. M. Described Vol. V.

ING CO. ARIZONA.
ceeded, 1910, by Happy Jack Mining & Reduction Co. a, Santa Cruz Co., Ariz. Described Vol. VIII.

ING & DEVELOPMENT CO. ALASKA.
d egg. Formerly at Valdez, Alaska. Described Vol. VIII.

ING & REDUCTION CO. ARIZONA.
d Title Bldg., Philadelphia, Pa. Mine office: Patagonia, z. Alfred W. Barnett, president and general manager; od, secretary and treasurer; preceding officers, Martin rs, directors. Organized circa 1910, as successor of Happy nds, circa 9 miles from Patagonia, have a shallow shaft and l to be driven 2,700′, showing auriferous and argentiferous

lead and copper ores. Property is said to have shipped c
average tenor, in the past, and is considered promising.

HAPPY JOHN MINE.

Mine office: Alberni, Vancouver Island, B. C. A
Bros., owners. Lands, 4 claims, area 125 acres, west o
the western side of the Alberni Canal, near its mouth, hav
ing a vein with paystreak of 30″ extreme width, assaying
oz. silver and $1.20 gold per ton. Idle.

HARCÚVAR COPPER CO.

Office: 1201 Pennsylvania Bldg., Philadelphia, Pa
dendale, Yuma Co., Ariz. Lemuel B. Woolston, presi
Burke, vice-president; N. A. Lund, secretary and treasu
superintendent; Herbert C. Shotwell, engineer. Organ
laws of Arizona, with capitalization $2,000,000, shares
Security Transfer & Registrar Co., New York, transf
Stock is listed on the New York curb. Annual meeting, f

Lands, 9 claims, patents applied for, area 180 acres
right, adjoining the Oro Cobre, circa 12 miles northwest
Cunningham Pass district of the Harcúvar Mountains.
contact deposits, between gneiss and diorite, of which one
width, traceable for some distance, is said to show oxidize
chalcocite, in surface workings, with chalcopyrite at de
cludes several prospect shafts and tunnels, and a 511′ dr
assaying up to 24.5% copper and $20 gold per ton, rep
3.5% copper, 1.5 oz. silver and $6 to $8 gold per ton.
gasoline power and 3 small buildings. Presumably idle.

HARDSCRABBLE MINING CO.

Dead. Property was sold by sheriff May, 1909. F
Socorro Co., N. M. Described Vol. VIII.

HARDSHELL-FLUX MINING & DEVELOPING CO.

Office: Tucson, Ariz. Mine office: Patagonia, S
Ben Heney, president; R. R. Richardson, vice-president;
tary and treasurer; Frederic John Siebert, consulting
Heney, counsel; J. C. Hartness, general manager, at last a
30 claims, in the Palmetto district, on the southerly slope o
tains, 6 to 9 miles from Patagonia, including the Flux, H
mines, formerly held by Col. Wm. C. Greene, who was u
payment. Property as a whole has about 800′ of workin
has tunnels aggregating about 400′ length, showing a larg
chalcopyrite, estimated to average 3 to 4% in copper te
whole, are mainly in silver, with some lead, copper and gol

HARLEY GOLD MOUNTAIN MINING & SMELTING CO.

Office: 704 New York Blk., Seattle, Wash. Min
Snohomish Co., Wash. Charles Burns, president and
Burns, vice-president; Henry S. Noon, secretary; K. O. N
Organized Dec. 15, 1900, under laws of Washingto
$2,500,000. Lands, 16 claims, area 300 acres, in the
showing 12 ore bodies, occurring as fissures in porphyry
between granite and porphyry. Four veins under dev
average 6′ width, and to carry 14.5% copper, 8 oz. silv
ton, which claim is decidedly excessive. Development i
of openings. Idle.

OTTO HARNECKER.

Office, mine and works: La Ligua, Aconcagua, Chil
mines, and a small smelter.

as contact deposits between limestone and porphyry. 1 meter average width, with dip of 31°, has an oxidized depth, succeeded by sulphide ores, and is opened by an l, with about 250 meters of laterals, all in ore averaging line has about 25,000 tons of ore developed, and is con-

4 kilometers from the smelter, has 8 parallel veins, in the management to be traceable about 15 kilometers, and dip of 43°, with widths of 5′ to 12′, carrying, below chalcopyrite with granitic gangue, of about 5% average especially suitable for fluxing the silicious ores of the rict. Mine has reserves of about 20,000 tons of ore.

the same veins as Los Maquis, but 3 kilometers north, ing about 3.5% copper, with 15,000 metric tons of ore mine, carrying ore of about 6% average copper tenor, has metric tons.

as the Fundición de Peña Blanca, 5 kilometers from the a 30-ton cylindrical water-jacket blast-furnace, using ng matte of 48 to 55% copper tenor, from ores formerly , and now averaging 5 to 5.5% copper. The smelter ssaying down to 0.2% copper, and does a custom busi- efit to the small operators of low grade mines, in the d Cabildo.

has been as follows: 311,972 lbs. fine copper in 1903; 4,646 lbs. in 1905; 190,455 lbs in 1906; 126,764 lbs. in 908; 122,223 lbs. in 1909. The mines and smelters are ale, but along sound lines.

NG CO. **ARIZONA.**

n King, Yavapai Co., Ariz. Geo. P. Harrington, gen- y is the Tiger mine, carrying ores of gold, silver and cop- . Idle some years and apparently moribund.

ARIZONA.

hio. Mine office: Turkey, Yavapai Co., Ariz. C. C. easurer; W. J. Martin, vice-president; Harry W. Moore, ficers are the directors. Organized July 20, 1910, under capitalization $1,000,000, shares $1 par, nonassessable;

npatented, area 480 acres, in the Tip Top district, on the ne Bradshaw Mountains. The property shows granite- ists, carrying 2 fissure veins, one of which is reported, in o 135′ width at surface, traceable one-half mile, showing giving average assay values of 14% copper and 3 oz. ures are self-condemnatory, and are not claimed by the nly about 120′ of workings, and is without equipment or

MÉXICO.

es, Cal. Mine office: Nacozari, Moctezuma, Sonora, ling, general manager; Fritz Werner, agent; W. J. R. Organized circa 1908. Lands, 346 hectares, circa 3 mine of the Moctezuma Copper Co., including La Cari- have been bought for $40,000, which is said to have 6,000 averaging 4 to 6% copper. Mine was said, February, carloads of 25% copper ore, but only diamond drilling Idle.

MÉXICO.

Monterey, N. L., Mex. Mine office: Cerralvo,

Cuarto, Nuevo León, Mex. Property includes the Bue anza mines, carrying argentiferous copper and lead ore steam power and a small smelter.

HARTFORD CONSOLIDATED COPPER CO.

Dead. Formerly at Redding, Shasta Co., Cal. D

HARTFORD COPPER & GOLD MINING CO.

Office: 7 Exchange Place, Boston, Mass. Mine off Henry J. Wilkins, president; Chas. M. Thayer, sec $2,000,000. West Virginia charter was forfeited, 1902. lands on Prince of Wales Island, Alaska. Had an optio Custer county, Idaho, but lost it. Idle, management matical, stock worthless,

HARTFORD MINING CO., LTD.

Dead. Office was Wallace, Idaho. Officers were dent; Jas. Fumerton, vice-president; W. J. Fumerton, preceding officers, Vido Marich and Wm. Shaefer, dir consulting engineer. Organized circa 1901, with ca shares $1 par. Lands were 5 claims, having a vein of carrying auriferous and argentiferous copper and lead ca 530′ drift-tunnel cutting a blind vein 250′ from the porta high assays in copper, with good values in lead and silve Formerly at Osburn, Shoshone Co., Idaho.

HARTWIG MINING CO.

Office: Tipton, Iowa. Mine office: Pollock, Id Moore, president; G. W. G. Geiger, secretary; Samue ceding officers, Wm. Hartwig, Fred Goldsmith and Gu Geo. Hartwig, general manager. Organized Jan. 3, 19 with capitalization $900,000, shares $25 par, fully issued

Lands, 5 claims, patented, area 72 acres, and a 5-ac River district, carrying 10 contact deposits between li which 4, under development, are of 30′ estimated avera carrying oxides, carbonates and chalcopyrite, estimated 14% copper, with traces of lead and zinc, 3 oz. silver and figures are too high. Mine has a 75′ shaft, and 3 tunn length, an 875′ lower tunnel cutting the ore zone, whi Property has 4 buildings, but no power equipment. account of lack of transportation facilities.

HASKINS MINING CO.

Dead. Lands, in the Tucson Mountains, were s 1905. Formerly at Tucson, Pima Co., Ariz.

HASSAYAMPA COPPER CO.

Office: 281 John St., Portland, Me. Letter re former mine office, Groom Creek, Yavapai Co., Ariz. C Chas. Sumner Smith, treasurer; R. A. Sweet, general m cers, E. P. Ricker and Harold N. Willis, directors; Mi Organized Dec. 24, 1906, under laws of Maine, with ca shares $5 par; issued, $1,355,480. Property, at last a stock of the Gold & Copper Consolidated Mining & M thorized issue of $4,000,000, and $35,000 of the notes of t advanced. The Gold & Copper Consolidated Mining & is dead, as it is impossible to deliver a letter to any of its

Lands, 34 claims, 15 patented, area circa 650 ac timbered, in 4 groups, known as the Little Kid, which Rockefeller, Chicago and President, 12 miles southe Hassayampa and Big Bug districts. Lands show nume ing auriferous and argentiferous oxidized and sulphide

& Copper Consolidated Mining & Milling Co. to average
er and $38 gold per ton, which figures were gross exagger-
is by 34 pits and shafts, of 10′ to 815′ depth, and by 21
ength, with about 2 miles of workings. The old company
00 tons of ore blocked out for stoping, which was untrue,
ny was said to have opened 3 new veins, carrying copper,
aying $25 to $200 per ton.
es steam power, and a 50-h. p. hoist, with several shops.
s a 10-stamp mill and a 50-ton cyanide plant, and was
anagement, to have a 50-ton concentrator.
this company includes several men of excellent standing,
lves to be drawn into the net, but also includes R. A.
nager, who was the former president and treasurer of the
lidated Mining & Milling Co., a faking corporation that
as possible, while lyingly claiming to be running its mill
s claimed, March, 1907, in behalf of the present company,
would become an important producer, with quick divi-
, but these laims failed utterly of verification. The pub-
00 shares of stock, paying $77,476 therefor, but of this
s than half went into the Hassayampa treasury, and about
that did reach the treasury went to pay salaries. Com-
a receiver, with affairs badly muddled, the property idle,
annual assessment work, and prospects entirely bad.
and buried in chloride of lime.

D & COPPER MINING CO. **ARIZONA.**
at Groom Creek, Yavapai Co., Ariz.

JAPAN.
lining Co.

ER, GOLD & NICKEL MINING CO. **ONTARIO.**
ere sold to Consolidated Copper Co. of Parry Sound.
nd, Parry Sound district, Ont.

O COPPER MINING CO. **IDAHO.**
at Doniphan, Blaine Co., Idaho.

U HAUT-KATANGA. **BELGIAN CONGO.**
gne du Parc, Brussels, Belgium. Mine office: L'Etoile
Belgian Congo. Baron F. Baeyens, chairman; Robt.
n; Baron de Moor and H. Buttgenbach, managing direct-
J. Jadot, J. Cornet, Lord Arthur Butler, Tyndale White,
C. F. Rowsell, directors; Geo. Velge, secretary; Eugène
nager; Allan Gibb, chief engineer.
, 1906, under laws of Congo Free State, with capitalization
par, divided into half dividend shares and half capital
100,000 dividend shares; fully issued, and fully paid.
authorized, at 4½%; issued, £320,000. Is controlled,
p each, by Tanganyika Concessions, Ltd., and Société
Annual meeting, first Monday in December.
tensive, being a concession comprising a copper belt about
ntaining upwards of 100 exposures of copper, and a tin
es length, north of the Kafue and Zambesi rivers, in the
rolling country with a fairly healthy climate. The prin-
show sandstone, carrying malachite impregnations, esti-
y to average 14% in tenor, which estimate is considered

ngo mine was estimated, June, 1908, to have ore reserves
ng 15% copper, and 900,000 tons averaging 6.5% copper.
tremely high that they are regarded with suspicion, and

one year previously the high grade ore was estimated at
tenor. It is claimed that, with assorting, the ore will b

The Kambove No. 2 mine has 2 shafts, "H" and "I,"
were about 100′ each in depth, but probably have been
were said to prove an ore body of 200′ width. This m
1908, to carry 9,000,000 long tons of ore, with 3,000
averaging 12% copper. This estimate, on the strength o
amateurish development, is considered grossly inflated

In addition to copper properties, the company ow
these including the Busanga mine, which apparently
deposits, in alluvium of 3′ to 10′ thickness. The Kas
have lode-tin deposits, but apparently are but slightly de

The company also owns the Ruwe gold mine, whi
to 14′ width, opened for a quarter-mile by several shal
circa 100′, vein being a sandstone reef carrying gold up
ton, and claimed to average 5 dwts. gold and 9 dwts. pl
palladium, gold being quite coarse. The platinum figur
tiation. The Ruwe mine also has a placer deposit, es
gold per long ton, from which some production was
claimed cost of only circa 12s. per ton. Apparently th
or quite worked out.

In addition to ores of copper, tin, and gold, and c
num and palladium, the company has an iron ore deposi
near Shamerenga, on the Lualaba River.

Like its relative, the Tanganyika Concessions, Ltd
tion has appeared in the public press regarding this pro
statements in the press have been so uniformly exagg
market valuations, that these exaggerations, apparently
have a sinister appearance, as lies do not generate both
tinuously. The company reported, several years ago
employed. There is a small experimental smelter,
reported, in the press, early 1910, to have ordered a 3,0
was said, late 1910, to have a 1,000-ton smelter under cons
may possess valuable mining properties, and what little
been secured is to the effect that some of the proper
promise, but, in view of the gross and apparently sy
statements appearing in the press, and taking into cons
with the Tanganyika Concessions, Ltd., in whose beha
varication has been carried on, systematically, for so
is regarded with suspicion.

HAUXHURST COPPER CO.

Dead. Lands were bonded to United States Cop
forfeited the bond, 1910. Formerly at Agua Calient
Property is described in this volume under title of Hau

HAUXHURST MINE.

Letter returned unclaimed from former mine office,
Co., Ariz. Jas. Hauxhurst, owner and manager; Nich
tendent, at last accounts. Lands, circa 900 acres, in th
about 65 miles west of Phœnix and 27 miles west of Wic
station. Mine, formerly owned by the Hauxhurst Cop
bond, for about 3 years, to the United States Copper
feited same, 1909. Mine has about 25 pits and shafts,
was claimed, by the United States Copper Mines, Inc., t
a 15″ paystreak assaying 25% copper, 3 oz. silver and
figures unquestionably were inflated. Idle.

R MINING CO. **WYOMING.**
at Encampment, Carbon Co., Wyo. Described Vol. VII.

G CO. **WYOMING.**
office was Greeley, Colo. C. C. Townsend was manager; erintendent. Lands were 35 acres, patented, adjoining the ing mine, developed by an 80′ shaft. Formerly at En- o., Wyo.

LTD. **ENGLAND.**
dated, voluntarily, February, 1905. Formerly at St. Ives, cribed Vol. IV.

& TUNNEL CO. **COLORADO.**
rryall, Park Co., Colo. Frank N. Clancy, superintendent, nds, in the lower Tarryall camp, about 25 miles northwest lead and copper ores, the vein, at depth of 80′, being said , carrying circa 13′ of payable ore. Has steam power. presumably moribund.

CO. **ARIZONA.**
mbia Trust Bldg., Los Angeles, Cal. Mine office: Jer- riz. C. B. Stranahan, president; Chas. H. Harris, vice- ey, secretary and treasurer; Thos. E. Campbell, mine October, 1906, under laws of Arizona, as successor of pment Co., with capitalization $2,000,000, shares $1 par. patented, area 160 acres, known as the Harryhousen group, Verde on the north, said to have been bought for $60,000. ular ore bodies occurring as replacements in schist, the 2 f 3′ to 19′ width, traceable circa 2,000′ carrying a great ted by company to average 6.2% copper, 3 oz. silver and Sulphides were found, circa July, 1910, and the manage- continuation of the United Verde ore bodies. Mine has fts of 40′, 45′ and 350′, and a 700′ three-compartment main n claim. Considerable crosscutting was done, 1910, with n, and about 2,000′ of diamond drill borings were made, using occasional interruptions before the installation of a on the 700′ level, late 1910.
des a power plant with three 50-h. p. boilers, a 12x16″ d for 2,000′, and a 10-drill Ingersoll-Rand air-compressor.
s.

. **MONTANA.**
eeded by Butte-Homestake Copper Mining Co. For- Bow Co., Mont. Described Vol. VIII.

ER MINING CO. **WYOMING.**
at Encampment, Carbon Co., Wyo. Described Vol. II.

& COPPER MINING CO. **CALIFORNIA.**
th Union Ave., Los Angeles, Cal. Letter returned un- ine office, Needles, San Bernardino Co., Cal. C. R. Wise- nized circa December, 1906, under laws of Arizona, with 00. Lands about 6 miles west of Needles, are slightly which proved wet. Idle.

MINING & MILLING CO. **COLORADO.**
ncer, Gunnison Co., Colo. L. C. Ehbeding, superintend- Ores carry gold, silver and copper. Idle.

COPPER CO. **COLORADO.**
, W. Va. Mine office: Central City, Gilpin Co., Colo. Organized 1907, under laws of Colorado, with capitaliza- rty is a 5-year bond and lease on the Anchor mine, in me years, until drained by the Newhouse tunnel, showing

considerable bodies of low grade copper and lead ores, an
ores. Apparently copper values are small. There is
stamps and concentrating machinery.

HEART OF ARIZONA GOLD & COPPER CO.

Dead. Lands were sold, 1906. Formerly at May
Described Vol. VI.

HEATH MINING CO.

Dead. E. P. Hall was manager; R. T. Wollaston, s
carried auriferous and argentiferous copper ore, and was
electric and water power, employing about 25 men, circ
Heath, Washington Co., Idaho.

HEBER SPRINGS COPPER MINING CO.

Office and mine: Heber, Cleburne Co., Ark. Org
develop lands carrying indications of copper, in the vicinit
of operations secured.

HECKLA COPPER SYNDICATE.

Mine office: Irvinebank, Chelmsford Co., Queensl
Swan, manager, at last accounts. Mine, showing copper o
ment, with a small force, 1909. Presumably idle.

HECKLEY GOLD & COPPER MINING CO.

Office: Colorado Springs, Colo. Letter returned u
mine office, Wickenburg, Maricopa Co., Ariz. F. J. W
Markert, vice-president; Arnold Nydegger, secretary and
under laws of Arizona, with capitalization $1,500,000, sha
claims, in 3 groups, on Copper Hill, in the Black Rock
east and northeast of Wickenburg, having a 268′ tunne
10′ and 25′ claimed average width, showing ore assayi
Idle and presumably moribund.

HECLA & ARIZONA DEVELOPMENT CO.

Dead. Title was changed, 1903, to Red Jacket & Bis
Formerly at Bisbee, Cochise Co., Ariz.

HECLA & ARIZONA GOLD & COPPER MINING CO

Dead. Formerly at Bisbee, Cochise Co., Ariz. De

HECLA CONSOLIDATED MINE.

Office and mine: Butte, Beaverhead Co., Mont.
owner. Property is the Atlantis, Cleves and other mine
the Hecla Consolidated Mining Co., which for 20 years w
silver and lead, with considerable gold and copper, latter
fine copper yearly. Property paid dividends of $2,250,0
vestment of $40,000, but was bought, 1906, at sheriff's sale
opment work was under way, early 1910, on the Condor c

HECLA CONSOLIDATED MINES CO.

Office: 1624 Curtis St., Denver, Colo. Mine office:
Wyo. Henry Schwartz, president; Wm. L. Wilson, vice
son, secretary; Eli Miller, treasurer; preceding officers
directors. Organized circa 1909, under laws of Wyomin
$3,000,000, shares $1 par, as a merger of the Hecla Mini
Copper Mining & Extraction Co., and Kopper Krown Mi

Lands, 640 acres, including the Hecla group, 13 clai
35-acre townsite, is in the Silver Crown district, 4 miles fr
the Union Pacific railroad, and 7 miles from the Cheyenne
Hecla is claimed to show 16 fissure veins, of 8′ average wid
ite, of which 3, of 7′ average claimed width, were claimed
ment, and are claimed to carry oxidised and sulphide ores
give average assays of 5% copper, 3 oz. silver and $12 gol
to which they are claimed to carry estimated values of

nd uranium, which values apparently are something more
1909 the management reduced its claims on ore percentages
Development, at last accounts, was by a 40′ tunnel and 14
10′ to 140′ depth. The Hecla group made an ore shipment,
ber, 1909, to the Boston & Colorado smelter.
osevelt-Good Hope group, formerly held by the Amalgamated
Extraction Co., is either 10 claims, area 200 acres, or 11
cres, in the Silver Crown district, 2 miles from the Union
23 miles from Cheyenne, said to have about 700′ of workings,
e giving fair assays in copper.
Crown group, circa 2 miles southwest of Hecla and 22 miles
apparently is 7 claims, area 140 acres, and not 154 acres, as
pany, having 413′ of workings, claimed to show 10,000 tons of
d out for stoping.
, 80x100′ in size, has 15 stamps, a 50-ton concentrating plant
t. The Ohly process, installed by the present management
anization, in an attempt to save the rare metals, was not a
ly low in grade, is only in part adapted to concentration, and
erhauling and adaptation to the ore.
ent of the Hecla Mining Co. and the preceding corporations,
Schwartz as president and general manager, peddled "guar-
ming that 5% interest was guaranteed for 3 years by United
bonds, but nobody seems to have seen the bonds. The old
ning Co. advertised that it planned building a smelter, and
on a moment's notice, but failed to receive the notice. Pros-
ent company states that it is "one of the most substantial,
uccessful mining organizations in the entire west," which is a
considering the history made in the past. Because of the bad
eding companies merged in this corporation, and operated
e same management, this company is regarded with much
xcept for annual assessment work, but presumably still has

IDATED MINING CO. **ARIZONA.**
were sold, circa August, 1909, to Arizona Consolidated Mines
Wellton, Yuma Co., Ariz.

IDATED MINING CO. **MONTANA.**
rly at Dillon, Beaverhead Co., Mont. Described Vols. VI

& GOLD MINING, MILLING **WYOMING.**
G CO.
eorganized, October, 1904, as Hecla Mining Co. Formerly
Co., Wyo.

MINING CO. **WYOMING.**
rly at Encampment, Carbon Co., Wyo. Described Vol. II.

CO. **WYOMING.**
nerged, 1909, in Hecla Consolidated Mines Co. Formerly at
., Wyo. Very fully described Vol. VIII.

f HEDWIGSGLÜCK. **GERMANY.**
were sold, 1907, to Rheinbach Copper Mines, Ltd. For-
h, Rheinprovinz, Germany. Described Vol. VII.

NG & DEVELOPMENT CO. **ARIZONA.**
las, Ariz. Mine office: Courtland, Cochise Co., Ariz.
president and general manager; Guy O. Strickland, vice-
ant manager; I. V. Scott, secretary and treasurer; preceding
irom, Chas. Blixt and T. A. Whalen, directors; Wm. O.

Lands, 210 claims, in 3 groups, area circa 4,200 acres, tains, property including a damsite, capable of developi power, and a ranch. Property has 2 contact depos and andesite, and 8 fissure veins, of good average wid and argentiferous chalcopyrite, with occasional born gold, with quartz gangue. Mine, on which work was beg shafts, No. 1 being 4x10′, with 2-compartments, 500′ de phides of good average tenor on the 400′ level. Mine i cludes a 45-h. p. boiler and hoist. Property has employe two past years, and is developing systematically, with v

HEISENJI MINE.

Mine office: Heisenji-mura, Ono-gori, Echizen, Jap was 96,277 lbs. fine copper.

HEKLA COPPER DEVELOPMENT & EXPLORATION CO., LTD.

Dead. Former office was National Mutual Bldgs., vaal. Jas. F. Ferguson, Dr. F. E. T. Krause, P. R. K Geo. Sheffield were directors; Philip Japhet, secretary; engineer. Organized circa May, 1903, under laws of T ization £16,000, shares 10s. par. Lands were 168 the farm Reitkloof No. 509, held under license o month. Mine had 3 shafts, known as No. 1, New an deep, on a fissure vein in gabbro, showing malachite an 70′, succeded by chalcopyrite, with ferruginous quartz assays of 3.7 to 29.25% copper, 5 to 15 dwts. silver and long ton. Formerly at Middelburg, Transvaal.

HELENA-BUTTE MINING CO.

Mine office: Clancey, Jefferson Co., Mont. Fred dent; Chas. J. Burgess, secretary. Organized under la known as the Silver Crest, in Warm Spring Gulch, opened circa 1890, has a 200′ three-compartment shaft, lead ore, with fair copper and gold values, with prospec at depth. There is a fair power equipment, and severa Idle.

HELENA COPPER MINING CO.

Dead. Formerly at Helena, Lewis & Clark Co., Mon

HELEN MINING CO.

Mine office: Graham, Socorro Co., N. M. Tho Property is the Confidence group, ores of which carry g Has a 30-stamp mill, with steam, water and electric power

HELGA GOLD & COPPER CO. E

Office: Sullivan Bldg., Seattle, Wash. Letter re former mine office, Clayoquot, Vancouver Island, B. C. intendent, at last accounts. Lands, 5 claims, area circa Good Hope group, on Trout River, developed by a tun showing of ore. Idle.

HELLAN MINING CO.

Mine office: Cle Elum, ...ttitas Co., Wash. Prop and free milling gold, with development mainly on latter a 10-stamp mill and 40-ton concentrator, built 1908. Mi force of 10 men, 1910.

HELSINGBORG'S KOPPARVERK AKTIEBOLAG.

Office and works: Helsingborg, Malmöhus län, Sw Ingelsson, manager. Property is a reduction plant, i leaching works, treating mainly cupreous residues and un Sulitelma mine. During 1910 the plant treated about

and the leaching plant is being enlarged, to have an annual
0,000 metric tons. The refinery treats about 1,200 metric
y, and is to be increased in capacity to at least 2,000 tons

ER CO. **ARIZONA.**

etropolitan Life Bldg., Minneapolis, Minn. Mine and works
ma Co., Ariz. C. C. Prindle, president; Chas. W. Sexton,
ecretary; Wm. A. Paine, treasurer; preceding officers, Jas.
illsbury, Russell M. Bennett and John R. Van Derlip, direct-
, superintendent. Organized March 3, 1899, under laws
eorganized Oct. 4, 1905, under laws of Arizona, with capital-
hares $25 par, in $250,000 full-paid and $4,750,000 assess-
sued. Levied 50-cent assessments, payable July 20, 1908;
ry, 1910, and Feb. 15, 1911, the latter assessment rendering
State Street Trust Co., Boston, registrar; Boston Safe
., transfer agent. Annual meeting, first Monday after first

s, 38 patented, area 853 acres, also a 40-acre patented mill
960 acres of scrip land, giving total holdings of 1,853 acres,
of the Santa Rita Mountains, 30 miles southeast of Tucson.
embling that at Bisbee, includes Carboniferous limestone
ological horizon, with similar porphyritic intrusions, but with
rops and gossans, 5 ore bodies, occurring as replacements
ng an aplitic intrusive, having an average strike of N. 35°
p of 45°, carrying ore of 2 to 4% copper tenor.
ncipal ore bodies, known as the Isle Royale, Old Dick, Ex-
eavy Weight, with development under way on three.
mine has an 800′ shaft, with a 196′ winze, and shows lenses
nd 15′ maximum width, carrying ore averaging about 3%
n in combined gold and silver values. The lower levels show
is shaft furnishes sufficient water for mine and smelter use.

nine carries an ore body estimated at 1,500′ in length, of 20′
ing only to the underlying granite, at depth of 110′ to 150′.
′ shaft, with one level, showing a considerable amount of
average tenor, with a tunnel, leading to an open pit, showing
idth, said to average better than 5% copper. The Heavy
ut 7′ width, circa 7′ from and nearly parallel with the Old
lphide ore, of 3 to 5% copper tenor, at shallow depth, and
e amount of low grade concentrating ore. There is a large
e concentrating ore in the Leader and Old Dick mines, and
tonnage of ore of about 2% copper tenor in the Elgin mine.
ne, opened by tunnel and drift under 700′ of heavy iron gos-
show 10,000 tons of 3% ore. Work on the Leader and Elgin
d Aug. 1, 1910.

orld mine, to which operations were confined, early 1911,
07, and is the principal property, showing a vein of 15′ esti-
h, traceable about 3,000′, carrying oxidized ores above and
h values, mainly in the latter, formerly estimated by com-
copper, 0.5 oz. silver and 50 cents gold per ton, which figures
igh. The Copper World mine has a 480′ shaft, sunk at an
rst level at 135′ from surface, and 3 levels below, at 100′
ne had 11,775′ of workings, at the end of 1909, considerably
ne Copper World mine shows an ore shoot about 500′ long,
th, ranging 2 to 8% copper tenor, and proven to depth of
portions of the mine, 3 shoots of ore have been opened, one

of 35′ to 60′ width, maintaining an average of about 4
shoots are 6′ and 12′ wide, where opened, but apparen
carry ore ranging 2 to 3% in copper tenor. The 100′
the Copper World show a large tonnage of low grade ore
medium grade, and some high grade ore. A heavy flow
hampered operations, and necessitated bulkheading, u
Prescott triplex pump, with capacity of 700 gallons per
a 500′ head.

The Helvetia made an exceptionally fine showing
ores turned base on the third level. In addition to th
property has about 25 old pits and shafts, with abou
opencuts. The mine as a whole has several miles of la
about 400,000 tons of ore.

Equipment includes a 375-h. p. steam plant and
good for depth of 600′, a 9-drill Ingersoll-Sergeant air-co
light plant.

There are 35 buildings, including a 30x20′ machi
20x40′ carpenter-shop, powerhouse and dwellings. I
yearly consumption of about 8,500 barrels.

A railway line has been surveyed, from Helvetia t
latter point, with the Southern Pacific, and there is te
Vail.

The company has no smelter. The first smelter,
built 1899, was burned 1900; rebuilt and blown in, 1
owing to exhaustion of the rich oxidized ores; agai
wrecked, May, 1906, by collapse of the ore-bins, whi
foundation; and again rebuilt, with a 100-ton water-
30-ton Medbery rotary oil-burning furnace, treating 2
intervals, installed by the inventors, at their own expe
treat ore at half the cost of ordinary water-jacket bla
proved a dismal failure.

Ore shipments of 25 to 100 tons daily to the Old
begun October, 1908, and discontinued Sept. 30, 1909,
haul to Vail, which was $3 per ton, plus leakage and
aggregate cost of $5.38 per ton of dry ore, from mine to
tion has been as follows: 379,823 lbs. fine copper, 3,
gold in 1906; 191,666 lbs. copper in 1907; 270,000 lbs
1909, with no production in 1910. Company was
monthly, in development work, October, 1910, and
January, 1911. There is a large tonnage of low and
some high grade ore, developed mainly in the Copper
much-needed rail connections, and a suitable reduc
promises to produce copper at a profit.

HEMBRILLO COPPER MINING CO.

Letter returned unclaimed from former office, El
Tularosa, Otero Co., N. M. H. C. Marks, secretary;
eral manager. Organized 1904, but abandoned land
and then repurchased the property. Lands, 8 claims,
brillo Cañon, on the eastern side of the San Andreas M
Tularosa, with a wagon-road thereto, said to carry 3 stro
converging to the south. The central or main vein,
and limestone, is said to have a nearly vertical dip. D
ous old pits, showing copper ore, and one old vertical s
filled with water, said to develop a vein of 5′ to 10′ w
carbonate ores, claimed to average 12% copper, with
lower workings. There also is the 800′ Platte drainage

NG CO. **MONTANA.**
d unclaimed from former office, Missoula, Mont. Mine
ssoula Co., Mont. John Morrison, superintendent, at last
ed circa 1909. Mine, about 2 miles from Saltese, is said to
vorkings. Presumably idle.

R MINING CO. **ALASKA.**
s, Alaska. Mine office: Landlock, Alaska. S. A. Hemple,
and general manager; F. S. Sylvester, vice-president; S. I.
preceding officers, Arthur Lang and R. P. Ferguson, direct-
superintendent. Organized March, 1910, under laws of
lization $1,000,000, shares $1 par, nonassessable. Company
ended about $25,000 on the property.
ns, patented, area circa 120 acres, with a 2-acre millsite, all
Standard and Three Man mines, at Landlock Bay. Property
slate and quartzite, carrying 2 ore bodies having 5 or 6 shoots,
in width, and to be traceable 2,000′, carrying chalcopyrite giv-
of 3 to 8% copper. Mine is opened by tunnels of 50′, 300′ and
,400′ of workings, estimated by management to show about
e blocked out for stoping, which estimate seems high. There
but property has 6 buildings. Management plans continuing
aising 250′ to the tunnel above, installing an 850′ ground-tram,
ilding a wharf and ore-bunkers, and also plans the installation
estimating that ore can be concentrated 6 into 1. The Tacoma
d to loan sufficient money, at 6%, to put the property on a
Mine considered promising.

ON & CO., LTD. **SCOTLAND.**
: Irvine, Ayrshire, Scotland. Property is a plant for leach-
from cinders remaining from the burning of cupriferous pyrites.

TRANSVAAL ESTATES. **TRANSVAAL.**
Berkenrode, Zoutpansberg, Transvaal. Property is in the
lessina mine, and development on a copper deposit was begun
Presumably idle.

WENTY COPPER PROPERTIES. **ARIZONA.**
ner office was 810 Breitmeyer Bldg., Detroit, Mich. John G.
F. Caspers were fiscal agents, and apparently were responsible
n. Lands, 20 claims, area 400 acres, near the Copper Creek
d, by the versatile and obliging fiscal agents, to be in the same
t as the Calumet & Arizona, Detroit, Shannon and Tharsis
a geographical impossibility. The "mines" were claimed to
hides assaying 8%. Formerly at Copper Creek, Graham Co.,

RNS MINING CO. **IDAHO.**
Mullan, Shoshone Co., Idaho. J. F. Whelan, president;
-president; Dennis Hennessy, secretary, treasurer and general
, 10 claims, about 1 mile north of the Snowstorm, on the
divide, having a 600′ main tunnel, showing galena assaying up
uildings, burned in the forest fires of August, 1910, are to be

INING & MILLING CO. **COLORADO.**
est & Cranmer Bldg., Denver, Colo. Letter returned un-
mer mine office, Silverton, San Juan Co., Colo. E. C. Drew,
Oliver, vice-president; W. T. Ford, secretary; H. B. Demarest,
ling officers, W. H. Platt, B. F. Mellor, John Colquhoun, W. T.
Theo. Royer, directors. Capitalization $3,000,000, shares $1
bought the property of the San Juan Smelting & Refining Co.,

at sheriff's sale, Oct. 4, 1909, and a receiver was asked, apparently having been waterlogged when launched.

Lands, circa 40 claims, 10 patented, including a r Henrietta mine, in Prospect Basin, on the western sid in Picayune Gulch on Treasury Mountain, with claim and 3 claims in Cinnamon Gulch, on the line of the Northern railroad, 7 to 10 miles from Silverton. Part under bond and lease by the Ross Mining & Milling C the Henrietta mine, carrying auriferous and argentifero a long crosscut tunnel, estimated, by the San Juan Sm former owner, to show circa 400,000 tons of ore of a blocked out for extraction, which figures were much e rietta is said to show occasional shoots of high grade sr 30% in copper tenor, with smelting ore averaging ab about 3.5% in copper tenor. The mine has 6,250' of w nels, and management planned extending tunnel No. long, to intersect the Henrietta vein at a distance of 1,20 back of about 1,200'. No. 7 tunnel is about 2,200' long

Equipment includes gasoline and electric plants, la the-Animas Power Co. A Trenton Iron Works aërial railway siding to the portal of No. 7 tunnel.

Works include a 400-ton concentrator, and the pyritic smelter, which has a fairly modern equipment, nace. Smelter, when in commission, which has been matte of 45 to 50% copper tenor. This company app the weak links in a fundamentally defective chain of pr public during the past 12 or 15 years, all of which h deadly monotony. Idle and apparently moribund.

HENSON CREEK LEAD MINES CO.

Dead. Lands were sold by sheriff, circa 1906. Hinsdale Co., Colo. Described Vol. VI.

HERCULES BOSHOF SYNDICATE.

Dead. Formerly at Pietersburg, Zoutpansberg, Vol. VIII.

HERCULES CONSOLIDATED MINING CO.

Office: Boston, Mass. Mine office: Silverton, S ward P. Ricker, president; Chas. S. Smith, treasurer; T director. Capitalization $1,000,000, shares $10 par. of $300,000 bonds at 6%, convertible into stock at par; Lands, 25 claims, area circa 300 acres, known as the Li tunnels of 1,500' and 2,500', showing auriferous and arg per ores, with values mainly in gold and silver. Has ste a modern 50-stamp mill.

HERCULES GOLD & COPPER CO.

Office: 81 Fulton St., New York, N. Y. Mine offi N. C. Moribund. Fully described Vol. VIII.

HERCULES MINING CO.

Mine office: Jedway, Queen Charlotte Island, B vicinity of the Ikeda mine, on Moresby Island. Idle.

HERCULES MINING CO.

Dead. Formerly at Butte, Silver Bow Co., Mont.

HERCULES MINING CO.

Dead. Formerly at Battle, Carbon Co., Wyo. I

HERCULES SONORA MINING CO.

Dead. Formerly at Ures, Sonora, Mex. Describ

SCHGLÜCK-STOLLN UND KIESELS **GERMANY.**
—ERBSTOLLN.
ine: Johanngeorgenstdat, Saxony, Germany. E. R. Poller, in the vicinity of Schwarzenberg, carries sphalerite and chal-on, which was small at last accounts, being mainly zincblende.

OPPER CO. **AUSTRALIA.**
Hermidale, Canbelego Co., N. S. W., Australia. Organized 3, under laws of New South Wales, with capitalization £2,625, Apparently no work has been done, though it was planned to circa September, 1908.

ING CO., LTD. **ONTARIO.**
met, Mich. Mine office: Massey, Algoma, Ont. Moribund. ed Vol. VIII.

PPER MINES, LTD. **GREECE.**
nerly at Spetzia, Corinth, Greece. Described Vol. VIII.

& COPPER MINING & SMELTING CO. **ARIZONA.**
e was Mercer, Utah. Officers were J. W. Lee, president; F. J. ; Edwin W. Lee, treasurer. Organized 1904, under laws of alization $100,000, shares $1 par. Lands, 5 miles below the tle Colorado River, were said to show promising ore bodies, development. Formerly at Ryan, Coconino Co., Ariz., via

COPPER CO. **COLORADO.**
Milk St., Boston, Mass. Letter returned unclaimed from Silver Cliff, Custer Co., Colo. Moribund. Described Vol. VIII.

PER CO. **NEW MEXICO.**
Broadway, New York, N. Y. Mine office: Hanover, Grant n W. Burchard, president; M. F. Westover, secretary; D. M. r and general manager; Henry N. Darling, assistant treasurer; stant secretary. Organized July 20, 1905, under laws of New alization $100,000, shares $100 par. Corporation Trust Co., rar. Annual meeting, first Monday in June.
liscovered circa 1800, and opened 1880, were worked inter-o various Indian troubles and lack of funds, until taken over, nt owner, which practically is the General Electric Co.
aims, patented, area circa 2,200 acres, in the Central or Han-nds include the Ivanhoe and Humboldt mines, which are the also the Copper Queen, Treasure Vault, Wild Cat, Ninety, other mines and attempts at mines. Country rocks are por-uartzite and limestone, showing various contact deposits be-limestone, with porphyry intrusions, ores occurring as lentic-ins with a generally northeasterly and southwesterly strike, p of circa 45°. Four different ore bodies are being developed, to 20′ in width, with a known depth of 410′ and known length pment is by shafts, as follows: Ivanhoe, 350′; Ninety, 410′; 25′; Wild Cat, 410′; Humboldt, 300′; Copper Queen, 200′; Mabel, 200′. All shafts show ore, and the various mines es of workings, estimated to show 100,000 tons of ore, with ed out for stoping. The property has large bodies of low ng ore, carrying average values of 3% copper, 3 oz. silver, and old per ton, with small quantities of lead near the surface, and of zinc, but not in sufficient quantities to materially hamper

ncludes a 700-h. p. steam plant, with 7 hoists, good for 500′ d 4 Sullivan air-compressors, of 26 drills aggregate capacity. a 20x40′ machine-shop and smithy, a 40x100′ carpenter-shop

and framing-mill, warehouse and sawmill, with a tota
wood.

The 40x90′ concentrator, of 100 tons rated daily ca
management, was altered and used for experimental pu
Blake crusher, 2 sets of rolls, 1 Hartz jig, 5 Overstrom t
screw sizers, 1 hydraulic sizer and 1 Huntington mill.

Considerable systematic development was done,
estimates of tonnage by eminent engineers, but results
pectations, as, though some very good ore bodies were
sufficient size to render the property profitable. Furth
systematic drilling, which has developed large ore bodi
joining property, is under consideration, with favorable
campaign of drilling, during 1911.

HERMOSILLO COPPER CO.

Office: 308 North Sixth St., St. Louis, Mo. Op
Hermosillo, Sonora, Mex. Mine office: Ures, Sonora
man, president; C. P. West, vice-president; R. D. Wo
urer; preceding officers, A. J. Rushing, F. E. Resler, F
H. W. Whitaker, directors; Jas. Penman, general ma
13, 1910, under laws of México, as Hermosillo Copper C
Feb. 19, 1910, under laws of Arizona, as Hermosillo Cop
tion $1,500,000, shares $1 par, nonassessable; issued, $1,0
practically a reorganization, under the same managemen
Copper Co., a singularly inefficient, vacillating and p
"operated" for nearly ten years, to the damage of its re
of its shareholders. Property of the Verde Grande Copp
13, 1909, at public sale, and old shareholders were give
stock, share for share, plus 25 cents cash per share. Th
voted most of its efforts to attempts at raising money
financial debility of its predecessor, which was a cross be
Annual meeting, second Thursday in January.

Lands, 1,395 acres, with 200 acres of mill and sm
district, circa 30 miles northwest of Hermosillo, partly ti
cottonwood and mesquite. Main tract, 460 acres, incl
La Cobriza and San Luis groups, reported by the ma
phyry and lime interstratified with granite and quartz,
mation, but thoroughly in keeping with the past meth
Verde Grande has contact deposits in limestone, near ig
ing oxidized ore giving assays of 6% copper, 6 oz. silv
La Cobriza group has contact deposits between granit
to 60′ claimed width, claimed to be traceable 7,000′, c
argentiferous copper ore, said to assay 5.5 to 16% copper
limestone. Company reports 7 ore bodies under devel
width, averaging 5.44% copper, 8.66 oz. silver and 75 cen
erty as a whole has 6 shafts and tunnels, with about 6,0
by the management to show 100,000 tons of ore.

Equipment includes a 30-h. p. hoist, good for 500′ c
compressor. There are 3 buildings.

The smelter, 1½ miles from the principal workings,
100-ton Allis-Chalmers water-jacket blast-furnace, but th
that coke was too expensive, and installed a 30-ton Mc
charcoal, made in 3 kilns, from ironwood and mesquite,
16 pesos per ton. The old management reported, Apr. 24,
of the exceeding hardness of the charcoal, and in orde
necessary of the pulverizer, they would add additional
considerably reduce the power at present required to r

expense of refining the ore." Any management that finds rize charcoal should be set to pounding sand, as the next e, 1908, the old management explained to the shareholders, e put out by the lack of long-promised dividends, that the eloped, was truly magnificent, but that, owing to the low as necessary to tap richer veins, and it was found necessary ores, the management explaining that sulphur is a fuel, he least refractory in reduction.

nt, installed or partially installed, 1904, was a failure, like d by the old company. From December, 1907, to June, ande produced 51,181 lbs. of black copper, of 95 to 96% r, and 16 oz. gold, sold for 12,495 pesos. The management of practically the same as that of its predecessor, the Verde which was promoted with the aid of utterly untruthful ad- aged with consistent inefficiency, this company is not re-

COPPER CO. **NEVADA.**

r office was 20 Broad St., New York, N. Y. Seward H. y. Organized circa February, 1907, under laws of Maine, $1,000,000, shares $1 par. Lands, were 5 claims, adjoining lidated on the south, on which very little work was done. White Pine Co., Nev.

D & COPPER MINES CO. **BRITISH COLUMBIA.**

rly at Grand Forks, Boundary district, B. C. Described

INERAL EXPLORATION CO. **MÉXICO.**

Chalchihuites, Sombrerete, Zacatecas, Mex. C. A. Phelps, roperty carries ores of copper and lead.

FERBERGBAUGESELLSCHAFT, LTD. **GERMANY.**

Rottenburg a/F., Hessen, Germany. Felix Wecker and usiness managers. Organized under laws of Germany, with 00 marks. Company was exploring for copper ore, with t accounts, early 1910.

COPPER MINING CO. **CALIFORNIA.**

ne: Sheridan, Placer Co., Cal. Geo. Grutman, secretary rganized 1903, with capitalization $75,000. No trace of and property was said, in the press, February, 1910, to residents of Oakland, Cal. Idle some years and apparently

JAPAN.

Kitakata-mura, Higashi-Usuki-gori, Hyuga, Japan. Seikyo ne is an old property, which was a considerable producer at enteenth Century, located on the eastern bank of the Tsun- h of the Gokasegawa, which gives deep water transportation. ainly cupriferous pyrite, with some chalcopyrite averaging 5 nor, without appreciable gold or silver values, in lenses hav- dth of 20′, occurring in clay-slate and sandstone. Equipment stallations aggregating 810 h. p. Forces averaged 1,131 d 1,021 hands in 1908. Production was 2,166,102 lbs. fine 902,425 lbs. in 1907, and 1,930,734 lbs. in 1908.

WNE. **TRANSVAAL.**

Motale, Zoutpansberg, Transvaal. Lands, 1,500 claims, es, held under license from the government, on the Motale ns, in the Pietersburg district. Property shows fissure d contact deposits between diabase and quartzite, with a d nearly vertical dip, there being 10 known ore bodies,

of which 4, under development, are of 1′ to 30′ wid copper, malachite, azurite and bornite, but mainly values up to 70% copper, from traces to 1 oz. silver, a long ton. Mine has pits and shafts of 20′, 20′, 20′, 3 with about 300′ of laterals, giving a promising showing awaiting the advent of a railroad, expected in 1913. to B. P. Wall, acting for a London firm, and was expe little high-grade hand-picked glance, circa June, 1911.

HICKEY COPPER, LTD.

Dead. Formerly at Motale, Zoutpansberg, Transv

HIDACHI MINE.

Mine office: Hidachi-mura, Taga-gori, Hitachi, hara, owner and manager. Property is a new mine, o ore averaging about 4.5% in copper tenor, and finished tween 9 and 10 cents per lb. laid down. Equipment tions that aggregated 2,225 h. p. in 1907, increased Forces averaged 783 hands in 1907, and 1,013 hands i 577,560 lbs. fine copper, 1906; 1,767,169 lbs. in 190 257,629 momme silver and 12,987 momme gold in 1908

HIDALGO COPPER MINING & SMELTING CO.

Office: Avenida 16 de Setiembre No. 26, México, office: Zimapán, Hidalgo, Mex. Sydney Ludlow, pr ager; Col. Felix Díaz, vice-president; R. A. Mills, se treasurer; preceding officers, Richard Sobey and W. Jas. H. Armstrong, smelter superintendent; Geo. Organized Aug. 14, 1907, under laws of Arizona, with shares $10 par, in $1,000,000 preferred and $1,000,000 meeting, third Monday in August.

Lands, 44 properties, area 500 acres, with a 500-s of the properties, including the Concordia and Purisi silver-lead ores, but several properties also carry a Lands show monzonite-porphyry and limestone, with ing argentiferous lead and copper ores, one with stri one with strike N. 60° E. and dip of 80°, and one with of 65°. Two ore bodies are under development, one and 115 meters proven length. There is also said to ore worth 45 pesos per metric ton, with values about silver and copper. Copper ores are estimated by the copper and 26 oz. silver per ton. The mines have including copper oxides and carbonates, carbonate a argentite and chalcopyrite. Development is by shaf 60 meters depth, and by tunnels of 154, 220, 260, 175 meters length, with a total of 2,229 meters of workings, tons of ore, with 43,000 tons blocked out for stoping.

Equipment includes a small steam plant and employs about 800 men at the mines and works.

The smelter, at Zimapán, 5 miles from the mine train, is of 50 tons daily capacity, having a 30-ton co lead stack both burning coke. Copper production is ing about 25% copper, 170 oz. silver and 0.25 oz. g Aguascalientes smelter. Copper production, 1909, w of about 3.5% copper tenor, yielding circa 400,000 lbs. plans deepening the Purisima and Concordia mines, mine.

HIDALGO MINING CO.

Dead. Formerly at Moctezuma, Sonora, Mex.

R MINING CO. **MÉXICO.**

Bldg., Chester, Pa. Mine office: Hidalgo del Parral, Josiah Smith, president; T. C. Williams, superintendent. aims on the Rio Conchos, in the Ciénegas de Olivas district, n Parral, said to show ore assaying up to 28% copper, at tigation involving the ownership of property was decided, ompany's favor. Presumably idle.

COPPER CO., LTD. **BRITISH COLUMBIA.**

merican Bank Bldg., Seattle, Wash. Mine office: Port istrict, B. C. T. M. Hodgens, president; M. K. Rodgers, general manager; Ralph Hodgens, secretary. Organized Washington, with capitalization $2,000,000, shares $5 par, d, $1,000,000. Is controlled, through ownership of 80% of t, late 1910, for $400,000, by Granby Consolidated Mining, Co., Ltd. Property was bought, for $100,000, of the Hidden Ltd.

s, crown-granted, area 400 acres, with 600 acres of mill and ose Bay, Observatory Inlet, a branch of the Portland Canal, m Prince Rupert. Property shows slate and greenstone, ins and contact deposits, of which 2 are under development. 120′ reported average width, is in an ore zone 200′ to 500′ 00′ by a prominent gossan. Ore is silicious chalcopyrite, any to average 3 to 7% copper, 1 to 3 oz. silver and $1 to Development is by trenching and tunnels of 750′, 120′, 100′, ′ and 12′, with 1,500′ of workings, estimated to show 350,000 he main tunnel level. There are 4 tunnels, aggregating 400′ n Bluff claim, showing chalcopyrite, associated with pyrite, tenor. There are tunnels aggregating about 300′ on the aim, showing mixed chalcopyrite and pyrite assaying 4.5 he principal working is the 750′ crosscut main tunnel, 450′ Cabin Bluff workings.

l, 2 miles north of the main tunnel, taking water under an an 8-drill air-compressor. There is a 7,000′ sawmill, and 15 th a 2-mile plank-road to tidewater on Goose Bay. An nder construction, in the vicinity. Management plans con- t. Property considered promising.

URE MINES CO. **NEVADA.**

Lane, White Pine Co., Nev. D. C. McDonald, manager. ebruary, 1907. Property includes the Point, Ontario and ted 1909. Presumably idle.

URE MINING CO. **MONTANA.**

bortive. Formerly at Clinton, Missoula Co., Mont. Fully

URE MINING & TUNNELSITE CO. **WYOMING.**

St., Lincoln, Neb. Letter returned unclaimed from former pment, Carbon Co., Wyo. John T. Dorgan, secretary; H. t last accounts. Lands, 9 claims, patented, having about to give a promising showing of auriferous and argentiferous me years and property for sale.

UPPER CO. **NEVADA.**

Mountain, Lander Co., Nev. J. J. Broecher, superin- Lands, 21 miles south of Battle Mountain, have showing copper ore. Mine was under develop-

JAPAN.

Oe-gori, Tokushima-ken, Awa, Japan.

Tokuzo Shima, president; Fusanosuke Kubara, manag
superintendent. Organized, November, 1910, under law
italization 1,000,000 yen.

Lands, 39 claims, area circa 3,000 acres, showing le
chloritic schist, with generally EW. strike, and dip of 60°
3 ore bodies under development, these being the Mochibe
traceable 2,000′; the Hiroishi, of 18′ average width, trac
150′ incline shaft; and the Higashiyama vein, which is th
average width of about 23′, traceable 5,800′, opened by a 30
ing an intimate mixure of chalcopyrite and pyrite, avera

Equipment includes 2 suction gas engines, aggregati
30-h. p. hoists, and 35-h. p. and 50-h. p. Leyner air-comp
was 803,048 kwan copper ore, carrying circa 100,000 lbs.
and approximately 4,500 tons of ore carrying about 400,0
1910. The management plans driving a 4,000′ tunnel fo
improving the present antiquated dressing plant.

HIGGINS DEVELOPMENT CO.

Dead. Formerly at Bisbee, Cochise Co., Ariz. Very
IV and V.

HIGGINS MINE.

Office: care of Thos. Higgins, owner, Higgins Bldg
Mine office Bisbee, Cochise Co., Ariz. Idle some years.
under title Higgins Development Co., Vols. IV and V.

HIGH GRADE SILVER & COPPER CO.

Mine office: Chewelah, Stevens Co., Wash. F. T
and general manager; L. E. Hertzell, vice-president; W. W
and treasurer. Organized circa August, 1909. Lands, 3
have a slate contact, carrying argentiferous copper and le
value, developed by a 110′ shaft. Equipment includes ste

HIGHLAND BOY CONSOLIDATED MINING CO.

Dead. Was wound up, 1906, and lands absorbed by U
Formerly at Bingham Canyon, Salt Lake Co., Utah. Des

HIGHLAND BOY GOLD & COPPER MINING CO.

Mine office: Bingham Canyon, Salt Lake Co., U
through stock ownership, by Utah Consolidated Mining
described under title of latter.

HIGHLAND COPPER CO., LTD.

Office: 604 The Rookery, Spokane, Wash. Letter
from former mine office, Dillon, Beaverhead Co., Mont.
president; J. S. Graves, vice-president; F. M. Longshore, s
manager; F. M. Dudley, treasurer. Organized 1909, under
with capitalization $1,500,000, shares $1 par.

Lands, 7 claims, unpatented, area 130 acres, in the S
Madison county, Montana, showing granite and limeston
deposits, with some work on each, there being 9 pits and s
in depth. Main vein, estimated by company at 10′ in
carbonates at surface, with chalcocite and chalcopyrite
given average assays of 10% copper, 2 to 5 oz. silver and
ton. Equipment includes a 40-h. p. hoist, good for 1,000′
buildings. Idle, apparently since organization, and before
ownership.

HIGH LONESOME GOLD MINING & MILLING CO.

Mine office: Grand Lake, Grand Co., Colo. E. S.
dent and manager; Dr. W. E. Rammel, secretary and t
1902, with capitalization $500,000. Mine has been claim

pencut, averaging 18 to 21% copper and $10 gold per ton, ross exaggerations. Idle and presumably moribund.

& COPPER MINING CO. MONTANA.

er Bow Block, Butte, Mont. Letter returned unclaimed ffice, Basin, Jefferson Co., Mont. Loren W. Harriman, nger, vice-president. Organized under laws of Montana, 150,000, shares $1 par; fully issued.

ral patented claims, and 2 water-rights, circa 5 miles from in estimated by management as 200′ wide, and averaging nd $10 per ton in combined lead, silver and gold values. a 1,900′ tunnel. Property apparently carries a very large ade ore. Idle some years.

MONTANA.

onda Copper Mining Co., at Butte, Silver Bow Co., Mont.

ER MINING CO. MÉXICO.

organized, 1909, as High Top Mining Corporation. For- ckingham Co., Va. Described Vol. IX.

NG CORPORATION. VIRGINIA.

Nassau St., New York, N. Y. Mine office: Elkton, Rock- Morris D. Brown, president; Prentice W. Brown, secretary; treasurer. Organized 1909, under laws of Arizona, with 00,000, shares $10 par, practically as a reconstruction of r Mining Co.

00 acres in Greene county, Virginia, 7 miles from the Nor- vay, said to show 3 wide fissure veins, carrying carbonate atter claimed to give average assays of 6% copper, 10 oz. er ton, which figures are entirely too high. Mine has some shaft, with a 45′ drift showing 8′ of argentiferous and auri- alcocite, giving assays of circa 10% copper. There also is a ral shallow pits and opencuts, tracing the outcrop for the e property, about 3 miles. Company reports that what ure veins now appears to be one ore zone, with a width of ncludes considerable machinery and a number of buildings. ed resuming operations circa March, 1911, and beginning d ore from the stock-pile, and building a 50-ton concentrator,

VERMONT.

orinth, Orange Co., Vt. Idle since November, 1907.

A HIGUERA. CHILE.

Vicuña, at Higuera, La Serena, Coquimbo, Chile.

INING CO. NEVADA.

iko, Lincoln Co., Nev. Is said to have a 3′ vein, traceable g average assays of 4.1% copper, 6.3% lead and 46 oz. silver

CHILE.

liguera, La Serena, Coquimbo, Chile. Richard H. Everitt ers and managers. Lands, 2 pertenencias, area 10 hectares, guera, carrying 3 parallel veins in diorite and granite. Main at surface, shows chrysocolla and carbonate ores of good afts of 20′ and 50′. Ore, as produced, averages about 15% on, and is sold to the Sociedad Minera San Juan. Com- d railroad would permit shipment of low grade ores, of which possesses considerable quantities.

MÉXICO.

Mine office: Bacis, San Dimas, Durango, Mex. ine, at El Cobre, in the vicinity of Bacis, carrying

auriferous and argentiferous copper ore. Property ha
matte was being produced and shipped, in small quantit

HILETA GOLD & SILVER MINING CO.

Office and mine: Velardeña, Cuencamé, Durango
general manager. Organized 1892, under laws of Wis
tion $100,000, shares $100 par, nonassessable. Lands,
Santo Tomás, Bolsa and other mines, and a 60-acre m
ported to show 5 fissure veins, in limestone and porph
EW. strike, with one vein, of 12" to 3' width, developed
6,000' of workings, carrying ore formerly said to averag
36 oz. silver and $10 to $50 gold per ton. Equipment in
line hoists, good for circa 1,000' each, and a 3-drill air-
9 buildings.

HILLMAN COPPER CO., LTD.

Office and mine: Sault Ste. Marie, Algoma, Ont.
dent; Edw. Ewing, vice-president; Hugh McKinnon, se
Organized 1907, under laws of Ontario, with capitalizati
par, as a holding and promotion company, with the pl
company later. Lands, 640 acres, in the township of
River mine, on the main line of the Algoma Central railw
ing up to 10% copper and 8 oz. silver per ton. Idle seve

HILLSBORO CONSOLIDATED MINES CO.

Dead. Was a swindle. J. N. A. Connor was presi
ager. Formerly at Hillsboro, Sierra Co., N. M.

HILLSIDE CONSOLIDATED MINING CO.

Letter returned unclaimed from former office, Ind
office: Cherry, Yavapai Co., Ariz. John H. Tribby,
Chas. W. Green, directors; M. M. Green, manager. Orga
under laws of Arizona, with capitalization $1,000,000, sh
ing to articles of association $999,500 was to go to Tribb
the property, leaving $500 in stock as the company's s
Apparently the company is a consolidation of the Grea
Annabelle Mining Co. and Golden Idol Mining Co. Land
the Majestic, Annabelle and Golden Idol groups, in the
having a 300' main shaft, planned to be sunk to 500'
values mainly in gold. Mine is said to have 3' of free m
300' level. Equipment includes a 3-stamp Nisson mill.
small force, late 1910.

HILLSIDE COPPER MINING CO.

Dead. Was merged, June 4, 1906, in Bristol Consoli
ng Co. Formerly at Pioche, Lincoln Co., Nev. Describe

HIMALAYA MINING CORPORATION, LTD.

Dead. Was dissolved January, 1905. Formerly at
Provinces, India. Described Vol. V.

HIMMELFAHRT FUNDGRUBE.

Office: care of Kgl. Sächs. Staatsfiskus, Dresden, Ge
Freiberg, Saxony, Germany. K. Stephan, manager.
berg, owned and operated by the Saxon Crown, emplo
Production is about 12,000 metric tons of ore yearly, m
including about 2,000 metric tons of highly argentiferous ch
opyrite.

HINDS CONSOLIDATED MINING CO.

Dead. Became bankrupt. Formerly at Santa Bár
Described Vol. VIII.

HINSDALE TUNNEL & REDUCTION CO.

Mine office: Lake City, Hinsdale Co., Colo. H. S. B

s. Succeeded, circa 1907, the Henson Creek Lead Mines Co. ie Bonanza group, include the Bonanza, Magnolia and other ng auriferous and argentiferous lead and copper ores. Has ower and a 50-ton concentrator. Presumably idle.

RHODESIA.

ie Copper Development Co., Ltd.

JAPAN.

Obaki-mura, Nii-gori, Iyo, Japan. Kiichiro Yamashita & e is a small producer of sulphide copper ore and iron pyrites, age of 75 hands, without power installation. Production, kwan of copper ore, valued at 34,544 yen, and 49,180 kwan luction estimated at circa 175,000 lbs. fine copper.

E. JAPAN.

Funatsu, Yoshiki-gori, Hida, Japan. Takaoki Yokoyama, hi, superintendent. Mine carries argentiferous copper ore, electric plants aggregating 460 h. p. Production was 960,351 988,519 grams silver in 1906; 1,392,280 lbs. copper and 47,207 ,130,831 lbs. copper and 324,969 momme silver in 1908.

RT. MÉXICO.

ne: Charcas, Moctezuma, San Luis Potosí, Mex. Lands y Anexas mines, which, circa 1907, produced about 15 tons La Trinidad y Anexas mines, carrying auriferous copper ore, e having antimony ore, and the Dolores é Hidalgo zinc mine.

E. JAPAN.

ukawa Mining Co.

JAPAN.

Fukiya-mura, Kawadami-gori, Bitchu, Japan. Toraji Mine, employing an average force of about 50 persons, with- on, in 1908 produced 964,200 kwan of iron pyrites and 77,837 phides.

E. JAPAN.

Kawada-mura Oe-gori, Awa, Japan. Is a comparatively new ich is chalcopyrite, slightly argentiferous, and averaging 4% edded in clay-amphibolite, beds ranging 2′ to 5′ in thickness. as 112,196 lbs. fine copper. Idle several years.

E. JAPAN.

Nakagawa-mura, Senhoku-gori, Ugo, Japan. Main vein has , with steep NNW. dip, and is 1′ to 4′ in width, carrying chal- with galena, sphalerite and pyrite, all slightly argentiferous, ing in copper and silver. Production was 566,268 lbs. fine momme silver, in 1900; 1,444,464 lbs. copper and 1,012,012 3; 1,588,913 lbs. copper and 229,680 momme silver in 1907; pper in 1908. Management is progressive.

JAPAN.

su Bishi Goshi-Kwaisha.

PPER MINING CO. NEW MEXICO.

rly at La Luz, Otero Co., N. M. Described Vol. VIII.

CALIFORNIA.

e: Ukiah, Lake Co., Cal. Lands, 4 claims, showing car- e ores assaying 6% copper, 2 oz. silver and $5 gold per ton.

IAS MINES. SUDAN.

d unclaimed from former mine office, Hofret-en-Nahas, gyptian Sudan. Lands, in southwestern Kordofan, are and primitive way, to meet purely local demands, ore being rmaces at the mine.

auriferou
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...gori, Tosa, Ja
... copper, ar
...ercalated
...32 lbs. fine

...113, Esse
...man; preced
...rner, directo
...include th
...and copper
...3,000 metri

...returned uncl
...Rheinprovinz, Prussi
...as successor of
...enstein, Hohenstei
...Beilehn, Helene, H
...and copper ores,
...ing about 100 me

...UND HAMBURG.
...Westfalen, Germany.
...erich Haas and Josef
...mine, employing about 3
...and ore dressing plant,
...40 tons of copper as a b

...Nii-gori, Iyo, Japan.
...3.5 to 4% in copper tenor
...ersing chlorite-amphib
...Idle some years.

...GOLD & COPPER MININ
...Chelan Co., Wash.

...PPER CO.
...from former office, Spo
...J. H. Holden, vice-presid
...Wm. Yolen Williams, ge
...Prospecting Syndicate, wh

...acres, on Railroad Creek
...and 185' claimed maxim
...connected by a blind sh
...also are numerous op
...2 oz. silver and $5 to
...Idle, except fo

...COPPER MINING CO.
...Princeton, Similkameen di

...New York, N. Y. Letter
...White Pine Co., Nev. W.
...Marshall, vice-president; E
...operations secured, and appa

...MINE.
...Alfred S. Wright, owner, 48 Sout
...Halifax Co., Va. Prop

north of Virgilina, first worked previous to the American phide ores, mainly chalcopyrite, carrying small gold and small producer, 1900–1903. Idle several years.

. **CALIFORNIA.**

Savings Bank Bldg., San Francisco, Cal. Mine office: ., Cal. H. W. Postlethwaite, president; F. R. Turton, 0 acres, known as the Alabaster Cave mine, 7 miles east of contact deposit between limestone and slate, that shows a in carries a 3′ to 8′ paystreak, said to average 3 to 4% cop- nd silver values. Development is by shafts of 50′, 50′ and 0′ and 100′. Idle some years, and present owners do not

& MILLING CO. **WISCONSIN.**

Mellen, Ashland Co., Wis. John Holmes, president and es, vice-president; Thos. A. Humphries, secretary; F. P. preceding officers, Edw. Bekken, A. D. Wilson and A. D. nized Jan. 9, 1902, under laws of Wisconsin, with capitaliza- 25 cents par.

freehold, well timbered, 1 mile north of Bad River, in the ving fissure veins in greenstone, diorite and slate, with EW. There are 3 ore bodies, of which one, under development, any as of 40′ average width, traceable one-half mile by a slate footwall and diorite hanging, vein carrying a little chalcopyrite, with quartz gangue, and formerly was said r. Ores give assays up to 9 oz. silver and $3.90 gold per is by shafts of 150′ and 188′. Equipment includes a ince May, 1910, but planned resumption, May, 1911.

PER CO. **AUSTRALIA.**

wra, Bathurst Co., N. S. W., Australia. Lands, one-half t Holmwood Station, and 5 miles northeast of Cowra, in show 4 copper veins in porphyry, with a 92′ shaft sunk try rock to intercept the underlay. A vein of 12″ to 18″ hes of ore assaying 8.22% copper, 3 dwts. 6 grains silver gold per long ton. Production is reported at 60 long tons years and apparently moribund.

. **JAPAN.**

lakaya-mura, Yatsuka-gori. Izumo, Japan. Tojuro Hori, The mine carries copper ore without appreciable gold or ment includes a 356-h. p. steam installation, and forces n 1908. Production was 699,331 lbs. fine copper in 1907, 08.

O. **ARIZONA.**

Morenci, Graham Co., Ariz. H. J. Degener, president; e-president; W. P. Gee, secretary and treasurer; N. L. nt. Organized April, 1901. Lands, 35 claims, area circa s, also a millsite on Eagle River. The Peacock group of out one mile southwest of Morenci, is opened by an 85′ of 150′ and 700′, latter giving a 500′ back. Ores are car- ith some chalcocite, also a wide ledge of low grade ore too king. The Buzzard Shadow group of 12 claims was sold. Idle several years and apparently moribund.

O. **WASHINGTON.**

le Elum, Kittitas Co., Wash. Idle some years and

INING CO. **MICHIGAN.**

reclaimed from former mine office, Copper Falls, Kewee-

naw Co., Mich. Lands, 240 acres, adjoining the Humb
North, Range 32 West. Did a little exploratory work,
producer and long idle.

HOME COPPER MINING CO.

Dead. Was disincorporated, 1903, with all debts pa
peropolis, Meagher Co., Mont. Described Vol. III.

HOME GOLD & COPPER CO., LTD. NEW MEXI

Dead. The promoter, Rufus L. Herrick, opened h
then fished, successfully, for suckers. Formerly at Coone
and Leipsigate, Lunenburg Co., N. S.

HOME RUN COPPER MINING CO.

Office: 17 Postoffice Bldg., Colorado Springs, Colo.
claimed from former mine office, Rudefeha, Carbon Co.,
president; J. F. Humphrey, vice-president; Adolph Fehr
C. Robinson, secretary. Capitalization $1,500,000, share
acres, partly patented, known as the Copper Bell group,
garty mine of the Penn-Wyoming Copper Co., having a
vein of 30″ to 9′ width, giving assays up to 12% copper
values. Idle.

HOMESTAKE MINES, LTD. B

Mine office: Rossland, Trail district, B. C. Ores
copper. Idle some years and apparently moribund.

HOMESTAKE MINING CO.

Dead. Was a swindle that advised investors to w
from savings banks before they "busted," and put it in
pay one per cent per month." Formerly at Jerome, Ya

HOMESTEAD COPPER, GOLD & SILVER MINING

Office and mine: Iron Mountain, Dickinson Co.,
president; Andrew Nelson, secretary; E. W. Holm, treasu
under laws of Wisconsin, with capitalization $1,000,000, s
8 miles south of Iron Mountain, in Florence county, W
low shafts, deepest circa 100′, showing a vein 2″ wide at
width of 18″ at depth, giving assays, from selected samp
and circa $3 per ton in combined gold and silver values.
moribund.

HOMESTEAD COPPER MINES CO.

Mine office: Homestead, Baker Co., Ore. L. L. C
at last accounts. Organized 1906, under laws of Arizon
$1,000,000, shares $2 par. Idle and apparently no work

HONERINE EXTENSION MINING CO.

Dead. Was organized under laws of Maine, and m
1910, in Bullion Coalition Mines Co. Lands were suppos
sion of the ore body of the Honerine Mining & Milling Co
ton, Tooele Co., Utah.

HONERINE MINING & MILLING CO.

Dead. Was merged, circa January, 1910, in Bullio
Formerly at Stockton, Tooele Co., Utah. Described Vo

HONERINE TUNNEL & MILLING CO.

Dead. Was organized under laws of Wyoming, a
January, 1910, in the Bullion Coalition Mines Co. Was
Mining & Milling Co., and closely connected with that c
Stockton, Tooele Co., Utah.

HONEST ENDEAVOR MINING CO.

Mine office: Yerington, Lyon Co., Nev. B. W.
Elmer Hoff, vice-president; C. S. Wood, secretary; F. D.
general manager. Organized 1907, under laws of Arizon

1 par. Lands, 4 claims, area 80 acres, west of Yerington, howing a vein up to 3′ in width, giving assays of 19% copper, silver values. Has gasoline power. Presumably idle.

PPER MINES, N. L. **AUSTRALIA.**

nto liquidation Oct. 23, 1908. Formerly at Canonbar, W., Australia. Described Vol. VIII.

OISE DES CUIVRES. **HUNGARY.**

usseé d'Antin, Paris, France. Mine office: Zám, Hunyad- Comte de Choulet, chairman; D. Reimbert, superintendent. s of France, as successor of Société Anonyme des Cuivres de

NGROISE DES MINES. **HUNGARY.**

s, Belgium. Mine office: Urvölgi, Hungary. Comte C.-F. chairman. Organized February, 1903, under laws of Bel- ation 1,500,000 francs. Dividend, for fiscal year 1906, was es. Controls, through stock ownership, the Société de La ölgi, which owns the Urvölgi mines in Hungary.

WORKS. **JAPAN.**

ukawa Mining Co.

R MINING & MILLING CO. **WYOMING.**

ville, Ind. Letter returned unclaimed from former mine , Carbon Co., Wyo. Capitalization $1,500,000, shares $1 as, area 180 acres, developed by a shallow shaft, said to give dium grade ore. Idle some years and apparently moribund.

NING & SMELTING CO. **NEW MEXICO.**

Randolph St., Chicago, Ills. Mine office: Magdalena, Alpheus McCallum, president; Elias G. Raffety, secretary pitalization $1,000,000, shares $1 par. Lands, 6 claims, area om a railroad, in the Hop Cañon district, showing ores carry- ic, silver and gold. Idle several years.

O. **MONTANA.**

y Bldg., St. Louis, Mo. Mine office: Philipsburg, Gran- ul A. Fusz, general manager; John R. Lucas, superintendent, roperty carries argentiferous copper ore, with values mainly t includes a steam plant, 10-stamp mill and 5-ton chlorina- nce circa 1909.

CO. **ARIZONA.**

ly at Cherry, Yavapai Co., Ariz. Described Vol. IX.

EY & SACRED MINING CO. **UTAH.**

office was Salt Lake City, Utah. Property was the Horace groups of claims, which were sold to the Bingham Group udgment of $30,500 was given this company, 1906, in a suit m Group Mining Co., the decree including the sale of the y at Bingham Canyon, Salt Lake Co., Utah.

ERA LAS HORMIGAS. **MÉXICO.**

Murphy was superintendent. The mine, apparently slightly rgentiferous copper ore. Formerly at Charcas, Moctezuma, ex.

INING CO. **UTAH.**

ttery Place, New York, N. Y. Operating office: 206 alt Lake City, Utah. Mine office, Frisco, Beaver Co., Utah. ice-president and treasurer; Philo T. Farnsworth, managing officers, Wm. H. Woolverton, Jacob Noadle, John Sharp, Elliott Hodgskin, directors; Frederick A. Bishop, secretary; eral manager. Organized 1879, under laws of Utah, with 000, shares $25 par. Has paid dividends of $5,642,000,

last having been paid in 1907. Cash balance, January

Lands, 19 claims, 9 patented. The mine is extensiv
been a large producer of zinc, lead, silver and gold,
copper as a by-product. The old bonanza mine carries
about 800', showing silver ores on the footwall, with a lit
ing-wall. Main shaft is 1,600' deep, but stoping is main
During 1910 a new body of slightly argentiferous copp
oped, on the 750' level.

Equipment includes a 30-stamp mill. Production is
year contract, ending 1911, to the American Smelting & R
1909, being said to have averaged about 20% lead and
Zinc ore, carrying up to 10% lead and 5 oz. silver, is sh
Kansas zinc plants. Production was suspended, 1907,
years, because of temporary inability to market ore.
4,490 tons of ore in 1908, and 11,189 tons of ore, includ
class copper ore, in 1909, when the value of all ore sold
total net earnings, including returns from store, and ren

Production was 577,578 lbs. fine copper in 1901; 717
6,539 lbs. in 1905, and was 24,508 lbs. copper, 3,583,355 l
zinc, 206,537 oz. silver and 2,841 oz. gold in 1907. Th
silver producer for many years, but has seen its best day
done but little better than make expenses, though it see
small further profits will be secured from production.

HORSE MOUNTAIN COPPER CO.

Mine office: Yreka, Siskiyou Co., Cal. Organized
with capitalization $1,000,000. Lands, 35 claims, in vic
Copper Co., with which this corporation apparently is c
and management. Presumably idle.

HORSEHOE BASIN MINING & DEVELOPMENT C

Dead. Formerly at Chelan, Chelan Co., Wash. D

HORSEHOE COPPER CO.

Mine office: Mackay, Custer Co., Idaho. D. E.
Lands, 17 claims, adjoining the White Knob mine of th
on the north. Idle.

HORSESHOE COPPER MINING CO.

Dead. Was a brazen swindle, for which the direct
prison. Formerly at Safford, Graham Co., Ariz. Descr

HORSESHOE GOLD MINING CO.

Dead. N. H. Scheur was superintendent. Property
carrying auriferous and argentiferous ore, worked on a sm
steam power. Formerly at Central City, Gilpin Co., Col

HORSESHOE MINING CO.

Office: 513 Hinckley Blk., Seattle, Wash. Letter
from former mine office, North Bend, King Co., Wash. S
and general manager; O. E. Olson, vice-president; E. C
treasurer; preceding officers, S. P. Battleson, Emma Ba
mark, S. Gangmark, Andrew J. Boyington and R. Steiger,
June 7, 1904, under laws of Washington, with capitalizat
$1 par, nonassessable; issued, $604,110.

Lands, 11 claims, area 228 acres, with a 10-acre mills
rights, well watered, and about 25% timbered, in the
Mount Defiance, between the middle and south forks of t
6 miles from the Northern Pacific railway, and 12 miles
Property shows granite, porphyry and slate, with 4 ore b
sure veins in granite, and between granite and slate, of wh
ment, are reported by management as 18' to 60' in widt

halcopyrite and galena, assaying 2 to 32% copper, up to silver and 0.12 oz. gold per ton. Development is by No. 1 of 226′, and No. 3 of 567′, with 1,300′ of workings. Mine pment or buildings. Management plans patenting lands, evelopment, building a wagon-road, developing a small water a sawmill.

G CO. **COLORADO.**

rly at Gold Hill, Boulder Co., Colo. Described Vol. V.

COPPER MINING CO. **IDAHO.**

l unclaimed from former office, Exchange National Bank ash. Mine office: Kingston, Shoshone Co., Idaho. E. E. . L. Powell, vice-president and treasurer; Mark F. Mendenpitalization $1,000,000, shares $1 par. Lands, 8 claims, 2 cre millsite, well timbered, on the Little North Fork River. 2 tunnels on the Sunset claim, and one on the August claim, tunnel having a 100′ winze, 150′ from the portal. Vein is of ce width, with slate foot and quartzite hanging, carrying says of 10 to 20%. Equipment includes steam and gasoline and necessary mine buildings. Presumably idle.

DICATE TRUST. **NEVADA.**

e: Hotcreek, Nye Co., Nev. Victor Barndt, trustee; John etary. Is not incorporated. Lands, 32 claims, unpatented, s, in Rattlesnake Cañon, showing limestone and andesite, s, occurring as fissures, as replacements in limestone near the and along fault-planes, ore bodies being reported by man- 25′ in width, and traceable from 400′ to more than 2,000′. the 40′ Green Flag shaft, 70′ Phœnix shaft, 120′ Redhead haft, 40′ Hunt shaft and 110′ Eagle shaft, with about 1,000′ copper ores averaging 2 to 3% copper, 5 to 10 oz. silver and lead ores assaying 8 to 15% lead, 10 to 20 oz. silver and $1 t water level is disseminated chalcopyrite, of concentrating idle.

SKA EXPLORATION CO. **ALASKA.**

ton, Mich. Mine office: McCarthy Creek, Copper River H. Rice, president; Frederick G. Coggin, secretary; Prof. consulting engineer. Organized circa 1905, under laws of pitalization $500,000. Property is under option to the Co. of Alaska, for $150,000 cash and 250,000 shares of stock. s, area 380 acres, of which 12 claims, area 180 acres, are in , also a 5-acre millsite, and 160 acres placer lands, held for l purposes. Lands adjoin the Bonanza group of the Kenn the northeast, and are on the McCarthy Creek slope of anza group being on the Kennecott slope. About 1,000 n McCarthy Creek, for a hydro-electric installation.

ault, traceable circa 7,000′, consists of 6″ to 12′ width of , with variable mineralization, latter occasionally up to 100′ lt and along the stratification planes of intersecting veins. as a series of fissures cutting the main fault, with mineralizaand near the points of intersection, but where other fissures ssures, only the Bonanza fault is mineralized. Ore is excluept at surface, where sometimes broken down to carbonates, y. Development consists of only 123′ of tunnels, as all work ensive, and there was no particular object in developing exportation facilities were secured. A railroad was completed, ap, early 1911, giving this property mixed rail and water

shipping facilities, by steamer on the Chitina River, 24 m
Management considered good.

HOUGHTON CONCENTRATING CO.

Dead. Was absorbed, 1908, by Lake Superior Nativ
merly at Houghton, Houghton Co., Mich. Described Vol

HOUGHTON COPPER CO.

Office: 713-199 Washington St., Boston, Mass. Min
Houghton Co., Mich. Chas. J. Paine, Jr., president; Ge
president; A. E. Coe, secretary and treasurer; preceding o
Jas. P. Edwards and Fredk. W. Nichols, directors; Dr.
general manager; Rex R. Seeber, consulting engineer; J. M

Organized January, 1910, under laws of Michigan,
$2,500,000, shares $25 par, assessable; issued, $1,675,000
trolled by St. Mary's Mineral Land Co., through ownershi
the 67,000 shares outstanding. Old Colony Trust Co., Bo
Street Trust Co., Boston, transfer agent. Application has
on the Boston stock exchange.

Lands, 23 acres of surface rights, with mineral rights
in fee, being the NW. ¼ of Section 14, T. 54 N., R. 34 W
Isle Royale mine and the Section 16 mine of the Atlantic.
begun March, 1910, in the horizon of the Baltic-Superior bed
ous amygdaloidal beds, of 17′ to 20′ width, with dip of 5
of trap, the lower bed overlying a conglomerate stratum at
150′, these strata corresponding exactly with the Baltic for
operating depth is figured at 2,800′.

Development is by a shaft, started September, 1910, s
footwall, which was circa 280′ deep, Apr. 1, 1911. The
soft and badly broken, necessitating close timbering, and o
and the shaft has been lined with a concrete collar for dep

Equipment includes a small power plant, and a 16-dr
air-compressor has been ordered. There are necessary bu
office, changing-house and warehouse, all of wood.

The property, though small, for the Lake Superior d
promising, and management good.

HOUGHTON DEVELOPMENT CO.

Dead. Formerly at Bisbee, Cochise Co., Ariz. Fully
and V.

HOULIHAN GOLD & COPPER MINING CO.

Mine office: Jerome, Yavapai Co., Ariz. J. T. Whe
Houlihan, vice-president; Geo. C. West, secretary and tre
shaft, said to cut a 35′ vein. Idle some years and apparent

HOUSTON-ARIZONA COPPER CO.

Mine office: Wickenburg, Maricopa Co., Ariz. Wm.
ent, at last accounts. Property is said to have 1,800′ of wo
idle.

AKTIESELSKABET HOVIN KOBBERMINER.

Office and mine: Hovin, Christiansand, Norway.
manager, at last account. Property includes small copper
din and Gransherred. Production, 1908, was 415 metric to
about 12% copper tenor, estimated to have given a product
lbs. fine copper.

HOWARD COPPER CO.

Office: 804 Equitable Bldg., Baltimore, Md. Mine
Granite Co., Mont. Lyman N. Loomis, president and tre
ard, manager. Organized under laws of South Dakota,
$1,500,000, shares $1 par. Is controlled, through stock

Mines Co. Was promoted by Ralph M. Jacoby, a shark, apparently had no connection with the promoter. Orig-es, apparently were lost, lands being, at last accounts, 2 nd one of 80 acres, presumably slightly developed. Idle.

G CO. **VIRGINIA.**

rly at Virgilina, Halifax Co., Va., Described Vol. VIII.

G, MILLING & DEVELOPING CO. **COLORADO.**

rty, immediately adjacent to Salida, had several shallow shafts, Formerly, at Salida, Chaffee Co., Colo.

LE EXPLORATION CO. **CALIFORNIA & NEVADA.**

swindle. Was merged, circa 1909, in Standard Amalga- Co. Former office was 7 Water St., Boston, Mass. J. H. dent; Alex. Chubb, vice-president; F. B. Davis, secretary; surer. Organized under laws of Arizona, with capitalization $1 par, nonassessable. Lands were claimed to be properties ld Circle, Goldfield, Paradise and Eureka districts of Nevada, l Range of Inyo county, California, in all about 160 acres, gold, silver and copper ores. The Death Valley mine was loped by shaft, and to be a shipper. The company was pro- I. Weil, a notorious mining crook, operating under the alias of ty Co., 506 Winthrop Bldg., Boston, Mass. Weil came to tal authorities, December, 1910. Formerly at Greenwater,

G CO. **ARIZONA.**

were sold, circa 1901, to American Copper Co. Formerly at ai Co., Ariz.

CO. **BRITISH COLUMBIA.**

ifth Ave., New York, N. Y. Mine office: Britannia Beach, district, B. C. Grant B. Schley, president; Evander B. ent; Kenneth B. Schley, secretary and treasurer; preceding llivan, E. J. Berwind, Louis S. Noble, Robt. H. Leach, M. G. Raynor, directors; Jas. E. Manter, clerk. Organized Aug. ws of Maine, with capitalization $3,000,000, shares $1 par; Bonds, $1,000,000, convertible into stock at par. Manhat- ew York, transfer agent. Annual meeting, fourth Monday

is a securities-holding corporation, controlling the Britannia g Co., Ltd., which took over the properties of the Britannia Ltd., and the smelter of the Britannia Smelting Co., Ltd., in

UTAH.

est First South St., Salt Lake City, Utah. Mine office: , Utah. Jos. H. Hurd, president; John B. Taylor, vice-presi- ook, secretary and treasurer. Organized 1906, under laws of ization $100,000, shares $5 par, assessable; fully issued. Five been levied. Is a close corporation, with only 5 stockholders, e from debt. Lands, 30 claims, partly patented, and balance Cañon, with water-rights, tunnel-rights, and franchise for a Pine Cañon into the Bingham district, also several hundred ds, 600 acres of stone quarry lands, and an 800-acre smelter he International smelter. Development is by tunnels, show- argentiferous lead and copper ores.

IDATED DEVELOPMENT CO. **ARIZONA.**

at Palmerlee, Cochise Co., Ariz. Described Vol. VII.

SOCIEDAD MINERA HUACHUMACHAY.

Mine office: Huachumachay, Yauli, Junín, Perú. laws of Perú. Lands, 10 pertenencias, in one group, inc mingo and Huachumachay mines, developed by a tunn Octavio veins, with practically vertical dip, cross diagonal on the Veta Crucero, with increase to width of about 30', ore averaging about 12% copper and 2 kgs silver per met gangue, the Veta Octavio being barren elsewhere.

Equipment includes an amalgamation mill and a 40- 1908, averaged 80 men, at average wages of 0.8 pesos d 133,152 lbs. fine copper in 1904; 149,030 lbs. copper and 1,(86,420 lbs. copper and 592 kgs. silver in 1907.

SOCIEDAD MINERA HUACRACOCHA.

Office: care of Dr. O. Valentine, general manager office: Yauli, Junín, Perú. Works office: Morococha, include El Carmen mine, at Yauli, not far from the smelt

The reduction plant, on the shore of Lake Huacracoch cocha, with rail connection, includes a concentrator and s have a 16-c. p. 60-light electric light plant. The mill h crushers, 3 Hartz jigs, 2 Evans jigs, 2 Frue vanners, 2 classifier. The smelter, of 75 tons daily capacity, has a furnace and 3 small blast-furnaces, largest of 30 tons daily iron stacks, Nos. 3 and 4 Connersville blowers, a 45-h. p. wheel.

HUALAPAI MINING CO.

Office: Phœnix, Ariz. Mine office: Cave Creek, T. W. Chamberlain, manager. Lands, in Moore's Gulch, in Springs Mining Co., are slightly developed. Presumably

COMPAÑÍA HUANCHACA DE BOLIVIA.

Office: 29 Rue de Londres, Paris, France. Mi Potosí, Bolivia. E. Sénéchal de la Grange, chairman; F. P Luis M. Solá, general manager; Segundo R. Nava, genera officers and H. Marijon, directors; Jules Regis, chief engin and reorganized 1891, under laws of Bolivia, with capitali and again, 1891, to 12,800,000 bolivars, shares 40 bolivar 1906 net profits were 1,143,263 bolivars. Recent divid 1895; 12s. in 1900; 6s. in 1901; 4s. in 1902; 4s. in 1903; 4s

Mines carry an argentiferous and auriferous sulphide mainly in silver, but also giving considerable production antimony and gold, copper production being mainly fro hedrite. The company has surrendered its lease of the railway, formerly operated.

The company has smelters at Pulacayo and Playa B leased to the American Smelting & Refining Co., now idl pany shipped, to the Tacoma smelter, 1,600 tons of ore 5% zinc and 50 oz. silver per ton, containing 160,000 lbs. tion estimated at 150,000 lbs. fine copper in 1909.

SOCIEDAD DE MINAS i FUNDICIONES DE HUAN

Office: Santiago de Chile. Mine and works office: Antofagasta, Chile. Organized Nov. 28, 1905, under laws zation £200,000, shares £1 par. Property includes a sm and reverberatory furnaces, making, when in commission copper tenor. Production was 245,085 lbs. fine copper in and apparently moribund.

ACIONAL MINERA i BENEFICIADORA CHILE.
A.

Chile. Mine office: Huantajaya, Tarapacá, Chile. Or- under laws of Chile, with capitalization 300,000 pesos, o trace of operations secured, and presumably moribund.

COPPER CO. ALASKA.

le St., Chicago, Ills. Operating office: Valdez, Alaska. y Creek, Copper River district, Alaska. Jerome G. P. Elliott, first vice-president and general manager; Geo. esident; A. J. Elliott, secretary; J. E. Slocum, treasurer; ident.

nuary, 1911, as a reconstruction of Hubbard-Elliott Cop- t Co. of Alaska, with capitalization $3,500,000, the new ,000 stock to shareholders of the old company. Controls nsolidated Copper Co., through ownership of 505,484 en bought for $42,500, by the old company.

35 patented, and balance in process, and 4 millsites, area ott Creek, an affluent of the Kotsina River, circa 13 miles he Kotsina with Copper River. Lands carry about 300 available water power, on Elliott Creek, reported by the of developing 5,000 h. p. Property is in the vicinity of he Kennecott Mines Co.

eenstone, carrying a series of fissure veins, of nearly NS. runs approximately EW., also replacements in amygda- of 100′ and 400′, stratigraphically, below the limestone showing some evidence of crushing, carries bunches of nly bornite and chalcocite. The old company, having nagement as the new, claimed that this property showed ng 20′ to 65′ in width, 300′ to 1,000′ in length and 1,100′ es were much exaggerated. Diamond drill borings were the late H. Curtis Elliott wrote, Aug. 26, 1909, that the h of 1,025′, but did not give the grade of the ore. The company claimed that ore had continued, unaltered, for

the 190′ Ely shaft, and 3 tunnels. The 600′ Elizabeth 4 veins, of 3′ to 10′ width, a winze on one vein showing e, said to give average assays of 17.5% copper, and this the management of the old company, to show 31′ of 20% e. The 425′ Curtis crosscut tunnel has cut several ore d width, and is being run to intersect the Elizabeth vein. ave given ore assaying 21 to 26.75% copper. The Ely ong, at last accounts. The management of the old com- f about 500′ of underground workings, estimated 600,000 , averaging 28% copper, which figures were wilfully and

& Northwestern railway, built to the property of the s 17 miles, at Elliott Junction, from this property, and for a 17-mile tramway, of 1,000 tons daily capacity, to y.

accounts, included a smithy, carpenter-shop and 4 log-

nos. F. Cole had an option on this property, 1909, which ary, 1910. Apparently the old company devoted its rs, mainly to the development of the property of the dated Copper Co., which was idle at last accounts, this failure, the tramway having been put on the wrong side

of the hill, and the wharf and sawmill sliding into the
operations of the predecessor of this company were mor
market than in the ground. Owing to its antecedents, th
garded favorably.

HUBBARD-ELLIOTT COPPER MINES DEVELOPME CO. OF ALASKA.

Dead. Was succeeded, circa January, 1911, by Hu
Co. Formerly at McCarthy Creek, Copper River distric
scribed Vol. VIII.

HUB MINING INVESTMENT CO.

Office and mine: Benson, Cochise Co., Ariz. W.
J. W. Hill, manager. Lands, 25 miles northwest of Benson,
group, adjoining the Valenzuela Copper Mining Co., showi
carrying cuprite, melaconite and malachite, with gold val
by a crosscut tunnel. Idle.

COMPAGNIE DES MINES DE CUIVRE DE HUELVA

Dead. Formerly at La Granada, Huelva, Spain. De

SOCIÉTÉ FRANÇAISE DES PYRITES DE HUELVA.

Office: Rue de Chateaudun 28, Paris, France. M
musa, Huelva, Spain. Albert Faraud, general manager;
ager; Chas. Marchal, assistant manager; P. Truchet, met
December, 1899, under laws of France, with capitaliza
increased to f6,000,000, as successor of Société Française
d'Aguas Tenidas. Properties include the Confesonarios n
the Perrunal and other mines at Cortegana, and El Lome
at El Cerro, all carrying cupriferous pyrite, low in copper
phur average, ore exported averaging about 48% sulphur.

The Perrunal mine, at Cortegana, has a country rock
and to the south are argillaceous metamorphic rocks, with
the planes of stratification.

El Lomero mine, at El Cerro, 6 kilometers east of
hectares, was opened 1877, and taken over by this compan
has been under development. The property shows a gos
width, for about 300 meters length, and carries cupriferous
about 1% copper. Development is by a 108-meter tunnel,

Production of ore has been as follows: 13,480 metric
metric tons ore and 13 tons cement copper in 1904; 154,394
tons in 1906; 239,400 tons in 1908; circa 220,000 tons in 190
tons in 1910, yielding a net profit of f901,271. Producti
mated as follows: 275,000 lbs. in 1901; 3,000,000 lbs. in 1
1906; 4,500,000 lbs. in 1907; 4,250,000 lbs. in 1908; 4,750,00
considered valuable, with good prospects of future increase

HUELVA CENTRAL COPPER MINING CO., LTD.

Dead. Was succeeded, 1903, by Huelva Copper &
Formerly at Almonáster, Huelva, Spain. Described Vol.

HUELVA COPPER & SULPHUR MINES, LTD.

Office: 6 Old Jewry, London, E. C., Eng. French offi
mann, Paris, France. Mine office: Almonáster, Huelva,
Gell, chairman; A. Davidson, vice-chairman; Chas. Forb
Blanchot, managing director; preceding officers, Mau
Hoskyns, J. P., Léon Donnet and L. Oury, directors; W. J.
de Pritzbuer, consulting engineers.

Organized Oct. 28, 1903, under laws of Great Britai
£400,000, increased, 1907, to £600,000, shares £1 par; is
paid. Was practically a reconstruction of the Huelva Co
Co., Ltd. For 1907, mining profit was £63,177 10s. from

7, amounting to £24,324 7s., company ending the year with
8s. Profits for 1908 were £16,439 5s. 2d., and £51,167 18s.
depreciation, etc. Apparently the company should have
hands of its French agents, August, 1909, but there was
g to misappropriation of funds. Shares are listed on the

tares, including 1,514 hectares of mineral lands, of which
l to the Tharsis Copper & Sulphur Co., Ltd., on royalty.
ocated, between the Rio Tinto and Tharsis mines, and are
raversed by the Olivargas and Juliana rivers. The com-
lands, with pine and eucalyptus. Property includes the
h is the principal mine, and the Corta, San Alberto and
Corta ore is of low grade, but in large tonnage, and the
contain 5,000,000 long tons of cupriferous pyrite, of 1.7
. The San Alberto mine, opened by shaft, has produced
rage grade. Work was begun May, 1908, on the Angelita
is not very far advanced. The Monte Romero has the
aft, and carries ore of 1 to 5% copper tenor, but some of
iferous. The Monte Romero has a good equipment, in-
nt and large ore-bunkers.
s built a complete town for its workmen, who average 1,200
g a normal population of about 5,000. The company's
ools and hospitals, with necessary mine structures. Trans-
ilometer railway, connecting with the Zafra y Huelva line.
5,563 tons of cupriferous pyrite in 1905; 20,523 tons in
1907; 48,511 tons of ore and 67 tons of cement copper in
fine copper is estimated at 175,000 lbs. in 1905; 600,000
0 lbs. in 1907; 1,350,000 lbs. in 1908.

& COPPER MINING CO. **COLORADO.**

alsenburg, Huerfano Co., Colo. Organized October, 1902,
cky. Lands, in the Ojo district, apparently are undevel-
anization and presumably moribund.

IRON & LEAD MINES, LTD. **SPAIN.**

olved Nov. 20, 1908. Formerly at Viella, Huesca, Spain.

OPPER MINING CO. **MONTANA.**

, Idaho. Mine office: Saltese, Missoula Co., Mont.
n, president; P. R. Levy, vice-president; R. M. Hamil-
Kerns, treasurer. Organized 1907, with capitalization
par.
carrying the extensions of the Boston-Colby vein system,
York & Brooklyn mine, and shortly east of Saltese. Prop-
veins, circa 300′ apart, one, of about 15′ width, showing
rnite and chalcopyrite, giving assays, from selected speci-
pper, the second vein, proven by trenching, being about 12′
ystreak of ore assaying 12% copper, 10 oz. silver and $8
rth vein has a 200′ drift-tunnel, with a 50′ winze, showing
copper, 10 oz. silver and $6 to $24 gold per ton. The 700′
is planned to be driven 1,450′, to cut the vein to give a

d by an overshot water-wheel, taking water, under a 12′
is River. There is a 4-drill air-compressor.

LA HUILLCA. **PERÚ.**

ococha, Junín, Perú. Organized 1892, under laws of
oup of 3 pertenencias, known as La Huillca and La
averaging about 8.5% copper and 900 grams silver per

metric ton. Forces, 1907, averaged 76 men, at average v
Production was 166,491 lbs. fine copper in 1904; 598,548
lbs. in 1906; 444,116 lbs. copper and 2,133 kgs. silver in

HUINAC COPPER MINES, LTD.

Office: 101 Leadenhall St., London, E. C., Eng.
Ancachs, Perú. Col. D. Pedro Juárez, chairman; A. Fergu
preceding officers and Victor M. Carceros, directors;
Wm. Neil, receiver; J. J. Keswick and H. M. Matheson,
holdings. Organized May 9, 1904, under laws of Great
tion £400,000, shares £1 par; issued, £360,000. Deben
A receiver was appointed May, 1908.

Lands, 256 hectares, circa 30 miles from Puerto
Montaña de la Plata mine, carrying argentiferous copp
coal lands, 15 miles from the copper mine. A smelter,
capacity, was blown in, 1908, after several years of leisur
blast only 2 months, when a receiver was appointed.
men at the mine and 80 at the smelter. Idle.

COMPAÑÍA MINERA DE HUIRIÁCHIC.

Mine office: Chalchihuites, Sombrerete, Zacatecas
president; C. A. Phelps, treasurer and general manager,
are argentiferous and auriferous chalcopyrite and galen
and tunnel. Idle.

HULBERT MINING CO.

Office: 199 Washington St., Boston, Mass. Mine
Houghton, Mich. Albert S. Bigelow, president; W. A.
and treasurer; Fred W. Nichols, agent. Organized pri
of Michigan, with capitalization $1,000,000, shares $25

Lands, 1,640 acres of mineral territory, in Houghton
ies, Michigan, in T. 56 N., R. 32 W.; T. 56 N., R. 33 W
T. 57 N., R. 33 W., and T. 55 N., R. 34 W. Lands a
properties, and a considerable part of the surface righ
mineral rights reserved by the company. No mining ev
years.

KUPFERERZBERGWERK HÜLFE GOTTES.

Mine office: Sommerkahl, Bavaria, Germany.
ager. Property, near Schölikrippen, has copper ores, b
producer. Presumably idle.

HULL COPPER CO.

Office and mine: Jerome, Yavapai Co., Ariz. Ho
dent and general manager; S. F. Dennison, vice-presiden
tary and treasurer; preceding officers, August Humbert a
ors. Organized 1906, under laws of Arizona, with cap
shares $1 par, fully issued. Bonds, $250,000 authorized

Lands, 21 claims, partly fractional, patented, area 2
United Verde on the northwest and south. Property sh
slate, a continuation of the formation of the United Verd
company to show 21 ore bodies, carrying some oxidize
phides, as developed. The "1888" shaft, of 475′ depth, ab
Verde smelter, has produced a small amount of ore, but
pal development is by the Dillon tunnel, which begins o
and connects with the "1888" shaft, on the Hull property
This tunnel is planned to be driven about 7,000′, and th
the tunnel. The Dillon tunnel has cut several shoots o
lateral therefrom developing a lens about 8′ wide by 70′
with silicious schistose gangue, in schist. Diamond dril
Verde have taken good cores from the Hull property.

ut Mr. Hull states that the workings are not deep enough
n of the main ore bodies of the United Verde. Mr. Hull
y has expended about $200,000, and the former owner
property.
es a 94-h. p. steam plant, and a gasoline engine, with 2
hoist, installed 1909, at the "1888" shaft. There also is a

ompany was "boomed," extensively and systematically,
tanton, who was then vice-president, but a falling out
nd Stanton led to the entire elimination of Mr. Stanton
nd his contract to finance the company was terminated,
ngs. The advertising done in behalf of the Hull Copper
s untruthful, and indefensible. The property was work-
at the end of 1910. Notwithstanding the apparently
d so far, the property is considered promising, and the
good.

DATED MINING & NEWFOUNDLAND.
NG CO.
at York Harbour, Newfoundland. Fully described Vol. V.

NA COPPER CO. ARIZONA.
re 5 claims, near Humboldt, having an 80′ shaft, 1908,
stallation was planned, but not secured. Formerly at
o., Ariz.

OLIDATED MINES CO. ARIZONA.
nboldt, Yavapai Co., Ariz. Benj. Rybon, vice-president
nager; Dr. B. S. Bowen, treasurer and general manager.
were under development, with a force of about 10 men,
erty has a gasoline hoist.

R CO. CALIFORNIA.
ka, Siskiyou Co., Cal. Apparently this corporation is a
untain Copper Co. Lands, 22 claims, well watered, ad-
ntain, said to show strong veins giving a good showing
ng chalcocite assaying up to 55% copper. Apparently
t. Property was said to have been bonded, late 1910, to

R CO. MICHIGAN.
ate St., Boston, Mass. Mine office: Copper Falls,
John C. Watson, president; John Brooks, secretary and
y Clark, superintendent; preceding officers and M. A.
anized 1863, under laws of Michigan, with capitalization
0,000, shares $25 par. Amount paid in is $100,000 in real
in cash. Annual meeting, fourth Tuesday in March.
16 and 21, the former fractional, Town 58 North, Range
eral belt, about midway between the Arnold and Phœnix
e greenstone, with the Eagle River and Natick mines to
opened 1853, but never a producer, has a single shaft,
ashbed, which shows the same characteristics as at the
onal bunches of rich ground. Equipment includes an
or building, smithy, warehouse and 4 dwellings. Idle

CO. NEVADA.
Bldg., San Francisco, Cal. Letter returned unclaimed
Winnemucca, Humboldt Co., Nev. E. J. Miley, presi-
president; M. P. Danly, secretary; preceding offi-
E. Ebright, directors. Organized under laws of
000,000, shares $1 par. Company claims that

it has 8 claims, on Jackson Mountain, connected by railroad 60 miles distant. Property is claimed to ha showing a vein of 12′ width at surface, claimed to wi nel, claimed to carry ores that are claimed to have ass 5 oz. silver and $1.65 gold per ton. Business methods is regarded with suspicion. Idle.

HUMBOLDT MINING CO.

Dead. Former office was Boston, Mass. Office president; Albert E. Knowlton, treasurer; Place & Organized circa 1910. Lands, known as the Humb Treadwell property, and near a railway, were said t and copper ores. Formerly at Ocotlán, Oaxaca, Mex

HUMBOLDT ORE CO.

Mine office: Humboldt, Yavapai Co., Ariz. $100,000. Is controlled, through ownership of pra by Consolidated Arizona Smelting Co. Idle.

HUMBOLDT SMELTER.

Owned by Consolidated Arizona Smelting Co Co., Ariz.

HUMBOLDT SMELTER MINES.

Dead. Formerly at Humboldt, Yavapai Co., A

HUMBOLDT SMELTING & REDUCTION CO.

Dead. Formerly at Golconda, Humboldt Co., N

HUMBUG MINING CO.

Mine office: Eureka, Juab Co., Utah. Ores ca Idle some years, and mine apparently true to its na

HUMPHREY-ARIZONA GOLD-COPPER MINES

Dead. Formerly at Wickenburg, Maricopa Co., A

HUNGARIAN COPPER CO.

Dead. Former office was 64-50 State St., Boston, secretary. To Dec. 31, 1871, the company levied ass Lands were 800 acres. Work was begun 1862, when a 100′ depth. Company was wound up, circa 1898, a ized as Oneco Copper Mining Co. Formerly at Dem

HUNT COPPER CO.

Dead. Formerly at Mountain Park, Otero Co., N

HUNTERS CREEK MINING & MILLING CO.

Dead. Was a swindle. Formerly at Springd Described Vol. VIII.

HUNT MINING & MILLING CO.

Office: 8 India St., Boston, Mass. Letter retur mine office, Weiser, Washington Co., Idaho. Idle so

HURON GOLD CO.

Office: Jerome, Ariz. Mine office: Huron, Ya Hull, president, treasurer and general manager; H. ganized under laws of Arizona, with capitalization Lands, 5 claims, area 80 acres, known as the Swindle trict, having a 125′ shaft and 680′ tunnel, with upw showing a vein up to 18′ width, carrying ore giving a and $5 to $30 gold per ton. Is said to have 800 tons since 1903, except for annual assessment work.

HURON MINING CO.

Office: Everett, Wash. Letter returned uncl office, Darrington, Snohomish Co., Wash. Property gold ores, and to be equipped with water power. Idle moribund.

PER CO. **COLORADO.**
Steamboat Springs, Routt Co., Colo. B. C. Hazel-
t accounts. Presumably idle.

). **ALASKA.**
claimed from former office, Seattle, Wash. Mine office:
f Wales Island, Alaska. Fred J. Eitel, president; J. A.
; Victor Vigelius, general manager; F. W. Crary, secre-
n, treasurer; C. H. Waters, superintendent. Organized
shington, with capitalization $60,000. Lands, known as
re on the north side of Karta Bay, circa 2,000′ from tide-
0x40′ pit showing an ore body of 40′ width, low in copper
to $2 gold per ton. A tunnel connects with upper bins,
2,100′ tramline running to ore-bunkers on the wharf,
some ore, 1907. Property considered promising. Pre-

CO. **MONTANA.**
e sold, 1906, to Butte Coalition Mining Co. Formerly
Co., Mont.

IG & MILLING CO. **IDAHO**
Idaho. Mine office: Kingston, Shoshone Co., Idaho.
dent; Geo. Herrington, manager; Otto A. Olson, secretary
Guay, superintendent; preceding officers, J. H. Kirk and
Stock is assessable.
ocated, 1886, by Octave Guay, having 3 veins, 2 being of
dth, the third vein, known as the Great Western, of 8′ to
to 18″ paystreak carrying native copper and cuprite, said
per tenor, and chalcopyrite, assaying up to 16% copper,
ng low grade ore, estimated to carry 2% copper, with
alues, with quartz gangue. Property also shows galena,
d. Mine is opened by a tunnel of circa 1,000′, with a
′ level, on which crosscutting and drifting was in progress
ower workings showing a 3′ vein, carrying chalcopyrite,
, and quartz gangue, said to give average assays of 3.5%
l 67 cents gold per ton. This is the deepest property in
the Cœur d'Alene sedimentary series, heretofore con-
r geologists, but the finding of chalcocite below 1,000′, of
dedly promising. The mine, which has considerable de-
e lower levels, and new pumps were ordered, late 1910, the
ding their installation.
es a $12,000 power plant, installed 1910, having a 225-
drill air-compressor, and a 3-drill Laidlaw-Dunn-Gordon
-ton smelter was planned, 1909, but management was
ne smelter plan was dropped, wisely. Work has been
s, with frequent interruptions and disappointments, but,
ing is considered promising.

IVA IBARRA HERMANOS. **SPAIN.**
Spain. Mine office: Cortegena, Huelva, Spain. José
Property is the San Telmo group of 29 old mining claims,
rying cupriferous pyrite. Presumably idle.

NING CO. **ARIZONA.**
riz. Mine office: Bouse, Yuma Co., Ariz. Thos. L.
H. McPhaul, vice-president; Wm. C. DeSpain, secretary
ng officers, J. L. DeSpain and J. D. Marrs, directors.
ls, circa 30 claims, with 28 claims said to have been added,
osa Mountains, 12 miles south of Bouse, showing oxidized

ores of high copper tenor, carrying up to $4.50 gold
power. Presumably idle.

ICONOCLAST CONSOLIDATED MINES CO.

Office: 412 Berlin Bldg., Tacoma, Wash. Mine off
Wash. J. R. Turner, president; C. E. Peterson, sec
Masters, superintendent. Organized 1902, under laws
capitalization $2,500,000, shares $1 par, as a merger of
Co. and Iconoclast Gold & Copper Mining Co.

Lands, 7 claims, area 115 acres, circa 2 miles nort
contact deposits, one claimed by company to be 150' w
copyrite assaying 5% copper, 2 oz. silver and $5 gold per
overestimate all around, property apparently having an
width, giving average assays of 3.6% copper and 2 oz. si
gold. Development is by a 325' main shaft, and 3 tunn
gate length of 514', longest tunnel apparently being 12
power. Idle several years.

ICONOCLAST GOLD & COPPER MINING CO.

Dead. Was absorbed, 1902, by Iconoclast Consoli
merly at Keller, Ferry Co., Wash. Fully described Vol.

IDAHO CONSOLIDATED COPPER MINES CO.

Dead. Was a bit of stockjobbery. Formerly at De
Idaho. Described Vol. V.

IDAHO CONSOLIDATED MINES CO., LTD.

Office: 512 Greer Bldg., Newcastle, Pa. Mine o
Co., Idaho. J. P. H. Cunningham, president; Edwin
J. H. White, secretary; C. R. Carpenter, treasurer; Irvin
Organized December, 1902, under laws of Virginia, with ca
shares $1 par, nonassessable. Company is said to
$500,000 on the property.

Lands, 22 claims, 12 patented, on the Salmon Riv
district. Development is by a 700' shaft and a 1,200' th
with about 3 miles of workings, developing mainly silver-
nel shows ore assaying up to 15% copper, 41 oz. silve
Equipment includes an 800-h. p. hydro-electric insta
compressor. The 300-ton concentrator has 2 units, o
Sutton, Steele & Steele dry tables, the wet section havin
screens and tanks.

IDAHO COPPER CO.

Office: Hillyard, Wash. Mine office: Coolin, Bon
Gordon, president; J. Matteshuck, secretary. Organize
ington, with capitalization presumably $500,000. Lands
ern side of Priest Lake. Development includes shafts
showing an 18" vein, carrying chalcopyrite, galena and s
includes a 35-h. p. boiler, 50-h. p. engine and 2 New Yor
ing as an air-compressor. Was said, 1910, to have a smal
ground.

IDAHO COPPER MINES CORPORATION, LTD.

Dead. Former office was 1906–74 Broadway, Ne
Greenwood was manager; N. S. Edwards, consulting engi
to acquire the Blue Jacket and Copper Coin groups, in th
but did not obtain the Blue Jacket mine, and apparent
lands. Formerly at Decorah, Washington Co., Idaho.

IDAHO COPPER MINING CO.

Office: 603 Palladio Bldg., Duluth, Minn. Mine
Co., Idaho. Simon Clark, president; Henry Taylor, se

909, under laws of Minnesota, with capitalization $100,000, trace of operations secured.

IINING CO., LTD. IDAHO.

, Idaho. Mine office: Mullan, Shoshone Co., Idaho. president; A. N. Stroud, vice-president; Geo. F. Stoney, herstone, treasurer; W. H. Herrick, general manager; pre- ne directors. Lands, 6 claims, 3 patented, and a water- and adequately watered, near the head of Willow Creek, in lying next west of the Reindeer Copper & Gold Mining & roperty carries about 4,500′ of the strike of the extension of nd is to be developed through the 3,000′ Reindeer crosscut have entered the ground of this company circa April, 1911.

IINING & SMELTING CO. IDAHO.

y at Elk City, Idaho Co., Idaho. Described Vol. VII.

NING CO. IDAHO.

olumbia Bldg., Spokane, Wash. Mine office: Lane, . John C. Kleber, president; Arthur A. Hale, vice-presi- secretary; Geo. E. Canfield, treasurer; R. G. Dunn, man- ca March 1910, under laws of Washington, as a reconstruc- 'Alene Eagle Mining Co., which had a capitalization of par.

on Eagle hill, 2 miles from Lane, showing at surface a vein th, between slate and porphyry, carrying auriferous and opper and nickel sulphides. Development is by a 115′ ft. Equipment includes a power-house, having a 5-drill here are 3 other buildings.

ER MINING CO. IDAHO.

s changed, 1910, to United Lead Mining Co.

CO. IDAHO.

y at Doniphan, Blaine Co., Idaho.

N CO., LTD. IDAHO & WASHINGTON.

y at Weiser, Washington Co., Idaho. Described Vol. VIII.

& REFINING CO. IDAHO.

y Bldg., Spokane, Wash. Works office: Sand Point, J. Herbert Anderson, president; Arthur B. Lee, vice-presi- secretary and treasurer; Thos. L. Greenough, chairman preceding officers, W. J. C. Wakefield, W. W. Hidman and r, directors; J. J. Campbell, general manager. Organized ion $2,000,000, as a reconstruction of the Panhandle Smelt- ,000 authorized, at 6%. Indebtedness of the old company, 00, was assumed by the present company.

he Venezuela group of claims, slightly developed, on the f Lake Pend d'Oreille, carrying silver-lead ores.

uction plant, known as the Panhandle or Ponderay smelter, ille, is primarily a lead plant, though capable of handling quipment includes four 60-ton roasters. There is a wharf, ns a small steamboat.

s blown in circa June, 1907, and blown out shortly there- g to lack of sulphide ores for fluxing, but actually because for ores. During 1909 the company was in the hands of R. , in Washington, and John Mocine, receiver, in Idaho, and, as on, president Anderson had the company thrown into volun- tement of receiver Blake, 1909, gave liabilities of $501,559.22, $222,244.93. The company made a very bad mess of mat- nstantly idle, since 1907, except for frequent notices, in the nt to resume smelting. Is not regarded favorably.

ores of ...
power.
ICON...
C...
Was...
Ma...
ca...
C...

...SPRING GULCH MINING & MILLING CO., LT...
...claimed from former office, Mullan, Id...
...Co., Mont. Fred Carson, president and ...
...vice-president; R. M. McVitty, superinte...
...Organized Oct. 30, 1906, under laws of Idal...
...shares $1 par; issued, circa $850,000.
...7 claims, 1 fractional, area circa 110 acres, well ...
the Little Pittsburg and King and Queen mines, 3 miles fro...
...organized district near Carter. Property shows porphy...
...carrying 2 ore bodies, of which one, under developm...
...width, traceable 2,000′, is reported to average 6%...
...per ton, mainly from gray copper ore. There also is a ...
...silver-lead ore. Development on the copper vein is b...
...and tunnels of 60′ and 700′, the longer being planned ...
to cut both copper and lead veins. The upper tunnel show...
urite, assaying circa 7% copper, 1.4 oz. silver and 1 to 6 oz. ...
are 3 small buildings. Idle since circa 1908.

IDA MONTANA DEVELOPMENT CO.

Dead. Was succeeded, circa August, 1907, by Ida-M...
Formerly at Butte, Silver Bow Co., Mont. Described Vol...

IDA MONTANA MINING CO.

Office: Calumet, Mich. Mine office: Butte, Silv...
P. D. MacNaughton, president; Capt. Jas. W. Milligan, vi...
ing director; Wm. J. MacDonald, secretary; Jos. W. Sel...
McEvans, superintendent; preceding officers, Wm. H. Th...
Victor Nordberg, Edward Ulseth, Angus McDonald and ...
directors. Organized 1907, under laws of Arizona, with cap...
as a reconstruction of the Ida Montana Development Co...

Lands, 3 claims, known as the Ida, "A" and "B," ...
Amazon-Butte, across the valley and about 1½ miles so...
just south of Columbia Gardens, said to have been boug...
be fully paid for. The property lies outside of the prove...

The property had 2 old shafts, of 115′ and 118′, one ...
3, has been cut down to 3-compartment size, and sunk ...
planned to be sunk 1,000′. This shaft shows, on the 250...
carrying silver and gold values of commercial grade, and ...
1908, by lessees.

Equipment includes a hoist good for 1,500′, taken ...
Michigan, and a 20-drill air-compressor. There are seve...
The mine employed about 50 men, late 1907, but was ...
December, 1907, for supplies furnished. The indebted...
sonal advances of some of the officers and leading sha...
indebtedness was estimated, September, 1910, at abou...
the shape of notes, endorsed by the directors. On Feb. ...
ing of shareholders authorized the directors to transf...
company, to be organized later, with capitalization of ...
company was not organized. Idle since 1907, in a ...
reorganization or collapse inevitable.

IDEAL MINING CO.

Dead. Formerly at Milford, Beaver Co., Uta...

IDEAL MINING & DEVELOPMENT CO.

Office: 38 Wall St., New York, N. Y. Mine ...
Co., Ariz. Cecil G. Fennell, general manager; M. ...
Gladstone mine; Jas. O'Brien, superintendent Mode...

The Gladstone mine, with a 1,000′ shaft, carries ...
ous copper and lead ores, values being mainly in gol...

,800′ level, handling 20,000 gallons daily, a 120-h. p. Hen-
, capable of raising 3-ton loads from 1,500′, and a 4-drill
r-compressor, all electrically operated by a Crocker-Wheeler
one formerly shipped high grade ore, and ran concentrating
Cabe mill.

e, 6 claims, formerly known as the McCabe, bought, circa
s a 750′ incline shaft, with about 12,000′ of workings, show-
s carrying 8″ to 10″ of smelting ore, and 12″ to 24″ of milling
abined gold, silver and copper values of $35 to $85 per ton,
bout 2% copper, with small gold and silver values. Coun-
with numerous intrusive porphyry dykes, the granite being
he zone of oxidation is only about 40′ deep, followed by
atiferous copper, lead and zinc sulphides.

n as the McCabe or Model, has 10 stamps and a 50-ton
Wilfley and 3 Standard tables.

518,895 lbs. copper, 139,766 oz. silver and 14,696 oz. gold
s. copper, 117,582 oz. silver and 12,004 oz. gold in 1907;
25,107 oz. silver and 2,812 oz. gold in 1908, and 189,107 lbs.
ilver and 6,256 oz. gold in 1909. Late 1910, negotiations
the sale of the property to Hon. Frank M. Murphy, but the
onsummated, at last accounts.

JAPAN.

)zu-mura, Naka-gori, Kii, Japan. Tanezo Nakaye, owner
only a 10-h. p. steam installation. Forces were 490 men in
nen in 1908. Production, 1907, was 5,416,690 kwan iron
1,943 yen, and 93,915 lbs. fine copper, and production, 1908,
on pyrites and 167,148 lbs. fine copper.

TD. **BRITISH COLUMBIA.**

eymour St., Vancouver, B. C. Mine office: Jedway,
een Charlotte group, B. C. S. J. Castleman, general man-
arson, consulting engineer and superintendent. Organized
der laws of British Columbia, with capitalization $850,000,
perty is the former holdings of the Awaya-Ikeda Co., Ltd.,
000, apparently with a $50,000 cash payment, and balance of
l and lease.

s, area 2,100 acres, in several groups, on Ikeda Bay, at the
esby Island, 3 miles from Jedway, and connected therewith
nd telephone. Steamer connection is had with Vancouver,

8 claims, area 400 acres, on the southwestern side of Ikeda
nly mining has been done, was discovered May, 1898, by
developed under his management, from opening, 1906, until
resent company, September, 1910. The Lily group shows
cut by dikes of greenstone and diorite, having well defined
right angles to and between the main fissures, which are
the others being approximately horizontal, and of great
s in a series of veins of 2′ to 8′ width, the largest ore bodies
ontal main fissure. The vein principally developed is of 5′
for 1,000′ in length and about 300′ in depth. The ore
width, carries lenses of chalcopyrite, averaging, as mined,
with a gangue of silicious country rock, and occasional
e and limestone. The ore mined, by the former owners,
copper, 2.2 oz. silver and $2.25 gold per ton, with occasional
to 12% copper, 60 oz. silver and $5 gold per ton, and was
hipment. Diamond drilling, 1910, is said to have shown
e opened by a 52′ crosscut. The Lily mine has 4 tunnels,

Nos. 1, 2, 2½ and 3, all tunnels being connected by win
350′; No. 2½ tunnel is circa 350′ long; No. 3 tunnel, 940′
argentiferous and auriferous chalcopyrite, of good averag
40x50′ chamber, from which considerable ore has been s
chamber apparently being not the same as that followed
about 45′ to the northward, and found by a crosscut.

A 6,100′ horse-tram, of 36″ gauge, connects the mi
having a 110′ ell, supplied with a 1,000-ton ore-bunker, the
ton and two 100-ton bunkers. The inlet is charted, and a
size, at flood tide. Equipment includes a steam plant, bu
drill Ingersoll-Sergeant air-compressor. There are 12 b
hospital, store, smithy, shops, boarding-house, bunkhous
tory, dwellings for superintendent and engineer, and stab

Production, to end of 1910, was about 12,000 tons o
tons were shipped from November, 1906, to Aug. 3, 1908.
2,100 tons were first class ore, averaging 12% copper, circ
gold per ton, and 3,568 tons were second class ore, averag
silver and $3 gold per ton, all shipped to the Tyee smelte
gave net smelter returns of $58,882, an average of bett
Shipments, first half of 1909, were about 4,000 tons of ore
mated at 125,000 lbs. fine copper in 1907; 800,000 lbs. in 1
in 1909, with considerable gold and silver values. Mana
sive development, for 1911.

IKONOMOFF CESSION.

Office: care of M. Dimitri Ikonomoff, owner, Hot
Bulgaria. Mine office: Kara-Baïr, Bourgos, Bulgaria.
veloped, are held as a cession from the crown. Idle some y

IKUNO MINE.

Owned by the Mitsu Bishi Goshi-Kwaisha.

ILION MINING CO.

Dead. Lands were 2 claims, known as the Grand
Ready, slightly developed. Property was sold, 1908, to U
Co. Formerly at Bingham Canyon, Salt Lake Co., Utah.

FUNDICIÓN DE ILLAPEL.

Owned by Geisse Hermanos, at Illapel, Coquimbo, Ch

ILLINOIS COPPER CO.

Letter returned unclaimed from former office and mine
bon Co., Wyo. Organized Nov. 10, 1909, under laws of Wy
zation $100,000, presumably as successor of Illinois Copp
trace of operations secured. Idle and apparently moribun

ILLINOIS COPPER MINING CO.

Dead. Formerly at Encampment, Carbon Co., Wy
Vol. VIII.

ILLINOIS COPPER MINING & MILLING CO.

Mine office: Keller, Ferry Co., Wash. Lands, about
are said to have a 40′ vein, developed by a short crosscut tun
40′ estimated width, carrying ore assaying up to 20% co
values. Idle.

ILLINOIS COPPER & SILVER MINING CO.

Mine office: Pittsfield, Ills. Mine office: Keller,
J. C. Davis, president and general manager; J. D. Nigh
A. Hamilton, superintendent; preceding officers, J. E.
H. Hoover, directors; B. H. Swan, secretary; J. D. Hess, t
under laws of Washington, with capitalization $2,000,000,
assessable, in $1,000,000 preferred and $1,000,000 commo
draw dividends equal to cost, and then become common sto

aim, 4 claims and 4 claims, in the San Poil district. The claims, 3½ miles from Keller, shows auriferous and argen-
The Oregon group has 300′ of workings, including 2 shal-nels, one of 112′ length, developing a vein claimed to be 72′ ssan showing low grade ore.

& COPPER MINING CO. MÉXICO.
at Pánuco de Monclova, Coahuila, Mex. Described Vol. III.

D MINING CO. MEXICO.
outh Sixth St., Springfield, Ills. Mine office: Ayutla, ex. E. A. Perry, president; Homer Vandevender, vice-ntgomery, secretary; J. T. Ash, treasurer; preceding officers s, directors; John Breckenridge, general manager. Capitali-hares $1 par; issued, $750,000.
ares, including El Crudo and El Bajio mines, latter an is said to show 15 veins, with 6 under development, main in width, traceable 2 miles. El Crudo shaft, of 225′ depth, 0% copper tenor, estimated to average 5% copper, 15 oz. er ton. Mine, at last accounts, had about 3,000′ of workings, circa 50,000 tons of ore.

OME COPPER CO. ARIZONA.
Jerome, Yavapai Co., Ariz. A. D. Zellanack, president; president; Annie E. Zellanack, secretary and treasurer; pre-the directors. Organized August, 1908, with capitalization 1 par. Lands, near the Copper Chief, apparently are unde-e circa 1908.

AN COPPER CO. MÉXICO.
rly at Ayutla, Autlán, Jalisco, Mex. Described Vol. VIII.

N. CHILE.
Talcuna, La Serena, Coquimbo, Chile. Victor Illanes, owner perty, 16 kilometers from Marquesa railway station, shows average width, and, in 1903, with a force of 16 men, produced ons of ore, of about 9% average copper tenor.

TED MINING & MILLING CO. IDAHO.
rly at Patterson, Lemhi Co., Idaho. Described Vol. VI.

CO. NEVADA.
Herald Bldg., Salt Lake City, Utah. Mine office: Hum-boldt Co., Nev. Geo. W. Morgan, president; Hon. O. W. dent; R. E. Siddoway, secretary; preceding officers, Jos. sons and Frank M. Smith, directors; Robt. Kirk, superintend-pr. 19, 1907, under laws of Utah, as successor of Morrison apitalization $500,000, shares $1 par, assessable; fully issued. ms, unpatented, with 2 millsites and a townsite, 4 to 5 miles ouse. Mine has a 250′ incline shaft, with about 4,000′ of ng ore assaying up to 8.8% copper, 7.6% lead, and 0.18 to on, with gold values, values being mainly in gold and silver. cludes three 60-h. p. boilers, a hoist, air-compressor and elec-ngs include an office and shops.
ll was put in commission July, 1909. Shipments were begun to the Selby smelter, of one carload weekly, of ore running n in assay value. Property considered promising.

ER CO. ARIZONA.
rly at Wickenburg, Maricopa Co., Ariz. Described Vol. III.

ER CO. ARIZONA.
Pine St., New York, N. Y. Operating office: Tomb-Silver Bell, Pima Co., Ariz. Hon. Frank M. Stanton, vice-president and general manager; A. N.

Gage, secretary and treasurer; Victor L. Mason, assistar
urer; preceding officers, Selwyn Eddy and H. M. Robir
Morgan, mine superintendent; G. W. Dietz, auditor; B.

Organized May 15, 1903, under laws of Arizon
$5,000,000, shares $10 par, nonassessable; fully issued
at 6%, under terms of issue of which the company canno
6% annually to shareholders. Interest on bonds was
Paid $100,000 dividends in 1906, and $200,000 in 1907,
each. Is controlled, through a majority stock ownership,
pany of America, and controls, through stock ownership o
ern Arizona Smelting Co. Net earnings for fiscal year en
were $220,129. The fiscal year has been changed to enc
meeting, second Tuesday in November.

Lands, 55 claims, patented, area 800 acres, with mill
miscellaneous lands of 1,820 acres, in the Silver Bell Mo
pendent range having a granitic base, with a capping muc
gone at many points. The district presents fragments o
a porphyry intrusion, and many later andesite and
cappings, of no economical interest, are of rhyolite, andes
and conglomerate, and recent basaltic flows. There has b
shearing, ore bodies occurring as irregular contact lenses,
with axes parallel to the fault and fissure planes. Ore is
the point of contact with monzonite-porphyry, and oc
long distances in the limestone, and the monzonite in
strongly mineralized with copper sulphides. The ore bo
sans. The oxidized zone is comparatively shallow, being
in the principal workings, with a sharp change from the o
zone. The oxidized ores are mainly cuprite, malachite a
nished the bulk of early production, but the principal or
occasional bornite. The mines also show some ore that i
phide complex of galena, sphalerite and chalcopyrite, dec
isfactory reduction. The gangue is garnetiferous. The
bodies, estimated by the company to average 4% in cop
silver and gold values. Ores mined 1905 were reported t
per, 1.2 oz. silver and 12 cents gold per ton.

During 1909 the company acquired working control of
lands, owned by El Tiro Copper Co., and considerable chur
done, showing an extensive deposit of disseminated sul
porphyry, it being estimated that about 1,000 acres of the
the Imperial and El Tiro are on monzonite. Drilling has
area of disseminated sulphides, assaying up to 3.3% coppe

The Mammoth mine, formerly known as the Old Bo
was a small producer of high grade copper and silver-lead
vals, under former ownership. Development is by the 1,2
nel and the 700′ Mammoth shaft, of 3 compartments, vert
400′ Mammoth shaft, sunk at 40° incline, now used fo
columns and lowering timber. The Mammoth vertical
cages, hoisting 1-ton cars. Ore is mainly chalcopyrite, wi
of bornite. The 700′ station has a Prescott compound c
ing about 200,000 gallons of water daily. The Mammoth
sive opencuts, from which ore has been extracted.

The Union mine has a 450′ shaft, developing conside
ing ore, of 3 to 4% copper tenor, and, in addition, there
of low-grade garnetiferous ore, of about 2% copper avera

The Billy mine has a 350′ shaft, and there also are the

ne mine, as a whole, was reported, by the company, March,
0,000′ of workings.
plant, at the Mammoth mine, has six 70-h. p. boilers, burn-
l-storage tanks. There are two 200-h. p. 14x18″ Wellman-
e-drum geared hoists, one at the vertical, and one at the
Iammoth, and a 14x18″ double-drum Sullivan hoist, these
d for 1,500′ depth each. There is a 60-h. p. double tandem
the Billy mine, and a 15-h. p. gasoline donkey hoist. The
a Nordberg 2-stage cross-compound condensing air-com-
of 3,000 cubic feet of free air per minute, at 90 lbs. initial
a 5-drill Norwalk 2-stage straight-line air-compressor at
re there is a steam plant with six 70-h. p. boilers. Com-
ter locomotives is furnished by a Norwalk 3-stage straight-
riven by a 40-h. p. 440-volt induction motor. Power for
or motor and for mill machinery, is generated by a 500-kw.
enerator, at the smelting plant at Sasco, and transmitted
to the mine, at 11,000 volts, stepped down at 440 volts for
shaft has a 36″ Link Belt picking-belt, of 120′ length, for

l, of wood, with corrugated iron siding and roof, of 300 tons
have cost circa $165,000, went into commission September,
operated at full capacity just before production was sus-
. The mill was planned to handle porphyry ores, and such
es as would require concentration before use as fluxing ore
pment includes three 16x36″ rolls, 6 New Century jigs, 22
nners. The mill is operated by electric motors of 5 to 50
old 20x40′ experimental mill, of 10 tons daily capacity.
20x30′ and 30x80′ machine-shops, of wood, sheathed with
6x40′ carpenter-shop, a framing-mill, an 18x50′ smithy,
g-houses, changing-houses and about 20 dwellings, with
carrying a large stock.
izona railway, controlled, through stock ownership, by this
long, of standard gauge, running from Silver Bell through
where connecting with the Southern Pacific line. Equip-
notives and 25 cars. At the mine, ore-cars are hauled in
r compressed air locomotive, to a 100-ton shipping bin, at
nence ore is taken in Ingoldsby 50-ton steel bottom-dump
lter. The Development Company of America has planned
y to Puerto Lobos, on the Gulf of California, to give a short

e about 400 men. Copper production is marketed by the
Ltd. Production was discontinued, August, 1910, awaiting
ons, since which time activity has been confined to develop-
nd, and on the porphyry ground of the Imperial and El
rt is being made to develop a large tonnage of disseminated
operations.
been as follows: 3,030,632, lbs. fine copper in 1904;
[illegible] lbs. in 1906; 5,267,401 lbs. copper and 63,170
[illegible] copper and 96,614 oz. silver in 1908; 10,115,355
[illegible] in 1909. Average cost of finished copper was
[illegible]any, March, 1909. Property is considered
[illegible]mission, owing to low metal prices.

ONTARIO.

[illegible] district, Ont.

WYOMING.

[illegible] Letter returned unclaimed

from former mine office, Encampment, Carbon Co., Wyo
and treasurer. Lands, 113 acres, patented, near the Portl
Creek, 12 miles west of Encampment, showing 2 veins, on
width, being a schist dike. Mine has about 500′ of tunne
assays of 6 to 14% copper, with small gold and silver val
having no indebtedness. Idle several years, except for s

IMPERIAL COPPER MINING CO.

Dead. Formerly at Pollasky, Fresno Co., Cal.

IMPERIAL COPPER MINING CO.

Dead. Formerly at Frisco, Beaver Co., Utah.

IMPERIAL COPPER MINING CO.

Letter returned unclaimed from former mine office,
Wash. J. W. Edwards, general manager; P. J. Bonner, s
near the Copper King mine, 3 miles north of Chewelah,
showing stringers of copper ore, apparently improving w
includes a small power plant. Idle since circa 1909.

IMPERIAL CORONA GOLD MINING CO.

Dead. Was a bad egg. Formerly at Elk City, I
scribed Vol. VIII.

IMPERIAL GOLD & COPPER MINING CO.

Dead. Lands were sold June 10, 1907, to Nevada-
Corporation. Formerly at Frisco, Beaver Co., Utah.

IMPERIAL MINING CO.

Mine office: Burke, Shoshone Co., Idaho. Her
Homer G. Brown, secretary; John H. Nordquist, genera
1906, with capitalization $1,000,000, shares $1 par. La
King, on O'Neil Gulch. Mine is developed by tunnels, t
below the upper, a crosscut, of circa 3,000′ length, plann
vein with a back of 1,126′, showing several small stringe
mercial quantity. Equipment includes a Pelton wheel a

IMPERIAL MINING CO.

Office: Marysville, Wash. Mine office: Silverton,
Jas. E. Dupree, president. Lands, 11 claims, showing
diorite and conglomerate, carrying gold, silver, copper
some years and apparently moribund.

IMPERIAL MONTANA COPPER MINING, SMELTING & WATER POWER CO.

Dead. Was reorganized, 1904, as Bornite Cop
Blackfoot, Teton Co., Mont. Described Vol. V.

IMPERIAL PAINT & COPPER CO.

Mine office: Spenceville, Nevada Co., Cal. Mi
has steam power. Idle several years.

IMPERIAL STATE MINING & MILLING CO.

Dead. Formerly at Searchlight, Lincoln Co., Nev.

INARI MINE.

Mine office: Nishi-Usuki-gori, Hyuga, Japan.
109,246 lbs. fine copper.

COMPAÑÍA MINERA INCA DE ORO i COBRE DE

Office: Iquique, Chile. Mine office: Copiapó, A
ized Dec. 14, 1906, under laws of Chile, with capital
£1 par. Property, apparently of promise, was a small p

INCA MINING & MILLING CO.

Letter returned unclaimed from former office, Colfa
Cuprum, Washington Co., Idaho. Property is the Min
Seven Devils district, carrying auriferous and argentifero
Idle several years and apparently moribund.

D. CHILE.
aquí, Ovalle, Coquimbo, Chile. Lands, 300 hectares, 4
lcillo, having a series of veins of 2 to 5 meters aggregate
de ore, with gangue of limestone, iron and quartz, devel-
bout 700 meters aggregate length, connected by winzes.
metric tons daily capacity. Forces, 1908, were 130 men,
s daily. Production, 1908, was 5,151 metric tons of ore,
in copper tenor, estimated to have yielded 675,000 lbs. fine

OPPER & GOLD MINING CO. UTAH.
ston Bldg., Salt Lake City, Utah. Mine office: Alta,
Chas. Parks, president; Fred Carlson, vice-president and
nerwood, secretary; E. R. Morgan, general manager. Or-
aws of Utah, with capitalization $50,000, shares 10 cents
as, 2 patented, 16 miles from Sandy, the nearest rail point.
of tunnels, showing copper and gold values, with a little
s, except for annual assessment work.

OPPER MINING & SMELTING CO. IDAHO.
rged, November, 1905, in Bonanza Mining Co. Formerly
Lake Co., Idaho.

EVELOPMENT CO. ARIZONA.
y at Globe, Gila Co., Utah. Fully described Vol. VIII.

GOLD & COPPER CO. MONTANA.
Deer Lodge, Powell Co., Mont. I. S. Eldred, president;
resident; E. Scharnikow, secretary; W. F. Gullette, treas-
rs, A. D. Hoss and M. Skones, directors; B. A. Eldred, gen-
nized 1907, under laws of Montana, with capitalization
ar. Lands, 120 acres, in the Oro Fino district, circa 12 miles
and 5 miles south of a railway. Property includes the old
located 1870, which is a patented tract of 102x2,200′, for-
aft and a 340′ tunnel. New workings include shafts of 25′,
nels of 30′ and 55′, showing a vein of 4′ to 5′ width, carrying
tiferous copper ore, said to have averaged, as produced,
ombined values, and to be capable of concentration 4 into 1,
with excess of iron. Idle since September, 1908, from lack

GOLD, COPPER & IRON MINING CO. CALIFORNIA.
y at Lavic, San Bernardino Co., Cal.

MINE. MONTANA.
alispell, Flathead Co., Mont. Property, on the Tobacco
show a 25′ vein giving average assays of 8% copper and
on, which obviously is a serious overestimate. Idle some

MINING CO. COLORADO.
urret, Chaffee Co., Colo. Has auriferous copper ores, with

MINING CO. IDAHO.
unclaimed from former mine office, Mullan, Shoshone Co.,
ing the Copper King on the east, are said to have a prom-
. Development is through the tunnel of the Missoula
on a stringer, widening from a few inches to 2′, was
ium 1908.

WYOMING.
Wis. Letter returned unclaimed from
yo. E. E. Meeleus, president; Henry
secretary, treasurer and general

manager; F. O. Withrow, superintendent, at last account 1904, under laws of Wyoming, with capitalization $1,00 successor of Leighton-Gentry Mining Co.

Lands, 6 claims, patented, area 120 acres, 2 miles Battle Lake district, showing eruptive metamorphic cou 11′ contact vein between quartzite and diorite, opened by 250′ tunnel, showing occasional stringers of 3″ to 12″ chalcopyrite assaying 12% copper, with small quantitie and traces of silver and gold. Has steam power, a hoist buildings. Company reports having a smelter with a 60 furnace, which seems doubtful, and may have been mean smelter. Idle.

INDEPENDENCE MINING & SMELTING CO.

Dead. Was succeeded, January, 1908, by Mascota at Guachinango, Mascota, Jalisco. Mex. Described Vol

INDEPENDENCIA MINING & MILLING CO.

Dead. Was succeeded January, 1908, by Mascota at Ameca, Jalisco, Mex. Described Vol. V.

INDEPENDENT COPPER MINING & MILLING CO

Letter returned unclaimed from former office, Walla Mullan, Shoshone Co., Idaho. Jos. Bean, president; Jo president and manager; C. D. Miller, secretary and treas Henry Billberg, D. F. Clark, R. R. McCormick, August directors. Organized 1907, under laws of Idaho, with c 1907, to $1,250,000, shares $1 par. Lands, 6 claims, near a 780′ tunnel, showing seams of argentiferous copper car tions of chalcopyrite. Presumably idle.

INDEPENDENT MINING CO.

Office: 705 First Ave., Seattle, Wash. Mine offi Wash. Edward Peterson, agent. Lands, on the north Kittitas county, Washington, are claimed by the compa galena, 2 gold veins, 1 cobalt vein, and an asbestos being asserted to be 30′ to 70′ wide. The company cla performed too little. Idle and apparently moribund.

INDEPENDENT SMELTING CO.

Office: Ogden, Utah. Works office: Hot Springs Matthew S. Browning, president; Joel Nibley, secretary a officers, J. B. Jenson, LeRoy Eccles and John B. Cri Kadish, general manager; R. H. Vail, superintendent successor of Utah Smelting Co., with capitalization $5 property is held under lease.

The works, 1½ miles west of Hot Springs and 9 mil a spur track from the Oregon Short Line railway. Wate wells, and conserved in a 25,000-gallon tank. Equipm air power, but the plant is designed for operation exclusi ing a 6,000-volt current from the Brigham City Powe down for use to a 440-volt 3-phase 60-cycle current. daily rated capacity, cost about $250,000.

The smelter, planned for 4 furnaces, has one 42x120 water-jacket blast-furnace, with maximum capacity of is supplied by a Connersville blower, direct-connected Electric motor. A Clisholm, Boyd & White briquetting 800 bricks per hour. There is no converter plant, mat to the United States smelter for conversion, when the wo The plant includes a 200-ton sampling mill, and there is a clubhouse for employés.

blown in July 27, 1907, employing about 120 men, and was 908, remaining idle since.

CO. MÉXICO.

y, Pa. Mine and works office: Indé, Durango, Mex. ent; Marcus Hulings, manager. Lands, near Rosario, the lude Las Coloradas and La Cruz mines, also the Mina Ma- 1909. The Matracal has a vein of 7 to 15 meters width, carrying gold and copper, with excess of iron, and copper slightly argentiferous and strongly auriferous. La Roca ler a lease expiring July, 1911, has 2 furnaces, of 200 tons a general custom business, using 10% charges of Colorado atte carrying 18 to 30% copper, 10 to 15 kgs. silver and d per metric ton, shipped to the Aguascalientes smelter for ng. Idle, late 1910, but planned resumption shortly.

COPPER MINING CO. WASHINGTON.

ter Horton Bldg., Seattle, Wash. Mine office: Index, h. A. M. Watt, secretary, treasurer and general manager. 40 acres, 3 miles east of Index, having a 50′ shaft, and tunthe latter a lower crosscut tunnel, having a 200′ back on a aystreak carrying argentiferous bornite assaying 16 to 50% silver per ton. Idle several years.

ENT MINING CO. WASHINGTON.

ds, Jan. 1, 1905. Formerly at Index, Snohomish Co., Wash.

O. WASHINGTON.

ish, Wash. Mine office: Index, Snohomish Co., Wash. t and general manager, at last accounts. Lands, 5 claims, group, opened by tunnels of 300′ and 800′, showing chalcoalcopyrite, in a 12′ vein of concentrating ore carrying a 2 ore on the footwall. Idle several years.

A MINING CO. ARIZONA.

rganized, circa 1906, as Indiana-Arizona Development Co. ell, Pima Co., Ariz.

CO. MICHIGAN.

y was sold, 1909, to Indiana Mining Co., and a final divi- of .$2.90 per share, was paid. Formerly at Lake Mine, h. Described Vol. VIII.

CO. WYOMING.

Campbell and Jos. Lohlein were directors. Lands were alf mile northeast of the Rambler mine. A little work was ormerly at Holmes, Albany Co., Wyo.

GTON MINING CO. WASHINGTON.

iley Bldg., Seattle, Wash. Letter returned unclaimed from Darrington, Snohomish Co., Wash. G. A. Rochester, presiford, secretary. Capitalization $1,000,000, shares $1 par. presumably moribund.

OPMENT CO. ARIZONA.

rganized, circa 1906, as Indiana-Arizona Development Co. Bell, Pima Co., Ariz. Described Vol. VI.

CO. CALIFORNIA.

ly at Needles, San Bernardino Co., Cal.

CO. MICHIGAN.

ngress St., Boston, Mass. Operating office: Dee Bldg., Mine office: Rockland, Ontonagon Co., Mich. Stephen R. in R. Bailey, secretary and treasurer; Richard M. Edwards, eceding officers, David E. Dow and Henry Tolman, directors.

Organized circa August, 1909, under laws of Michigan
$2,500,000, shares $25 par; issued, $2,000,000, paid in,
60,000 shares to owners of lands for its property, and
August, 1909, for public subscription, and is supposed to
with $128,000 cash.

Lands, 1,200 acres, bought 1909 from the Indiana
lying northeast of the Lake and north of the North Lake,
28, T. 50 N., R. 37 W. The property was worked on a sm
the burning of its mill, 1864, but the old openings are inac
has been done thereon by the present company. The lands
and can supply all mining timber for a considerable ti
available from the Fire Steel River. Transportation is f
the Copper Range railway, completed December, 1910, an
line is within a short distance.

The lands are traversed by the Evergreen belt of co
loidal beds, and by a number of unidentified cupriferous b
evergreen belt and the eastern sandstone. The southeaste
in the hypothetical horizon of the Lake amygdaloidal
covered with a heavy overburden of sand, hampering drill

The ground has been tested by extensive diamond
August, 1909, the first hole being drilled to the eastern
1910, the company operated 4 diamond drills, engaged in
cross-sections of the property, and the 12th hole was being

No. 2 drillhole resulted in the disclosure of pheno
ground, October, 1909, the core being taken from a bed lyi
a 400′ conglomerate. This hole gave rich cores from dep
with a lesser quantity of copper to depth of 1,490′, and a
separate beds, of circa 40′ and 25′ width, separated by an a
of about 100′ width. The nature of this bed is a subject
been called sandstone, conglomerate and felsite, but there
it is an altered felsite. A microscopic analysis, made of N
R. C. Allen, state geologist of Michigan, shows the rock
extremely fine-grained, with a rather confused texture,
interlocking and overlapping very irregularly. The rock
quartz and light colored mica, with secondary infiltrations
irregular grains of disseminated native copper. Seconda
normal, occurs in small ramifying veinlets. Mica seems
one with extremely small and irregular flakes, and the othe
of much larger size. The even size of the quartz grains, w
texture, indicates an igneous origin. There are indication
felsite rock, and a second zone of about 25′ width, are pa
approximately 265′ width, the second zone of 25′ being n
wide bed. No. 5 hole, in March, 1910, drilled in felsite, at
in the horizon of the felsite cut in No. 2, the discovery
October, 1910, cut felsite carrying heavy copper, at a de
ently a continuation of the same ore body. The theory
after careful study of the situation, that the Indians
drillhole, and later holes, is a felsite intrusion, having
practically vertical dip. Confirmation is given this theor
results in No. 7 and 9 drillholes, which are only 60′ apart,
being bored, for practically its entire depth of 1,600′, in fe
less copper, while No. 7 hole, only 60′ west, shows no fels
1,700′. The bedding of the Keweenawan strata is extreme
fusing in the vicinity of the Lake mine, this area including
the irregular strike and erratic dip being the more unexp
regularity generally found in the Keweenawan beds. App

nal NS. strike, is curving to the west, to conform with the edded series.

en, January, 1911, near No. 2, the discovery hole, for a erburden at this point being about 110′. The shaft is tside diameter, lined with steel and concrete, with inner Property considered promising and management good.

CO. **OREGON.**

er Bldg., Anderson, Ind. Operating office: Baker City, Medical Springs, Baker Co., Ore. John W. Messner, presi- nager; J. W. McAlpine, vice-president; Dr. W. H. Stapish, Cleaver, auditor; W. L. Myers, superintendent; preceding r, G. F. Aldrich, Henry Schies and Wm. Godejohann, di- ley, secretary. Organized June 18, 1903, under laws of zation $1,500,000, shares $1 par.

, also a 280-acre townsite, on Big Creek, circa 25 miles City, in the foothills of the Powder Mountains. Property s, with a contact deposit between porphyry and green- ferous and argentiferous copper sulphides, with quartz o 3% copper, with occasional ore of higher grade. Devel- , which has not reached the ledge, and a 375′ two-compart- evels opened, and about 6,000′ of workings, developing 2 ′ estimated average width, about 200′ apart, in altered r vein is said to carry 3.5 to 5% copper, and circa $3 per and silver values.

des a Leyner hoist, good for 1,000′ depth, a 4-drill Leyner ver drills and a small electric light plant. There are about ng a 40x70′ shafthouse, 40′ high, a 16x30′ office and a precipitation plant has 7 tanks, each 4x4x3′. Mine was 7, to have circa 20,000 tons of ore on the dump, mainly nt, which probably was an excessive estimate. Idle several y moribund.

PPER MINING CO. **WYOMING.**

y at Riverside, Carbon Co., Wyo.

COPPER & MINING CO. **MÉXICO.**

ere sold, in undivided interests, 60% to the Cananea Cop- 0% to the San Pedro Copper Co., S. A., both subsidiaries ea Copper Co. Formerly at La Cananea, Arizpe, Sonora, ed Vol. VIII.

NSOLIDATED MINING CO. **UTAH.**

y at Newhouse, Beaver Co., Utah. Described Vol. IX.

NING CO. **BRITISH COLUMBIA.**

ceeded by Spitzee Gold Mines, Ltd. Formerly at Phœnix, . C.

VELOPMENT CO. **CALIFORNIA.**

St., Tacoma, Wash. Mine office: Indian Falls, Plumas rmer, president; J. H. Spencer, vice-president; Horace W. B. Roeder, treasurer; preceding officers and John Arthur, dhue, general manager; Capt. C. Henry Thompson, con- rganized May, 1908, under laws of Washington, with capi- , shares $1 par, nonassessable; issued, $1,640,000. Annual ch year.

, partly patented, area 420 acres, also 156 acres of miscella- d, including the townsite of Indian Falls, in the Shoofly hows talcose schists, slate and porphyrite, carrying 8 lentic- schist, with average strike of N. 40° W. and dip of 55° to der development are reported as averaging 4′, 8′, 12′ and

30′ in width, traceable 12,000′, carrying chalcopyrite, s estimated by management to average 2% copper, 1.4 oz per ton. Development is exclusively by tunnels, of 90′, and 610′, with 1,149′ of workings, estimated by manageme of ore, with 4,200 tons blocked out for stoping.

A 3,000-h. p. water power, from Indian Falls, is unde agement plans the completion of the hydro-electric power centrator, and erecting a summer-resort hotel.

INDIAN QUEEN CONSOLIDATED MINING CO.

Office: Provo, Utah. Letter returned unclaimed fr Newhouse, Beaver Co., Utah. Jesse Knight, president; president; R. E. Allen, secretary and treasurer; David Quinn, superintendent, at last accounts. Organized 190 with capitalization $150,000, shares 10 cents par, fully iss on the Salt Lake stock exchange.

Lands, 25 claims, partly patented, near the King miles east of Newhouse, taken over from the old Indian Q panies. Development is by a shaft and a 4,700′ tunnel, circa 6,000′, showing, at 1,500′ from the portal, a miner drifted on for 500′, but gave no ore. Equipment includes hoist and air-compressor. Idle since July, 1910.

INDIAN QUEEN MINING CO.

Dead. Was merged, 1907, in Indian Queen Con Formerly at Newhouse, Beaver Co., Utah.

INDIAN QUEEN MINING & SMELTING CO.

Office: 45 West Park St., Butte, Mont. Mine offic Co., Mont. Thos. F. Stephens, president and general m son, vice-president; Thos. W. Ellis, secretary; A. H. Ste ceding officers and T. J. Ellis, directors. Organized Jul Montana, with capitalization $450,000, shares $1.50 par, $228,300.

Lands are 2 claims, area 40 acres, and a 3-acre mills trict, known as the Indian Queen mine, which is owned jo and the Anaconda Copper Mining Co. The property sh and dolomite, having 2 contact deposits, between granit to 10′ average width, carrying malachite, azurite and ch management to average 8% copper, 10 to 12 oz. silver and Mine was opened 1867, and has been worked intermittent opment is by shafts of 150′ and 220′, and an 820′ tunnel workings, formerly estimated to show 50,000 tons of blocked out for stoping, which was an overestimate.

Equipment includes about 60 h. p. in steam and gaso for 500′ depth. There is a small smelter, connected wit tramway, having a 30-ton 36″ circular water-jacket blast- blast, made matte averaging about 55% copper, 27 oz. si per ton. Production, 1903, was circa 1,400,000 lbs. fine co there has been no regular production, though small quan extracted, by lessees, from time to time. Idle since 1908

INDIAN SPRINGS COPPER MINING CO.

Letter returned unclaimed from former office, Sp office: Lida, Esmeralda Co., Nev. E. F. Burns, presiden vice-president; T. R. L. Harris, secretary and treasurer; tendent, at last accounts. Organized 1906, under laws capitalization $1,500,000, shares $1 par. Lands, 7 claims rying sulphide ore assaying 12% copper. Has steam pow with a small force, March, 1909. Presumably idle.

G CO. **WYOMING.**
aylor was superintendent. Lands were on French Creek, ampment, and apparently were undeveloped, except from rk. Formerly at Encampment, Carbon Co., Wyo.

ER MINING CO. **ARIZONA.**
at Benson, Cochise Co., Ariz.

NG CO. **MÉXICO.**
unclaimed from former office, Nogales, Ariz.; former oper- Hermosillo, Sonora, Mex., and former mine office, Carbó, out company is still alive, displaying remarkable vitality. gent, at last accounts. Lands, 20 hectares, known as the Sierra Carnero, 37 miles west of Carbó. Mine has a vein of th, in limestone, showing ore giving assay values in copper, Development is by a 300′ tunnel, and prospect shafts. November, 1910, to have raised money to pay all indebted- ing work, but continued idle at last accounts.

SE POUR L'INDUSTRIE **FRENCH CONGO.**
S.
evard Haussmann, Paris, France. Mine office: Stephan- J. Belmone, manager. Property is concessions covering circa 200 miles from the coast, in the French Congo, pre- ou-Niari basin, on which some exploratory work was done,

VER MINING CO. **COLORADO.**
Eaton was superintendent. Mine, opened by shafts and rous and argentiferous copper ore, and equipment included Was working circa 1902. Formerly at Crystal, Gunnison

RIVER DEVELOPMENT CO. **BRITISH COLUMBIA.**
dway, Moresby Island, Queen Charlotte Group, B. C. y, at the southern end of Moresby Island, include the Cop- ing a vein of 20′ estimated average width, traceable circa ed, early 1909, giving ore assaying 9 to 11% copper, with lues. Presumably idle.

NG CO. **ARIZONA.**
at Prescott, Yavapai Co., Ariz. Described Vol. IX.

GUARÁN. **MÉXICO.**
e Provence, Paris, France. Mine office: Inguarán, Ario, h. Laforgue, general manager; Maurice Armand de Lille, superintendent. Organized Jan. 15, 1898, under laws of zation 12,000,000 francs, shares 500 francs par. Is con- French house of Rothschild, and the Banque Mirabaud, tion of the company's stock is owned by the Compagnie du bought for 1,500,000 pesos, and company is said to have 0,000 thereon, which undoubtedly is a very serious over-

ares, also mineral concessions covering 5,000 additional nbaro district, lying on the plateau of the volcano Jorullo, plains. Th mountains form a succession of rugged, al- ks, with ore outcrops near their crests, these, of 90′ to 200′ rally east and west trend. Country rock is granite, in ation, capped by a silicious limestone of 200′ to 300′ thick- immense size, carry almost exclusively copper sulphides, halcocite and chalcopyrite, with a little bornite, having a gue, assays giving 1.5 to 65% copper, 2 to 100 oz. silver oz. gold per ton. As a rule the silver values are consider-

able, with slight gold values. Proven depth of the ore is
which depth it apparently cuts off. Development is by
main shafts, deepest circa 350′, with levels opened at 80
and country rock are exceedingly firm, little timbering
mates of size and value of the ore bodies vary greatly, bu
estimate an average of circa 3.25% copper, with 2,000,00
tons of ore blocked out. The ore is well adapted to cone
ently could be put about 8 or 10 into 1.

The mine has steam power, and a 200-h. p. hydro-e
Mata de Plantano, 7 miles from the mine, where there is a
80 litres per second, with an available head of 930′, fed
forth from the foot of Mt. Jorullo, after the last eruption
1750.

A survey was made, 1905, for a railway from Patzcuar
point, to Inguarán, a distance of 32 leagues. A complete
and plans drawn for a railway from the mines to Zihuatane
on the Pacific, the route of the proposed line traversing a
would necessitate several years for construction.

The Inguarán was the particular bugaboo of the copp
of the Nineteenth Century, the exigencies of the trade
always be some mine, just about to begin production, t
hundred million pounds of copper yearly, at a merely
Inguarán has a large body of low grade ore, but not equal
to that of several other Mexican mines. The only rec
598,439 lbs. of ore, valued at 21,870 pesos, shipped 1904,
poses. The property has been idle some years, and is not li
ducer until rail connections are secured, and, judging fr
progress of the past decade, will become a large producer
Gabriel blows his horn.

CARLOS VERGARA IÑIGUEZ.

Office, mine and works: Petorca, Aconcagua, C
El Mauro mine, opened 1860, which has copper ore carryin
in gold and silver. The smelter, known as the Fundición
eters from Los Vilos, the nearest port, has been idle severa
was circa 200,000 lbs. fine copper in 1903, but shrunk to 24
to 14,021 lbs. in 1907. Idle since 1907.

INLAND COPPER CO.

Office: 1017 Commerce Bldg., Kansas City, Mo.
Yuma Co., Ariz. L. E. Corbin, president; A. W. Bork,
Dodson, secretary and treasurer. Organized under laws o
talization $5,000,000, shares $1 par, nonassessable. La
including 2 groups, of about 15 claims each, in the Bill Wil
Bill Williams Fork River, with a millsite, smelter-site a
mine has 2 tunnels, presumably short, and a 2-compart
planned to be sunk to 250′, equipped with an 18-h. p. gasol
several mine buildings. Company advertised, January, 19
ducer of copper ores, which seems something more than do
an occasional ton of ore and dumping it on surface be calle
company.

INLAND COPPER CO.

Mine office: Troy, Latah Co., Idaho. Lands, 8 c
Inland Empire mine, 6 miles east of Troy. Development
gating about 1,000′, showing, at depth of 160′, a vein of
carrying mainly oxidized ores, with rich streaks assaying
Company was said, early 1909, to plan shipping 12 carload
out, to the Tacoma smelter, but apparently failed to do so.

CO. **MONTANA.**

unclaimed from former office, Wallace, Idaho. Mine office: Mont. Barney Swanson, president and general manager; consulting engineer. Lands, 10 claims, well timbered, in 3 miles southeast of the Dennemora mine, about 5 miles g a 3′ to 10′ vein with EW. strike, carrying chalcopyrite copper, 11 oz. silver and $6 gold per ton, but apparently copper, with smaller gold and silver values. Development is scut tunnel, a 100′ middle tunnel and a 700′ lower crosscut of ore was shipped, for a smelter test, 1910. Property con-

JAPAN.

kawa Mining Co.

& COPPER DEVELOPING CO., LTD. CAPE COLONY.

Ayliff, Cape Colony. Mine office: Kokstad, Griqualand . Wilfred Vernon Parsons, secretary. Organized circa aws of Cape Colony, with capitalization £200,000, shares £1 ining areas, formerly held by South Namaqua Syndicate, nated through norite, occasionally occurring as lenticular le size in norite, with a shale contact. Average assays were to 3.37% copper and 3.29 to 4.75% nickel. Idle.

PPER CO. **ARIZONA.**

ad St., New York, N. Y. Mine office: Globe, Gila Co., npson, president; H. F. J. Knobloch, first vice-president and en, treasurer; Walter H. Aldridge, managing director; pre- E. Gunn, John F. Alvord, Edmond C. Converse, Chas. A. lden, John G. Hopkins, Albert H. Wiggin and O. J. McCon- Drummond, manager; Thos. Tighe, superintendent; Henry ngineer. Organized December, 1908, under laws of Maine, $10,000,000, shares $10 par, fully issued. A former issue of % cumulative preferred stock was converted into common , when the balance of stock in the treasury was sold, at $10 rter provides that the number of directors shall be fixed by not less than 5, nor more than 15. Guaranty Trust Co., r. Bankers Trust Co., New York, transfer agent. Shares Boston stock exchange. Annual meeting, first Monday in

s lands were bought of the Inspiration Mining Co., for mmon stock, with commission to the promoter, Mr. Wm. B. 0 shares, balance of stock going to the treasury, and being Thompson, at various prices, aggregating $3,022,120, in full 21 shares. Expenditures, 1910, were $425,893 for mine $108,412 for churn drilling, company ending the year with and, $25,455 in bills receivable, and secured loans, drawing 00, giving total cash assets of $1,799,668.

ns, partly fractional, 12 patented, balance in process, area e claim lying in a fairly compact tract, having an extremely ext west of the Miami, and north of the Keystone, 8 to 10 e. Company also owns a 160-acre ranch, with valuable g the junctions of Pinal and Miami creeks, said, in the press, r for milling purposes, which seems somewhat doubtful.

arries about 1½ miles of the strike of a mineralized belt of crushed, altered and silicified, the shattering having allowed of mineralizing solutions. The oxidized zone shows car- y of commercial tenor, as in the Clipper tunnel, but ore occurs y form, as disseminated chalcocite, forming an enriched zone

of commercial ore of 50′ to 575′ in thickness, estimated b
average 180′, with an average of 90′ to 100′ of overburde
mary zone of cupriferous pyrite below commercial tenor
values occur in small fissures and veinlets, and along th
planes of schistosity, copper being mainly in the form o
chalcocite, with some cuprite and occasional native copper
60% of ore values being disseminated through the gangue
with some quartz. The mineralization also extends into
contact, about 10 to 15% of the ore developed near the C
granite. The cupriferous schist is faulted, just east of th
by the Bulldog fault-zone, of about 300′ width.

The property, under the former management, wa
development, and a major part of the former workings wo
the present plan of operations. Development under the
been of a dual nature, including both extensive undergr
lines somewhat similar to those used in opening the adjo
extensive churn drill borings, along the same general syst
development of the Ray and Chino mines. On Feb. 1
27,526′ of workings, and 81 churn drill holes. By the co
and drill holes bored from surface, the ground has been p
width of 1,400′ and length of 3,400′, and, Feb. 20, 1911, th
to have an average thickness of capping of 367′, with av
commercial ore, with an estimate of 21,202,000 tons of ore
tenor, developed in this tract of something more than
management expects to develop at least 30,000,000 tons
the property, and hopes for 50,000,000 tons.

The system of underground development includes
main haulage tunnel, with a number of other tunnels and
former operations. A record in underground work was
in the week ending May 14, 1910.

The 500′ two-compartment Joe Bush shaft, started
main north and south drift, with parallel drifts at 75′ inte
at 200′ intervals, the plan of underground openings corres
avenues and alleys of a city laid out with right-angled
includes boilers and a 60-h. p. steam hoist.

The Colorado shaft is 635′ deep, this depth corresp
level of the Joe Bush shaft. There is a 40-ton undergro
enlarged later. The temporary gasoline hoist was replac
two-drum hoist.

The 2-compartment Scorpion shaft, started Septe
northwest of the Joe Bush shaft, and also is about 500′
equipped with a gasoline hoist.

The Bulldog shaft is 300′ deep, encountering the Bull
the Woodson ore body.

The Black Copper shaft, circa 200′ deep, is an old wo
ore up to 15% in copper tenor, but is idle.

The management is said to plan sinking a 6-compa
shaft, near the entrance to the main tunnel.

There are 4 tunnels, known as the Woodson, Clippe
remaining from former operations. The Clipper tunnel i
zone, showing carbonate ores assaying 2.5 to 3% copper.
in the western part of the property, 45′ lower than the Cli
the sulphide zone, on another body of disseminated ore
developed to the eastward, and 750′ of workings on the W
shown ore assaying about 2.25% copper.

The main tunnel, starting from Keystone Gulch, is d

hich will permit dropping ore through chutes to the tunnel
tunnel was 2,075′ long, Dec. 1, 1910, and was connected
d Scorpion shafts, on the 500′ level, with about 250′ re-
to connect with the Colorado shaft. This tunnel is to
with 36″ gauge tracks.
as begun May, 1909, and 6 drills were in operation at the
les are put down, checkerboard fashion, in 200′ squares.
h is mainly temporary, but ample for development pur-
n. p. steam plant, with a 20-drill compound air-compressor
ain tunnel. Buildings include an office, warehouse, chang-
s small shops, with a machine-shop under erection, late
n is to be furnished by a spur of the Arizona & Eastern

ilt 1907, is 36x200′ in size, of wood, terraced, and is used
oses.
ded 1910 employing about 200 men, but expected to in-

plans a 5,000-ton concentrator, and has a site at Wheat-
from Miami, on which some surveying was done, March,
rtesian water can be secured from the Pinal Mountains.
he consulting engineer, estimated, Dec. 1, 1910, that a
ive the property a productive capacity of about 45,000,000
arly, laid down in New York at a cost of 9 to 9½ cents per
ion is a property of exceptional promise, and is being
ed and precision highly creditable to the management.

ING CO. **ARIZONA.**

lands, near Globe, to the Inspiration Copper Co., and
o Majestic Copper Co. Fully described Vol. VIII.

COPPER CO. **NEW BRUNSWICK.**

igan Bldg., Providence, R. I. Mine office: Dorchester,
. B. Darius L. Goff, president; T. J. Edwards, secretary.
r laws of Arizona, and capitalization decreased, 1906, to
par, in preferred and common shares, latter with restricted

freehold and 1,100 acres leasehold from the crown, showing
g carbonate and sulphide ores, claimed to give returns of
n probably is an overestimate. Has shafts of 40′, 75′ and
nage tunnel, with about 8,000′ of underground workings.
200-ton concentrator, leaching plant and electrolytic re-
rs, 4 engines, crusher, rolls, 15 tubular roasting furnaces,
ats and two 50-kw. dynamos. The electrolytic plant has
d 550 lead anodes, 22x33″ each, giving a plating surface of
the deposition of electrolytic copper. Plant also includes
n of metal on scrap iron. The reduction plant did not
achinery going wrong after making about 50 tons fine cop-
and apparently moribund.

EXPLORATION CO. **UTAH.**

at Stockton, Tooele Co. Utah. Described Vol. VIII.

GOLD & COPPER MINING CO. **IDAHO.**

atello, Bannock Co., Idaho. G. B. Rogers, president;
G. A. Clark, secretary. Lands are the Lost Horse group,
reservation, opened by a 50′ shaft, said to be bottomed in
l years and apparently moribund.

MINING & INDUSTRIAL ASSOCIATION. **UTAH.**

Bldg., Denver, Colo. Letter returned unclaimed
Canyon, Salt Lake Co., Utah. R. E. Goodell,

president; Col. Thos. B. Crawford, manager. Prope
copper claims at Granite Gap, N. M., one claim in
claims in the Bullfrog district of Nevada. Company a
Rio Dolores Copper Co.

Principal property is 10 claims, 3 patented, area
Mystic Shrine group, in Markham Gulch, Bingham
Utah. The Mystic Shrine is said to show chalcopyrite
a few inches to 20′ in width, giving assays of 6.5% c
silver and $2 gold per ton. The mine has 4 shafts, de
longest 700′, with about 3,500′ of workings. Equipm
air-compressor. The mines shipped a little low grad
smelter, shortly before that plant closed down. Idle.

INTERNATIONAL CONSOLIDATED COPPER CO

Office: Liberal, Kans. Letter returned unclai
office, Hermosillo, Sonora, Mex. Geo. M. Kerr, pre
secretary and treasurer. Organized circa 1907, und
capitalization $1,000,000, and is protocolized under
36 hectares, circa 60 miles northwest of Hermosillo. I
sumably moribund.

INTERNATIONAL CONSOLIDATED MINING CO

Letter returned unclaimed from former mine off
Utah. F. C. Jenkins, manager. Organized 1909, u
capitalization $1,000,000. Lands, 11 claims, in Big C
5 miles from Alta, having a 100′ tunnel showing a strea

INTERNATIONAL CONSOLIDATED SMELTING & MINING CO.

Dead. Was a bad egg. Formerly at Guaynop
Mex. Described Vol. VIII.

INTERNATIONAL COPPER CO.

Dead. Was a swindle. Formerly at Natagaima,
scribed Vol. VI.

INTERNATIONAL COPPER CO.

Dead. Formerly at Basin, Jefferson Co., Mont.

INTERNATIONAL COPPER CO.

Dead. Was merged, 1903, in Dirigo-La Sal Go
Formerly at Castleton, Grand Co., Utah.

INTERNATIONAL COPPER CO., LTD.

Office: 56 Cannon St., London, E. C., Eng.
Rioja, Argentina. Capt. W. B. McTaggart, D. L., J.
field, secretary. Organized July 7, 1905, under laws
capitalization £100,000, shares £1 par; issued, £75,000.
the Famatina Development Corporation, Ltd., buying
£20,000 income bonds of that company, and agreeing t
tional, at 6%, for the erection of a smelter, if require
right to act as exclusive agent for sale of the Famatina
commission. Company also owns a share interest in t

INTERNATIONAL COPPER CORPORATION, LTD

Dead. Lands were sold, 1900, to Caledonian Mi
merly at Noumea, Diahot, New Caledonia.

INTERNATIONAL COPPER & GOLD CO. COLORADO, M

Office: 1122-135 Adams St., Chicago, Ills. Fred
and treasurer; Jas. R. Hendra, general manager. Orga
Arizona, with capitalization $3,000,000, shares $1 par.
company only, controlling, through stock ownership,
Gold Mining Co. and the Santa Fé Gold & Copper M

Central Mines Co., under which title all affiliated properties

COPPER MINING CO. ARIZONA.
ly at Bisbee, Cochise Co., Ariz. Described Vol. VIII.

COPPER MINING CO. MONTANA.
ibby, Lincoln Co., Mont. Lands, in the vicinity of Libby, , said to show an 8′ vein of molybdenite. Company was to be installing machinery. Presumably idle.

COPPER MINING CO. UTAH.
erged, circa 1906, in Boston & Utah Copper Co. Formerly Co., Utah.

COPPER MINING CO. MICHIGAN.
PERIOR.
ound up, 1901, and lands sold to Wetterhorn Land Co. wood, Ontonagon Co., Mich.

COPPER MINING & MILLING CO. WYOMING.
y at Encampment, Carbon Co., Wyo. Described Vol. VIII.

COPPER ORE CO. MÉXICO.
arritt Bldg., Kansas City, Mo. Mine office: Noria, Altar, e Mexican operating corporation of the Sonora Copper Co.

EXPLORATION & INVESTMENT CO. ARIZONA.
cceeded, circa 1902, by Lady Helen Copper Mining Co. Graham Co., Ariz.

GOLD-COPPER MINING CO. BRITISH COLUMBIA.
nds, circa 1899. Formerly at Rossland, Trail district, B. C.

GOLD & COPPER MINING CO. MÉXICO.
uaynopa, Guerrero, Chih., Mex. J. C. Peterson, president. the lands formerly held by the International Consolidated Co., and presumably is a reorganization. Lands, 254 hec- Utah mine, in Guaynopa Cañon, claimed, by former owners, ith an 8″ to 12″ paystreak carrying high grade chalcopyrite, copper, with good silver values. Mine has several short parently only 100′. Water power is said to be available.

GOLD & COPPER MINING CO. UTAH.
office was 62 Commercial Block, Salt Lake City, Utah. us to November, 1910, with the Dirigo-La Sal Mining Co., Mining Co. Apparently lands had little or no development. Grand Co., Utah.

INDUSTRIAL CO. ALASKA & WASHINGTON.
ly at Valdez, Alaska. Described Vol. VIII.

MINE & INVESTMENT CO. MÉXICO.
ly at Fronteras, Arizpe, Sonora, Mex. Described Vol. VIII.

MINING CO. ARIZONA.
ly at Chloride, Mohave Co., Ariz. Described Vol. VIII.

MINING CO. COLORADO.
ly at Black Hawk, Gilpin Co., Colo.

MINING CO. MONTANA.
: 114 East Main St., Bozeman, Gallatin Co., Mont. J. W. S. J. V. B. Henderson, vice-president, treasurer and general rris, secretary. Organized Oct. 2, 1902, under laws of Mon- ation $600,000, shares $100 par. Lands, 12 claims, area 240 , in an unorganized mining district near Bozeman, showing d shale, said to carry fissure and contact veins, opened by ′, 180′ and 1,481′, showing sulphide ores, reported by com- to 40% copper and 6 oz. silver per ton. Presumably idle.

INTERNATIONAL MINING CO., LTD.

Dead. Formerly at Dean Lake, Algoma, Ont. D

INTERNATIONAL MINING & REFINING CO.

Mine office: Chañaral, Atacama, Chile. Proper mines near Chañaral, also claims in the Huantajaya distr Idle several years.

INTERNATIONAL SMELTING CO.

Office: 502 Hall Bldg., Kansas City, Mo. Mine of Ures, Sonora, Mex. J. V. Hammer, president; H. W. T Finley, treasurer. Organized 1905, with capitalizatio par. Planned building a smelter, but did not do so. apparently found the hostilities of the Yaqui Indians a failing to carry out its promises. Is regarded with mu

INTERNATIONAL SMELTING & REFINING CO. NE

Office: 42 Broadway, New York, N. Y. Operatin Salt Lake City, Utah. Smelter office: Tooele, Tooel office: Perth Amboy, Middlesex Co., N. J. John D. R Sheedy, vice-president; preceding officers, Chas. F. Br Thos. Morrison, Chas. H. Sabin, Chester A. Congdon, L Lewisohn, Wm. D. Thornton, Urban H. Broughton an ors; J. W. Allen, secretary and treasurer; E. P. Mathe Chas. R. McBride, general purchasing and claim agent purchasing agent; H. M. Thomson, superintendent; C. neer; Edw. Scallon, assistant engineer.

Organized Dec. 31, 1908 under laws of New Jers $50,000,000, shares $100 par; issued, $10,000,000. Is Ryan interests, and is closely affiliated with the Amalgam United Metals Selling Co. is said to own about 40% of considerable share interest is said to be owned also by Mining Co. Company owns the entire capital stock Works, Raritan Terminal & Transportation Co., New J house Co., and Tooele Valley Railway Co. Guaranty Tr Old Colony Trust Co., Boston, transfer agents. Banker and American Trust Co., Boston, registrars. Shares a stock exchange. Annual meeting, second Thursday in J

The New Jersey charter is very broad, permitting in the mining, milling, smelting and refining of all metal more that the company may acquire the stocks, bonds corporations, and guarantee dividends, interest, etc., of panies, and may buy and utilize standing timber, lumbe railroads, etc. The charter allows the directors to exe any action on the part of shareholders, and the board o of 3 members, or multiples of 3, one-third of the board r

The balance sheet, of Dec. 31, 1909, gave total a of which $7,817,702.72 was in fixed assets, and $1,9 hand and in banks. Net income for year 1909, after d for depreciation, was $1,235,712.62, with a surplus of come for 1909 was $2,586,542.66, of which $2,442,901. charges and profits on metals. Dividends were begun A of 1½% quarterly, but rate was increased, 1910, to 2% q refinery was bought of the United Metals Selling Co. f cash and partly in shares.

The Tooele smelter is at the mouth of Pine Cañon, and just over the divide from Bingham Canyon. Const early 1909, foundations requiring the extraction of m

c, and the smelter, which cost nearly $3,000,000, was blown
e plant, originally planned to be of 2,000 tons daily capac-
apacity of 1,500 tons. In order to obviate, so far as pos-
agricultural interests, smoke easements were secured, and
adjoining lands. The company has no interest in the new
le, and is nowise interested in town lots, mercantile pur-
ding-houses, or any other business than smelting. Build-
struction throughout, requiring, for the complete plant,
uctural steel. Considerable material from the demolished
onsolidated was used in construction. The works consist
ns, a sampling mill, calcining plant, reverberatory depart-
epartment, converter department, power plant, and mis-
he general plan followed is much similar to that of the
on a materially smaller scale, and the completed plant was
ystem, so that it can be enlarged, whenever required, with
ture of time, labor and money.

mpling mill is in 2 parallel units, with 6,000-ton ore-bins,
en by 30″ belt-conveyors to 2 shaking grizzlies feeding two
, making a 2″ product. There are 2 sets of Brunton sam-
ically driven. From the mill ore is transported, by belt-
he blast-furnace or roaster storage-bins.

ilding is in 2 units, each having sixteen 16x16′ McDougal
Rabbling arms are air-cooled. There are 5,000-ton ore
in transit from the bins to the roasters passes over a
natic continuous weighing and recording machine,to 40-
each of the 32 roasters. After calcining the ore drops into
tation to the reverberatory building. No fuel other than
alcining. Fumes are discharged, through two 24″ elbows,
ber, 120x140′ in ground section, 20′ high, which connects, by
e, with the main stack. The increased size of the chamber
s the velocity of the gases to such an extent that dust is
use of baffle-walls, bags or wires. Dust from the chamber
r-cars, to the reverberatories, and calcines are taken in cars,
he reverberatories.

ding, of steel frame, sheathed with iron, covers both the
nverter departments. The reverberatory department is in
he reverberatory charge section, furnace building and boiler-
re 19x102′ reverberatory furnaces, with grate area of 7x16′
ondville coal, from the Wyoming mines of the Anaconda
Each furnace is of 275 tons daily capacity, and there is
al furnaces. Slag is drawn into cast-iron launders, and
cars, running in a tunnel beside the main flue. Waste
rberatories fire four 750-h. p. Stirling water-tube boilers,
he main flue, between the furnaces, to further utilize the
ers reducing the temperature of the gases to about 600°
ue, common to the reverberatory and converter depart-
in size, discharges to the stack on the side opposite that
r gases. There also are three 350-h. p. hand-fired boilers,
apacity of about 4,000 h. p., with steam at 180 lbs. pressure
e boiler plant has a 15x40′ steel smokestack, using induced

e department includes 3,000-ton storage-bins, from which
uled by an electric locomotive. There is a single monstrous
51′ in size, with two 16′ settlers, this treating first class ore.
epartment is under the same roof, and directly below, the
ng, taking matte from the reverberatories through 60′

iron launders. There are 5 stands, operated electrically, having 96x150″ horizontal barrel-type Leghorn shells, ea inch tuyeres, taking air from a 12″ blast-main. Converte ladles, and returned hot to the reverberatories, by a 25-t per from the converters is ladled direct to a pouring sta moulds on a casting belt, in the casting shed. The pneumatic rammers for tamping. The converter buildin as follows: one 60-ton main crane, one 25-ton auxiliary c in the casting shed, and a 30-ton wrecking crane above all

The main dust flue is 1,300′ long, 20′ wide and 18′ hig tapering from a thickness of 4′ at the base to 2′ at the to ⅞″ steel rods, placed horizontally, and 1⅛″ vertical rods The walls have concrete footings 9′ wide and 30″ thick, an thick, with a 4″ air-space left between the brick and conc support I-beams, spaced on 5′ centers, carrying the flat-a flue.

The smokestack is 350′ high, standing on a foundati of concrete. The stack has an inside diameter at base of with the addition of a 2′ flare at the top. Thickness is 4′ at the top.

Ground was broken, March, 1911, for the installati have a combined capacity of 500 tons daily.

The power-house is of steel frame, with brick walls a in length and 52′ in width for most of the distance, but middle, by 2 wings, one wing containing the steam auxili out is electric, generated by steam. The power-house has electric crane.

Equipment of the power-house includes the following h. p. Nordberg Corliss tandem compound engine, 16x30x3 direct connected to a 250-kw. Westinghouse generator at 550 volts, 455 amperes; one 350-h. p. Nordberg tan engine, 16x32x36″, making 100 r. p. m., direct-connected house generator giving a direct current of 550 volts, 455 erators furnishing the direct current used for the haulage Union Iron Works triple-expansion marine engines, 18x nected to two 750-kw. Westinghouse alternating-current current for driving the various machinery; one 250-h. p. pound Corliss engine, 15x30x42″, making 95 r. p. m., duplex air-cylinders, 36x36″, with a capacity of 5,000 cu minute; one 600-h. p. Rarig cross-compound Corliss engi 95 r. p. m., tandem-connected to duplex air-cylinders, 52x 12,000 cubic feet of free air per minute, these engines furn at 16 to 18 pounds pressure per square inch; one 350-h. p don cross-compound engine, 15x26x36″, 160 r. p. m., tan stage compressor, 13½x25″, with a capacity of 3,500 cu minute; one Ingersoll-Rand 2-stage compressor, 15¼x26½ of 1,800 cubic feet of free air per minute, belted to a induction motor, these compressors furnishing air at 90 lbs pling mill, tamping machines, pneumatic tools, etc.; one valve engine, 12x12″, at 300 r. p. m., direct-connected to direct-current generator, used as an exciter; one 75-h. p. tion motor, direct-connected to a 50-kw. d. c. generator, 290-h. p. Westinghouse induction motor, direct-connect generator; a Knowles twin-tandem plunger pump, 8x12x ity of 332 gallons per minute; a Worthington outside pump, 12x7x10″, with a capacity of 346 gallons per m

, 16x9x12″, with a capacity of 750 gallons per minute, the es, and a 16x24x24″ Deane steam pump condenser. The n the basement of the power-house.
building, below the casting shed, covers the office, ware-shop. A 78x117′ steel frame building houses the smithy

connected with the Utah Consolidated mine, of Bingham r side of the divide of the Oquirrh range, by an aërial tram ith eastern terminal at the mouth of No. 7 tunnel of the The tram is of Bleichert type, made by the Trenton Iron ooden towers, on concrete bases, with 6 tension stations, 2 1 rail station. Longest span is 1,040′; load cable is 1½″, ble, and 1″ traction cable. Speed is 600′ per minute, carry-, and capacity is 100 tons per hour. Each control station tion motor, to start the line to haul buckets to the top of the o power is required. The line has bin capacity of 1,500 tons eiving bins of circa 4,000 tons capacity at the smelter, these 0′ on the ground and 32′ high, ore going from the receiving mill and crusher by belt-conveyors.
ey Railroad Co., controlled, through stock ownership, by the 7-mile main line of standard gauge, connecting with the San & Salt Lake railway, and is operated by electricity, having 2 are about 10 miles of industrial track, at the works, 7½-ton and two 18-ton electric locomotives, and 50 cars.
d weather bureau, for the protection of the company in the ver fume damages, was installed February, 1910, and com-ords of direction and velocity of wind, and amount of pre-ted to prove valuable in case of damage suits brought for tock. The company also has employed the services of an nd a botanist, who have given careful study to the condition mal life in the district.
as a 10-year smelting contract, dating from March 1, 1910, of the Utah Consolidated, but the unfavorable developments ve greatly reduced the ore tonnage anticipated under this ter was blown in July 25, 1910, and has been in continuous ores from the Utah Consolidated, South Utah Mines & ber of smaller properties, but has not operated to anywhere , material treated ranging as low as 150 tons, and up to 550 were 4 furnaces in commission January, 1911, with a force nd it was expected that tonnage treated would be increased, e year.
lant, on New York harbor, completed 1899, and since , is one of the largest and the most modern copper refineries ing upwards of 1,000 men, and having a productive capacity, of about 30,000,000 lbs. refined copper monthly. A lead ed.
partment of the Raritan works has 2 furnace buildings, with s, casting anodes in iron moulds on a mechanical conveyor, sting furnaces for wirebars and anodes.
refinery includes 2 tankhouses and a power-house, connected els, power consumption being about 3,000-kw. The works for trimming cathode loops, and a Morrow loop machine for gs to the cathode starting-sheets.
al tankhouse, has 1,600 tanks, each having 21 anodes and 21 x36″, using a current of 500 amperes, with a cross-sectional

area of only 5 square inches in the busbars. Anodes r
sion, and cathodes are deposited in 14 days.

No. 2 tankhouse is 150x184′ in size, having concret
frame and brick walls, special acid-proof Berlin brick
ment floor. Permanent equipment includes 1,870,00
1,500,000 lbs. are in tank linings, and 881,000 pounds
lows: copper cathode rods, 186,000 lbs.; stripping plat
and connections, 170,000 lbs.; leads, etc., 100,000 lbs.;
lbs. No. 2 tankhouse has 3 bays, running lengthwise,
Whiting cranes in each bay, equipped with special devic
tankful of anodes or cathodes at one load. There are 3
lengthwise, one in each bay, each circuit of 396 tanks
power-house by an electric generator. Current is 7,500
density of 20 amperes per square foot. The main co
tional area of 12¾″. There are 1,188 depositing tanks,
11 cells each, with electrode arrangement on the Walk
lined with 6-lb. lead, containing 4% antimony. There
rinsing the cathodes, after removal from depositing tan
bing slimes from scrap anodes, latter amounting to
Anodes are 28x36″ and cathodes are 30x37″, each tank
cathodes, spaced on 4⅜″ centers, cathodes requiring 3

The general direction of the electrolytic circuit is
tion of the electrolyte is crosswise, and, for circulatio
house is divided into 6 units, of 198 tanks each, the circ
4 gallons of electrolyte per tank per minute, solution en
and overflowing from tops. Adjoining the tankhouse is
hard-lead centrifugal pumps for circulation of the electr
no stuffing-boxes or wearing parts coming into conta
and with shaft-bearings placed above the level of the
pumps giving excellent service. Slimes are screene
launders to a sump, and pumped thence to receiving tan

The International Smelting & Refining Co. has be
with purchasing, or intending to purchase, a considera
plants that were not taken over. The Tooele smelte
signed and equipped, but, owing to the decline of the Ut
strong competition of the American Smelting & Refi
fraction of the work for which it was planned, and, wh
piece, scarcely can be considered a commercial success
ment, however, is strong and capable, and the compa
power through the Raritan works, hence the Tooele plant
satisfactory basis of production, eventually, through
supply.

INTERSTATE EXPLORATION CO. ARIZONA, ILI

Office: Endicott Bldg., St. Paul, Minn. Letter
former mine office, Globe, Gila Co., Ariz. Maj. E. L.
ager. Company claims to have copper claims at Gl
claims at Benton and Platteville, Wis., and Galena, Il

INTERSTATE MINING CO.

Dead. Formerly at Helena, Lewis & Clark Co., Mo

INTERSTATE MINING & MILLING CO.

Dead. Was reorganized, 1910, as Interstate S
Formerly at Wallace, Shoshone Co., Idaho. Describe

INTERSTATE SILVER LEAD MINING CO.

Office: 315 Sellwood Bldg., Duluth, Minn.
Shoshone Co., Idaho. Gust. Carlson, president; M
president; John A. Percival, secretary and treasurer; p

n, C. M. Crego, and J. H. Robbers, directors; Oscar B. nt; Peter Kau, foreman. Organized July, 1910, under reconstruction of Interstate Mining & Milling Co., with 00, shares $10 par, nonassessable; issued, $1,400,000.
, area 500 acres, and 2 water-rights, lying between the outheast and the Callahan to the northwest, in the Placer known as the Sunset Peak district, on Nine Mile Creek, . Lands are magnificently timbered, carrying upwards measure, of some of the finest standing white pine, fir, he American continent.
nnels, No. 1, the upper tunnel, having about a half-mile of rosscuts and a 50′ winze, showing several promising veins rrying small quantities of argentiferous galena, bornite and crosscut, with a 235′ drift on the vein, shows broken ching also shows a little galena and lead carbonates.
rosscut tunnel, 800′ vertically below the upper, was 2,200′ 0, and has cut 3 veins, known as the South, Intermediate e drifting on each, these veins showing occasional stringers diate vein carrying 1′ to 2′ of good ore. The tunnel shows a atter, carrying a little lead, zinc and copper, with quartz ear the portal there is a vein of 50′ to 60′ width, having d quartzite on the west. The lower tunnel will be under workings at a distance of about 3,000′, and should develop h, judging from the promising showing of the upper work- lectric-lighted, and has a No. 7 ventilating fan, and an 18″

a 28x28′ office, 20x40′ bunkhouse and 20x40′ cookhouse, iss chalet style, the mining location being unusually attrac- mithy, and a 14x52′ power-house with an air-compressor, using commercial electric current, furnished by the Wash- here are 2 flumes, 3,800′ long, with a storage tank, and an a head of 325′, with hydrants along the penstock for fire considered promising and management good.

NG & PROSPECTING CO. **WYOMING.**

ment, Wyo. Letter returned unclaimed from former Carbon Co., Wyo. Aaron Slothower, president and gen- Winter, vice-president; C. B. Bergquist, secretary and l July 19, 1904, under laws of Wyoming, with capitalization claims, patented, area 64 acres, in the Battle Lake dis- ct deposit up to 22′ in width, between schist and quartzite, ng some oxidized ores, changing to chalcopyrite at slight t is by a 110′ shaft. Idle some years.

CALIFORNIA.

ing was manager. Was organized July, 1907, by preceding Capt. Horton. Lands, known as the Verde group, in the carried argentiferous copper and lead ores. Apparently done. Formerly at Darwin, Inyo Co., Cal.

NES & SMELTERS CO. **CALIFORNIA.**

lboa Bldg., San Francisco, Cal. Mine office: Keeler, . Paddock, president and general manager; T. J. Fitzsim- Philip S. Montague, secretary; H. L. Wrinkle, engineer. 05, under laws of Arizona, with capitalization $1,000,000, ble; issued, $720,000. Levied a 3-cent assessment, August, save the property.
, area circa 375 acres, in the Ubehebe Mountains, showing d granodiorite, with porphyry intrusions, carrying 8 con-

tact deposits, of 2′ to 40′ reported width, between li granodiorite, showing a little native copper, malachite, chalcopyrite, giving assays of 4 to 41% copper, and assays of 12% copper, 6 oz. silver and $7.50 gold per to Mine has shafts of 60′ and 100′, and 4 prospect tunn workings. The company made unsuccessful efforts, l stock. Idle since 1907, except for annual assessment financially.

INYO COUNTY CONSOLIDATED COPPER CO.

Office: 254 Wilcox Bldg., Los Angeles, Cal. Le from former mine office, Citrus, Inyo Co., Cal. D. J. accounts. Lands, 7 copper claims and 5 gold claims, owned having been sold to the New York & Inyo Copp and apparently moribund.

INYO NEVADA MINING CO.

Dead. Formerly at Big Pine, Inyo Co., Cal. D

IONE COAL & IRON CO.

Office: Crocker Bldg., San Francisco, Cal. Min Co., Cal. I. W. Tantau, superintendent, at last accou claim, on Irish Hill, about 3 miles north of Ione. Prop ing a vein of about 4′ width, between an amphibolite aluminous shale footwall, developed by 5 shafts, dee copyrite and cupriferous pyrite, slightly auriferous and ment includes a steam hoist. Presumably idle.

IOWA COPPER MINING CO.

Mine office: Modena, Iron Co., Utah. L. J. Ros tion to company of exactly same title in Summit Co Bullion Cañon, 25 miles east of Modena, show lead carb mixture of argentiferous galena and what is reported Copper ore in the upper workings is in the fissure vei planes. Development is by a 1,100′ tunnel, showing m low average grade, with some copper ore.

IOWA COPPER MINING CO.

Letter returned unclaimed from former office, Salt office: Park City, Summit Co., Utah. Is no relation same title in Iron County, Utah. A. W. Spooner, secre Peterson, superintendent. Lands, on Scott Hill, whic Park City and the Big Cottonwood district, are deve showing several rich stringers, and a 1,100′ tunnel devel ing silver, lead and copper ores, latter of good averag wet, causing some trouble in operation. Small shipme 1909.

IOWA & NEW MEXICO MINING CO.

Dead. Formerly at Carrizozo, Lincoln Co., N. M

IOWA-UTAH MINING & MILLING CO.

Office: 300 D. F. Walker Bldg., Salt Lake City, unclaimed from former mine office, Frisco, Beaver Co president; F. W. Rombach, vice-president; J. K. Shaw, Organized June, 1906, under laws of Utah, with capitali $1 par, nonassessable; issued, $725,000.

Lands, 15 claims, unpatented, in the Star district, Mine has a shaft, with about 500′ of workings, showing copper ores.

IRENE MINING, SMELTING & PROSPECTING C

Office: 403 South Flores St., San Antonio, Te Aldama 11, Saltillo, Coahuila, Mex. Harry S. Jones, pr

t, secretary; J. J. Coffman, treasurer; Francisco Farias, nized 1906, under laws of Arizona, with capitalization par. Property is the Josefina mine, carrying cuprite, e and tetrahedrite, all more or less argentiferous. Mine water, until a drainage tunnel was driven.

IOS y CA. **MÉXICO.**

etamo, Michoacán, Mex. Firm operates small copper irregular producer of copper in small quantities. Pro- s. fine copper, 1902.

IES, LTD. **IRELAND.**

lved March 5, 1909. Formerly at Bonmahon, County Described Vol. VIII.

ARIZONA.

et & Arizona Mining Co., at Bisbee, Cochise Co., Ariz.

ARIZONA.

ton, Graham Co., Ariz. B. A. Boyles, president; N. L. Otto Rosenthal, secretary; C. P. Dunn, treasurer. Lands, a vein of 10′ to 15′ width, carrying oxides and altered ies up to 15% copper, opened by a 100′ tunnel. Idle some

PRIETARY CO., LTD. **IRELAND.**

St., Dublin, Ire. Mine office: Bonmahon Co., Water- Aug. 2, 1906, under laws of Ireland, with capitalization nary shares, £1 par, and 100,000 deferred shares, 2s. par.

MÉXICO.

Charcas, Moctezuma, San Luis Potosí, Mex. Property e mine, carrying auriferous and argentiferous copper ore, last accounts, by a shaft planned to cut the vein at depth.

CO. **ARIZONA.**

riz. Letter returned unclaimed from former mine office, Ariz. Original lands, near Globe, were sold to National o. Present property, 5 claims, held under bond and lease, trict, 16 miles south of Florence. Idle and presumably

R MINING CO. **WASHINGTON.**

at Spirit Lake, Skamania Co., Wash. Described Vol. VIII.

IDAHO.

urray, Shoshone Co., Idaho. C. Stout, manager, at last a 900′ tunnel, showing silver-lead ore of concentrating copper sulphides, at 1,000′ from the portal. Presumably

ING & MILLING CO. **IDAHO.**

eeded Jan. 6, 1908, by Copper Crown Mining Co. For- shone Co., Idaho.

ER CO. **OREGON.**

Erie Trust Co., Erie, Pa. Mine office: Homestead, Baker rad, president; H. G. Fink, vice-president; A. A. Clauss, tze, treasurer; preceding officers, Geo. R. Metcalf and , directors. Frank E. Pearce, superintendent, at last under laws of Pennsylvania, with capitalization $500,000, e Trust Co. holds title by trust deed and bond. The mine eet of workings, and has been claimed, in the press, to have ocked out for stoping, with considerable ore on the dumps. d to the General Development Co., but option was sur- Presumably idle.

IRON HAT COPPER-GOLD MINING CO.

Dead. Formerly at Silverton, San Juan Co., Col

IRON HAT MINING CO.

Office: 307 Atlas Blk., Salt Lake City, Utah. I from former mine office, Eureka, Juab Co., Utah. C Geo. N. Lawrence, vice-president; C. E. Hinsh, secr Hoffman, superintendent, at last accounts. Organi Utah, with capitalization $1,000,000, shares $1 par; are listed on the Salt Lake exchange.

Lands, 6 claims, partly patented, including th claims, in the East Tintic district, taken over, circa Ju deed, from the Three Metals Mining Co. Propert of slightly auriferous and argentiferous copper ores. shaft and a 115′ incline shaft. Presumably idle.

IRON HEEL MINING CO.

Dead. Formerly at Eureka, Juab Co., Utah. I

IRON HORSE MINING & MILLING CO.

Letter returned unclaimed from former mine offi Organized 1904, with capitalization $500,000, share through stock ownership of 53%, by Rattler Coppe southeast of the Superior & Boston, in the eastern p Idle apparently since birth, and presumably moribund.

IRON KING CONSOLIDATED MINING CO.

Office: Provo, Utah. Mine office: Eureka, Juab Loose, general manager. Mine has a 600′ shaft and a be driven 3,000′, and which possibly may be driven mine shows large quantities of iron ore, and man 1910, to have contracted to furnish 50 to 75 tons of ir can Smelting & Refining Co.

IRON KING EXTENSION MINING CO.

Dead. Was a Douglas, Lacey & Co. swindle. Yavapai Co., Ariz.

IRON MASK GOLD MINING CO.

Dead. Formerly at Rossland, Trail district, B.

IRON MASK MINE.

Owned by Kamloops Mines, Ltd.

IRON MASK MINING CO.

Office: St. Maries, Idaho. Mine office: Cart Wm. Carney, president; J. W. Masser, vice-president; and manager; J. G. Fralich, treasurer; preceding offic Schneider, J. W. Scott and Frank Carney, directors. C capitalization $500,000, shares, $1 par, nonassessable.

Lands, 10 claims, well timbered and watered, 3 m ing a 10′ vein of concentrating ore, with an 18″ vein of has a tunnel of circa 2,000′ length, with back of abou mile of workings, showing silver-lead ore of good aver gold. Equipment includes gasoline power, and th buildings. First carload of ore was shipped October,

IRON MOUNTAIN COPPER CO.

Mine office: Lund, Iron Co., Utah. Has argenti erous copper ore. Idle since circa 1903 and apparently

IRON MOUNTAIN MINE.

Owned by Mountain Copper Co., Ltd.

IRON MOUNTAIN MINING CO.

Mine office: Jedway, Queen Charlotte Island,

e Queen Charlotte group, in the vicinity of the Ikeda
mably idle.

NG CO. COLORADO.

William St., New York, N. Y., and 615 Stevens Bldg.,
office: Leadville, Lake Co., Colo. De Forest Paine,
, vice-president; Homer Hoit, secretary; Frémont Wood-
ng officers, Hon. Thos. W. Palmer, Gen. Anson G. Mc-
ll, H. C. DuVal, Henry G. Stevens and Samuel E. Rein-
O. Argall, general manager; Wm. Carson, superintendent.
, 1880, under laws of New York, with capitalization
) par. Net earnings were $267,034.64 in 1904; $515,127
1907; $6,960.46 in 1908; $183,121.93 in 1909. Dividends
$300,000 in 1907; none in 1908; $50,000 in 1909; $200,000
vidends, to end of 1910, of $4,350,000. Farmers Loan &
registrar. Annual meeting, first Tuesday in March.

Hill, about 2 miles east of Leadville, include the Moyer,
nes, producers of importance in the order named, and the
s, through stock ownership, the Nisi Prius Consolidated
under lease to 3 different sets of lessees. Values from ore
n zinc, lead, copper and silver, in the order named. The
rous sphalerite, galena, chalcopyrite and pyrite, the two
ular in occurrence. Calamine assaying 47.5% zinc was
, 1910, on the southern side of Iron Hill. New mine open-
6′.

, which is the principal producer, has 2 miles of workings,
3,767 tons of low grade ore, valued at $190,448. The Moy-
erous and auriferous sulphide complex. The Dome mine
carbonates.

e carries argentiferous zinc and lead and copper ores, and
s 17,265 tons of ore, valued at $241,045. The Tucson has
of 12 tons hourly capacity, costing $7,855, from the shaft
, which has cut the cost of ore transportation to about 12
e of former cost of 60 cents.

e mines as a whole was 74,166 tons of ore, valued at $447,024
oduction has been as follows: 948,902 lbs. fine copper,
5,805,699 lbs. zinc, 950,067 oz. silver and 3,049 oz. gold in
pper, 4,542,938 lbs. lead, 61,738,134 lbs. zinc, 425,050 oz.
. gold in 1906; 21,321 lbs. copper, 5,489,047 lbs. lead,
298,598 oz. silver and 1,360 oz. gold in 1907; 8,080 lbs.
. lead, 14,624,954 lbs. zinc, 60,878 oz. silver and 135 oz. gold
lbs. copper, 3,170,268 lbs. lead, 18,619,067 lbs. zinc, 455,883
oz. gold in 1909. The property is well equipped and well
own decreasing production for some years, until 1909, when
ent was noted.

ER MINING CO. MONTANA.

e, Idaho. Mine office: Saltese, Missoula Co., Mont.
dent; Albert Honeker, vice-president and treasurer; W. W.
hn J. Curran, general manager; preceding officers and Mor-
ors. Capitalization $1,000,000, shares $1 par. Lands, 4
lie and Amazon-Dixie mines, in Leslie Gulch, in the vicinity
Idaho-Montana divide. The property has a fissure vein in
circa 6,000′, showing chalcopyrite and galena, at and near
s up to 22.5% copper, 52% lead, 40 oz. silver and $2.80
elopment is by a tunnel of circa 700′.

IRON SPRINGS MINING CO.

Dead. Lands were sold, 1908, to Keystone Mini
merly at Weiser, Washington Co., Idaho.

IRONWOOD & ARIZONA DEVELOPMENT CO.

Dead. Former office was Ironwood, Mich. Lan
Harcúvar Mountains, circa 10 miles northwest of Sal
Carbonate shaft, and a shallow shaft on the Stonewall
was sold to Butte & Arizona Copper Mining Co., wh
Yuma Copper Co. Formerly at Vicksburg, Yuma Co.

IROQUOIS COPPER CO.

Dead. Former office was 199 Washington St.,
Bigelow, was president. Was organized, 1890, by S
Land Co., under laws of Michigan, with capitalizati
par. Lands were 160 acres, being the SW. ¼ of Secti
just south of the Wolverine. Property was sold to
Mining Co., becoming the South Kearsarge mine, and
circa 1899. Formerly at Kearsarge, Houghton Co.,

IRVINEBANK MINING CO., LTD.

Office: Irvinebank, Queensland, Australia. Mi
Mungana, Lynd Co., Queensland, Australia. Geo. C
Mackey, mine manager. Company employs circa 7
was engaged in copper mining, on a small scale. Prop
West Chillagoe and the Lamington copper mines, la
with steam hoist, mine having a 12″ vein averaging cir
dwts. gold per long ton.

The smelter has a water-jacket blast-furnace, plan
copper and silver-lead ores, and also for the accumu
seems a rather ambitious program for one small furnac
the Lamington mine, circa 400 tons of 17% ore, carry
copper, which was sold to the Chillagoe company. W
on the copper properties, which have remained idle si
a producer of tin.

IRVINGTON SMELTING & REFINING CO.

Office: 30 Church St., New York, N. Y.
Essex Co., N. J. Chas. Engelhard, manager. Prope
refinery, employing about 50 men.

ISABEL COPPER MINING CO.

Dead. Former office was Frémont, Neb. C. H.
Jas. H. Knowles, secretary; D. S. Baker, superintende
1899, and sold property, October, 1902, to Rambler
Lands, on the western side of Purgatory Gulch, had fis
contact deposits between diabase and quartzite, carr
25% copper, with small gold values. Mine had
Formerly at Riverside, Carbon Co., Wyo.

ISABELLA MINING CO.

Dead. Was organized circa 1906. Property was
have a fair showing of copper ore, which was under d
force, 1906–1907. Formerly at Tres Piedras, Taos Co

ISLAND CITY COPPER MINING CO.

Office: Eaton Rapids, Mich. Letter returned
mine office, Saratoga, Carbon Co., Wyo. Mine has a
copper ore, between a norite dike and schist. Idle si

ISLAND COPPER CO.

Office: 1400 Alworth Bldg., Duluth, Minn. T
Geo. C. Stone, vice-president; Frederick W. Nichols, sec
F. W. Hennick, Oscar J. Larson, Henry Nolte, Geo. G

arnes, directors; Edw. J. Maney, treasurer. Organized
aws of Michigan, with capitalization $1,000,000, shares
25.

s of 90,000 acres, including former holdings, 83,720 acres,
l Corporation, Ltd., and lands of the Island Mining Co.,
le Royale, county of Isle Royale, Michigan. Holdings
tion of the area of this, the largest freshwater island of the
ining, of a rather desultory nature, has been done upon
periods in the past, and a limited production of copper
he Island Mining Co. and its predecessors did rather
nglomerate bed of the Keweenawan copper bearing belt,
which was said to be 1,000′ deep, with a fair showing at
e, but work was suspended on this property in 1873. No
ment work has been done on the island since 1892.
n done by the present company, but the management is
e most extensive diamond drilling campaign ever under-
200,000′ of drill boring, at an estimated cost of about

O. MICHIGAN.
on Isle Royale, Michigan. Described Vol. VIII.
N CONSOLIDATED COPPER CO. CALIFORNIA.
at Hoaglin, Trinity Co., Cal. Described Vol. VI.
CO. BRITISH COLUMBIA.
at Valdez Island, B. C. Described Vol. VIII.
SOLIDATED MINING CO. MICHIGAN.
ceeded, March, 1899, by Isle Royale Copper Co. For-
Houghton Co., Mich.
PER CO. MICHIGAN.
urton Place, Boston, Mass. Mine office: Houghton,
Employs about 800 men. Rodolphe L. Agassiz, presi-
, vice-president; Geo. A. Flagg, secretary and treasurer;
ncis L. Higginson and Chas. N. King, directors; Clarence
ecretary and treasurer; Jas. MacNaughton, general man-
, mine superintendent; Jas. G. Glanville, mill superintend-
ngineer; John T. Reeder, chief clerk and purchasing agent;
rk; Edward Colenso, chief mining captain. Organized
aws of New Jersey, as a merger of the Isle Royale Con-
and Miners' Copper Co., with capitalization $3,750,000,
Colony Trust Co., Boston, transfer agent; State Street
egistrar. Company owns a $50,000 stock interest in the
ng Co. Annual meeting, first Wednesday in April, at 243
y City, N. J.

es and an 80-acre millsite. Mineral lands include the old
ortage and Huron mines, the Dodge and Frue prospects,
ped tracts. The Hussey-Howe tract of 280 acres, lying
erior, supposed to carry the extension of the Baltic bed, was
0,000. An option formerly held on the mineral rights of
, of circa 240 acres, lying next west, has expired. Lands
1, 2 and 11, and parts of Sections 3, 9, 10 and 15, T. 54 N.,
es in Section 6, T. 54 N., R. 33 W., 40 acres in Section 31,
and 160 acres in Section 36, T. 55 N., R. 34 W., giving a
ng about 2½ miles of the strike of the system of copper-

has 3 parallel amygdaloidal beds, with strike of N. 32° E.
°, of which two have been extensively opened, these being
ortage beds, the latter lying approximately 200′ west of the

former. The shafts are on the Isle Royale, but th
on many levels by crosscuts. East of the amygdalo
lying near the Eastern Sandstone, 4′ to 7′ wide and ri
per, but deficient in stamp-rock. It was opened to
John and Austin Mabbs, circa 1875, and has been test
present owner. There also are unidentified and u
amygdaloids, lying west of the Portage bed, and occa
carrying arsenical copper ores.

The three old mines included in the present
48,452,590 lbs. fine copper, of which the Huron furn
Isle Royale 9,204,071 lbs., and the Grand Portage 3,48
were secured under primitive conditions, at a net
$2,500,000. The old Isle Royale and Grand Porta
1853, and the Huron in 1855. The three old mines
about 5 miles of old workings in the Huron, and 3 mi
Royale and Grand Portage mines combined. Undergr
been built at various points, to hold back the water in
workings being under the old, without connections.
old mines is given in detail in Vol. II.

Considerable diamond drilling has been done,
underground openings were 8,251′ in 1906; 8,728′ i
15,919′ in 1909; 14,588′ in 1910. About 75 rock drill

No. 1 shaft, near the northern boundary, was
December, 1903, and was abandoned. This shaft had
1,335′ deep, opened on the Isle Royale bed, with crosse
to fifteenth levels, inclusive, to the Portage bed, lying
about 2 miles of drifts opened thereon, stoping having
between the two beds, which were found markedly sim
copper values. Concrete dams have been built acros
at the thirteenth and fourteenth levels, holding back
water is collected on the eighth level, and sent to N
The surface plant at No. 1 was dismantled, 1908, mach

No. 2 shaft, with 3 compartments, 2,280′ southw
256′ in 1910, ending the year at depth of 3,102′, at t
produces less mass copper than formerly, and the no
especially well for several years, the average of groun
mine as a whole.

No. 2 shaft has a combination shaft-rockhouse, 4
with 18x24" and 13x20" Portage Lake crushers. The
steel frame on stone foundations, equipped with a hoist
lathe-turned grooves for 6,000′ of 1½" cable, capable o
depth of 6,000′.

No. 3 is merely a site for a shaft, to reopen the
the nineteenth level south drift of No. 2 was sent unde
nearly 1,000′ deep, that remain filled with water.

The new shafts, Nos. 4, 5 and 6, are all on th
southern end of the property, and have several m
considerable heavy copper. These shafts are unconne
ings, in shafts Nos. 1 and 2, at the northern end of the
6 are connected by drifts on the upper levels.

No. 4 shaft, circa 3,100′ south of No. 2, was 99
veloping stamp-rock of very fair average grade. Eq
Nordberg duplex-cylinder hoist, good for one mile
compressor, both taken from No. 1 shaft. There i
rockhouse, built by the Wisconsin Bridge & Iron Co

ıd 32′ high. The power plant has a 140′ steel brick-lined

5,100′ south of No. 2, on Section 2, was started October, ep Dec. 31, 1910. The shaft is sunk in the footwall, and similar to that of No. 4.

7,300′ southwest of No. 2, near the center of Section 11, and was 1,028′ deep, Dec. 31, 1910, developing very good ed showing much epidote. The levels are opened at 100′ On surface there is a circular steel shaft-rockhouse, similar e plant at No. 6 includes a brick engine-house, with hoist ressor, and a steel boiler-house having a 140′ brick-lined tack.

ed September, 1908, on the Hussey-Howe tract, is 972′ at cut at depth of 350′. A 205′ crosscut, at depth of 474′, in which the shaft is sunk. On the third level, at depth of outh to within 50′ of the Houghton Copper Co. boundary, nt of amygdaloidal rock, not carrying copper in promising ft is supposed to be sunk on the Baltic bed, but there is whether the shaft really is opened on the northern exten- l failure to locate the twin Baltic bed, within a distance of n the 474′ level, accentuates this doubt.

haft, begun October, 1905, and discontinued January, 1908, was sunk in search of the Baltic bed, and drifts and cross- 4 directions, without securing satisfactory results. The badly disturbed amygdaloidal bed, practically barren of

ted, 1904, on Section 10, but was discontinued because of n, and a diamond drill substituted, the drill cores showing , of which about 5′ in width carried stamp-copper in fine

at No. 2 shaft, includes No. 2 engine-house, a compressor- ill Nordberg 2-stage air-compressor; a 44x72′ boiler-house, torage addition and a 3,000-ton coal trestle, having three rizontal boilers, taking water from a dam 300x500x6′. The 0′, of steel, on stone foundations. Shafthouses and rock- by electricity, commercial current being taken from the Electric Light Co. The company has a private telephone about 100 dwellings on the company's lands.

railway, owned by the company, connects the mine and es of main line, having easy grades, and was reballasted, and strengthened, 1908. Equipment includes 35-ton, 55-ton ives, and 40 forty-ton steel rock-cars, equipped with air-

the mouth of Pilgrim River, has nearly one mile of frontage The mill, 134x210′, of steel frame, on stone foundations, has -bins and 3 Nordberg stamps having circular mortars and . As built, each stamp had 32-ton mortars, resting on on a 20x20′ platform, 3′ thick, of 14x24″x20′ oak timbers. atform is a caisson, reaching to bedrock, made of $\frac{5}{16}$″ boiler 12′ in diameter, until near the top, where there is a bell- diameter, to support the oak platforms underneath the anvil- n and spaces between were filled with concrete. The first ver, March, 1905, to the steeple-compound system, and the 2 mpounded, 1908–1909, the former capacity of about 500 tons d by compounding to a maximum capacity of 700 to 750 tons old foundations under two stamp-heads were removed and

replaced by solid concrete bases, to depth of 20′ u
foundation was being put under the third head, May
has 72 rough jigs and 30 finishing jigs, of the Pa
slime tables, and Bartlett and Wilfley tables to tr
tables. There are rolls with fixed bearings to regr
mortars.

The mill has a complete machine-shop, on the
furnished by a 750-h. p. engine, taking steam from
46x72′ boiler-house at the rear of the mill.

There is a 32x600′ wharf, with deep water alon
appliances for unloading coal and general freight, and
in scows, to the Dollar Bay smelter, 2 miles across

Water is furnished the mill by a 16,000,000-gall
especially designed to handle muddy water, having
riveted steel water-main, running 2,200′ from pumpl
ing located some distance from the mill, to obviat
intake. Three 100-h. p. boilers furnish power for t
from a large coal-trestle at the rear of the pumpho
near the mill supplies feed water for the boilers.

Yield of fine copper per ton of rock stamped,
stamped and per pound of finished copper, have beer
per per ton in 1901; 13.5 lbs. in 1902; costs of 11.83
ton, in 1903; 15.8 lbs. per ton, costing 13.3 cents p
1904; 15.2 lbs. per ton, costing 12.76 cents per lb.
costs of 12.22 cents per pound and $2.25 per to
per ton in 1907; costs of 17.09 cents per lb. and $2.92 p
ton, costing 28.99 cents per pound and $2.33 per ton
costing 16.64 cents per lb. and $1.87 per ton in 1909
11.84 cents per pound and $1.42 per ton in 1910.

Recent production has been as follows: 2,973,7
2,937,098 lbs. in 1906; 2,667,608 lbs. in 1907; 3,011,
lbs. in 1909, and 7,567,399 lbs. in 1910.

The company began 1907 with a balance of asse
that year with a balance of $501,157.64. This bala
at the end of 1909, to a balance of liabilities of $11
1910, to a liability balance of $18,731.35, showing ne
one of the hardest years ever known in the copper ind

The Isle Royale is under the domination of the C
which is endeavoring to merge its various subsidiaries,
Gratiot, which are organized under the laws of New
ment of the Calumet & Hecla management, Januar
present financial condition of the Isle Royale does no
exploratory work, proper development work, or the r
which are required. It is obvious from the results s
years that the Isle Royale, while a low grade mine, is
in bad years, and of earning substantial profits in goo
maintained. The Isle Royale could use several hu
advantage, in the immediate future, but should be a
earn a new dollar for an old one, for several years
present circumstances.

ISLE ROYALE LAND CORPORATION, LTD.

Dead. Was liquidated, 1909. Lands sold to Isl
at Washington Harbor, Isle Royale Co., Mich. Full

SOCIETÀ METALLURGICA ITALIANA.

Office: Rome, Italy. Operating office: Forc
Italy. Works office: Leghorn, Tuscany, Italy. Org

on increased to 10,000,000 lire, and later to 17,000,000 lire. 067 lire, with a 7½% dividend, in 1904, and profits were % dividend, in 1910. The property includes 4 plants, the ith the 3 smaller plants at Limestre and Donnas, in the

horn, occupying a site of about 25 acres, includes a smelter es, of about 70 tons aggregate daily capacity, and 4 rever- sting refined copper as anodes, plates, ingots, etc. The 0,000 tons of ore yearly, partly native, but largely imported and elsewhere.

efinery, built 1900, in connection with the Leghorn smelter, ery great purity.

of the works has 16 engines, with about 1,800 aggregate plete electric plant, furnishing power, light and energy for ry. The shops are extensive, including rolling mills, tube hops, wire-rope shops and miscellaneous shops for the man- o a great variety of forms. There is a special alloy foundry naces, for fusion of the principal copper alloys, the products ing an excellent reputation. There also is an extensive acture of sulphuric acid. The company turns out nearly manufactured copper yearly, in almost an infinite variety s about 1,500 men.

WYOMING.

, Wyo. Letter returned unclaimed from former mine on Co., Wyo. I. C. Miller, manager; Albert Bryle, super- counts. Is not an incorporated company. Lands, 4 miles e said to have a 20′ vein, carrying a 3′ paystreak of high undeveloped, and a vein up to 8′ in width, carrying occa- and sulphide ore, formerly claimed to average 30% copper t actually averaging about 8% copper only. Development A 200-ton reduction plant, reported to have been bought, ginary. Idle.

ALASKA.

an, Alaska. Mine office: Kasaan, Prince of Wales C. Strong, president; J. C. Barber, secretary and manager; er. Organized 1908, under laws of Washington, with capi- ares $1 par, nonassessable.

, 5 in process of patenting, on Kasaan Bay, in the Ketchikan mber of contact ore deposits between diorite and limestone, rrying a little bornite, but mainly argentiferous and aurifer- imated by the management to average 8% copper, 1 oz. per ton. Mine was opened 1908, and is worked only sum- t is by a 200′ prospect shaft and a tunnel.

udes a 15-h. p. hoist and a 2-stage Sullivan air-compressor. unkers, and a 1,200′ gravity tram that connects with a leading to 1,000-ton shipping bunkers on a substantial ement plans driving a new 1,400′ tunnel, to cut the present 400′, or 200′ below the bottom of the shaft, to serve also for re watercourses in the limestone that cause considerable

timated at 150,000 lbs. fine copper in 1908; 600,000 lbs. in s. in 1910. Company reports net smelter returns of about 10. Property considered promising and management good.

JAPAN.

suki-mura, Kuma-gori, Higo, Japan. Property has veins slates, carrying chalcopyrite, without gold or silver values,

associated with pyrite, averaging 5 to 6% copper. Eq
and 118 h. p. machinery installations and forces av
Production has shown a serious decline during the p
1,080,163 lbs. in 1900; 441,407 lbs. in 1906, and 330,
later production reported. Presumably idle.

IVA GRACE MINING CO.

Mine office: Silver City, Owyhee Co., Idaho. M
ent, at last accounts. Property carries argentiferous
includes a small steam plant and a 5-stamp mill.

IVANHOE MINING CO.

Office: 716 Northwestern Bldg., Minneapoli
Patagonia, Santa Cruz Co., Ariz. Ace P. Abell, pre
president; Chas. Copelin, secretary and treasurer;
Cramer and Jas. E. Hurd, directors; Jas. Johnson, gen
1906, under laws of Arizona, with capitalization $750,
assessable; issued, $675,000. Annual meeting, third

Lands, 27 claims, unpatented, area 500 acres, in
to 6 miles southwest of Patagonia, the nearest rail
rhyolite, andesite and diorite, with some brecciation
bodies, of which 5, under development, are estimated b
27′ in width, carrying chloride, bromide and oxide
azurite, gray copper and chalcocite, estimated by ma
copper, 6% lead and 225 oz. silver per ton. Develop
mercial shaft and tunnels of 200′, 100′ and 100′, wit
mated to show 100,000 tons of ore. Equipment inclu
with a 50-h. p. hoist good for 1,000′ depth. There a
is supplied by a 6-h. p. gasoline pump. Was developi
at end of 1910.

IVANHOE MINING CO.

Letter returned unclaimed from former mine offic
Lake Co., Utah. At last accounts was in litigation wit
ing & Refining Co. Long idle.

IVANPAH CONSOLIDATED SMELTING CO.

Dead. Property passed to Cocopah Copper Co
San Bernardino Co., Cal. Described Vol. V.

IVANPAH MAMMOTH GOLD & COPPER MINI

Office: San Diego, Cal. Letter returned uncl
office, Ivanpah, San Bernardino Co., Cal. Capitaliza
par. Lands, 22 claims, 11 freehold and 10 held unde
12 miles west of Ivanpah, formerly claimed to show a l
long, which, at last accounts, had shrunk, most unacc
which 6′ is said to carry argentiferous and auriferous c
formerly claimed to give surface assays of $9 to $105 pe
and apparently moribund.

IWAYA MINE.

Mine office: Itsuki-mura, Kuma-gori, Higo, J
owner and manager. Equipment includes a 75-h.
Forces averaged 169 hands in 1907, and only 57 han
was 252,971 lbs. fine copper in 1907, and 158,584 l

JACK POT MINING & MILLING CO.

Office: 55 High St., Oshkosh, Wis. Letter retu
mer mine office, Copperton, Carbon Co., Wyo. Ole
general manager; H. Thorsgaard, vice-president; H. O.
treasurer. Organized Dec. 23, 1903, under laws of Wyo
$1,000,000, shares $1 par. Lands, 9 patented claims, a
tle Lake district, showing fissure veins in diorite and c

liorite and porphyry, carrying carbonate and sulphide ores. developed, are said to average 14′ and 60′ width. The en average assays of 8% copper and $3 to $12 gold per ton, ng very low grade copper ore, apparently not of commercial t is by a 75′ tunnel, 100′ shaft and 8 pits of 20′ to 36′ depth, s. Idle since October, 1907.

ER CO. **ARIZONA.**

swindle, perpetrated by the Wm. F. Wernse gang, of St. Pima, Graham Co., Ariz.

MINING CO., N. L. **AUSTRALIA.**

rly at Jacqua Creek, Argyle Co., N. S. W., Australia. De-

COPPER CO. **MÉXICO.**

rly at Caborca, Altar, Sonora, Mex. Described Vol. VIII.

R MINING CO. **ARIZONA.**

stockjobbing enterprise. Formerly at Oro Blanco, Pima Co., ol. VI.

AN) MINING SYNDICATE, LTD. **MÉXICO.**

w Broad St., London, E. C., Eng. Mine office: Zapatiltic, alisco, Mex. A. Firth, chairman; preceding officers, R. T. Wyllie, directors; W. W. Barrell, secretary; M. P. Gosset, V. Mitchell, mine superintendent, at last accounts. Organ- under laws of Great Britain, with capitalization £15,000, 1907, to £25,000, shares £1 par; issued, £16,000, fully paid. cias, area 198 acres, known as the Malpillas mines. Idle.

G & DEVELOPMENT CO. **MÉXICO.**

d unclaimed from former office, St. Paul, Minn. Mine office: o, Jalisco, Mex. W. M. Matthews, president; John M. Ryan, Ryan, treasurer; R. R. Landrum, superintendent, at last zed circa 1906, as successor of Altmira Mining Co. Lands, ped by shafts and tunnels, with a limited amount of workings, and argentiferous lead and copper ores. Idle.

G & SMELTING CO. **MÉXICO.**

Edward St., Philadelphia, Pa. Mine office: San Martin alisco, Mex. Chester P. Ray, president; Rudolph H. Wolf, W. Brockmeyer, secretary and treasurer; Michael J. Slattery, preceding officers, Frederick C. Dieck, S. Bernard November, enry C. Schmidt and Frederick W. Schmidt, directors; Geo. H. tendent. Organized Oct. 29, 1904, under laws of Arizona, $2,500,000, shares $1 par, nonassessable; issued, $1,740,857. 1, 1908, gave cash on hand $41,602. Annual meeting, second nber. Property is the entire stock issue of the Philadelphia Mining, Milling & Smelter Co., under which title the mine

OLIDATED COPPER CO. **JAMAICA.**

34 State St., Boston, Mass. Mine office: May Pen, Claren- ederick A. Smith, president; Winfield S. Baker, vice-president ger; Otis W. Swan, secretary and treasurer; Cyril Abraham, Organized circa September, 1907, under laws of Maine, with 00,000, shares $1 par.

acres, held on a 99-year lease, 15 miles from the coast, in the Property was claimed, August, 1909, to have upwards of , development being exclusively by tunnels. The Congo Hill nnel, showing a small vein carrying chalcopyrite and bornite. d mine has a 270′ tunnel, showing a small stringer of bornite. as a 75′ tunnel, showing bornite and chalcocite, said to assay

7% copper. The Elma mine has a 240′ tunnel, and the
nel. Wages are said to be 18d. per day. Small ore shi
this property, 1854–1857. The advertising and publici
have been exceedingly raw. The company stated in i
not general knowledge that the production of copper up
been $300,000,000." This statement is literally true, th
knowledge, because no such production, nor a tithe of
tithe, ever has been secured from Hayti.

Ore is said to include cuprite, malachite, azurite, c
bornite and chalcocite. In an advertisement, Augu
claimed to have 11 mines opened, 8 of which were produ
and the company claimed to have more than $12,000,0
cally in sight," which also was untrue. The company c
1908, that it would be shipping 200 tons daily not later t
of course this prediction of production was not made
were circulated, 1909, to the effect that a quarter interes
by "Dr. John Morgan," had been sold, for $7,500,000, t
which interest also was said, in the press, to be the
Co., but of course this was a lie from the whole cloth.
with suspicion as a mere bit of stockjobbery.

JAMAICA COPPER CO.

Dead. Was a bad egg. Formerly at May Pe
Described Vol. V.

JANIE MINING CO.

Dead. Lands were sold, 1907, to Mexican Mines
at Baca, Hidalgo, Chihuahua, Mex.

JANOS MINING CO.

Dead. Was a swindle. Formerly at Casas Grand
Mex. Described Vol. VI.

JAPAN-FLORA MINES & TUNNEL CO.

Office: 310 Colorado Bldg., Denver, Colo. Min
Miguel Co., Colo. J. J. Fisher, president; Chas. H.
Wm. P. Humphreys, secretary; J. P. H. Cunningham, t
cers and Geo. W. Johnson, directors; Harry J. Wolf,
Midwinter, mine superintendent; Nelson Vezina, mill s
ized Aug. 22, 1903, under laws of Colorado, with capitali
$1 par, nonassessable; fully issued. Bonds, $300,000
sued, $133,500

Lands, 43 claims, patented, area 301 acres, and a
Upper San Miguel district, 4 miles from a railway. Pr
andesite and porphyry, with 5 fissure veins, of which 3,
of 1′ to 8′ average width, carrying auriferous and arge
erite and chalcopyrite, associated with pyrite, with qu
by management to average 1 to 2% copper, 3 to 40% le
50 oz. silver, and $8 to $30 gold per ton.

Mine has shafts as follows: No. 1, of 272′; No. 2
No. 4, of 363′; No. 5, of 72′; No. 6, of 340′. There are tu
of 2,975′; No. 2, of 230′; No. 3, of 70′; No. 4, of 30′; No. 5
No. 7, of 470′; No. 8, of 70′; No. 9, of 70′; No. 10, of 6
mine is reported by the secretary to have 29,665′ of w
by the general manager to have 7½ miles of workin
96,024 tons of ore in sight, actually blocked out for stop
and $626,662 net estimated value. Equipment includes
air-compressor. There are 17 buildings.

The 50x150′ concentrator, of wood, has an 8x10"
centrifugal crusher, 2 trains of rolls, three 6-compartme

, 4 sizers and a 5′ Huntington mill. Property has produced e past, and a little high grade silver ore was shipped, by ie Pandora claim. Management plans improving the mill tion, 1911.

CO. NEW MEXICO.
rganized, 1903, as Three Bears Copper Co. Formerly at M.

& SMELTING CO. NEW MEXICO.
illa, Otero Co., N. M. Lands, 20 claims, held under 5- xpiring 1909. Idle some years and apparently moribund.

O., LTD. ONTARIO.
ad egg. Was succeeded, 1908, by Cambrian Mining & td. Formerly at Port Arthur, Thunder Bay district, Vol. VIII.

N COPPER CO. WYOMING.
uglas, Converse Co., Wyo. Idle since circa 1904 and

G CO. WASHINGTON.
ewelah, Stevens Co., Wash. F. C. Bailey, superintendent, perty is a copper prospect, slightly developed.

H MINING CO. MINNESOTA.
stnut St., Kingston, Pa. Mine office: Pine City, Pine tt Smith, president; Herbert Conyngham, secretary; Edw. ry Hoefler, general manager. Lands, 500 acres, freehold, rk begun thereon, 1879, on the Lower Snake River, carry- sion of the Keweenawan copper-bearing beds of Lake Su- mation having a strike of about N. 20° E., with dip of about beds to be on the northern fold of the syncline. One bed tion of 12° to 18°, on surface, for a distance of more than 5 t was started on this bed. There also are pits and shafts 150′. The main shaft was abandoned, and another shaft st. Several of the amygdaloidal and conglomerate strata, r, have been proven by test-pitting and diamond drill bor- rts having expended about $50,000 on exploratory and ince 1879. Idle.

G CO. COLORADO.
was a prospect, near Hillside, on which a very limited ent work was done, circa 1903. Formerly at Hillside,

CO. BRITISH COLUMBIA.
dway, Queen Charlotte Island, B. C. Property is sundry 5,000 bond and lease. Some ore of fair grade was shipped,

OUN MINING CO. COLORADO.
ck Exchange Bldg., Chicago, Ills. Letter returned un- mine office, Russell Gulch, Gilpin Co., Colo. Louis D. lfred M. Stearns, vice-president; Wm. S. Calder, secretary ing officers, C. A. Constable and Peter J. Keeling, directors; perintendent, at last accounts. Organized under laws of alization $3,000,000, shares $1 par, apparently as a recon- ash Consolidated company. Lands, 7 claims, patented, on by the Newhouse tunnel. Mine carries auriferous and and lead ores, and is said to have been a considerable pro- In 1909 the management planned sinking a 1,800′ shaft. steam power and an air-compressor. Idle.

JEFFERSON COPPER-GOLD MINING CO.

Dead. Formerly at Morrison, Jefferson Co., Colo

JEFFERSON COPPER MINING CO.

Dead. Was a swindle, perpetrated, 1900, by the n of Denver. Was merged, circa 1901, in the Zanesville circa 1902, in the Wabash Consolidated. Formerly a Colo.

JEFFERSON COUNTY MINING CO.

Dead. Formerly at Basin, Jefferson Co., Mont.

JEFFERSON-MONTANA COPPER MINES CO.

Dead. Formerly at Corbin, Jefferson Co., Mont

JELDNESS COPPER CO.

Dead. Oalus Jeldness was manager. Was orgs capitalization $1,000,000, shares $5 par. A little devel 1906–1907, and stock sold up to $3 per share, early 1 White Pine Co., Nev.

JELM TOWNSITE & MINING CO.

Dead. Formerly at Jelm, Albany Co., Wyo. Des

SOCIEDAD MINERA JENERAL LAS HERAS DE CABEZA DE VACA.

Dead. Formerly at Copiapó, Copiapó, Chile. De

JENNIE DELL MINING CO.

Dead. Was succeeded, 1905, by Columbus-Butte at Butte, Silver Bow Co., Mont. Described Vol. III.

JERICHO MOUNTAIN COPPER CO.

Dead. Former office was St. Paul, Minn. A. Mc E. W. Buckley, secretary and general manager; pres Morton, W. R. Edwards, Jos. W. Morrison, Ernest J. J. W. Bayley and William T. Kuehn, directors; J. G. C ent. Organized Jan. 14, 1907, under laws of Monta $2,000,000, shares $1 par, as a reconstruction of the Be Co. Lands were 18 claims, 1 fractional, area circa 350 Elliston, supposed to carry auriferous and argentiferou developed by a 400′ shaft, and an 800′ tunnel, on the F company failed to develop the ore bodies thought to lie included a 10-stamp mill, sold, for $4,000, to the Kine company was badly managed, and wasted considerable m

JEROME-ARIZONA COPPER CO.

Office: Prescott, Ariz. Letter returned unclain office, Jerome, Yavapai Co., Ariz. Hon. Reese M. Lin June, 1907, under laws of Arizona, with capitalization $ Lands are 4 miles northeast of Jerome. Idle and appare organization.

JEROME CAÑON COPPER CO.

Dead. Formerly at Jerome, Yavapai Co., Ariz.

JEROME COPPER CO.

Dead. Was succeeded, 1902, by Cleopatra Cop Jerome, Yavapai Co., Ariz.

JEROME MINES DEVELOPMENT CO.

Dead. Formerly at Jerome, Yavapai Co., Ariz.

JEROME SILVER-COPPER MINES CORPORATIO

Dead. Formerly at Jerome, Yavapai Co., Ariz.

JEROME VERDE COPPER CO.

Office: 223 Security Bldg., Los Angeles, Cal. Min apai Co., Ariz. Wm. Welles Bosworth, president; Thos. dent and general manager; Leland S. Stillman, secreta

eers and Truman Berry, directors; J. Frank Rogers, uperintendent. Organized December, 1906, under laws zation $5,000,000, shares $1 par, nonassessable; issued, zed as successor of Verde Queen Copper Co., giving 000 in stock, which is held by the old company in a practically escrowed. Reorganization was effected by nd the General Securities Co., these firms offering the ranteed," with very untruthful advertising. The Hol- ated from the management in 1908.

atented, area 485 acres, encumbered by a small mort- nited Verde and adjoining the Little Daisy mine of the n. Property shows an iron gossan, with outcrops of e and Columbia claims. Development is by the 585′ nbia shaft, planned to be sunk to 700′, with about ing mainly copper carbonates, with small quantities of lso some sulphides, and a little native copper, all slightly rous. Average assays were reported, by former man- r. The mine is quite wet, and has an electric pump, with per minute, working against a 700′ head.

s a hoist good for 1,000′ depth, and a 5-drill air-com- urrent is taken from the Arizona Power Co.

r of mine buildings, and a 35-ton smelter, which was in ime, 1901–1902, producing 2 carloads of low grade black nor, and a small quantity of matte. Work was resumed, r's idleness, owing to the promising disclosures on the e United Verde Extension, adjoining this property, and orking 20 men, in 3 shifts.

NING CO. **ARIZONA.**

Jerome, Yavapai Co., Ariz. C. H. Putnam, president; -president; M. A. Putnam, secretary and treasurer; pre- . Sinclair, directors. Capitalization $1,000,000. Lands ief. Idle, apparently since organization.

ER MINING CO. **NEW MEXICO.**

at Silver City, Grant Co., N. M. Described Vol. IX.

NG, MILLING & SMELTING CO. **CALIFORNIA.**

ershim Bldg., Los Angeles, Cal. Letter returned un- ine office, Daulton, Madera Co., Cal., with notation by n company exists there. W. H. Sallada, president; W. T. J. Carpenter, lessee. Organized 1902, under laws of zation $1,500,000, shares $1 par. Lands, 3 patented with a 200′ main shaft showing 4 fissure veins, carrying ulphide ores, said to give assays of 15 to 20% copper, 6 to $15 gold per ton. Had steam power, air-compressor ator. Shipped some concentrates of about $40 per ton Idle some years and apparently moribund.

INING CO. **UTAH.**

at Dixie, Washington Co., Idaho. Described Vol. VIII.

ARIZONA.

e. Property was sold, January, 1909, to Ohio Mines Co. avapai Co., Ariz. Fully described Vol. VIII.

INING CO. **UTAH.**

nclaimed from former office, Salt Lake City, Utah. Mine Co., Utah. A very limited amount of prospecting work Idle and presumably moribund.

IA DE BAQUERÁCHIC. **MÉXICO.**

via de Oro, Batopilas, Chihuahua, Mex. Is an old prop-

erty, once important, having copper sulphides carry gold per metric ton. Idle.

JESÚS MARIA MINES CO.

Dead. Formerly at San Juan de Heredia, El scribed Vol. VI.

JICARILLA MINING & REDUCTION CO.

Dead. Formerly at Jicarilla, Lincoln Co., N.

J. I. C. MINE.

Owned by Anaconda Copper Mining Co., at Bu

J. I. C. MINING CO.

Letter returned unclaimed from former office, S office: Park City, Summit Co., Utah. G. D. B. Tu accounts. Was controlled, through stock ownership ing Co., hence presumably is now controlled by the Co. Mine, near the Daly-West and Daly-Judge, ably idle.

COMPAÑÍA MINERA DE JIMOLES.

Dead. Formerly at Torreón, Viesca, Coahuila,

JIMULCO MINING CO.

Office: care of San Antonio Brewing Associatio office: Otto, Viesca, Coahuila, Mex. Otto W Koehler, vice-president; S. G. Newton, secretary; superintendent; John D. Moore, mine superintend laws of Texas, with capitalization $500,000, shares 1906, and reduced, 1908, to $1,000,000, shares $100 dividends aggregating $965,000, as follows: $55,00 $285,000 in 1905; $150,000 in 1906; $200,000 in 190 in 1909; $60,000 in 1910.

Lands, 111 hectares, including the Defensa, R Juan properties, carrying argentiferous azurite, ma bornite and chalcopyrite, oxidized ores predominati in limestone. Development is by a 500′ main shaf of 100′ to 150′ depth, with 6 main tunnels, and 4 sh gregating about 1 mile in length. The mine as a w workings, showing good ore in the bottom levels. Or ientes smelter for reduction, and shipments were 11,(average returns of 6.4% copper and 5.5 oz. silver, in

Equipment includes gasoline and electric pow There is a 5-mile private narrow-gauge railway, grades up to 6 and even 8%, equipped with a Sh motive, connecting with the Mexican Central line,

Production, at end of 1910, was about 25 met was 1,369,056 lbs. fine copper in 1902; 1,693,957 lb 1905, and approximately 1,635,000 lbs. fine copper a Property considered valuable and management g

JOAQUINA GOLD MINING CO.

Office: 327 Douglas Bldg., Los Angeles, Cal. tillo, Norte, Baja California, Mex. L. H. Mitch accounts. Has auriferous copper ores and steam

JOE CREEK COPPER CO.

Mine office: Hurlton, Siskiyou Co., Cal. La merly by Copper King Mining Co., lying between t Blue Ledge mine, have opencuts and crosscuts deve 400′. Property is said to carry several large ore copper tenor, and $8 per ton in combined gold and s of values is considered excessive.

MINING CO. **WASHINGTON.**
ed, 1902, in Ethel Consolidated Mines Co. Formerly at
. Wash.

PPER MINING CO. **NEW MEXICO.**
ginia charter was forfeited 1902. Formerly at Steins,

CO. **NEVADA.**
at Johnnie, Nye Co., Nev.

ATER CONSOLIDATED **CALIFORNIA & NEVADA.**

at Greenwater, Inyo Co., Cal., and Johnnie, Nye Co.,
VIII.

NG & MILLING CO. **COLORADO.**
ho Springs, Clear Creek Co., Colo. Has auriferous and
nd lead ores, with steam power. Presumably idle.

DEVELOPMENT CO. **ARIZONA.**
rt, Ky. Mine office: Johnson, Cochise Co., Ariz. H. S.
h R. Wilson, vice-president; E. H. Elliott, secretary; E. C.
preceding officers, P. S. Head, Hon. A. A. Hazelrigg, J. A.
Deckeraw, directors. Organized, 1906, by Wallace H.
uick specialist of Chicago, now in the penitentiary, with
000 shares $3 par, and was reorganized March 13, 1908,
a, with capitalization $2,000,000, shares $1 par, nonassess-
,200,000. Annual meeting, second Tuesday in October.
3 fractional, unpatented, area 123 acres, known as the
en the Peabody and Copper Chief mines, showing granite,
and limestone, with replacement deposits in lime, estimated
to average 2′ in width, carrying malachite, chrysocolla,
te. Development is by 9 pits and prospect shafts, of 16′
78′ two-compartment working shaft, said to be bottomed in
in limestone, shaft showing 22″ of good ore at depth of 20′,
, and 25′ of mixed ground at depth of 225′. Management
are widening as they cross the shaft.
udes a 40-h. p. Fairbanks & Morse gasoline hoist, good for
e are 5 buildings, including a 24x32′ frame building covering
nithy and warehouse. Management plans deepening the
00′.

WASHINGTON.
le Elum, Kittitas Co., Wash. Property, in the Stanaway
little high grade gold-copper ore, 1903, to Puget Sound

NE. **MONTANA.**
conda Copper Mining Co., at Butte, Silver Bow Co., Mont.

NING CO. **MONTANA.**
ty was sold, 1906, to Butte Coalition Mining Co. Formerly
w Co., Mont. Described Vol. V.

NING CO. **MONTANA.**
Clinton, Missoula Co., Mont. John Wood, manager. Prop-
ein on the North Point claim, in which copper ore of good
e was opened, circa April, 1909. Presumably idle.

PPER MINING CO. **MONTANA.**
Stark, Missoula Co., Mont. Daniel McGinnis, president;
secretary and treasurer; preceding officers, Forest D. Fraser
ctors; Jas. McGinnis, manager. Organized 1907, under laws
capitalization $1,000,000, shares $1 par. Lands, 8 claims,
acres, on Nine Mile Creek, 14 miles from the nearest railway,

at Houston. Mine has a 190′ shaft, showing galena a
claimed to give average assay of 21% copper, 3 oz.
which figures are considered too high. Equipment
hoist, and there are necessary mine buildings.

JOSEPHINE COPPER MINING & SMELTING

Dead. Was organized circa May, 1903, unde
were several claims in the Blackfoot ceded strip. N
secured. Formerly at Chouteau, Teton Co., Mont.

JOSEPHINE GOLD & COPPER MINING CO.

Dead. Was a bad egg. Formerly at Prescott
Basin, Grand Co., Utah. Described Vols. V and VI

JOSEPHINE MINE.

Owned by Anaconda Copper Mining Co., at But

JOSIE GOLD & COPPER MINING CO.

Dead. Formerly at Houghton, King Co., Wash.

JOWELL GOLD & COPPER MINING CO.

Dead. Formerly at Sylvanite, Grant Co., N. M.

MINA LA JOYA.

Office: Huelva, Spain. Mine office: El Cerro
by Sucesión Vázquez López. Lands are 9 concession
vicinity of El Cerro, carrying 4 ore bodies, known
Norte and San Rafael, the Levante being the most i
oped. Lands include old mines dating from ancien
workings, whence the richest ores were extracted.
siderable quantities of cupriferous pyrite, said to aver
The Poniente and Norte mines are opened by tunne
15-kilometer railway, to connect the mines with the
under construction, 1910, as the mine experienced gr
tion, owing to lack of adequate transportation faciliti
5,000 metric tons of slightly cupriferous ore in 1908.
about 300,000 metric tons of washed sulphur ore re
adequate transportation facilities are furnished. P
ising.

JUANITA MINING CO., S. A.

Office: First National Bank Bldg., Duluth,
Bisbee, Ariz. Letter returned unclaimed from former
Arizpe, Sonora, Mex. Martin Pattison, president;
president and manager; Lemuel C. Shattuck, secretar
circa 1,000 hectares, known as the Sulphide group,
Sonora, northwest of La Cananea. Property carries a
galena and sphalerite, with some ore assaying up to 15
but values as developed are mainly in silver-lead a
220′ deep, and there also is a 75′ shaft. Results not
was suspended, early 1911.

JUANITA MINING & MILLING CO.

Office: Phœnix, Ariz. Mine office: Prescott,
M. Dwight Jennings, president and general manager
president; D. A. Seaman, secretary; E. J. Bennett, tre
Dr. John W. Foss, Walter Talbott, B. F. Peters and O
A. E. Seaman, consulting engineer; C. E. Warren, su
March 29, 1905, under laws of Arizona, with capitaliza
par, nonassessable; issued, $1,025,000. Annual mee
second Monday of April.

Lands, 16 claims, unpatented, area circa 300 ac
about 4 miles from the Senator mine, in the Hassayam
Management reports the property

with 4, under development, of 1′ to 60′ width, traceable
g auriferous and argentiferous copper sulphides assaying
00 oz. silver and $1 to $1,700 gold per ton. Apparently
ut 8′ average width. Development is by a shaft, 100′
ut probably deepened since, with circa 3,000′ of workings.
am power, and management plans a 20-ton mill.

Y MINES. **TASMANIA.**

Jukes, Montagu Co. Tasmania. Walter Donath, mine
vicinity of Crotty, with a wagon-road connecting there-
unnel, and it is planned working this property in connec-
es mine. There are several small mine buildings. Block
3, to the Mt. Lyell smelter. Company employed 17 men
1910.

ING SYNDICATE, LTD. **SPAIN.**

ne's Chambers, London, S. W,. Eng. Mine office: La
, Spain. Maj.-Gen. E. H. Stewart, C. M. G., cha rman;
W. H. Sykes and B. H. Rolfe, directors; W. J. Kingsford,
ower, consulting engineer; J. E. Taylor, mine manager.
1908, under laws of Great Britain, with capitalization
ar, in £5,000 of 6% participating preference shares and
s, fully issued, £7,500 fully paid and £2,500 partly paid.
nine, area 340 acres, bought for £2,500 in cash and £5,000
shares. Some development work was done. Presumably

ING CO. **UTAH.**

gham Canyon, Salt Lake Co., Utah. David Clay, man-
s. Mine has a tunnel showing gold-copper ores, and is
power. Idle some years and apparently moribund.

A JULIA DE COLLAHUASI. **CHILE.**

Chile. Mine office: Collahuasi, Tarapacá, Chile. Or-
7, under laws of Chile, with capitalization 400,000 pesos,
No trace of operations secured.

MILLING CO. **UTAH.**

, American Fork, Utah Co., Utah. Jas. Chipman, Jr.,
Thornton, vice-president; J. E. Bennett, secretary and
d August, 1909, under laws of Utah, with capitalization
ts par. Lands, 5 claims, unpatented, showing gold, silver

NZALEZ JULIO. **CHILE.**

ajon de Maipó, Victoria, Santiago, Chile. Lands, known as
are a short distance from holdings of the Compañía Minera
a parallel vein of the same general character. The copper
onnection, and are refractory, production being small at last
bly idle.

OPPER MINING CO. **MÉXICO.**

ly at Santa Catarina, Norte, Baja California, Mex.

NING CO. **BRITISH COLUMBIA.**

ly at Rossland, B. C. Described Vol. VIII.

LOPMENT CO. **ARIZONA.**

organised, October, 1905, as Junction Mining Co. For-
chise Co., Ariz. Fully described Vol. V.

ARIZONA.

umet & Arizona Mining Co., at Bisbee, Cochise Co., Ariz.

NG CO. **ARIZONA.**

erged, circa 1907, in Superior & Pittsburg Mining Co. For-
chise Co., Ariz. Very fully described Vol. VI.

JUNIATA GOLD & COPPER CO.

Office: 225–315 South Broadway, Los Angeles, Ca
Yuma Co., Ariz. P. W. Powers, president; E. S. F
ton S. Patterson, secretary; T. W. Phelps, treasure
intendent. Organized Oct. 29, 1907, under laws of Ar
$1,000,000, shares $1 par. Lands, 10 claims, area 200
Gray Eagle and Carnation mines, in the Seneca distric
have a vein 100′ wide, carrying argentiferous copper
in value, which figures are questioned. Developmen
and 200′, showing ore claimed to give average assay
26.84 oz. silver per ton, which figures probably are for
ore. Was developing, with a small force, at last accou

JUPITER MINING CO.

Office: Tomah, Wis. Letter returned unclaimed
Holmes, Albany Co., Wyo. W. A. Lee, president; J. A
J. W. Hancock, secretary and treasurer. Lands adj
southwest. Claim No. 1 has a 60′ shaft. Idle sever
moribund.

JURA-TRIAS COPPER CO.

Dead. Became bankrupt, and property was sold,
lin. Formerly at Señorito, Sandoval Co., N. M. Des

JURY COPPER MINES, LTD.

Office: Sault Ste. Marie, Ont. Mine office: D
Organized Dec. 5, 1906, under laws of Ontario, with
Lands, in vicinity of Dean Lake, have a 46′ shaft, show

JUSTICE MINING CO.

Dead. Formerly at Central City, Gilpin Co., C

KAFUE COPPER DEVELOPMENT CO., LTD.

Office: Salisbury House, London, E. C., Eng.
wayo, Rhodesia. Mine office: Silver King, Norther
Stokes, chairman; Lord Gifford, vice-chairman; preced
Percy G. Tarbutt and A. H. Edenborough, directors;
Organized May 31, 1905, under laws of Great Bri
£350,000, shares £1 par; issued, £250,007, fully paid.
stock ownership, by Northern Copper (B. S. A.) Co., L
Co., Ltd., all three having the same officers. It is ex
track of the operations of this company because of its in
with the Northern Copper (B. S. A.) Co., Ltd., Rhodes
various other subsidiary corporations of the Northern C

Lands include the Silver King, Sable Antelope and
the most developed, also the North Star, Maurice Giff
Blue and Blue Jacket mines.

The properties are near the Kafue River, and the
so far located, are at and near ancient workings, in a b
miles wide, running nearly north and south for a grea
belt being flanked, and sometimes intruded, by talcose,
schists, and by granite, feldspar and quartz porphyries
irregular deposits in limestone, and in veins traversing
surface, the predominant ores being tetrahedrite and c
bornite and chalcopyrite, the ores in schists being m
those in limestone.

The main camp is at the Silver King mine, in lat
longitude 26° 55′ E., 12 miles south of the northerly r
The main shaft of the Silver King mine was 205′ deep,
not been deepened, the ore body which apparently is a
the bottom of the shaft was reached, though there is a po

r King obviously is a pockety mine, and apparently small.
as an area of 160 claims, on the Kafue River, and in 1908
g, from depth of 34′ to 99′, a vein of 4′ 8″ estimated aver-
e claimed to average 21.36% copper and 2.4 to 13 dwts.
here also was a second shaft of 100′, which seems to have
especial promise.
ine is equipped with steam power, and a pump. No. 3
et mine, 138′ deep, at last accounts, shows carbonate cop-
ite.
s a 25-ton smelter, which cannot be considered as any-
rimental. The company has some copper ore of excellent
has not developed any assured tonnage.

NDICATE, LTD. **RHODESIA.**

orbed, 1904, by Rhodesia Copper Co., Ltd. Formerly at
Rhodesia. Described Vol. IV.

PPARVERK. **SWEDEN.**

pparberg, Orebro Län, Sweden. Mine has argentiferous
with values mainly in copper. Production, 1901, was
copper matte, and 16,423 kgs. fine copper, giving net pro-
. fine copper, with lead and silver values additional. Idle

JAPAN.

oki-mura, Nii-gori, Iyo, Japan. Wataro Shiraishi, owner.
nstallation. Employed, 1908, an average force of 73 per-
325 kwan copper ore, valued at 14,723 yen.

PER MINING CO. **COLORADO.**

est Cedar St., Kalamazoo, Mich. Letters returned un-
operating office, Encampment, Wyo., and former mine office,
Colo. H. E. Brown, president; E. S. Drury, vice-president;
ry and general manager; W. C. Carson, treasurer. Organ-
under laws of Wyoming, with capitalization $1,000,000,
ls, formerly 10 claims, are now 4 claims, area 40 acres, which
, 1911. Property is supposed to carry about 1,000′ of the
of the adjoining Coldwater mine, which is under the same
since circa 1904.

JAPAN.

Kamigo-mura, Kamihei-gori, Rikuchu, Japan. Chobei
he principal property is an iron ore mine, but there also is a
tiferous copper ore. Production was 56,777 lbs. fine copper
ons of iron ore in 1907; 105,280 lbs. fine copper, 891,080 kwan
nomme silver and 37,251 metric tons of iron ore in 1908.

JAPAN.

su Bishi Goshi Kwaisha.

ES, LTD. **BRITISH COLUMBIA.**

adenhall St., London, E. C., Eng. Mine office: Kamloops,
F. V. Marment, chairman; preceding officer, C. E. Bulling,
C. E. Tempest, directors; Jos. Argall, mine manager. Or-
05, under laws of Great Britain, with capitalization £135,000,
sued, £137,703 fully paid. Debentures, £37,000, at 6%.
been in arrears for some years, and property has been admin-
for the debenture-holders since August, 1906. Property has
since 1908, to E. G. Wallinder, of Duluth, Minn.
s, area 288 acres, known as the Iron Mask mine, 4 miles south-
also 5 claims in the Frederick Arms district. The Iron Mask
one, faulted and broken, mineralized for about 100′ in width,
of better grade ore forming a paystreak, of variable width,

carrying mainly chalcopyrite, associated with magnet somewhat aluminous, with an average of 8 to 12% cop mineral zone estimated by the management to avera iron and 36% SiO_2, ore also carrying small values i opment is by a 600′ main shaft.

Equipment includes 2 boilers, aggregating 300 tandem-compound condensing engine, 6′ double-dru pressor, and an electric light plant. There also is a s

Transportation is by a good wagon-road, though to the railway siding below Kamloops. Traction eng doned, because not adapted to the steep grades. Th 2½-mile tram, having a drop of 1,100′.

There is a 160-ton mill, receiving ore by aërial grizzlies, and coarse stuff passed through a 10x16″ Jen thence to ore-bins, whence crushed ore is fed to co feeders, going thence through intermediate rolls and b trommels. Sized material from the trommels is co Tailings from finer sizes are run to waste, while tailings size from trommels are recrushed by fine rolls and Fines from trommels pass through 3 magnetic sepa magnetite gangue. Sands are concentrated on 3 B from these go to Overstrom tables. Slimes run to product of which is concentrated on 6 Lühring va The mill put about 5 into 1, but suspended work after and experiments were then made with smelting. A to be under construction, July, 1910.

The 50-ton smelter, originally planned as the firs has a 36″ cylindrical water-jacket blast-furnace, which ore to 50% copper matte. Production, October, 1,278,621 lbs. fine copper, circa 6,500 oz. silver and $250,060. The average grade of ore is low, but the property might be worked opencast to advantage. ployed September, 1910, reopening the mine. Prope though low in grade, if operated on a large scale.

KANABU MINE.

Mine office: Yoshino-mura, Aida-gori, Mimasaka owner. Property also includes mines at Makuyam Sayo-gori, Harima, Japan. The Kanabu mine has a employed an average force of 182 hands, 1908. Pr fine copper and 63,355 momme silver in 1907; 92,97 momme silver in 1908.

KANASAKA MINE.

Mine office: Sugiharadani-mura, Taka-gori, Hayashi & Co., owners. Mine, having no power plan 79 persons, 1908, producing copper ore carrying no values. Production was 143,346 lbs. fine copper in 19

KANAYAMA MINE.

Owned by Mitsu Bishi Goshi Kwaisha.

KANE COPPER CO.

Mine office: Needles, San Bernardino Co., Cal. at last accounts. Organized, 1907, under laws of Ar $1,000,000. Lands, 6 miles west of Needles, are said sumably idle.

KANGAROO HILLS MINING & SMELTING CO.

Dead. Lands were forfeited, 1907. Formerly at Co., Queensland, Australia. Described Vol. VI.

TD. AUSTRALIA.
King Co., N. S. W., Australia. Chas. Taylor, manag-
1 1908, under laws of New South Wales, with capitaliza-
par. Lands are in the Lachlan district, about one-half
River. Management was said, 1909, to plan a 10-mile
long, the nearest rail station. Mine, discovered 1899,
has a 5′ vein, developed by shaft, carrying argentiferous
rite, galena and sphalerite, assaying 5 to 8% copper, 5 to
nc, 10 to 20 oz. silver and 5 to 12 dwts. gold per long
10-horse teams, over very bad roads. Production for-
but, since 1908, goes to the Port Kembla works. In 1909
10 long tons of copper-lead ore, known as middlings, to
4.43% copper, 33% lead, 18 oz. silver and 2.5 dwts gold
ion, at last accounts, was circa 25 tons of high grade ore
was said, August, 1909, to plan building a small smelter
ion is estimated at 400,000 lbs. fine copper and 2,500 oz.
rty considered promising.

CHINA.
n-Hsien, Kiang-Hsi, China. Tuan Fang, viceroy of the
s, general manager. Development was begun 1907, a
having been furnished for the purpose, in equal amounts
ang-Hsi and Kiang-Su.

JAPAN.
no-mura, Yama-gori, Iwashiro, Japan. Mine, known as
erous and slightly argentiferous copper ore, and had power
ggregating 2,036 h. p. Production was 967,451 lbs. fine
er and 388 oz. gold in 1907; 2,160,676 lbs. copper, 763,539
09 momme gold in 1908.

JAPAN.
-mura, Minami-Aizu-gori, Iwashiro, Japan. Production,
fine copper.

HS CONSOLIDATED MINING CO. COLORADO.
bankrupt 1904. Formerly at Central City, Gilpin Co.,
. V.

COPPER CO. MÉXICO.
passed, 1910, to Arizona-Cananea Mines Corporation.
nea, Arizpe, Sonora, Mex. Described Vol. VIII.

PPER MINING & SMELTING CO. COLORADO.
y at Oneco, Routt Co., Colo. Described Vol. VIII.

VELOPMENT CO. MÉXICO.
City, Mo. Mine office: Nacozari, Moctezuma, Sonora,
ard, secretary; Tobias Crane, general manager. Lands,
as the Credo Liberal mine, having an 80′ shaft showing
% copper, 20% lead, 200 oz. silver and $7 gold per ton. Idle

LD & COPPER MINING & MILLING CO. COLORADO.
ly at Crestone, Saguache Co., Colo.

SONORA MINING & MILLING CO. MÉXICO.
y was sold, 1903, to Ures Consolidated Mining Co. For-
ra, Mex. Fully described Vol. III.

KOREA.
Ko-chin-don, Kap-San, Hamgyeng, Korea. Is operated
dated Feb. 15, 1904, by the Collibran-Bostwick Co. Mine,
of the walled city of Kap-San, and about 120 miles from the
hyang, was discovered and opened, more than a thousand
inaman, eventually passing to the Korean throne, and, circa

1883, was worked by the crown, for 2 years, with a 20,000 men. Ore occurs as a metasomatic deposit, th nations of limestone and marl, with interbedded clay- quently metamorphosed by intrusive granite, and o basaltic dikes. Ore occurs as large irregular masses copyrite, associated with arsenopyrite and pyrrhotite contact minerals. The deposit now worked is the thir has an extreme width of 20′, and known length of 80′, Ore as mined is assorted into 2 grades, rich ore averagi poor ore being of 5 to 6% copper tenor, the average of copper, 45.44% iron, 37.40% sulphur and only 0.66 estimated at 625,000 lbs. fine copper in 1906, and 750,0

KAPUNDA COPPER MINE, LTD.

Dead. Was abortive. Formerly at Kapunda, L

KAPUNDA MINES, N. L.

Office: Melbourne, Australia. Mine office: K Australia. F. C. Howard, chairman; preceding officer directors. Troubles over title are said to have been

The mine, 44 miles north of Adelaide, was opene ore Jan. 8, 1844, and to 1876 had produced about 70,0 mine was sold, in liquidation, June 14, 1879, and wor producing about £9,000 worth of ore, 1879–1886.

The mine has 4 veins, of 6″ to 4′ width, 2 being cr rock and vein matter being very soft, requiring heavy zone, only about 50′ in depth, carries oxides, carbona copper, succeeded by secondary sulphides, selected ore per, and second grade ore ranging 8 to 12% copper, p but some small shipments, 1906, ranged about 40% i shafts, caved below the water-level. The 480′ Harris s showed good ore in the bottom, when worked former water causing the abandonment of the mine. The Bu the Gribbins and Charlotte shafts are about 300′ each is said to show ore averaging about 4% in copper ten pended, late 1907, but a little ore was produced, 1909, ary, 1910, the management planned a new shaft, on the vein where located, at 244′ depth, by a drill-hole, th about 4′ width, carrying payable ore. Property con adequate equipment and financial backing, and reop modern scale. Idle.

KARANKULSKI MINE.

Office, mine and works: Tashkent, Turkestan. tive lines, and was a small producer at last accounts.

KARATOYA MINING CO.

Mine office: Okura-mura, Mogami-gori, Uzen, J no power installation, employed an average of 101 ha was 40,741 lbs. fine copper, 4,570,368 lbs. copper ore zinc ore, of the total value of 27,703 yen, in 1907, and v and 116,180 kwan of copper ore, with total value of 35 equivalent to 150,000 lbs. fine copper, in 1908.

KARGALINSKI WORKS.

Office and works: Orenburg, Russia. W. A. Pa ner, manager, at last accounts. Lands, 24 miles fr different mines, having 28 shallow shafts, some of wh times, ore averaging about 3% copper. Equipment power. Forces, 1909, averaged 242 men underground is a small smelter, closed 1906, but presumably in co

ıe copper 1899, and was 975,210 poods of copper ore in
e yielded circa 900,000 lbs. fine copper.

ATANGA. **BELGIAN CONGO.**

ıe Namur, Brussels, Belgium. Mine office: Katanga
Albert Thys, managing director; preceding officer, Baron
ron Lambert, Georges de Laveleye, Alexandre Delcom-
Oultremont, Maurice Bunau-Varilla, Chas. A. V. Cony-
ry Pasteur, directors; Victor Van Achter, secretary; L.
managers. Organized Apr. 15, 1901, under laws of Bel-
of the Belgian Congo company, with capitalization
00 preferred stock, shares f500 par, and 18,000 ordinary
d value.

00 square miles, freehold, with sundry preferential mining
Principal mining property is 3 groups, known as the
d Pala, located on the upper bank of the Lualaba River,
per ores.

is primarily a land and holding company, and its proper-
d by a number of other corporations, mainly subsidiary or
ding the following companies:

ial du Katanga, organized 1900, of which one-third of the
l by this company, and two-thirds by the late Congo Free
is developing the copper properties at Katanga, and is
en for this company and its subsidiaries.

du Lomami, organized 1898, which is developing mining
nami River.

re du Haut Katanga, which is separately described in this

ıyme de Recherches Minière du Bakat, which is conducting
ry work for any and all minerals that may be found.

ıstrielle et Minière du Katanga, which also is engaged in
ork.

Geologique et Minière des Ingènieurs et Industriels Belges,
ıg general exploratory work.

ge Katanga, which is prospecting for minerals, and also has

ımerciale et Minière du Congo, which also is prospecting,
ding concessions.

an Co., which holds a concession from this corporation, is
y, and has no mining concessions.

RUSSIA.

H. Lorenz, manager, Elizabethpol, Russia. Mine office:
ıpol, Russia. Property includes the Katarski and Tuniski
ıich have been operated jointly for some years past. The
ımber of veins, in diabase, of 1 to 2 meters width, with pay-
m. average width, carrying chalcopyrite, bornite and covel-
15% copper. Production was 4,448,000 lbs. fine copper in
in 1902; 1,520,000 lbs. in 1903; 1,760,000 lbs. in 1904;
5; 1,056,000 lbs. in 1906; 1,980,000 lbs. in 1907.

ABETH CONSOLIDATED MINING CO. **ARIZONA.**

ly at Jerome, Yavapai Co., Ariz. Described Vol. VIII.

IINE. **JAPAN.**

anyama-mura, Oe-gori, Awa, Japan. Ore is chalcopyrite,
te, averaging 4% copper, in a 2′ to 4′ vein in amphibolite.
34 lbs. fine copper in 1900, 77,221 lbs. in 1907, and 86,395

KAY COPPER CO.

Office: Phœnix, Ariz. Mine office: Cave Cre
Lands, about 9 miles north of Cave Creek, include the
ing a 125′ main shaft, showing a vein of about 10′
carbonates at and near surface, succeeded by sulphides
per and $10 gold per ton, with small silver values.
shipped to the Sasco smelter, 1910, assayed 15% coppe
gold per ton.

KAY MINE SMELTING CO.

Letter returned refused from former office, 1102–7
N. Y. Mine office: Omega, Halifax Co., Va. Z. L.
eral manager. J. R. Wilbourne, vice-president; W. R.
treasurer. Organized Aug. 8, 1905, under laws of S
talization $1,000,000. Lands, 261 acres, freehold, 9 n
Virginia. Company's prospectus states that mine is in
to Butte, which will be news in Butte, as the people the
to be granite. Company reports 7 veins, up to 42′ i
width of 82′, veins being reported as 3 "quarts" and
pany claims an average of 8% copper in its prospectus,
report to the Copper Handbook, and claims to have s
copper. Mine has 2 shallow shafts, depth not reported,
ore to depth of 2,500′, the management gravely estim
$20,103,575, which either is sheer ignorance or intent
ably a little of each. This is a very fine sample of th
company.

KEARNS CONSOLIDATED COPPER MINES CO.

Dead. Was succeeded Apr. 18, 1904, by Keyston
Co. Formerly at Downington, Carbon Co., Wyo.

KEARSARGE MINE.

Owned by Osceola Consolidated Mining Co., at K
Mich.

KEARSARGE MINING CO.

Dead. Was absorbed, 1897, by Osceola Consoli
merly at Kearsarge, Houghton Co., Mich.

KEATING GOLD MINING CO.

Office: Duluth, Minn. Mine office: Radersb
Mont. R. T. Goodell, president; A. L. Agatin, v
Barnes, secretary and treasurer; preceding officers, Je
Newton and Jos. H. Hodgson, directors; C. W. Pritch
M. B. Graves, superintendent. Organized Nov. 21, 1
tana, with capitalization $1,250,000, increased, 1909,
par; issued, $1,875,000. Is said to be controlled, thro
the Radersburg Consolidated Mining Co. Has a $50
posed, March, 1911, to refund same by issuing $125,0
15, 1914, convertible into stock at par, at option
shares unissued in the treasury, to provide for

Lands, 10 claims, including former holding
mine formerly was a considerable gold produc
100′ level, and is popularly reported to have p
former ownership, work having been confined b
was taken over by lessees, 1906. The vein
and is of 2,200′ known length. There also ar
are well mineralized. The mine has auriferou
ore, with increasing copper values at depth.
shipped some ore up to circa 17% in copper
velopment is by the Keating shaft, and a nea

hich was 600′ deep at the end of 1910, showing a 4′ vein
′ level. It is planned deepening the Blacker shaft to

s a complete electrical plant, installed 1910, with hoist
traction engine hauls ore 12 miles to Toston, the nearest
ern Pacific line, but it is hoped that rail connection may

3-year contract, signed circa August, 1910, to the Pitts-
e. For the year ending May, 1909, production was
or the calendar year 1909 the mine shipped 120 carloads
17 per ton. During October, 1910, the mine shipped 40
$19 per ton, said to have netted the company $5,000
d, early 1911, the mine was shipping 2 carloads daily,
nd 500′ levels. Net smelter returns were about $17 per
n in October, 1910; $21 per ton in November, 1910, $24
1910, and $26.50 per ton in February, 1911, when esti-
about $25,000, on shipments of 27 carloads, netting an
ar. Management plans shipping about 110 tons daily,
considered promising and management good.

NWERKE KEDABEG. **RUSSIA.**

ebrüder Siemens, owners, Berlin, Germany. Mine office:
Russia. Works office: Kalakent, Elizabethpol, Russia.
mines, with 25 shafts, on the flank of Miodagh, or Copper
uth of and 450′ above Dalliar, on the Trans-Caucasian
est rail point. Property includes an old mine, reopened,
ners, that is variously termed the Kedabeg, Kiadebek and
perty shows diorite on the east, and diabase dikes on the
nd diabase porphyrite, with tuffs. There are 16 known
not outcrop, apexing at depths of 120′ to 400′ below sur-
dually into the walls, with very indistinct partings, the
hanging-wall, as a rule. The lenses range from 6′ to 165′
to 820′ in length. Ore is mainly chalcopyrite, with some
nal chalcocite, associated with sphalerite, pyrite and
sional galena and magnetite, all slightly auriferous and
a gangue of quartz-porphyry carrying considerable barium
3 to 5% average copper tenor. Development is almost
, and the caving system is used to some extent. The ore is
Halske electric drills.

urface into 3 grades, first being smelting ore of about 7%
all ore of 5% or better being smelted. Second grade ore,
nor, is leached, and third grade pyritic ore, carrying less
old to the petrol[illegible] for making sul-
used extensively[illegible]. Wages are
to 62 cents per[illegible] cents per diem

nelters, the[illegible]
t at Kala[illegible]
The works[illegible]
ual explosive[illegible]
and 60%[illegible]
roasted in ro[illegible]
d in Gerstenh[illegible]
es, of which t[illegible]
in diameter[illegible]
uarts, in layers[illegible]
ing product is a[illegible]

matte carrying 28.6% copper, 36.7% iron, 19.7% sulp
nickel and cobalt combined, 0.10% lead, 0.05% ars
0.0014% gold, with small quantities of silica, aluminum
sulphate. The first-fusion matte is broken into lumps,
low grade blister copper, averaging 88 to 90% copper,
gold per ton, which is refined at Kalakent, product bein
largely used for sheets, but less desirable for brass.

Fuel is petroleum, of which about 20,000 tons are b
piped 29 miles, from Dalliar, on the Trans-Caucasian r
Kedabeg. Petroleum is used for general steaming purp
and for roasting, smelting and refining copper, 2,700 lb
quired to produce 3,600 lbs. fine copper from ore, wh
petroleum is required to refine precipitate to blister copp
a specific gravity of 0.882, and contains 87.4% carbon, 12
oxygen, with a heating value of 11,700 calories. In pr
54 parts of petroleum, by weight, are equivalent in heat
bituminous coal, or 250 parts of wood. Petroleum is sp
the reverberatories, under high pressure.

The electrolytic refinery, at the Kalakent works, h
and 102 tanks, with multiple arrangement of electro
daily capacity of about 3,000 lbs. of cathodes.

The Kedabeg has not held its own as a producer
old ore bodies having been exhausted more rapidly than
and has declined, from first place to seventh, in the Ca
during the first decade of the century. Improvement is
in production, which has increased from the low point of
circa 4,500,000 lbs. in 1900; 2,966,720 lbs. in 1904;
3,077,563 lbs. in 1908 and 3,324,079 lbs. in 1909.

KUPFERKIESBERGBAU KELCHALPE.

Mine office: Kelchalpe, Tyrol, Austria. Is an old
producer, at occasional intervals. Idle.

KELLER & INDIANA CONSOLIDATED SMELTING

Office: Greensburg, Ind. Mine and works offic
Wash. Robt. L. Boyle, president and general manager;
dent; Ira J. Hollensbe, secretary and treasurer; preceding
J. T. Durdle and Chas. Cooper, directors; W. J. Elmend
C. C. Smith, superintendent, at last accounts.

Organized Aug. 7, 1903, under laws of Washingt
$1,500,000, shares $5 par; issued, $1,100,000. Is close
ownership, with the Silver Creek Mining & Milling Co.
Saturday in February.

Lands include the Manila mine, 4 claims, 26 miles
ently held under a $60,000 bond and lease, on a $500
reservoir and millsite, all well timbered, with a 20,000'
Lands are in the San Poil district, 7 miles above the
miles from Wilbur, the nearest rail station. The Manila
a vein of 70' to 100' width, traceable circa 1,000', opene
showing ore averaging about 4.5% copper and 4 oz. silv
are excessive.

A dam across the San Poil River, about a mile nort
electric plant, claimed to be capable of developing 1,48
150-kw Bullock generator.

The smelter, 5 miles from the mine and connect
road, was built by R. L. Boyle & Co., under contract, M
president of the company and the head of the firm cont
seems an arrangement of doubtful business probity. T

two 100-ton Allis-Chalmers blast-furnaces, one for lead
rious dates for blowing in were given, followed by post-
lter, although completed 1906, never has been blown in.
pparently moribund.

DATED MINING & MILLING CO., LTD. IDAHO.
t Kellogg, Shoshone Co., Idaho. Described Vol. IX.

REFINING CO. MONTANA & MÉXICO.
s name, circa 1909, to Alta-Montana Copper Co., which
Iontana property, and the New Mexican property was
raylor and Howard Paschal, jointly. Formerly at Cor-
t., and Kelly, Socorro Co., N. M. Described Vol. VIII.

OPPER MINING CO. ARIZONA.
l Bldg., Philadelphia, Pa. Mine office: Ray, Pinal
sold, circa April, 1909, to Ray Central Copper Co., at a
000, of which $300,000 was to be spent in development
later, if property developed satisfactorily. Apparently
742,800 shares of its capital stock to the Kelvin-Calu-
Fully described Vol. VIII.

INING CO. ARIZONA.
fice was 43–89 State St., Boston, Mass. No trace of
r secured at the property. Formerly at Kelvin, Pinal

N CO. ARIZONA.
sold, circa 1907, to Ray Consolidated Copper Co., and
to Kelvin-Calumet Copper Mining Co. Formerly at
iz. Fully described Vol. VII.

OPPER CO. ARIZONA.
adnock Blk., Chicago, Ills. Mine office: Kelvin, Pinal
aldwin, president; Carlton B. Case, vice-president; Neil
d general manager; W. Espy Curtis, treasurer; preceding
lleigh, Dr. J. A. Glenn and J. D. Riley, directors; H. C.
ganized Apr. 19, 1910, under laws of Arizona, with capital-
res $1 par, nonassessable; issued, $1,752,440. Company
f the Sultana-Arizona Copper Co. Stock is reported by
scrow with the Commercial National Bank, Boston. Man-
his company has cleared up the entire floating indebted-
pany.

3 fractional, entered for patents, 150 acres of patented
acre millsites, with total landed area of 528 acres, also 30
r lands in the Ures district of México, which is idle.

ls include the Riverside and Bryan groups, said to have
000, in the Riverside district, across the Gila River from
ast of Kelvin. Management reports 19 contact deposits,
diorite, of which 5 veins, expected to unite at depth, have
veloped, these being reported as 18″ to 6′ wide, and esti-
o average 5′ in width, with a generally NW. trend, but
that it is now sinking for an ore-zone in porphyry, and
d, by the use of the terreohmeter, an ore body of at least
ns carry carbonate copper ores in a comparatively shallow
eded by sulphides, mainly chalcopyrite. The property
y, to show a 4′ vein averaging 15% copper in the upper
carrying chalcopyrite in the lower workings, from which
mboldt smelter returned 8.7 to 10.6% copper. Average
ns was estimated, by the old company, as 10% copper and
hich was too high, and is now estimated by the management
r, 15% iron and 4 oz. silver per ton, with traces of gold.

Development is by 5 shafts, of 40′ or more in de
ently being only 185′, and by 7 tunnels of 50′ to 2
trenches and opencuts, giving a total of about 4,000
ment of old company estimated 40,000 tons of ore i
blocked out for stoping, which figures were entirely to

Equipment includes a 25-h. p. steam plant, with
ment of former company planned a 1-mile aërial tram,
the railway station of Kelvin, and also planned a conce
daily capacity. Production of old company, to end
ore, yielding $12,450. Production was 45,838 lbs.
silver in 1907. Management predicted, 1910, an out
daily, within a year, which prediction was entirely unw
and ore in sight. Company ended 1910 employing 15

KELVIN TUNNEL SITE CO.

Letter returned unclaimed from former office, 2
Los Angeles, Cal. Mine office: Kelvin, Pinal Co., A
tions secured, and company apparently moribund.

KELYNACK TIN MINE, LTD.

Office: 7 Great Winchester St., London, E. C.,
druth, Cornwall, Eng. E. W. Gundry, chairman; H. W
ceding officers and H. D. Williamson, directors. Organ
laws of Great Britain, as Western Tin & Copper Sy
changed, July, 1907, to present title, with capitalizatio
issued, £2,750, 10s. paid. Lands include 7 setts of ti
923 acres, near Redruth, and the Kelynack tin mine,
Copper property is considered promising. Presumabl

KEMP-KOMAR COPPER MINING CO.

Mine office: Loon Lake, Stevens Co., Wash.
Mine has a 200′ shaft, showing oxidized ores above an
ings, carrying small gold and silver values, in a 12′
6″ to 5′. Carload shipments have returned 16 to 20%

KEMPLAND COPPER CO.

Dead. Formerly at Greenwater, Inyo Co., Cal.

KEMPTON MINE.

Owned by Col. E. A. Wall, at Bingham Canyon, S

KENDRICK & GELDER SMELTING CO.

Dead. Was merged, 1903, in San Juan Smeltin
merly at Silverton, San Juan Co., Colo. Described V

KENNEBEC MINING CO.

Office: 414 Atlas Blk., Salt Lake City, Utah.
Salt Lake Co., Utah. W. J. Craig, president; S. M.
general manager; C. M. Dupont, secretary. Organi
laws of Utah, with capitalization $400,000, shares $1
20 claims, 14 patented, area 400 acres, in the Big Cot
opened by tunnel, shows mainly silver-lead ore, and h
in the past. Idle.

KENNECOTT MINES CO.

Office: 165 Broadway, New York, N. Y. Operatin
Mine office: Copper Center, Copper River district,
president; Stephen Birch, general manager; L. S. Le
Organized circa 1907, and is controlled by American

Lands circa 3,000 acres, patented, known as the Bo
ern slope of Bonanza Mountain, east of Kennecott Gl
about 60 miles west of the Canadian boundary, and 1
St. Elias. Property is on the Kennecott River, 4 mile
the Nizina River, which in turn is an affluent of the

River. Lands carry considerable spruce. Ownership was secured after a series of complicated lawsuits. The he Jumbo mine, in the same general district, which has ress, to be an even greater property than the Bonanza. e, discovered circa 1900, has the most remarkable surface any mine in the world, the outcrop being at nearly the rp mountain. The property shows Nicholai greenstone, r of basaltic flows of lava, of Triassic age or older, hard, rably altered, amygdaloidal in places, varying in color reen. The greenstone is overlaid by the Chitistone lime- with bedding planes parallel to the flow planes of the lava, a bluish color, weathered to gray at surface. There also site intrusions and dikes. Ore occurs in more or less fault-zone usually more or less parallel to the fault-planes, cal, but the ore follows, to some extent, minor fault-planes, the vein at various angles, and also follows the bedding- ne, and forms stockwerks and irregular masses in the he outcrop is 20′ to 40′ wide, with an average of about 25′, 400′ in length, the southern half showing 2 nearly parallel to 10′ in width, separated by about 10′ of limestone, show- nd at the northern end of the outcrop the chalcocite bands rs and interlacing seams of chalcocite and azurite, which v the vein northward, and fade out as they pass into barren n ore body apparently extends downward only about 50′ t off, at about that depth, by a bed of shaly limestone form- estone series, which carries merely traces of ore, having only lcocite, bornite and oxidized ores. Underground, beneath l ore bodies, showing a tendency to follow the minor faults, bedding planes. There is a chance of finding continuations, h ore, with further and thorough development, but this y rather than a probability.

massive chalcocite, with a thin coating of azurite and mala- by oxidation. The ore assays up to 74% in copper tenor, lcocite outcrop, including the surface coating of carbonates, 50 and 60% copper. This ore carries up to 22 oz. silver, robably 5 to 8 oz., and a little gold also.

utcrop of high grade chalcocite is so unusual that it has ation. Notwithstanding weighty opinions to the contrary, his body of chalcocite is a primary ore, there being no so- ide ore in the vicinity, while the erosive action of snow and from the outcrop before it can be leached and altered, and zen condition of the ground prevents the free circulation of

he Bonanza outcrop there is a second ore body in the talus, f float ore and limestone that is detrital matter, broken off The slide is about 300′ wide, and extends for about 500′ lope from the outcrop, varying in depth from 3′ to 20′. A sunk on the outcrop, showed an average of 4′ depth, with an 3% copper, this including boulders of chalcocite up to 200 barren limestone. Ore probably will be extracted from the f cuts.

the slide, there probably is as much additional ore that has cliff to the westward, but this is buried in a glacier of mixed debris.

eveloped exclusively by tunnels. The highest tunnel, at an above sea-level, extends through the vein, near the southern

end of the outcrop, from the western face of the ridge, tem of workings from the eastern slope of the ridge, f comprising an upper tunnel extending through the ridge nel, of about 300′ length, directly underneath, with an mediate level running north and south. The mine has a made exclusively by hand work.

An estimate of ore reserves, made by Mr. L. W. Stor ity, while necessarily somewhat rough, is the most acc Mr. Storm estimates 80,000 tons of 50% ore in the Bons tons of 12% ore in the slide, with available ore, of 3 to tween and around the large rich masses, probably equal tonnage, though not in value, these figures leaving o possible but not probable underground extension of the

The mine is connected with the mill at the lowe aërial tram, in 2 sections, the upper of 7,000′ and the drop of 4,000′. The tramline has 40 towers, longest sp at both terminals, and has an estimated hourly capacity camp has the mine buildings, power plant and mill. small steam plant and an air-compressor. Buildings messhouse, assay office and 10,000′ sawmill.

The mill, of 100 tons daily capacity, is terraced, or ore is to be hand-sorted, and lower grade ores, though of are to be concentrated in the mill, and ore and conc Tacoma smelter.

Owing to the inaccessibility of this mine, develop under very great disadvantages, and at phenomenally production being impossible without transportation facili interests have constructed the Copper River & Northw of about $13,000,000, this line, of 195 miles length, star sea, and ending at the lower camp, having had to cope floods, glacial floods, blizzards and other difficulties in operations in an extremely mountainous country near line was completed circa April, 1911, when ore shipmen

The press has been filled with misinformation regar the Guggenheim operations in Alaska. These fabulo mainly under three heads, one being the phenomenal size another group of fairy tales referring to the phenomena mine and building the railway, sufficiently large without ex lot of stories covered, in great detail, the fabulous valu holdings of the Guggenheim interests. The railway undou pensive, and has been rendered more costly in constructi obstructive tactics of the federal government, which has d the right to mine coal in Alaska, which would have resul of the public, as well as to the Guggenheim interests, an import British Columbian coal, at a cost of $12 per ton, in the ground, thanks to the more radical "conservationists use of any natural resource by any important business in the present generation, is nothing short of criminal. Th bly is the highest grade copper mine in the world, and, may be called the most overrated copper mine in the wo ore bodies are found, which is possible, but not entir amount of copper in the Bonanza mine is insufficient to producer of the third rank, not even comparable with suc ine and Mohawk in the Lake Superior district, though mine will be able to produce its entire output within a fe good annual showing, but lasting only a few years.

ATED GOLD MINING & MILLING CO. NEVADA.
y Bank Bldg., Yerington, Nev. Letter returned un-
ne office, Buckskin, Douglas Co., Nev. W. C. Pitt,
bell, vice-president; E. H. Whitacre, secretary; Lyon
Organized under laws of Arizona, with capitalization
r. Lands, about 14 miles west of Yerington, are but
e.

O. MONTANA.
nia City, Madison Co., Mont. Ores carry gold and
er and a 60-ton stampmill. Idle several years.

CONSOLIDATED MINING, ARIZONA.
VELOPMENT CO.
anized, 1906, as Kentucky-Arizona Copper Co. For-
aricopa Co., Ariz. Fully described Vol. VI.

A COPPER CO. ARIZONA.
t Cave Creek, Maricopa Co., Ariz. Described Vol. VIII.

MINING CO. COLORADO.
Cup, Gunnison Co., Colo. Ores carry gold, silver and
wer. Idle several years and apparently moribund.

O. UTAH.
nclaimed from former office, Salt Lake City, Utah.
Juab Co., Utah. J. E. Galigher, president; H. B. Blades,
ne S. Snow, secretary and treasurer; preceding officers,
Tennell, Harry F. Hart and E. J. Howell, directors. Or-
9, under laws of Utah, with capitalization $100,000, shares
y is the eastern part of the Tintic district. Idle.

R CO. BRITISH COLUMBIA.
unclaimed from former office, Spokane, Wash. Mine
st Yale district, B. C. Dan. Schultz, president; Henry M.
Lands, 3 claims, 2 miles from Keremeos, the nearest
in of 14′ reported average width, opened by 3 tunnels, the
0′ long, with about 1,500′ of workings. A small test
made, June, 1908, to the Northport smelter. Presum-

ER MINES, LTD. BRITISH COLUMBIA.
ganized, August, 1903, as Keremeos-Pontiac Mines, Ltd.
East Yale district, B. C. Described Vol. IV.

AC MINES, LTD. BRITISH COLUMBIA.
ad egg. Formerly at Olalla, East Yale district, B. C.

TING & REFINING CO. BRITISH COLUMBIA.
y at Olalla, East Yale district, B. C.

SOLIDATED MINES CO. ALASKA.
Ketchikan, Alaska. Jas. A. Davis, president. Organ-
ws of Maine, with capitalization $5,000,000. Lands, 36
gedo Island. Presumably idle.

PER CO. ALASKA.
y at Ketchikan, Alaska. Described Vol. VII.

OCIATION. MICHIGAN.
Milk St., Boston, Mass. Operating office: Marquette,
, chairman; Dudley S. Dean, secretary and treasurer; John
ral agent. Is a land corporation, holding circa 1,000,000
mber lands, but with some mineral lands, partly on the
r belt, in the upper peninsula of Michigan, taken over from
Ship Canal, Railway & Iron Co.

KEWEENAW COPPER CO.

Office: Hancock, Mich. Mine office: Mandan
Thos. F. Cole, president; Spencer R. Hill, vice-preside
second vice-president and mining director; Chas. A. W
treasurer; preceding officers and Capt. Jas. Hoatson, dir
mine superintendent; Howard G. Wright, mill superint
railway superintendent; Jas. T. Bryant, mining ca
engineer.

Organized March 13, 1905, under laws of Michi
$10,000,000, shares $25 par; issued, $5,000,000; paid i
was $1, May, 1909. Controls, through stock ownersh
dated Copper Co., Washington Copper Mining Co.,
Railroad Co. Total expenditures, exclusive of money
tion of the railway, were $586,783.66 to end of 1910,
expended in 1909. Company ended 1910 with cash a
$101,919.59, and accounts payable of $10,063.74. Has
American Trust Co., Boston, registrar; City Trust Co.
Annual meeting, second Tuesday in February.

Lands are circa 18,500 acres, mainly mineral land
maple, birch, cedar and oak. The tracts are in 3 main g
of the Keweenawan mineral belt for about 14 miles, in
the amygdaloidal and conglomerate cupriferous beds
numerous copper-bearing cross-fissures. Lands are in T
27, 28 and 29 West, and include the tracts formerly own
Harbor, Empire, Girard, Hanover, Keweenaw, Mandar
& Boston, Resolute and Vulcan companies, in addi
through stock ownership in subsidiary corporations.

The company's lands carry nearly 2 miles of wate
of the Montreal River, including Fish Cove, one mile e
which might be made a fair harbor at comparatively sm
age will be available for mills, and as the site of a pow
minal. The lands also include 5 miles of the course of
and, with other holdings, give the company the entire wa
Lake, which the company has rechristened Lake Medo
to use Mosquito Lake for a storage reservoir, by throwin
and developing a great water power, with a hydro-el
mouth of the river. There is a millsite on Bete Gris
Montreal River, having about 5 miles of water frontag

The company also owns the Lac La Belle, or Mend
long, connecting Lac La Belle with Lake Superior. Thi
which should be deepened by the federal government,
haven that should be made a harbor of refuge.

Most of the old mines secured by the company wer
Ætna had a recorded production of 140,881 lbs. fine co
and the Resolute mine had a 379′ shaft, with circa 2,00

The Medora mine, opened circa 1860, had 3 old s
deepest 140′. The Medora amygdaloidal bed, traversi
for about 4 miles, lies immediately under the Allouez con
several hundred feet north of the Montreal River bed.
in average width, is a soft chocolate-colored amygdalo
prehnite, calcite and quartz, in connection with fine
sional heavy copper, a 30″ paystreak along the footw
work, the bed as a whole being bunchy.

The Medora tract also carries other copper-bearing
the Medora fissure vein, outcropping circa 225′ east of
into the shaft at depth. About 100′ south of the Medo

all quantities, and to the northward are the Wolverine width, and the Allouez conglomerate, lying about 280′ at surface.

as reopened on a considerable scale, to depth of 1,700′ h about 2 miles of workings. Considerable work was l bed 230′ north of the Medora, which showed a little mp test of rock from the Medora was begun July 28, larch 31, 1909, results being disappointing, and giving ng a payable mine, hence all work in the mine was . The Medora workings are fully described Vol. VIII. so carries the Medora bed, circa 3 miles east of No. 1 ng and test-pitting, done 1906–1907, on the Empire out 15′ width, carrying some copper at surface. The Montreal River amygdaloid, on which the Manitou did

a diamond drill outfit, and has made extensive borings, of the Medora, Mandan, Resolute and Empire tracts. illing was done in 1909, the several beds paralleling the diamond drilling from the bottom of the Medora shaft, e Allouez conglomerate to the north, and the Osceola nglomerate and other beds south of the Medora. The ickness of 18′ to 37′ carrying a fair amount of copper, ores were taken from the Kearsarge amygdaloidal bed, ere drilled.

gs were begun in the Kearsarge horizon June, 1909, and, g, 2 testpits were started on this bed, July, 1909. The te tract of 2,440 acres carries the Kearsarge bed under itory. The shaft on the Kearsarge bed, known as No. 2, the old Medora workings. No. 2 shaft was 676′ deep, he first permanent level opened at depth of 400′, this est copper yet noted. The shaft is 8x14′, sunk at an izon, the bed having an average dip, so far as determined th of 18′ to 20′. Diamond drilling, 1910, showed both of the Kearsarge formation well mineralized, the upper n of about 17′ and the lower or eastern bed a width of eparated by about 70′ of trap. No. 2 shaft has been inery formerly at No. 1, consisting of a 125-h. p. boiler, versible link-motion hoist, good for 1,000′ depth, and an nt straight-line compound air-compressor. Buildings at ft-rockhouse, with Blake crusher Lake Shore and engine; 24x30′ engine-house; with a 10-drill Ingersoll-Sergeant air-compressor; 22x28′ machine-shop; 20x30′ smithy; hanging-house, and about 20 dwellings. Water is pipeline from Mosquito Lake to a tank at the mine. hone system.

ntral Railroad Co. is a reconstruction of the old Lac La y. The entire capital stock issue, $730,000, is owned by Co. The railway company has $500,000 bonds, not with accounts payable of circa $100,000, presumably Keweenaw Copper Co. The railway, having about 40 s and branches, cost circa $800,000, and runs from Cenrb of Calumet, where connection is had with the Copper Belle. Equipment includes 4 locomotives, 7 passenger rock-cars being of 25 tons capacity each. Railroad arnings in 1907; a $4,883.09 deficit in 1909, and a

Production from the Medora was 122,471 lbs. f
57,091 lbs. in 1909. While the Keweenaw has not yet
and the Medora was a failure, the company owns an im
lands, and a profitable mine should be developed in tim

KEWEENAW COPPER CO.

Dead. Had no connection with present Keweenaw
at Delaware Mine, Keweenaw Co., Mich. Described

KEWEENAW WESTERN DEVELOPMENT ASSOCIATION.

Office: Summerfield Block, Cloquet, Minn.
Pine Co., Minn. F. V. Inskeep, president; H. Berglu
Lancelot, secretary; Gust Berglund, treasurer; Wm. K
preceding officers, Hon. W. H. Skemp, C. E. Wilander,
Krelwitz, H. H. Austin and John Kotka, directors.
under laws of Arizona, with capitalization $1,000,000,
able; issued, $428,520.

Lands, 160 acres, held under contract, carrying the
Keweenawan copper-bearing bedded series, having a st
of 75° with the horizon, presumably to the southward.
under development, traced a quarter-mile, carries nativ
shaft with a 100′ crosscut.

Equipment includes a 35-h. p. steam plant, wit
depth, and a 5-drill Rand air-compressor. There are 2
idle.

KEY CITY COPPER CO.

Dead. Formerly at Mt. Sicker, Vancouver Island, B

KEYSTONE-ARIZONA COPPER CO.

Office: 1609 Commonwealth Bldg., Pittsburg,
Valley, Yavapai Co., Ariz. Geo. S. Sarver, treasurer o
tee of the P. A. Mining Co., filed a bill of equity, Sept
Smith, of Pittsburg, alleging that he entered into a cont
1910, for sale of the assets of the P. A. Mining Co. to th
per Co., payable in bonds of latter, and that Smith un
securities on 50% commission, but that Smith obtaine
Trust Co., Pittsburg, without legal consent, or the pa
worth of bonds, and withheld possession of part of th
trary to the agreement. No trace of operations secu
financing. Is not regarded favorably.

KEYSTONE COPPER CO.

Dead. Was succeeded, circa August, 1909, by Ne
Formerly at Globe, Gila Co., Ariz. Very fully describ

KEYSTONE COPPER & GOLD MINING CO.

Office: 502 Park Bldg., Pittsburg, Pa. Letter r
former mine office, Wickenburg, Maricopa Co., Ariz.
W. J. Strassburger, secretary and general manager; W
Organized 1900, under laws of Arizona, with capitali
$10 par, nonassessable.

Lands, 9 claims, patented, area circa 180 acres, in
A group of 15 claims in the Blue Tank district was surr
oped to depth of 550′, and for length of 1,600′, with o
estimated to show 150,000 tons of sulphide ore. Comp
gation, 1901, that continued until 1909. Idle some y

KEYSTONE COPPER MINING CO.

Office: 603 West Broadway, Newton, Kans.
Cochise Co., Ariz. W. W. Miller, president and gener
vice-president; T. C. Miller, secretary; W. S. Tyner,

ceding officers, Wm. Dyck, Dr. W. G. Graybill, E. B. directors; Doane Merrell, territorial agent. Organ-a, with capitalization $900,000. Lands, 16 claims, nited, having a vein of about 15′ width, with a strong 5′ paystreak of ore assaying up to 15% copper. De-line shaft, in limestone, showing chalcocite. A test high grade copper ore was made to El Paso smelter, th a force of 10 men, at last accounts.

INING CO. **NEW MEXICO.**

Pa. Mine office: Tres Piedras, Taos Co., N. M. s the Payroll mine, in the Bromide district, opened wing a vein of sulphide ore said to be 20′ wide and with fair gold values. Has steam power and a 50-ton years and apparently moribund.

MELTER CO. **MÉXICO.**

ldg., Philadelphia, Pa. Operating office: Apartado Iine office: Tapalpa, Sayula, Jalisco, Mex. Robert ard E. Cattel, vice-president and chairman of execu-. Lee, secretary; Daniel Lamont, Jr., treasurer; Theo. ager. Organized 1901, under laws of New Jersey, with creased, July 6, 1905, to $500,000, shares $1 par. Had ficates of indebtedness, at 6%, redeemable Dec. 10, ere not fully redeemed, though said to have been re-y May, 1910, when a receiver was asked, but appar-

tares, in 5 groups, including the Mexicana, América imber rights to circa 50,000 acres of adjoining lands. on La Mexicana group, area 82 hectares, 15 miles west 200-metre crosscut tunnel, cutting 4 veins, with about eins are fissures in porphyry, averaging 5′ width, carry-iferous chalcopyrite, sphalerite and pyrite.

steam and electric power. There is a 30-ton mill, s and 3 concentrating tables. A small smelter, built reverberatory furnace, making matte of 30 to 48% ted, which was for a short time only, and the smelter ears ago. It was planned to add a cyanide plant for out apparently this was not done. Company bought 0 tons daily capacity, 1908, and was said to plan remov-reduction plant was remodeled and put in operation,

COPPER CO. **ARIZONA.**

Clifton, Graham Co., Ariz. Described Vol. VIII.

CO. **IDAHO.**

g, Pa. Mine office: Weiser, Washington Co., Idaho. and treasurer. Lands were bought for $10,000, October, Springs Mining Co. Presumably idle.

ELOP- **COLORADO & WYOMING.**

r, Colo. Mine office: Downington, from former mine office, Boulder, nt and general manager; Wm. ganized Apr. 18, 1904, under ares $1 par, as successor of Colorado and Wyoming. ea 20 acres, the Dirigo area 40 acres, all in

Boulder county. Principal development seems to be on
erties. The Wyoming lands, area 206 acres, on Beav
south of Encampment, include the Kearns mine, open
the 160-acre Downington townsite. Idle several years
bund.

KEY TO SUCCESS COPPER MINING, SMELTING EXPLORATION CO., LTD.

Dead. Was reorganized, circa 1908, as Milford-
merly at Frisco, Beaver Co., Utah. Described Vol. V

KEY WEST MINING CO.

Mine office: Bunkerville, Lincoln Co., Nev. Ores
nickel and platinum. Idle several years.

KHAYYAM COPPER CO.

Dead. Was merged, circa 1904, in Omar Mining C
Alaska.

KIADEBEK MINE.

Owned by Berg- und Hüttenwerke Kedabeg.

KIDOGASAWA MINE.

Mine office: Fujihara-mura, Shioya-gori, Shimo
tion was 154,256 lbs. fine copper, 1908.

KILLEEN MINING SYNDICATE, LTD.

Office: 19 Brazenose St., Manchester, Eng.
County Tipperary, Ireland. C. C. Singleton, W. Ru
directors; L. W. Sadler, secretary. Organized Jan. 19, 1
Britain, with capitalization £1,500, shares £1 par; iss
miles east of Newport, have Llandovery beds of the
point of junction with old red sandstone, in the san
the copper mines in the southwestern part of County
discovered by a turf-digger, circa 1905, and 130 long ton
obtained from opencuts. The mine has a shallow shaft,
27% copper tenor, and was working, on a limited scale,

KILLINGDAL KOBBERVAERK.

Operated under lease by Bede Metal & Chemical

KIMBALL CREEK MINING CO.

Dead. Formerly at Berlin, King Co., Wash. Des

KIMBERLEY SYNDICATE. W

Dead. Formerly at Derby, Western Australia. I

KINCORA MINING CO.

Dead. Former office was 102 South Main St., Salt
cers were Ray Van Cott, president; A. H. Crabbe, vice-p
ter, Jr., secretary; F. B. Waddell, treasurer. Organized
laws of Utah, with capitalization $500,000, shares $1
were 8 claims, unpatented, near the Cactus mine of the
the Beaver Lake district, 6 miles from a railroad, showi
and auriferous lead ore, developed by a 200′ tunnel.
Beaver Co., Utah.

KIN-E-CHY MINING & MILLING CO.

Office: 1112 Majestic Bldg., Detroit, Mich.
Cochise Co., Ariz. Moribund. Described Vol. VIII.

KING COPPER MINING CO. OF NEVADA.

Office: 431–53 State St., Boston, Mass. Letter r
former mine office, Lovelock, Humboldt Co., Nev. Pro
mine, carrying auriferous and argentiferous copper o
Long idle, and moribund.

KING DAVID MINING CO.

Office: Provo, Utah. Letter returned unclaimed

. Jesse Knight, president; David Evans, vice-presi-
Allen, secretary and treasurer. Organized circa 1908,
capitalization $500,000, shares 50 cents par, assessable,
business with $50,000 in the treasury.
bout half patented, adjoining the Horn Silver mine,
vn as the Reciprocity group, bought December, 1908,
ent of the debts of the Reciprocity company. Property
as, and is supposed to carry the extension of the Horn
n 800′ two-compartment shaft, showing values mainly
me chalcopyrite.
two 80-h. p. boilers, a 12x14″ double-drum hoist, and a
Principal buildings are of steel frame. Water is sup-
e. Property was developed vigorously, but not satis-
closed down May, 1910.

T CO. ARIZONA.
d, circa 1904, in Consolidated King Development &
g Co. Formerly at Jerome, Yavapai Co., Ariz.

ES, LTD. BRITISH COLUMBIA.
Fairview, Boundary district, B. C. R. H. Parkinson,
ce-president; D. Braithwaite, secretary and treasurer;
Carmichael and W. A. Hainig, directors. Organized
ws of British Columbia, with capitalization $500,000,
0 claims, area 500 acres, in the Similkameen division of
ened by 350′ of workings, show a sulphide ore body of 6′
to average 5% copper and about $1.50 per ton in com-
lues. Presumably idle.

ING CO. ONTARIO.
t Thessalon, Algoma, Ont. Fully described Vol. VII.

PER MINING CO. WASHINGTON.
, Wash. Letter returned unclaimed from former mine
ens Co., Wash. Moribund. Described Vol. VIII.

PER MINING & MILLING CO. CALIFORNIA.
indle. Formerly at Victor, San Bernardino Co., Cal.

NING CO. NEW MEXICO.
at Steins, Grant Co., N. M.

G & REFINING CO. ARIZONA.
eeded by Union Smelting Co. Formerly at Kingman,

WYOMING.
Neb. Letters returned unclaimed from former mine
oon Co., Wyo. Thos. Carroll, president and general
ecretary; Jas. H. Knowles, treasurer. Lands were sold
ing & Smelting Co., but were taken back, circa 190
veloped claims near the South Fork and Cascades mi

LTD. BRITISH COLU
ganized, circa 1903, as Denoro Mines, Ltd. Form
. C.

PER CO. MIC
Washington St., Boston, Mass. Operatin
ine office: Winona, Houghton Co., Mich.
eo. P. Gardner, vice-president; preceding officer
Goodell, Nathaniel H. Stone, C. J. Paine and
ard B. O'Connor, secretary and treasurer; Dr.
er R. Seeber, superintendent; Frank G. Lukey,

Organized Nov. 13, 1905, under laws of Mich
$2,500,000, fully issued; paid in, $13, to March, 1911.
$1, August, 1908; $1, December, 1908; $2, November
January, 1911. Company ended 1910 with $97,538
able, and $13,970 accounts payable. Is controlled, th
shares, by St. Mary's Mineral Land Co. City Tru
Annual meeting, third Wednesday in March.

Lands, 1,040 acres, in Houghton and Ontonagon
main tract lying about one mile south of the Win
changed parcels of 5 acres with the Winona Copper Co
permitting each to work to better advantage in sha
The lands were quite thoroughly probed by diamond
were started.

The mine is opened by 2 shafts, both sunk in the f
and the mine is connected with the Winona on the
Rock filling is to be used underground. The Winon
in width, on this property, and carries considerable
1910 working 11 drills.

No. 1 shaft, 1,001′ south of the Winona bounda
about 85′ in the footwall, at an angle of 70°, and ended

No. 2 shaft is 2,780′ south of No. 1, on the south
and 3,400′ from the southern boundary of the tract.
footwall, was 1,108′ deep, at end of 1910, with crosscut
levels, to the Winona bed, which gives a fair showing,

Equipment at No. 1 shaft includes an electric hoi
Winona, and No. 2 shaft has an isolated steam hoi
houses are temporary. The King Philip takes electri
and in return furnishes compressed air. The 28x40′
of two 200-h. p. Parker tubular boilers, coal being
through a concrete tunnel, under a coal-trestle surmo
The 34x40′ power-house has a 60-drill Nordberg 3-sta
drill and 15-drill auxiliary compressors.

Buildings include a 26x36′ warehouse, 15x24′
house, 24x36′ office, 20x50′ cookhouse, 24x62′ bunkhou
for employés, these being 6-room electric-lighted ho
able and homelike.

It was proposed, early 1911, to merge this compa
Co., by doubling the capitalization of the Winona, and
for 3 shares of King Philip stock. The mine, as devel
no means hopeless, and, in combination with the Win
prospects of making good.

KING & QUEEN COPPER CO.

Mine office: Steins, Grant Co., N. M. Lands
and Johnny Bull mines. Idle.

KING & QUEEN MINING CO.

Office: 1007 Bessemer Bldg., Pittsburg, Pa.
Missoula Co., Mont. O. P. Weaver, president; G.
dent; John F. Hinckley, secretary; H. A. Spangler, t
22, 1905, under laws of Montana, practically as a reco
Mining & Development Co., with capitalization $1,0

Lands, 15 claims, partly patented, area 188 acr
well timbered, 3½ miles from Carter, the nearest rail
district. Property carries limestone, quartzite and
posits between quartzite and limestone, of which one
estimated average width, formerly was reported as
6.5% copper, 16% lead and 16 oz. silver per ton,

., and is now reported to average 4.5% copper and 12 oz.
l values ranging up to 8 oz. per ton. Apparently values
in argentiferous galena. The mine has a 700′ crosscut
riven 1,800′, which tunnel formerly was reported as 1,200′
0′, and a shaft, formerly reported as 600′ deep, but having
Mine was said, circa 1908, to have about 3,000′ of work-
able ore.
es an 80-h. p. boiler, 25-h. p. hoist and 6-drill duplex
e are several small mine buildings, and a 6,000′ sawmill.
roducer, for about 10 years, before bought by present own-
pped a little ore, 1910, said to have netted about $21 per
centrator, with a first unit of 75 tons capacity.

IINES. **BRITISH COLUMBIA.**
B. C. Letter returned unclaimed from former mine
couver Island, B. C. Moribund. Described Vol. VIII.

MINING CO. **BRITISH COLUMBIA.**
at Greenwood, Boundary district, B. C. Described

MINING CO. **MONTANA.**
ancey, Jefferson Co., Mont. S. N. Moreland, president;
ger. Lands, on Clancey Creek, 2 miles west of Clancey,
pth of about 500′, showing, on the 300′ level, a vein of 6″
mated average of about 2′, carrying ore assaying up to 3%
l 190 oz. silver per ton. Idle at end of 1910, but planned
1.

TUNNEL & DEVELOPMENT CO. **COLORADO.**
jestic Bldg., Denver, Colo. Mine office: Frisco, Summit
nsmore, president and general manager; Samuel H. Alex-
; W. W. Theobald, secretary; O. A. King, treasurer; pre-
Theobald, F. B. Fluck and C. M. Rome, directors; Daniel
Organized January, 1903, under laws of South Dakota,
2,500,000, shares $5 par, nonassessable, as successor of King
ing Co.
quarts-claims, and about 20 placer claims, in the Ten Mile
as fissure veins in granite, carrying auriferous and argen-
lead ores, developed by a tunnel of 4,700′ reported length.
a 160-h. p. steam and electric plant, with an 8-drill Ingersoll-
.

TUNNEL MINING CO. **COLORADO.**
organized as King Solomon Tunnel & Development Co.
Summit Co., Colo.

& COPPER MINING CO., LTD. **BRITISH COLUMBIA.**
chester St., Quebec, Que. Mine office: Hedley, Boundary
A. Marsh, president; Vezey Boswell, vice-president; pre-
. John Sharpless, C. A. E. Boswell and A. B. Clahon, direct-
secretary and treasurer; Fred M. Wells, local manager. Or-
r laws of British Columbia, with capitalization $1,000,000,

, 1 fractional, showing slightly auriferous and argentiferous
and mispickel, with ore that probably could be hand-sorted
% copper, with fair gold values. Development, mainly on the
Horse claims, includes some stripping, several opencuts and
ls.
old, 1910, to the Redeemable Investment Co., of Boston, for
was bought, February, 1911, to have this sale set aside,
[illegible]

KING WILLIAM MINING CO.

Office: 546 East First South St., Salt Lake C
Eureka, Juab Co., Utah. Chas. H. Blanchard, presid
J. H. Rouse, vice-president; A. C. Ellis, Jr., secretary;
urer; W. M. Owen, superintendent. Organized 1907
with capitalization $1,250,000, shares $1.25 par, no
listed on the Salt Lake stock exchange.

Lands, 2 claims, surrounded by the holdings of
Centennial-Eureka and Grand Central. Developmen
Blue Bell workings, on the 500′ and 1,000′ levels, corr
and 1,900′ levels of the King William. There are se
in present use, with no surface improvements, none

KINSLEY CONSOLIDATED MINES CO.

Office: Herald Bldg., Salt Lake City, Utah. M
Co., Nev. R. W. Young, president; Newton A. Du
consulting engineer; W. T. Atkin, secretary and treasur
ant secretary and treasurer; preceding officers, Thos.
Henry Green, T. C. Callister, Henry T. McEwan and
I. A. Dunyon, superintendent. Capitalization $1,000,
erty is an old mine, apparently formerly a producer.
vein giving assays of 1.5 to 6% copper, and circa 4 oz.
a parallel vein, 250′ to the westward. A little ore was

KINSLEY DEVELOPMENT CO.

Office: Herald Bldg., Salt Lake City, Utah. M
Co., Nev. John D. Kendall, president; W. M. Bradley
A. Dunyon, secretary, treasurer and manager; R. J. Dei
preceding officers, B. F. Beaur and Wm. Pischell,
$1,000,000, shares $1 par. Lands, 30 miles from Curri
auriferous copper and lead sulphides, with carbonate o
and a 4″ vein of molybdenite. A little ore, shipped
about $40 per ton net value.

KIRKEBY KOBBERGRUBER.

Office: Carl Johansgade 23-IV, Christiania,
Hakedal, Christiania, Norway. Olaf Sandaas, manage
Bentzen, superintendent. Lands, about 10 kilomet
numerous parallel veins, with cross-fissures, carryin
chalcopyrite, galena, sphalerite and pyrite, with quartz

KIRK LEASING CO.

Mine office: Bingham Canyon, Salt Lake Co.,
general manager. Organized circa October, 1908, to
from the Boston Consolidated Mining Co. Presumab

KISHORN MINE.

Office and mine: care Mrs. M. M. H. Stewar
Carron, Rosshire, Scotland. Mine was worked about t
or opening of the Nineteenth Century, but since idle
work, with circa 80 men, for a short time, 1904.

KISMET MINING CO.

Office: 325 Brooks Arcade, Salt Lake City, Uta
Lincoln Co., Nev. Wm. R. Wallace, president; R.
J. E. Berkeley, secretary and treasurer. Organized
capitalization $250,000, shares 25 cents par, nonasse
Lands, 9 claims, in process of patenting, 8 miles north
development work was in progress, at last accounts.

KITANNING COPPER MINING CO.

Dead. Formerly at Index, Snohomish Co., Wash

IE. **JAPAN.**
-mura, Mine-gori, Nagato, Japan. Masashi Kuwabara,
, includes a 40-h. p. steam plant. Employs an average
tion was 111,129 lbs. fine copper in 1907, and 53,250 lbs.

-COPPER MINE, LTD. **SOUTH AUSTRALIA.**
ere sold, 1906, to Port Lincoln Copper Co., Ltd. For-
, Robe Co., South Australia. Described Vol. VI.

CO. **COLORADO.**
nado Bldg., Denver, Colo. Mine office: Silverton, San
vid B. Carey, president; R. Thomas, secretary; F. B.
B. Clark, manager. Capitalization, originally $1,000,000,
10, to $1,250,000. Report filed with the state, February,
dness of $227,992.46. Lands, circa 650 acres, unpatented,
d lease, with a part interest in one patented placer claim.
a vein of about 12′ width, carrying auriferous copper ore,
d-copper ore of milling grade. Equipment includes steam
mill. Company was said, July, 1910, to have contracted
oncentrating several thousand tons of ore.

UBER. **NORWAY.**
eitan, Aalen, Guldalen, Trondhjem, Norway. Tönne
roperty formerly was owned by Kjöli Mines, Ltd., which
Mine is said to have a 10-mile aërial tram. Production,
tric tons of cupriferous pyrite. Idle.

D. **NORWAY.**
ds 1908. Formerly at Reitan, Aalen, Guldalen, Trondhjem,
Vol. VI.

OPPER MINES, LTD. **TRANSVAAL.**
en Victoria St., London, E. C., Eng. Letter returned un-
mine office, Pietersburg, Zoutpansberg, Transvaal. Robt.
n, chairman; preceding officer, Adrien L. Lambert and
directors; Victor Thomasset, secretary. Organized March
f Great Britain, with capitalization £60,000, shares £1 par;
ands are 444 copper claims, near the Klein Letaba River,
ted Gold Trust, Ltd., for £500 cash and £40,000 in fully paid
operations secured, and apparently idle since organization.

KLINGENTHAL-GRASLITZER **GERMANY.**
BAU.
Klingenthal, Saxony, Germany. Erhardt August Scheidt,
officer, Herr Göring, Richard Keil, C. L. Birk and Gerh.
mmittee; E. von Baczko, manager; Herr Utsch, superintend-
1,000 shares, without assigned value. Employs about 300

eveloped by the 100-meter Erhardt-August shaft, and the
Kupferhübel, developing copper sulphides. The company
. Peter Fundgrube.
udes ore dressing works and a smelter, near Barby. The
1910, to have issued bonds of 2,000,000 marks, for the pur-
ulphuric acid plant and a new smelter.

AQUALAND) COPPER **CAPE COLONY.**
LTD.
iquidated, voluntarily, 1904. Formerly at O'okiep, Little
pe Colony.

CO. **COLORADO.**
Pearl, Larimer Co., Colo. Was controlled, through stock
tional Mining & Milling Co., which disappeared. Lands, 9

claims, area 80 acres, known as the Big Horn group, gneiss and diorite, opened by shafts of 65′ and 85′, occasional bornite. Has a 25-h. p. steam hoist. Idle bly moribund.

KNICKERBOCKER DEVELOPMENT CO.

Dead. Formerly at Helena, Lewis & Clark Co., M

KNICKERBOCKER MINING CO.

Dead. Formerly at Butte, Silver Bow Co., Mon

KNIGHT COPPER CO.

Mine office: Humboldt, Yavapai Co., Ariz. W. general manager; W. F. Whitney, vice-president; J. E Moore, treasurer. Organized May, 1907, under laws zation $1,500,000, shares $1 par. Lands, 5 claims, are of the Humboldt smelter, showing schist and a fe carrying lenses of ore of 15′ to 75′ estimated average w 4% copper, with high grade paystreaks. Developme 175′ tunnel. Presumably idle.

KNIGHT INVESTMENT CO.

Office: Knight Blk., Provo, Utah. Jesse Knigh Knight, vice-president; R. Eugene Allen, secretary officers, Raymond Knight, W. Lester Mangum, J. Knight, directors. This company controls a large nu ing from prospects up to successful dividend-paying m of Juab county, Utah.

KNIGHT'S ISLAND-ALASKA COPPER CO.

Office: 902 Lowman St., Seattle, Wash. Letter former mine office, Valdez, Prince William Sound, secretary; Wm. Egan, superintendent, at last account half mile northeast of Northeast Cove, on Dryer Ba erty has a schistose ore channel, up to 25′ width, in copyrite, associated with pyrrhotite, with quartz gan tunnel. Idle.

KNIGHT'S ISLAND CONSOLIDATED COPPER

Office: 265 La Salle St., Chicago, Ills. Operati Block, Seattle, Wash. Letter returned unclaimed Valdez, Prince William Sound district, Alaska. A. J. Sayer, vice-president; J. E. Slocum, secretary; John ceding officers, A. W. Cutten, Grant G. Chase, John F Munger and Sydney Stein, directors. Organized Sep Washington, with capitalization $1,000,000, shares through stock ownership of $505,480, by Hubbard-El

Lands, 37 claims, area 640 acres, formerly having acres, in 5 groups. Development is by a 250′ tunnel and a 300′ tunnel on the Little Urchin claim, showing 20% copper, associated with pyrite and pyrrhotite California claim shows nickel-cobalt ore giving assays

Property was equipped with a Riblet aërial tram, tunnel with the ore bunkers on the wharf, and had a was put on the wrong side of the hill, and the wharf, o into the bay. Idle.

KNIGHT'S ISLAND COPPER MINING CO.

Office and mine: Valdez, Prince William Soun president and treasurer; O. P. Brown, vice-president and manager; preceding officers, Chas. Kraemer, R. and Swan Johnson, directors; Geo. Wolintine, superin laws of Alaska, with capitalization $1,000,000, shares

nds were in sight, but had not overtaken them, early in

fractional, area circa 150 acres, near tidewater, on Dryer Alaska. Property carries 2 veins, one having a gossan developed by 3 crosscut tunnels and a 60′ shaft, showing hipments to the Tacoma smelter returned 19.35% copper. el, cuts a vein carrying chalcopyrite giving assays of 8.2% ′ drift tunnel, on a vein of 3′ to 7′ width, from which some to Tacoma. No. 3, the main tunnel, with portal 3,000′ planned to be driven 1,350′, to crosscut 5 veins, at approx- portal of 400′, 500′, 700′, 850′ and 1,350′, with backs of 250′

les a hydraulic plant, said to be 200 h. p., having 1,400′ water-wheel actuating a 4-drill air-compressor. A trial vas made, July, 1907, to the Tacoma smelter, but further m-line are necessary for regular production. Employed 12

MINING & DEVELOPMENT CO. **ALASKA.**

ngton Ave., New York, N. Y. Mine office: Valdez, Prince ka. W. C. Rothkranz, president and general manager; ident and secretary; Robert Kutschinski, superintendent. uis Bay, said to have 11 veins of 12′ average width, carrying g 12% copper, which figures are highly creditable to the e party making them. One vein is said to have a 2′ hang- ore, claimed to assay 25% copper, with small gold ncludes a small power plant and sawmill. Presumably idle.

MINING CO., LTD. **BRITISH COLUMBIA.**

rged, March 29, 1901, in Granby Consolidated Mining, ., Ltd. Formerly at Phœnix, Boundary district, B. C.

INES. **IRELAND.**

ahon Copper Mines Development Syndicate, Ltd.

NG CO. **MICHIGAN.**

y at Greenland, Ontonagon Co., Mich. Described Vol. VIII.

CO. **JAPAN.**

oyoka-mura, Kauchi-gori, Shimotsuke, Japan. Mine has a Production, 1907, was 92,474 lbs. fine copper, and 1908 nploying an average of 150 persons.

JAPAN.

sunekanemaru-mura, Ashina-gori, Bingo, Japan. Is an old 893. Ore is chalcopyrite, associated with sphalerite, pyrite atite, all argentiferous, in a fissure vein 4′ to 8′ wide, with ornblende. Country rock is hornblende-granite. Concen- 13.4% copper and 4% silver. Production, 1900, was er. Idle.

ER MINING & MILLING CO. **COLORADO.**

rly at Dumont, Clear Creek Co., Colo. Described Vol. V.

JAPAN.

Kawabe-mura, Shonan-gori, Mimasaka, Japan. Yekiji ine, opened 1882, carries chalcopyrite, associated with pyrite s of sphalerite, ore occurring in lenses, largest 60′ in width, sandstone and clay-slate. Equipment includes a 60-h. p. verage forces, 1908, were 68 hands. Production was 348,497 1899; 232,882 lbs. in 1903; 196,929 lbs. in 1907, and 258,432 165 kwan copper ore in 1908.

JAPAN.

tsu Bishi Goshi-Kwaisha.

KOOTENAI COPPER MINING & SMELTING CO.
Dead. Formerly at Port Hill, Bonner Co., Idaho.

KOOTENAI COUNTY MINING CO.
Letter returned unclaimed from former office, Detr
Priest River, Bonner Co., Idaho. Capitalization $2,0
Lands are at the eastern end of Priest Lake. Idle sever
moribund.

KOOTENAI MINING & MILLING CO., NO. 2.
Mine office: Priest River, Bonner Co., Idaho. I
head of Priest Lake, opened by tunnels of 30′ and 40′, s
average assays in copper and silver. Presumably idle.

KOOTENAY COPPER MINING CO., LTD. E
Letter returned unclaimed from former office, S
office: Creston, West Kootenay, British Columbia.
Organized circa 1906, with capitalization $50,000, shares
apparently moribund.

KOPERMYN SYNDICATE, LTD.
Dead. Was succeeded, Oct. 19, 1905, by Koperm
Formerly at Marabastad, Zoutpansberg, Transvaal.

KOPERMYN (TRANSVAAL), LTD.
Office: 237 Finsbury Pavement House, London, E.
Marabastad, Zoutpansberg, Transvaal. T. E. Crispe, K
J. McL. Cameron and Capt. J. S. Orr, directors; E. C. C.
ganized Oct. 19, 1905, under laws of Great Britain, with c
in 100,000 shares of £1 par and 2,000 shares of £10 par; is
Lands are two-thirds of Kopermyn No. 2, which ha
Property, 19 miles southeast of Pietersburg, was bough
Trust, Ltd. Mine is estimated to have developed 45,000
aging 6% copper and 2 dwts. gold, which tonnage seems
extremely limited development secured, and the average g
Idle.

KOPPER KROWN MINING CO.
Dead. Was merged, 1909, in Hecla Consolidated M
Hecla, Laramie Co., Wyo. Described Vol. VIII.

KOSAKA MINE.
Owned by Fujita-Gumi & Co., at Kosaka-mura,
Japan.

KOTSINA COPPER CO.
Dead. Formerly at Kotsina, Copper River distric
Vol. VIII.

KREMLIN MINING CO.
Dead. Former office was Salt Lake City, Utah.
shaft, and drained through the main tunnel of the Bingh
said to show a large body of concentrating ore on the 30
Bingham Canyon, Salt Lake Co., Utah.

KRISTIANIA MINEKOMPANI.
Office: Christiania, Norway. Mine office: Skaf
Christiansand, Norway. Property is the Bandakslid K
and the Goli Kobbergruber at Sauland, on which a little
under way, 1909. Company also owns copper claims at

KRUGER COPPER & SILVER MINING CO.
Dead. Formerly at Cusihuiriáchic, Iturbide, Chi
described Vol. VII.

KRUG GOLD & COPPER MINING CO.
Office and mine: Chewelah, Stevens Co., Wash.
dent; August Krug, secretary and general manager; T.

2, 1906, under laws of Washington, with capitalization ar, nonassessable. Annual meeting, last Saturday in

fractional, area 185 acres, known as the Hartford group, ewelah, showing 8 contact deposits, under development, een diabase and schist, with NS. strike and dip of 40°. spect shafts, of 25′ to 35′ depth, and a 340′ tunnel, show- pper and galena, all argentiferous and auriferous. Com- ne tunnel and sinking a permanent shaft.

HLENBERGER ZUG. **GERMANY.**

laimed from former office, Düsseldorf, Germany. Mine n, Germany. Rud. Küpper, Gustaf Zyrsch and H. Was- committee; H. Schönnenbeck, general manager. Or- Germany, with capitalization 1,000 shares, without include the Kuhlenberg and Alwein mines, carrying an omplex of lead, zinc, copper and iron, but present opera- mining of iron ore, with a force of about 150 men, secur- n of about 8,000 metric tons. There is a small ore dress-

JAPAN.

va Mining Co.

PFERBERG. **GERMANY.**

t Kupferberg, Bavaria, Germany.

PFERBERG. **GERMANY.**

zberg, Rheinprovinz, Prussia, Germany. Julius August eding officer, Emil Guilleaume, Otto Haagmann, Otto Hoffmann, executive committee. Organized under laws of zation 3,000,000 marks, shares 3,000 marks par. Bonds, %. Employs about 180 men. Property, carrying cop- h, includes the Danielszug mine, on which development agement plans further development, and the installation r-compressor and concentrator. It is planned organizing e over property of this company, and the Glanzenberg on of 10,000,000 marks.

DES MINES DE CUIVRE **GERMANY.**

G.

Belgium. Letter returned unclaimed from former mine aria, Germany. Chas. Leys, commissaire; J. W. Arendt, nized June 15, 1904, under laws of Belgium, with capi- ares f500 par.

s, including the former holdings of Konsolidierte Kupfer- Messrs. Hans Praeger, Victor Veysy and Franz Juhasz ormerly held by Gewerkschaft Boberthaler Erzberg- explore certain parcels of land in the south and south- ncession, also 3½ hectares of land near Kupferberg, and iving in return the entire capital stock of the company, bonds, from an authorized issue of f1,000,000, at 5%. noribund.

HAFT ZUR GEWINNUNG UND **GERMANY.**

VON KUPFERERZEN.

benbürgen, Brandenburg, Prussia, Germany. Jacob its Klausner, A. Zwack, Alb. Bruck and Martin Kondor, nder laws of Germany, with capitalization 80,000 marks, e entire capital stock. Properties, in the vicinity of Sie- prospect stage, and presumably idle.

KUPFERKIESBERGBAU KUPFERPLATTE.

Mine office: Kitzbühel, Tyrol, Austria. P
carrying bedded deposits of chalcopyrite, with qu
Mine was a small producer, circa 1905. Presum

KUPREANOF COPPER MINING CO.

Letter returned unclaimed from former office
Petersburg, Kupreanof Island, Alaska. Organize
laws of Arizona, with capitalization $1,000,000, sh
rich and L. L. Gates. Lands are near Duncan can
trace of operations secured, and presumably morib

KUPREANOF COPPER MINING & SMELTIN

Mine office: Petersburg, Kupreanof Island
manager. Lands, 4 claims, area 78 acres, showing
main vein of about 6′ width, dipping into the m
copyrite, associated with pyrite, with quartz and f
to average about 4% copper and $2 per ton in co
Development is by stripping, trenching, prospecti
Was developing, with a small force, at last accou

KUROTAKI MINE.

Mine office: Motokawa-mura, Tosa-gori, T
distance only from the famous Besshi. Ore is cha
ing 10% and second grade 2 to 4% copper. Beds
widths and values being found in the saddles and
10′ thickness. Production was 151,890 lbs. fine
1907, and 82,767 lbs. in 1908.

KURTZ-CHATTERTON COPPER MINING C

Dead. Was succeeded by Chatterton Minin
ment, Carbon Co., Wyo. Fully described Vol. IV

KUSAKURA MINE.

Owned by Furukawa Mining Co.

KUYKENDAL MINING CO.

Mine office: Carlsbad, Eddy Co., N. M.
accounts. Lands are 13 miles from Carlsbad.

KVANANGENS KOBBERGRUBER.

Owned by Altens Kobbergruber.

KWAGGAFONTEIN SYNDICATE, LTD.

Dead. Formerly at Nylstroom, Waterberg, Tr

KYHACO COPPER MINING CO.

Dead. Former office was Shawnee, Okla.
president; C. A. Miles, vice-president; A. M. Coffi
treasurer; preceding officers, Jas. H. Kyner, C. J
directors. Organized under laws of Oklahoma, w
and was merged, 1908, in Shawnee-Wyoming Cop
Encampment, Carbon Co., Wyo.

KYLOE COPPER MINES, N. L.

Office: Sydney, N. S. W., Australia. Mine
Co., N. S. W., Australia. J. W. Ashcroft, chairma
Taylor Young, A. G. de Lauret and J. T. Toohey,
eral manager. For fiscal year ending July 31, 191
dend, of £1,000, on preferred shares, and two inte
preference and ordinary shares, giving total divide
interim dividend of £3,000 July 30, 1910.

The mine, 3 miles from Adaminaby and 30 m
rail point, was discovered 1860, and a little ore was
until taken over, 1904, by Schafer Bros., who shipp
returning 11 to 25% copper, to the Waratah smelte

, in felsite, passing into aplitic and biotitic granite away The oxidized zone carries malachite, azurite and cuprite, about 40′, by bornite, and a little finely disseminated chalcopyrite, associated with small quantities of pyrite, ere being impregnations of chalcopyrite in the granitic e, of milling grade, averages about 4.5% copper. The haft, with levels at 120′, 200′, 300′ and 400′, opened for stimated, June 30, 1910, to have reserves blocked out of ore, and 29,500 long tons of 6% milling ore, latter esti- g considered too high. The mine has two 25-ton ore-bins. s a steam plant with a 10x15″ Thompson double-cylinder ch air-compressor, and an electric light plant. Buildings , office and store. Water is taken from the Eucumbine t, with a pumping plant on Frying Pan Creek, pipelines -gallon storage tanks, near the mill.

has a Krupp ball mill and jigs, treating ore averaging d turns out concentrates of about 16% copper tenor.

eap-roasting, heaps of 60 to 80 tons of green ore requiring Fines are calcined in a McMurtry sintering pot, and d, with the addition of 6% of green ore, in a small rever- g matte of 45 to 50% copper tenor, shipped for conversion ectrolytic Refining & Smelting Co. of Australia, Ltd., at ntly the smelter was out of commission, September, 1910. ear ending July, 1910, was 12,582 tons of ore. Production ,000,000 lbs. fine copper for 1909.

ATION, LTD. **RUSSIA.**

urch St., London, E. C., Eng. Operating office: Boz- ersburg, Russia. Mine office: Kyshtim, Perm, Russia. rman: S. J. Blumlein, managing director; L. Urquhart, eding officers, Baron Vladimir Meller-Zakomelsky, D. J. lds, S. Polak, A. J. H. Smith, F. Stobart, and R. Gilman . B. Webster, secretary.

9, 1908, under laws of Great Britain, with capitalization par, fully issued and fully paid. Property is the entire ing of 34,440 shares, of 220 roubles par, of the Kyshtim oration organized 1900, under the laws of Russia, of which naging director. Property was taken over subject to a 0,000, and for 1909 the subsidiary company made a loss on roubles. The Kyshtim Corporation, Ltd., is controlled, interest, by the Anglo-Siberian Co., Ltd., and has a con- American shareholders. Debentures, £300,000 authorized, 00. Debentures are convertible into fully paid shares at Nov. 1, 1911, and are redeemable, on or before May 1, edemption fund, to be created by applying £17,500 yearly, tions, beginning on or before May 1, 1912, to redeem the ngs, at £105, or by purchase in the open market below that eserving the right to redeem any or all of the debentures at s notice.

uare miles, or 1,406,700 acres, including iron mines, iron gold mines, copper mines and a copper smelter. the mineral 189,000 acres, with 367,200 acres of arable and grazing res of forest lands. Under the provision of the Russian law, of the arable lands must be sold to peasant tenants.

copper and gold mines, in the Soimonovsk valley, about 30 , include a number of copper mines, having lenticular ore le size, estimated, 1910, to carry 1,200,000 long tons of prob-

able ore, of 3.3% average copper tenor, which figures see
mines are the Koniukhoff, Smirnoff, Tissoff and Karab
mine has the richest copper ores, which also carry good
ore reserves of the Koniukhoff being estimated at 550,0
18,000 long tons fine copper, or a trifle better than 3.25% i
The old workings have caved badly, and are being replace
shaft, which was 300′ deep, early 1909. A borehole on th
1909, shows about 10′ of medium grade copper ore, at dep
mine developed some new ore of promise during 1909. I
secured, 1909, from Soimonovsk to Kyshtim.

The smelter, known as the Verch Kyshtim Works,
rebuilt, 1909–1910, to much larger capacity. The works
and Kaslinsk factories. In 1910 the management planne
furnaces, for the treatment of flue-dust. An electrolytic
planned to refine the blister copper from practically the e

In addition to its copper mines and works, the com
on different parts of the estate, the iron plant at Kyshtim
at Niazepetrovsk making sheet iron, and that at Kasli, s
Kyshtim, making castings. About 1,500 men are employ

Production, for 5 months ending February, 1910, w
copper. For September, 1910, ores treated assayed 3.1%
and 0.11 oz. gold per long ton, with production for that mo
ter copper. The property was operated under check, I
627,951 lbs. fine copper in 1907; 1,386,303 lbs. in 1
1909. Average cost of producing electrolytic copper
H. H. Knox at only £32 per long ton, or 7 cents per
very low figure, and Mr. Knox further estimates that,
£103,000, the production should be increased to nearly 4,5
per yearly. These figures are regarded with doubt. Cos
been only £36 7s. 8d. per long ton for October, 1909, but
ter of bookkeeping. Reports regarding this company
are decidedly conflicting, as to methods employed and re
ability of the company to make copper for 7 cents per pou
strated by actual results secured from two years' operati
for 1909 must have been nearer 17 cents than 7 cents, on

**LABORERS' COÖPERATIVE GOLD, SILVER B
& COPPER MINING CO.**

Office: 99 Washington St., Chicago, Ills. Mine o
nay district, B. C. Gust. L. Young, president; N. N.
dent; Chas. E. Sweiberg, secretary; John W. Turnquist,
under laws of British Columbia, with capitalization $150,0
and capitalization apparently has been increased to $500,0

Lands include the Shining Beauty group, having tu
400′. The company built a tin-pot smelter, which was n
mine to feed it. The company was promoted by the lat
a renegade Baptist preacher, who found it more profitab
stock than to expound the gospel. The company is still p
ing for more money.

LA BUFA MINING & SMELTING CO.

Dead. Formerly at La Bufa, Sahuaripa, Sonora, Mex.

LA CANANEAS COPPER CO.

Dead. Was promoted by Henry B. Clifford. For
Arizpe, Sonora, Mex. Described Vol. VIII.

MINA LA CARIDAD.

Mine office: Pilares de Teras, Moctezuma, Sonora,
developed, show ore assaying 8 to 55% copper. Presuma

CO. MICHIGAN.
, for $250,000, to the Manitou Mining Co. For-
weenaw Co., Mich.
PER MINING CO. COLORADO.
ont, Clear Creek Co., Colo. Fully described Vol. VI.
. MÉXICO.
St., Indianapolis, Ind. Mine and works office:
Mex. Fred C. Emery, president and general man-
ident; E. B. Sharpe, secretary and treasurer; pre-
er, directors; C. W. Tonkin, superintendent; D. F.
nt. Organized June 5, 1905, under laws of Arizona,
shares $1 par, and is protocolized in México.
the vicinity of Puerto, 16 miles west of Noria.
ct deposits of nearly vertical dip, between limestone,
main ore body under development is reported by
aceable 1,500′ on surface, carrying carbonates to
ed by chalcopyrite averaging 6 to 8% copper, 4 to
gold per ton. A carload of ore shipped to El Paso
ne press, to have returned 18% copper, 3 oz. silver
ne is opened by shafts of 150′ and 500′, and a short
ng 6,000′ of workings. The mine was claimed, in
ve 100,000 tons of smelting ore blocked out, which
e.
00-h. p. steam plant, with an 8x10″ hoist and a 6-
r. There are 20 buildings, including an engine-
d about 15 dwellings.
ton Macdonald hot-blast pyritic furnace, construc-
9, and was to have been blown in during the middle
reported by the company, Jan. 23, 1911, as erected
not later than Feb. 15, 1911. The smelter has a
nned to do custom smelting. An indictment was
ed C. Emery, Henry S. Bonsib and Wm. T. Stewart,
d jury, at Indianapolis, on a charge of conspiracy to
Stewart resisting extradition. The indictment was

INING CO., LTD. SPAIN.
ld, circa October, 1909, to Spanish Mines, Ltd.
Ciudad Real, Spain. Described Vol. VIII.
PMENT CO. ARIZONA.
Mine office: Florence, Pinal Co., Ariz. B. Reed,
unts. Lands, 18 miles northeast of Florence, prac-
district, have a 265′ shaft, showing at bottom an 8′
% copper, 1 oz. silver and $2.50 gold per ton. A tun-
ssays up to 23% copper, 15 oz. silver and $8.41 gold

IDAHO.
ldg., Portland, Ore. Mine and works offices: Min-
o, and Landore, Washington Co., Idaho. Chas. E.
Peacock, vice-president and general manager; John
urer.
in the Seven Devils district. The first group, 4
t of Consolidated Copper Co., shipped some ore,
p to 350 oz. silver per ton. The property at Landore
ging 35% copper, and ore of much lower grade has
d.

The company has smelters at Mineral and La small water-jacket blast-furnace, burning coke. Th tons daily capacity, has a 50-ton combination reve blast-furnace, former burning wood and latter burn furnace was devised on a novel and absolutely un in a double stack blast and reverberatory furnaces, v moist updraft, charging being in both furnaces, and to have been furnished by a gas-producer consuming The theory and practice did not correlate, hence the more common-sense lines.

Smelters were closed down November, 1905, portation facilities that rendered it difficult to secur while poorly located as to facilities for transport, is and property for sale.

LA DICHA MINING & SMELTING CO., S. A.

Dead. E. D. Elson, was general manager. Or laws of México, with capitalization 10,000 pesos ownership of supposedly the entire stock, by the merly at Chilpancingo, Bravos, Guerrero, Mex.

LADOGA LAKE MINING & SMETLING CO., L

Office: Finsbury House, Blomfield St., Londo Pitkäranta, Viborg, Finland. Col. R. G. Sharam McCully, managing director; J. Sargent, secretary. under laws of Great Britain, with capitalization £20 £111,000, of which £100,000 vendors' shares are fu are 1s. paid.

Lands, circa 10,000 acres, mainly well wooded, iron and copper ores. The Pitkäranta mine, oper steadily until 1903, making an average annual prod fine copper during the last decade of operation, and the Russian Imperial Bank, 1894–1908.

The property carries several ore bodies, the on of "skarn," which is a granular mixture of augit magnesian silicates, impregnated with chalcopyrite, with dip of 40° to 50° S., has been opened at interv miles. To the eastward the ore occurs as bunche weight, and at this end of the workings the ore body the footwall bed, of about 70′ width, carrying finel in "skarn," overlaid by a 2′ to 3′ layer of barren ma of barren schist, succeeded by a cupriferous bed, of a somewhat argentiferous copper sulphides. The con ore, and are said to have indications of tin.

The mine has a small smelter, and the company the Vulcan, Ludwig and Niemelin, and 10 barges. ble. Presumably idle.

LA DURA MINING CO.

Mine office: Torres, Hermosillo, Sonora, Mex. gers. Ores carry gold, silver, copper and lead. out silver-lead-copper concentrates, when working.

LADY CHELAN COPPER CO.

Dead. Formerly at Chelan, Chelan Co., Was

LADY ELGIN COPPER MINING CO.

Dead. Operated briefly, circa 1880. Forme Co., Me.

LADY HELEN COPPER MINING CO.

Dead. Formerly at Pima, Graham Co., Ariz.

O. NEWFOUNDLAND.
d to Carmen Copper Mines, Ltd. Formerly at Lady

MINING CO. MONTANA.
St., Chicago, Ills. Letter returned unclaimed from
, Powell Co., Mont. Edw. R. Roe, president; G. F.
Hemala, secretary; Frank A. Smith, manager. Or-
of South Dakota, with capitalization $400,000, in-
0, shares $1 par.
a 12 miles northwest of Elliston, well timbered and
t deposit between limestone and granite, up to about
Development is by a 180′ two-compartment shaft, and
1,500′ of workings, sulphide ore occuring at depth of
reported to be up to 75′ in width, and is estimated to
pper tenor, which figures seem too high. Company
May, 1909, three carloads of ore, to the Pittsmont
load to the Tacoma smelter, giving returns of about
5% respectively, netting about $2,600.
in its prospectus that dividends should be paid during
warranted. By reason of an accident to the general
spension of work for a year, development was greatly
, 1910, but hopes to resume 1911.
R MINES, LTD. SPAIN.
ted, voluntarily, 1908. Formerly at Los Martires,
escribed Vol. VIII.
CO. MICHIGAN.
up, 1906. Formerly at Matchwood, Ontonagon Co.,

SMELTING CO. WASHINGTON.
anville, Ferry Co., Wash. J. C. Stutz, president and
vice-president and general manager; John Bell, treas-
I. M. Genin, Chas. Nelson and Chas. P. Bennett, direct-
8, 1908, under laws of Washington, with capitalization
, assessable; issued, $550,000, paid in, 95 cents. Annual
June.
aims, area 150 acres, in 2 groups, have been reduced to
on the northeastern slope of La Fleur Mountain, in the
railroads within a mile. The property shows diorite,
nite-porphyry, carrying 2 contact deposits, reported to
granite-porphyry, of which one ore body, on the Cuba
imated average width, and now reported as averaging
riferous and argentiferous chalcopyrite, estimated by
1% copper, 2 oz. silver and $3.50 gold per ton. Devel-
and a 600′ tunnel. Idle.
D & COPPER CO. MÉXICO.
t Cos, Moctezuma, Sonora, Mex. Described Vol. VIII.
G, MILLING & DEVELOPING CO. MÉXICO.
of La Florencia Gold & Copper Co. Formerly at Cos,
ex. Described Vol. III.
G CO. MÉXICO.
t Ahualulco, Jalisco, Mex. Described Vol. VIII.
G CO. MÉXICO.
ado Bldg., Washington, D. C. Mine office: Apartado
ex. C. E. Miller, president; Wm. H. Brown, first vice-
n, second vice-president; Amos Tyree, secretary; Am-
surer; Wm. Nelson Brown, superintendent. Organized

1906, under laws of South Dakota, with capitalizat

Lands, 30 hectares, known as the Treadwell g
tlán and one-half mile from the Oaxaca-Taviche br
railway. Property shows a well defined nearly ve
width, cutting bedded andesite tuffs, greatly leac
300′. Development is by a 400′ vertical shaft, wi
prospect shafts, and 4 tunnels, of 700′ aggregate le
tiferous chalcopyrite, with quartz gangue, estima
4.5% copper and 200 grams silver per metric ton.
ing 14% copper and 600 grams silver per metric
40-h. p. boiler, hoist and a small air-compressor fo
idle.

LA FRANCE COPPER CO.

Office: 74 Broadway, New York, N.Y. Mine
Mont. Works office: Basin, Jefferson Co., Mont
John L. Williams, secretary and treasurer; preced
E. M. Drennen and David Gilbert, directors; M.
Organized April, 1905, under laws of New York, v
shares $25 par, in $1,000,000 of 6% preferred st
stock. Debentures, $2,000,000 first-mortgage 25-
1, 1932. Interest was defaulted on bonds 1908 an
notes of the United Copper Co. Is controlled,
United Copper Co., or some of its subsidiary corpo
mon stock is said to be owned by the Copper Secu
reported as circa $491,000 for year ending June 1,
operations for year ending June 1, 1908.

Lands, 8 fractional claims, area 32 acres, kn
held from the French owners under a $250,000 b
name of Louis Girard, assigned to La France Coppe
ville, in the northern part of the Butte camp.

The Lexington mine has a 1,450′ three-compa
on the 600′ level with the Alice mine, with several
was worked many years ago for gold and silver, bu
The lower workings carry an argentiferous and a
chalcopyrite, galena and sphalerite, of which abou
average assay of 1.2% copper, 3.5% lead, 18%
gold per ton, which may be taken as a fair average
ore blocked out in the lower levels. In addition th
chalcopyrite up to 3% in copper tenor, with pro
silver values, and having smaller quantities of zin
on the 650′ and 1,450′ levels capable of handling 50

Equipment includes a 20x60″ Allis-Chalmers d
double-deck cages, a 15x30″ Ottumwa auxiliary ho
and a 50-drill air-compressor. There is a very con
a well equipped machine-shop, carpenter-shop, sm
structures.

The old stamp mill, idle since 1893, has be
100,000 tons of auriferous zinc tailings, which pos
future time.

A 200-ton experimental mill was built, 19
Walkerville and Centerville, at a cost reported b
This mill used the magnetic separation process of
no water, treating about 125 tons of ore daily, an
ore, but made such an insufferable quantity of d
courts, on an injunction sued out by the city of Wa
success.

Basin, is the old Basin & Bay State concentrator, 00,000 bond and lease, rated at 1,500 tons nominal nent includes 2 crushers, 8 sets of rolls, 4 Hunting- Wilfley tables and 80 Callow settling tanks. The ating ores of the Butte & Superior Copper Co. mpany was sold for taxes, circa August, 1908, but has been kept open, with a little work done in the g, and a small production secured, 1910, by lessees. hat a combination process, devised by the General ke, would make possible the saving of 70% of assay es. This process calls for concentration on Wilfley ntrates, and magnetic separation followed by recon- minerals. The property is capable of a large zinc ory reduction process can be found. Production was n 1907.

MÉXICO.

a Bufa, Sahuaripa, Sonora, Mex.

ARIZONA.

OPPER CO.

Cal. Mine office: Dewey, Yavapai Co., Ariz. ger. Lands, known as the Red Bluff group, 6 miles bond and lease, show ore giving assays up to 20% and 8% cobalt, with considerable antimony and eedingly refractory, requiring special treatment.

COLORADO.

SMELTING CO.

e: Lake City, Hinsdale Co., Colo. B. N. Ramsey, er; Nelson Hopper, superintendent. Company sup- issue, 1910. Mine is developed by tunnel. A 50-ton the outskirts of Lake City, does a small custom busi- were working, on a small scale, at last accounts, red by lack of funds.

MICHIGAN.

re St., Boston, Mass. Mine office: Lake Mine, m. A. Paine, president; John H. Rice, vice-president; and treasurer; preceding officers, Wm. F. Fitzgerald, obt. T. McKeever, directors; C. K. Hitchcock, Jr., her, head mining captain; Wm. Ivey, assistant mining eer.

1905, under laws of Michigan, with capitalization r, fully issued. Shares are listed on the Boston stock Co., Boston, registrar; State Street Trust Co., Boston neeting, third Tuesday in June.

business with $45,000 cash, and has been financed by her than assessments on the customary Lake Superior nd of 1910, when balance of issue was sold, netted the ast sale of stock having been 13,450 shares, at $35,

ncluding 1,150 acres of mineral land, 680 acres of timber utover lands. The company bought 20 acres immedi- m St. Mary's Mineral Land Co., to provide room for a se carrying with it mineral rights to a depth of 100', portion of the Lake shaft, collar of which is almost di- Property includes the SE. ¼ of Sec. 29, SE. ¼ of Sec. d E. ½ of Sec. 31, T. 51 N., R. 37 W. The bulk of the y was a part of the Belt mine, opened 1848, and taken Copper Mines, Ltd., which corporation, by utter incom- of bad management, sunk about £250,000 in 3 years,

without securing as much as a half-mile of undergr
making only about 2,500′ of workings for $1,250,0
foot, while the original management of the Lake
openings for $14,000, or at the rate of $14 per foot.
produced by the Belt company cost about $5 pe
work was done on the property, 1901, by Capt. V
Leopold.

The first work of the present company was
Butler beds, with a little work on what formerly
green, principal work being on the Knowlton amy
old shafts of 170′ and 300′, latter having been dee
company. Considerable copper was taken from
$3,800, but it was thought wise to transfer wor
southern end of the property, and the wisdom of th
the outcome. There also is a 90′ shaft on the Tre
Knowlton, which was sunk circa 1865, and is sa
from the copper extracted. Considerable diamon
the borings of the Adventure, on adjoining lands, i
have several other promising amygdaloidal beds, i
the Lake bed now being opened.

Work was begun, late 1906, on an amygdalo
in the district. About 500′ of trenching was done
bed being found about 60′ wide on surface.

The Lake shaft has 3 compartments, and wa
The first level is at 145′, with levels below at approx
The shaft leaves surface at an angle of 40°, whic
level is reached, between which and the 7th level,
and below the 7th level to 30°. This change wa
shaft having gone about 160′ into the footwall a
shaft is badly laid out, due to no fault of the origin
encountering a geological situation hitherto unfou
trict, in 70 years of mining, and a condition that no
but which has puzzled the best geological authori
tirely clear, though apparently is becoming underst
per-bearing series is composed of upwards of 200 t
calated conglomerate beds, all with practically par
section, with a general strike varying from N. 30° E
tically parallel dips, varying from about 70° at the
the series, to as flat as 25° at the Arnold mine, 40
in the upper third of the series. In the case of the
ings of the Belt property disclosed the beds of t
which carries 5 to 7 copper-bearing beds in a cros
mile. The beds of the Evergreen belt were found
hence, when work was transferred to the southward
the bed being opened would not conform in any pa
of the bedded series shortly to the northward.

The strike of the Lake amygdaloid, and the p
about N. 6° E., with dip of about 35° W. It was
bed was a fissure, but that this is not the case wa
disclosure of parallel strata, including a conglome
under. The Lake bed, which is a typical Lake Sup
barring its unusual strike and dip, is exceedingly w
ranging from 50 to 100′, the width on the floors
levels being as follows: 60′ to 85′ on the 2d level;
the 5th level, and 70′ on the 6th level. The hangi
defined but the footwall is extremely irregular, th

rock and trap. There is an exceedingly rich pay-
ll, and the average throughout is above that of the
le being comparable only to the Wolverine, South
pion and Baltic among the amygdaloidal mines of
There are patches of poor ground, as is always the
hese is no more than normal. The Lake bed appears
s of enriched copper ground, raking northward with
ade to locate the northerly extension of the Lake bed
rface, but without success, though 3 holes were bored.
horizontally into the foot and hanging-walls, under-
d drill holes have been bored, aggregating 1,638′.
workings of the mine show a deflection to the west-
n, 1911, at the extreme north, of N. 15° W., which
ypothesis of Dr. L. L. Hubbard, who correlates the
d from the top of the 4 amygdaloidal beds cut by the
Lake. According to Dr. Hubbard's hypothesis, the
at the north, and will have a curvature, eventually,

ring amygdaloidal stratum, carrying considerable
ote, underlies the Lake bed at a distance of approxi-
opened by crosscuts on the 5th, 6th and 8th levels.
drifts on the 6th level, of which about 300′ show fair
of 8′. A crosscut on the 5th level, 125′ above, showed
at on the 7th level, but a little copper is found in a

) with 7,450′ of workings, with longest workings of
ery large proportion of the drifts being in neither the
all, giving a rather indifferent line on the actual values
working 11 drills, February, 1911, with development
the rate of $4 to $4.50 per running foot for drifts, and

diagonally on the plane of strike of the bed, is
and permanent working shaft, with its collar about
shaft. The new shaft is being opened by sinking
, from the different levels, and can be sunk to the pres-
in 6 to 9 months. The new shaft will obviate the long
present shaft, and will be made of good capacity, for
The old shaft has a temporary shaft-rockhouse, of
house with circular bins of 2,000 tons capacity has been

a hoist, bought of the Champion mine, good for one-
der has been placed for a 32x72″ Nordberg duplex-cylin-
hoist, capable of lifting 10-ton loads from depth of a
gine-house is to be 52x87′, of steel frame. There are
ir-compressors, taken from the equipment of the old
be a new 50-drill two-stage cross-compound air-com-
ssor-house 40x80′ in size. The boiler-house is 52x102′,
with three 250-h. p. locomotive firebox boilers, with
ers of the same size. The boiler-house is to have a 135′
Mine structures include a machine-shop, smithy, chang-
rding-house. There are 6 new double dwellings, and a
the Belt location. The property is served by the main
e railway, which passes through the old Belt location,
he shaft, and a siding has been built to within 500′ of
Range railway, giving the mine the advantage of com-
About 150 men are employed.

Production was begun November, 1909, and c
the change in management. There were total ship
rock, sent to custom mills, at a treatment cost of 5
tion of 24,717 lbs. fine copper in 1909, and circa
earlier mill tests gave a recovery of 41 lbs. of min
March, 1910, to 28 lbs. of mineral per ton, equal t
per ton. The extraction from the Lake can be n
by milling practically everything between walls, or
by very careful selection, but judicious production
tion, probably will give an average return of better
per per ton of rock stamped. The management is
capable, and the mine, while as yet in the develo
experimental point, and now stands as easily the m
agon County, and the most promising of the devel
perior district.

LAKE COPPER MINING CO., LTD.

Office: Eastern Harbour, N. S. Mine office
ishe Co., N. S. H. G. Dunbar, secretary and tre
agent. Organized circa January, 1908, with capi
$1 par. Lands, circa 6,400 acres, on Polson Lake
average width, said to be traceable 1 mile, carrying
copper ore, developed by a 103′ shaft, with 554′ o
Presumably idle.

LAKE COPPER PROPRIETARY CO., LTD.

Office: 40 Queen Victoria St., London, E. C.
Strand, Aninskog, Elfsborg län, Sweden. Col. A
M. Schreiter, mine manager; C. Maurice Champ
March 10, 1906, under laws of Great Britain, wit
298,000 ordinary shares of £1 par, and 40,000 defer
lands through Lake Copper Syndicate Aktiebola
Sweden.

Lands, on Lakes Animmen and Arr, circa 90
Sweden, include the Storra Strand and Vingnäs m
traceable circa 10 miles. These mines have 13 sh
circa 800′, showing ores giving assays of slightly l
small gold and silver values. Ore reserves of t
estimated, Jan. 1, 1908, at 100,000 long tons. M
erecting a smelter, but apparently closed down inste

LAKE CREEK GOLD MINING CO

Office and mine: Albany, Albany Co., Wyo.
G. S. Simmons, vice-president; Wm. Benton, secr
C. L. Houston, treasurer; preceding officers and H
Organized January, 1909, under laws of Wyoming, w
$1,000,000, shares $1 par, nonassessable; issued, $3

Lands, 4 claims, unpatented, area 80 acres, i
miles from the Laramie, Hahn's Peak & Pacific
fissure veins, in diorite-porphyry, of which one, und
to average 7′ in width, and to be traceable 3,000′,
mated to average 6% copper, 2 to 16 oz. silver and
velopment is by pits of 35′, 20′, 15′ and 18′, and a
reports that what was considered hematite has bee
hübnerite, rich in tungstic acid, and it is planned
tungsten ores. Property has no power equipment

LAKE GEORGE MINE.

Mine office: Bungendore, Murray Co., N. S.
non and J. Plun, owners. Lands, 172 acres, freeh

n of Bungendore. The mine, circa 700′ deep, was
n of 22′ to 30′ width, having a NS. strike and
s, ore occurring as replacements along fault-lines,
xture of chalcopyrite, sphalerite, galena and pyrite,
ngue, carrying an average of only about 1.5% cop-
r values. Ore, from its nature, is very refractory in
, 1898, were only 1.45% copper.
60-ton water-jacket blast-furnaces. Ore requires
es. Pyritic smelting was tried, but proved unsuc-

f the mine was circa 500 long tons fine copper
g 30 to 35% copper, 65 oz. silver and 1 oz. 12 dwts.
sive companies have been wrecked in attempting to
owners did some work, 1906-1907, raising 40 tons
eated. Idle since 1907.

LTD. **AUSTRALIA.**

., 1904, as Lake George Successors, Ltd. Formerly
N. S. W., Australia.

ORS, LTD. **AUSTRALIA.**

ngendore, Murray Co., N. S. W., Australia. Fully

O., N. L. **TASMANIA.**

elbourne, Australia. Mine office: Crotty, Montagu
len, chairman; preceding officer, Dr. C. Moore and
adden, secretary; Geo. Hyde, mine manager. Or-
ws of Victoria, with capitalization £150,000, shares
, 2 leases, area 120 acres, near Mount Jukes, on the
Property shows a vein of about 20′ width, carrying
lcopyrite, developed by mainly surface prospecting.
mp mill. Idle at last accounts.

NG & REFINING CO. **MICHIGAN.**

Place, Boston, Mass. Operating office: Calumet,
t Mills, Houghton Co., Mich. Quincy A. Shaw,
laws of Michigan, with capitalization $2,500,000,
, $5 paid in. Balance on hand, Jan. 1, 1910, was
through joint ownership of stock, by the Alloues
l Copper Mining Co.,
ing more than 1¼ miles frontage on Portage Lake,
te. The mill was built by the Arcadian Copper Co.,
, by the Centennial Copper Mining Co., and latter
rporation.
f steel frame, having 6 Norberg stamps, 4 of which
daily capacity of about 4,000 tons. The mill has
rsize material. Power is furnished by a 600-h p.
engine, and there is a 15,000,000-gallon Nordberg
75′ into deep water, is equipped with a modern coal-
ellaneous buildings include a machine-shop, smithy
are a number of dwellings for employés.
$120,167, of which $119,867 came from milling cus-
ere $90,604, for general running expenses, showing a
9,563, which was turned into a deficit of $42,998, by
,561, incurred for the new heads and milling machin-
year with a deficit of $11,607. The mill stamped
; 449,574 tons in 1909; 427,048 tons in 1910. Cost of
per ton in 1907, and 21.216 cents per ton in 1910,
sts.

LAKE SHORE MINING CO.

Office: 990 West Kensington Road, Los An unclaimed from former mine office, Green, Ontona lick, president. Organized under laws of Michigan, shares $25 par. Lands, 773 acres, patented, on th Town 51 North, Range 44 West, reported to car slate walls, of 5′ and 12′ width, showing copper average assays of 1.5% copper, 0.5 oz. silver and Apparently the ore body is of the secondary or Po nawan formation, and ores may change to native co pecting has been done. Idle several years.

LAKESIDE COPPER CO.

Office: 350 Twenty-fourth St., Ogden, Utah. Box Elder Co., Utah. H. E. Baker, president and vice-president; T. R. Tisdale, treasurer. Organize Utah, with capitalization $500,000, in nonassessab unpatented, 3 miles from the Lucin cutoff, having v of 15′ to 50′ width, traceable circa 300′, by shallo shallow shaft and a 400′ tunnel, showing auriferous giving assays up to 40% in copper tenor.

LAKESIDE GOLD-COPPER MINING CO.

Dead. Formerly at Index, Snohomish Co., W

LAKE SUPERIOR & ARIZONA MINING CO.

Dead. Title was changed, 1904, to Lake Su Smelting Co. Formerly at Florence, Pinal Co., Ari

LAKE SUPERIOR & ARIZONA MINING & SM

Office: Calumet, Mich. Mine office: Superi Cuddihy, president; Dr. W. A. Holt, vice-president; Wm. B. Anderson, treasurer; preceding officers, J. Hon. Angus W. Kerr, Edw. Ulseth, Henry L. Baer, son Vivian, directors; Fred W. Hoar, superintendent

Organized Sept. 30, 1902, under laws of Arizo Arizona Mining Co., with capitalization $200,000, sh 1904, under laws of Arizona, with present title, wi shares $20 par; issued, $1,680,000, formerly asse The company has given an option on its property, Magma Copper Co., with 20% of net smelter return to go to the Lake Superior & Arizona, and to app option is exercised. The option price is $500,000, option of the Lake Superior & Arizona, in Magma s amount of $300,000, and balance in cash. Develop the Magma Copper Co.

Lands, 11 claims, area 110 acres, freehold, in south of the Silver King mine, 30 miles west of Glo ence. Litigation over 2 claims, instituted by F. company's favor, in all courts. The mine, formerl was worked, for gold, by the Gem Gold Mining Co., in 1895, after paying considerable dividends. The shallow shafts and short tunnels, opened at rand owners extracted rich surface ores.

The property shows limestone, quartzite and d which 2, under development, are contact deposits stone, and in limestone, these having a quartzite foo with average width of circa 6′. The main ore body strike, with dip of 26° 30′, and shows a prominent oxides and carbonates, associated with iron and

e ores likely to be opened at greater depth. Ship-
from the Anderson tunnel, gave average returns of
and $2.67 gold per ton, netting $24,649.81.
hafts and 4 tunnels. The ground is not especially
equired, except for openings in occasional soft places.
been concreted for about 200', above the crossing of
out 7,000' of workings, not including the old openings
n taken over, under bond, by the Magma Copper Co.
s sunk vertically, in low ground, and cut diagonally

rca 500' length, cuts a 16' ore body, giving a back

lt shaft, sunk from the breast of the Holt tunnel, at
unk at an angle of 38° to a depth of 1,300' from sur-
st good for 1,000', and is said to show, on the 850'
up to 50% copper and $28 gold per ton, with a quartz
gold per ton, but these figures are considered exces-

el, 130' vertically below the Holt, is connected with
the dip of the vein, and is circa 3,000' long, showing
per.
steam plant with a 175-h. p. water-tube boiler, and
r-compressor. Fuel is petroleum, and there are 5
nd 2 at Florence, each holding 2 carloads of oil.
wer-house, smithy and bunkhouse at the mine, and
lorence, 28 miles distant.
R. R. Co. was organized, by shareholders of the Lake
& Smelting Co., with capitalization $500,000, shares
uilding a railroad from the mine to Florence, to con-
astern railway. This line would traverse 19 miles of
9 miles of hills, and would cost from $300,000 to
nd equipment.
lbs. copper, 1,040 oz. silver and 188 oz. gold in 1907.
mber, 1907, and resumed July, 1908, but was not long
as idle until work was begun, 1910, by the Magma
considered promising, if given the rail connections
tive for profitable operation.

BEE DEVELOPMENT CO. **ARIZONA.**

Bisbee, Cochise Co., Ariz.

ENTRATING CO. **MICHIGAN.**

d 1905, and practically succeeded by Copper Concen-
Hancock, Houghton Co., Mich.

ER CO. **MICHIGAN.**

nd, Ontonagon Co., Mich. Organized July, 1853,
with capitalization $500,000, shares $25 par. Lands
was organized by the Minesota Mining Co. Lands,
nd 14, Town 50 N., Range 39 W., carrying the parallel
Evergreen Belt. Company expended about $40,000,
made 14,821 lbs. fine copper. Idle since 1874.

ER CO. **ONTARIO.**

Boston, Mass. Mine office: Port Arthur, Thunder
t. Lewis Brittan, president; Gustave E. Wolters,
rell, secretary and treasurer; Capt. Walpole Roland,
anized January, 1907, under laws of Maine, with cap-
res $25 par, and is registered under laws of Ontario.
as the Cloud Lake mines, in the township of Crooks,

3 miles from the mouth of Cloud River, opposite Isle of Port Arthur. Property shows amygdaloidal and ing native copper, the principal bed being an amygo width. Idle.

LAKE SUPERIOR COPPER & ZINC CO.

Dead. Charter was forfeited, 1902. Formerly district, Algoma, Ont. Described Vol. III.

LAKE SUPERIOR COSO DEVELOPMENT CO.

Office: Hancock, Mich. Mine office: Darw Kiiskila, president; Nels Majhannu, vice-president Peter Strolberg, treasurer. Organized 1907, with ca $25 par. Lands, 30 claims, area 600 acres, formerly 1 a distance of about 13 miles. The property carries a copper, lead and zinc sulphides.

LAKE SUPERIOR DEVELOPMENT CO.

Letter returned unclaimed from former office, office: Mohawk, Keweenaw Co., Mich. Jos. Croze zie, secretary; Jos. W. Selden, treasurer. Lands, 40 being the N. ½ of Sec. 25, and S. ½ of SW. ¼ of Property, about one half mile east of the Gratiot, a miles southwest of the Ojibway, formerly was own Mining Co., which apparently did little or no work Keweenawan formation, carrying several amygdaloi has been found in the past, and the syndicate began 1910, in the hope of locating a payable bed between and the eastern sandstone.

LAKE SUPERIOR GOLD MINING & MILLING

Dead. Was liquidated circa 1902, with a fina 14½ cents per share. Formerly at La Cananea, scribed Vol. VIII.

LAKE SUPERIOR NATIVE COPPER CO.

Dead. Former office was 41 Liberty St., New Livingston Whitney, president; D. H. McAlpin, 2d Barnes, secretary; Geo. S. Chauncey, treasurer; pre Baldwin, Geo. T. Brokaw and E. W. Van Vleck, d superintendent. Organized April, 1908, under law ganized Jan. 4, 1909, with capitalization $1,000,0 $400,000. Financial relations between this comp turing Co. and the Houghton Concentrating Co., wer Mason Manufacturing Co. became bankrupt July about $100,000, and assets entirely inadequate to me Looney was appointed receiver. Property was a l Quincy Mining Co., fully described under title of Vol. VIII.

LAKE SUPERIOR & PITTSBURG DEVELOPME

Dead. Was reorganized June 1, 1904, as L Mining Co. Formerly at Bisbee, Cochise Co., Ariz.

LAKE SUPERIOR & PITTSBURG MINING CO.

Dead. Was merged, circa 1907, in Superior Formerly at Bisbee, Cochise Co., Ariz. Very fully

LAKE SUPERIOR SMELTING CO.

Office: 12 Ashburton Place, Boston, Mass. Houghton Co., Mich. Jas. MacNaughton, general superintendent; Hon. J. C. Dunstan and Jas. Mc chemist; H. M. Gernberger, assistant chemist. Orga gan, with capitalization $1,200,000, shares $25 pa

s, of which 5 shares stand in the names of the 5 Mining Co., and balance of stock is owned by the g Co., which has 15,000 shares, and the Isle Royale 0 shares.

nected with the plant of the Tamarack-Osceola Mfg. urnaces, five of 11x16′ size each, four of 17x30′ size, capacity each. Three refining furnaces were added, nanical ladling and casting device having a 1,100-lb. with molds linked into an endless belt, dumping over s, whence the ingots are removed mechanically by r the ingots to inspection and loading platforms. On ile inverted, they pass over a rosin fire, which coats event sticking. About 300 men are employed. The nantled smelting plant at Hancock, Houghton Co.,

NORA DEVELOPMENT CO. MÉXICO.

. Mine office: Caborca, Altar, Sonora, Mex. C. S. . H. Moran, vice-president and general manager; d treasurer; Alex. M. Hamfield, general manager; lsted and Jas. Smith, directors. Organized 1909, 0, shares $10 par.

ported as 200 acres, and as circa 1,000 acres, property ore mine, area circa 200 acres, in the foothills of the 0 miles northwest of Altar. Other properties are the uanita mines, all carrying auriferous and argentiferous aid to have 6 well defined fissure veins, in porphyry, ain veins, one having an iron gossan carrying copper p to 30% copper, and 20 to 50 oz. silver per ton. De- ing, and 2 shallow shafts. Equipment includes steam ssary mine buildings.

FRANCE.

Inn, Strand, London, W. C., Eng. Letter returned ne office, La Tour-sur-Tinée, Alpes Maritimes, France. nan. Organized Oct. 30, 1903, with capitalization d, £3,000. Lands, which are undeveloped, are said to d copper. Idle some years and apparently moribund.

WALES.

). sea, Glamorganshire, Wales. Property is extensive ncluding smelters and an electrolytic plant.

CHILE.

ERT. rks: La Compañía, La Serena, Coquimbo, Chile. ador and San Antonio mines, area 93 hectares, which, men, produced 4,500 metric tons of 8% ore. Country g veins of about 90′ extreme width, with dip of 60°, pth of circa 100 meters. The Fortuna and Placeres men, at last accounts. Los Bronces mine, formerly ad Minera de Los Bronces.

16 miles from Coquimbo, with rail connection, includes d a smelter that was the first modern plant in Chile, This smelter, known as the Fundición La Compañía, 1′ reverberatory furnaces, treating ore averaging about 0.75% copper. Equipment includes two 100-h. p. nes and a small hydraulic turbine. Fuel is Australian r ton, delivered. Forces are about 80 men, at aver- ily. Production formerly was copper sulphate, con- g plants using the Kröhnke process, but this business

was lost, some years ago, and the smelter now proc
copper tenor. Production was 1,481,491 lbs. fine
in 1907; 1,283,077 lbs. in 1908; 1,176,154 lbs. in 1

LA MINA COBRE CO.

Office and mine: Tucson, Pima Co., Ariz. I
Kane, secretary and treasurer. Capitalization
Lands, 12 claims, circa 35 miles southwest of Tu
having about 300′ of workings. Has a gasoline

LAMPA MINING CO., LTD.

Office: 80 Drury Bldgs., Liverpool, Eng.
Lampa, Puno, Perú. J. Lionel Barber, chairman;
mont, H. P. Gamon and G. M. Hampshire, direct
engineer. Organized June 30, 1906, under laws of
tion £35,000, shares £1 par; issued, £23,280. Deb
at 7%; issued, £6,420. Lands, 34 hectares, includ
San Otto, San Carlos, Esmeralda and Socavón min
Trapiche, and the water-power of Toropujani, n
employed 42 men, 1908.

ERZBERGWERK LAMPERTUS.

Mine office: Hohenstein-Ernstthal, Saxony,
helm Fetzner, chairman; preceding officer, Herr
and Emil Löbner, executive committee; C. Di
under development for some years past, with an a
has 3 shallow shafts, showing auriferous, argentife
ores of copper.

LA NATIVIDAD MINING CO.

Dead. Was a swindle. Formerly at Coapa
Described Vol. V.

LANCASTER GOLD & COPPER MINING CO.

Dead. Formerly at Prescott, Yavapai Co.,

LANCELOT FREEHOLD TIN & COPPER MI

Dead. Was succeeded, March 19, 1909, by La
merly at Herberton, Cardwell Co., Queensland, Au

LANDLOCK BAY MINING CO.

Office: Valdez, Alaska. Mine office: Lan
Rystrom, president; Thos. Scott, vice-president;
manager. Organized circa 1905, with capitalizati
Lands, on a small peninsula, with tidewater on both
western side, and a shallow shaft, showing chalcop

LANDORE COPPER CO. OF IDAHO, LTD.

Office: 602-79 Milk St., Boston, Mass. M
ington Co., Idaho. Dr. Jas. E. Stevens, president
dent and general manager; John Sennett, secretar
preceding officers, M. C. Drake and A. H. Bowen
with capitalization $1,000,000, shares $1 par. La
Camp Creek, 2½ miles from Landore, and about
nearest rail point. Property has a vein, formerly cl
shrunk to 30′, developed by a 400′ upper tunnel,
12% copper and $6 gold per ton, with a lower tun
upper, and a shallow shaft. Was developing with

MINA LA LAPILLA.

Office and mine: Alosno, Huelva, Spain. W
Property is a group of government concessions, wi
of Sr. D. Francisco Limón Pebollo, property being
capitalists.

3 groups, known as the Demasia Lapilla, Demasia adjoining the Almagrera and Tharsis mines. Prop- e exploited extensively by the ancients, who left im- ner owner was the Dallas Pyrites Co., work stopping xander Grant Dallas. The property carries a very yrite, with outcrops traced 1,100 meters, only 220 ng been exploited. The principal workings, at the dy up to 45 meters in width, with an average width 200 meters, with workings to a depth of 30 meters. at the western end, but the openings are caved so ons are necessary in the central portion. Apparently workings could be obtained by dry-walling, to replace ne, having poor ventilation, has 3 levels, opened pil- quantities of good ore in the pillars and floors. The rn end produced ore of 2.5 to 8% copper tenor, suc- per, but of good sulphur tenor. There are about le underground, and much more if worked opencast. e ore bodies to the east of the present workings, and in sulphur and probably workable to good depth, copper contents. The main shaft is vertical, with mine has a pump, and was unwatered 1909. 24-h. p. hoist and an air-compressor. The mine is ay, with rather high freight rates, and somewhat con- rs, when surcharged, carry 3 kgs. copper per cubic ucted in the same manner as at the Cabezas del Pasto most promising of the ancient mines of the Iberian ed capable of making a considerable production, if nt and worked vigorously.

CO. **MÉXICO.**

Ayutla, Autlán, Jalisco, Mex. Described Vol. VIII.

TED MINING CO. **UTAH.**

egg. Formerly at Ogden, Weber Co., Utah. De-

NES, LTD. **BRITISH COLUMBIA.**

Duncans, Vancouver Island, B. C. Described Vol. VII.

ING CO. **MÉXICO.**

Maria del Oro, El Oro, Durango, Mex. P. J. Opper- st accounts. Mine has auriferous and argentiferous steam and water power, and a 10-stamp mill.

MÉXICO.

Concepción del Oro, Mazapil, Durango, Mex. De-

CO. **MÉXICO.**

Bldg., Philadelphia, Pa. Mine office: San Martín Mex. Edwin F. Hall, president; Dr. S. C. Runkel, Fee, secretary; Josiah G. Williams, treasurer; M. J. r; Percy Graves, superintendent; Ernest Koch, mill Medina, mining captain. Organized circa 1910, with as successor of Philadelphia Copper & Gold Mining,

ncluding the San Vicente, La Perla, La Fé, La Concha, Property shows veins of 3′ to 25′ width, carrying aurif- ferous chalcopyrite, and formerly was claimed to have ed out, with circa 600′ of workings. The mine has 4 La Fé mine is said to show ore up to 30% in copper nows a 12′ vein, estimated to average 7% copper, 2 oz.

silver and $20 gold per ton, which figures are cons
del Norte mine has a 260′ tunnel. The property a
100′ average depth, with a total of about 1,000′ o
sight 200,000 tons of auriferous copper ore. Wor
pended 1909, and development has been confined
said to show, at depth of 115′, ore averaging 2 oz. sil

Equipment includes a steam hoist and air-co
group. The mill has a 25-ton Elspass mill, 25-to
Huntington mill and 3 Pachuca tanks. In 1909 th
ton smelter, which failed to materialize.

LA REINA UNIÓN MINING & REDUCTION

Office: 602 Empire Bldg., Denver, Colo.
Hermosillo, Sonora, Mex. J. F. Williams, manag
bres mine, having argentiferous and somewhat au
Equipment includes steam and electric power,
sumably idle.

LA RITA DEVELOPMENT CO.

Office: Tombstone, Ariz. Letters returned
former mine office, Fairbank, Cochise Co., Ari
preceding officer, Frank Hare and D. L. Cunni
claims, near Mescal Springs, circa 16 miles west o
trenches, showing silver bromides and copper carb
of 12% copper and 100 oz. silver per ton. Idle
moribund.

LA ROCA-NEGRITA MINING CO.

Dead. Lands were sold, circa 1903, to Amer
opment Co. Formerly at Velardeña, Cuencamé,

JOSÉ LARRAGUIBEL.

Mine office: Algarrobito, La Serena, Coqui
Pajalones mine, having a vein of one meter aver
130 meters, with horizontal workings for 400 mete
was 400 metric tons of ore averaging 14% coppe
fine copper. Presumably idle.

LAS ADARGAS MINING CO.

Office: 15 John St., New York, N. Y. Mine
Mex. E. G. Seiler, president; Geo. E. Crawfor
general manager, at last accounts. Claims to be
York, with capitalization $1,000,000, shares $10
25 cents per share, April, 1902. Property was sa
$300,000, on which $15,000 was paid. Claimed
garded with much suspicion. Idle and apparently

LA SAL COPPER MINING CO.

Dead. Was succeeded, 1904, by Consolidat
Co. Formerly at La Sal, Grand Co., Colo.

LA SAL COPPER-SILVER MINING CO.

Office: 1317-25 Broad St., New York, N.
Montrose Co., Colo. J. Ensign Fuller, president
president; John B. Overton, secretary; Frank R.
is a reorganization of Consolidated La Sal Mining
reorganization of La Sal Copper Mining Co.

Lands, 7 claims, patented, and 3 millsites,
Cashin mine, some distance from a railway, with
Lands are said to carry coal also. The mine has
bonate ores, and presumably sulphides also, assay
oz. silver per ton. Equipment includes steam p
pressor.

O. **MICHIGAN.**

ton Place, Boston, Mass. Mine office: Calumet, Quincy A. Shaw, president; Rodolphe L. Agassiz, vice-, secretary and treasurer; Jas. MacNaughton, general ers, Col. Thos. L. Livermore, Courtney C. Douglass, and T. M. Perkins, directors; Ole Hallingby, superin- d Josiah Bartell, mining captains.

ember, 1906, under laws of Michigan, with capitaliza- 25 par; issued, 302,977 shares. Company absorbed the d controlled the Tecumseh Copper Co., through owner- ntire stock issue, giving 1⅛ shares of La Salle for 1 of he entire property of the Tecumseh, May 11, 1910, for d, through ownership of 53,500 shares, by the Calumet he Calumet & Hecla contributed $1,000,000 cash to the ing pay in stock, and agreed to loan $750,000 additional ce sheet of Apr. 30, 1910, gave liabilities of $5,906.82, 362.92, but, of this amount $298,169.10 was in the shape h Copper Co., since wound up, so that the actual cash was approximately $450,000 only. Annual meeting, gust.

also the Gregory millsite, on Torch Lake, nearly oppo- la mills. The Tecumseh and Caldwell contributed 560 es were furnished by the Calumet & Hecla, St. Mary's den & Douglass Estate, and other interests, these lands pany at a novel basis of valuation, figured upon zones of p of the Kearsarge bed, allowance being made for de- zones carrying the underlay at increased depths. There Tecumseh and 2 on the Caldwell tract, with room for 3 ive a total of 7 shafts, at intervals of about one-third rries the strike of the Keweenawan formation for about

ond drilling has been done, more than 30 diamond drill- d on the Tecumseh and Caldwell tracts, several years ago, has been done on the western portion of the La Salle, none h of the Pewabic amygdaloid, and only a little drilling ast of the Kearsarge bed.

he Tecumseh mine was done on the Calumet conglomer- when a shaft was sunk circa 1,000′, but found no payable econd era of activity, 1889–1902, a shaft was sunk 2,300′ loid, but this bed being found practically barren of copper, November, 1902. It is possible that the old Osceola l, eventually, as the southern drifts of the No. 6 shaft of 4,000′ level, near the Tecumseh boundary, are among the

haft, formerly known as No. 1 Tecumseh, sunk on the ′ in size, with three compartments, 2,041′ deep, May, 1910, o 12′ width, with variable mineralization, including con- ound, carrying some heavy copper that is rather showy, newhat disappointing in the mill. Equipment includes a hoist.

haft, formerly known as No. 2 Tecumseh, is about 1,700′ ′ in size, with 3 compartments, and was 708′ deep May, f fair width, not carrying much copper. This shaft has a se. The power plant has a 125-h. p. boiler, a hoist good an 8-drill air-compressor. Buildings include a changing-

No. 5 shaft, formerly known as No. 1 Caldwel is 1 mile south of No. 1 shaft, and can be sunk to the boundary. This shaft was 1,220′ deep, May, bed, with unsatisfactory copper contents, and wo ber, 1910. Equipment includes a shaft-rockhouse hoist and a 15-drill air-compressor. Buildings barn and several dwellings.

No. 6 shaft, formerly known as No. 2 Caldwel is circa 1,500′ southwest of No. 5, and is a dupl This shaft was abandoned, June, 1909, at depth of no copper, and the surface equipment was remove

The Kearsarge bed is narrow in the Tecumseh with an average of about 9′ width. It is estimated tons of stamp rock were blocked out in No. 1 Tecu greatest length of lateral opening being on the 12th 1,000′ of good stoping ground has been developed.

Production was begun March, 1910, at the rat was increased, September, 1910, to about 250 tons 2 months was 13,754 tons of rock, yielding mineral copper, an average of slightly better than 13.5 lbs. c

It is proposed to merge the La Salle in the C the merger having been approved, informally, 215,097 shares for and 978 shares against. If the m of La Salle will be given two one-hundredths share Hecla Mining Co. for 1 share of La Salle, or, in ot shares of La Salle for 1 share of the new Calum Salle has proven decidedly disappointing.

LA SALLE COPPER MINING & MILLING CO

Mine office: Carrizozo, Lincoln Co., N. M. dent. Organized under laws of Arizona, with cap $100 par. Lands, 3 claims, area 60 acres, 6 miles f 12′ to 15′ vein of low-grade copper ore. Compa concentrator. Presumably idle.

LAS ANIMAS COPPER MINING & SMELTIN

Dead. Property was sold, circa 1909, to S de Cuivre de Chañaral, and company went into li merly at Chañaral, Atacama, Chile. Fully descri

LAS ANIMAS GOLD-COPPER MINING CO.

Dead. Formerly at Hillsboro, Sierra Co., N.

LAS ANIMAS MINING & SMELTING CO.

Dead. Property was sold to Mexican Met Magdalena, Sonora, Mex., and Altar, Sonora, Me

LAS BOLAS MINING & SMELTING CO.

Letter returned unclaimed from former office, Guachinango, Mascota, Jalisco, Mex. Fred Mic Eduard Villemin, manager; C. K. Heidelburg, as circa January, 1908. Mine, 20 miles west of Amec carrying argentiferous lead and copper ores, with

LAS COCHES MINING CO.

Office: 1085 West 21st St., Chicago, Ills. Mex. Idle several years.

LAS CRUCES COPPER CO.

Dead. Formerly at Organ, Dona Ana Co.,

LAS GORITAS MINING CO.

Letter returned unclaimed from former office

Sonora, Mex. Idle several years and apparently

. MÉXICO.
by Las Moras Copper Mining Co. Formerly at
ribed Vol. VI.

INING CO. MÉXICO.
December, 1908, to Magistral-Ameca Copper Co.,
Jalisco, Mex. Fully described Vol. VIII.

NG CO., LTD. BRITISH COLUMBIA.
C. Mine office: Van Anda, Texada Island, B. C.
D. Tennant, vice-president; John D. Mather, secre-
rer; Percy Williams, manager; preceding officers and
rganized circa 1910, with capitalization $500,000,

50 acres, on Lasqueti Island, near the southwestern
ne Gulf of Georgia, 55 miles from Vancouver. De-
th a 38′ upraise to surface planned to be turned into
n as St. Joseph, having 4 paystreaks, of 6″ to 24″
average 10% copper and $20 gold per ton, and it is
the vein carries combined gold and copper values of
gures are entirely too high. A 20-ton test shipment,
ave net returns of $19.25 per ton.

O. MÉXICO.
he Bariste Copper Co., and a poor outfit. Formerly
uerte, Sinaloa, Mex. Described Vol. VIII.

MINING CO. MONTANA.
ain St., Butte, Mont. Letter returned unclaimed
ltese, Missoula Co., Mont. Geo. Champagne, presi-
ary; Dr. T. C. Witherspoon, treasurer; Jos. Laundry,
ation $1,200,000, shares $1 par.
ated, adjoining the Ben Hur mine, 4 miles north of
ow shafts and an 800′ lower tunnel. Mine has a 30′
tunnel, now having no ore in sight, but a winze shows
carry about $100 per ton in values. Ore is claimed
42% copper, 450 oz. silver and $8 gold per ton with a
pper, 60 oz. silver and $4 gold per ton, which is much
rts past shipments of about $150,000, one carload
3.6% copper, 394 oz. silver and $12 gold per ton. Idle
d to resume circa May, 1911.

R MINING CO. WASHINGTON.
Ferry Co., Wash. Idle some years and moribund.

G CO. ARIZONA.
d, 1902, by Canyon Copper Co. Formerly at Will-
Described Vol. IV.

G CO. UTAH.
on, Salt Lake Co., Utah. W. P. Worthen, general
s. Lands, 1 patented claim, adjoining the American
ottonwood district. Shaft, at depth of 70′, is said to
ad ore. Management planned, 1909, installing a hoist
apparently failed to do so. Presumably idle.

t MILLING CO. NEW MEXICO.
Tres Piedras, Rio Arriba Co., N. M. Described Vol.

CO. NEW MEXICO.
imed from former office, East Las Vegas, N. M. Mine
guel Co., N. M. F. A. Manzanares, president; J. M.

Thompson, secretary; J. M. Allen, treasurer and Buck, consulting engineer. Capitalization, $100,0 is the Tecolote mine, showing auriferous and arg vein of chalcanthite or natural copper sulphate. H and a concentrator. Company claims to have dev of carbonate ore, which estimate is considered gro years and apparently moribund.

LAS VIGAS MINING CO.

Office: Santa Barbara, Cal. Mine office: C Mex. Geo. E. Voorhees, Jr., manager at last accou leased to Compañía Minera Cuatro Señores, S. A.

Lands, 74 hectares, said to show 19 ore bodies, stone, and as contact deposits between sandstone pregnations and replacements in the sandstone. Fo ment are reported to average 7′ to 12′ width, and returns of 7.5% copper and 3 oz. silver per ton, m copyrite, with occasional oxidized ores and native 61′, 98′, 125′ and 179′, and 3 short tunnels, estimat ore. Equipment includes steam power, a hoist an ings include an office, store and 19 dwellings. Or Trancas station, by a Buffalo-Pitts traction engine

LATAH COPPER MINING CO., LTD.

Office and mine: Potlatch, Latah Co., Idah Wm. Deary, vice-president; H. P. Henry, secretar derson, general manager. Organized under laws o $2,000,000, shares $1 par, nonassessable. Annua September.

Lands, 9 claims, 1 fractional, area circa 161 King mine, in the Hoodoo district, 40 miles east o tunnel, showing malachite and chalcopyrite, est average 6 to 20% copper, ore being zinciferous, an The mine has a steam hoist. Idle since 1907, exc load of ore, July, 1910, from a 1,200-ton dump.

LATHAM MINING & SMELTING CO.

Dead. Was succeeded, circa 1905, by Ohio L Formerly at Wells, Elko Co., Nev. Fully describe

LATIMER COPPER MINING CO.

Mine office: Pierceville, Fannin Co., Ga. ently moribund.

LATOUCHE CONSOLIDATED COPPER CO.

Office: Seattle, Wash. Mine office: Latouc William Sound, Alaska. Organized 1907, under law talization $1,000,000, shares $1 par, by Jas. Denny, Lands, 5 claims, on the southern end of Latouche nolds-Alaska, said to show a vein traceable 1½ mile pits, and a shallow shaft, about one-half mile from

LATOUCHE COPPER MINING CO.

Mine office: Latouche, Latouche Island, Alask Lands, 7 claims, about one-half mile north of the B Copper Co., at the northern end of Latouche Island about 750′, by trenches and pits, and is develope chalcopyrite associated with pyrite and pyrrhotite, copper tenor, having small gold and silver values. tram to a shipping wharf. Buildings include a bu office.

N MINING CO. **ALASKA.**
ne, Latouche Island, Alaska. Idle and apparently

OPPER MINING CO., LTD. **ALASKA.**
Bldg., Seattle, Wash. Mine office: Latouche,
Jas. A. Murphy, president; Tenning Carlson, first
S. Jamison, second vice-president; Gordon Everett,
s, treasurer; preceding officers, Dudley A. Tyng and
lip C. Stoess, consulting engineer. Organized under
capitalization $5,000,000, shares $5 par.
ell timbered, and a millsite, carrying approximately
ge, on the northeastern shore of Latouche Island, circa
The property has 3 practically parallel veins, of 8′
width, having a generally NS. strike, with dip of about
proven by trenches at intervals for about 3 miles.
low shaft and tunnels of 94′, 103′, 160′ and 200′, with
showing ore of 5 to 6% claimed average copper tenor,
d to have in sight approximately 200,000 tons of ore,
red excessive. Ore is mainly bornite and chalcopyrite,
ying up to 25% copper, with $1 to $3 combined gold
The company claims that the first 3 shipments, 1907,
from surface ores, without assortment.
a small hydro-electric plant having a water-wheel and
npressor. Company is said to have expended about

CO. **ALASKA.**
he Beatson Bonanza mine, but lost same. Formerly
sland, Alaska. Fully described Vol. VIII.
DATED COPPER CO. **MÉXICO.**
ded, 1907, by Central Consolidated Copper Co. For-
pe, Sonora, Mex. Described Vol. VI.
MINING CO. **ARGENTINA.**
ice: Humahuaca, Jujui, Argentina. Has steam power
loying about 100 men in 1905. Idle several years.
LAURA DE HUANTAJAYA. **CHILE.**
hile. Mine office: Huantajaya, Tarapacá, Chile. Or-
under laws of Chile, with capitalization 60,000 pesos,
No trace of operations secured.
NG & MILLING CO. **COLORADO.**
t Newett, Chaffee Co., Colo. Described Vol. IV.
O. **WASHINGTON.**
Wash. Mine office: Orient, Ferry Co., Wash. Wilbur
l manager; W. J. Roberts, superintendent. Lands,
and about 9 miles from the Granby smelter, show a wide
′ by trenching. A 60′ shaft has a 16′ vein of ore giving
with excess of iron, and a 400′ crosscut tunnel shows ore
% copper and 10 to 12 oz. silver per ton.
ES DE CUIVRE DE LAURIOLLE. **FRANCE.**
t Lauriolle, Basses-Pyrénées, France. Described Vol. VIII.
CO. **MICHIGAN.**
urton Place, Boston, Mass. Mine office: Calumet,
Quincy A. Shaw, president; Rodolphe L. Agassiz, vice-
gg, secretary and treasurer; Jas. MacNaughton, general
ficers and Francis L. Higginson, directors; Geo. G. Endi-
y and treasurer. Organized under laws of Michigan, with
00, shares $25 par, fully issued. Is controlled, through

ownership of 26,900 shares, by the Calumet & Hecl
dividends of $4 per share, through sale of town lots i
Balance sheet of Apr. 30, 1910, gave assets of $182,4
$142,484.71. Annual meeting, second Tuesday in Jun

Lands originally were 640 acres, lying next east
but a triangular tract of about 65 acres, carrying both
was sold, many years ago, to the Calumet & Hecla, a
face rights have been disposed of since as building
mineral rights, leaving present holdings of approxim
rights, with mineral rights to 570 acres. The property
the strike of the Kearsarge bed, with circa 280 acre
Laurium a chance to develop this bed to a depth of ab

The shaft, started Aug. 7, 1909, and predicated
borings, is about 2,200′ from the SW. corner of Sec. 2
north of No. 1 Tecumseh shaft, and a second shaft is pl
one-half mile north. The shaft was about 900′ deep
little drifting, showing encouraging copper values. T
of about 600 tons daily capacity.

Equipment includes a boiler-house, with a large
house with a small hoist and air-compressor, and a cha
considered promising. It was proposed, early 1911, t
the Calumet & Hecla Mining Co., giving 1 share of ne
for 10 shares of Laurium.

LA VENTURA MINING & MILLING CO.

Mine office: Ocotlán, Oaxaca, Mex. Geo. I. B
accounts. Mine carries auriferous and argentiferous
has a small steam plant.

SOCIEDAD MINERA LAVINIA DE HUANTAJAYA

Office: Iquique, Chile. Mine office: Huanta
Organized Oct. 29, 1906, under laws of Chile, with cap
shares 100 pesos par. Presumably idle.

LEACLEDE CONSOLIDATED GOLD & COPPER M

Office: 461 Broadway, Albany, N. Y. Mine
Union Co., Ore. W. J. Curtis, president; Geo. Oliver
Wolf, secretary; D. Keefer, treasurer. Organized Jun
Oregon, with capitalization $1,500,000, shares $1 par.
timbered, 3 miles from a railway, in the foothills of th
in Baker county and partly in Union county, Oregon
hundred feet of shafts, tunnels and crosscuts, showing
width, carrying auriferous and argentiferous ores assa
with iron gangue. Idle since 1905, and apparently mo

LEADVILLE MINING CO.

Mine
ager. Ca
Arizona M
sum was
Lands
Maid of S
40′ claimed
have a 300′
40,000 tons
ings show 24
LEADVILLE
Office:
A. Cottrell, pr
preceding offic
Courtland, Cochise Co., Ariz. Wm
$600,000. Was bonded for $20
with a $2 h payment, 190
shareh dividend.
pate as the Leadv
ing es. The prop
la one-half mile
ve feet of driftin
be ores seam h
4% copp
).
Basin,
tre
and

LEICHHARDT-CLONCURRY DEVELOPMENT CO

Office: 398 Collins St., Melbourne, Australia. St., Brisbane, Queensland, Australia. Mine office: Co., Queensland, Australia. D. W. Harvey Patters phett, local director; preceding officers, E. A. Wein H. F. C. Keats, directors; F. C. Hughes, secretary; F. S J. R. Peberdy, mine manager. Organized October, 19 as successor of Leichhardt Copper Co., with capitaliz par, in 1,500 shares of fully paid stock, and 1,000 shar

Lands, 270 acres, near the Duchess mine of The Wee MacGregor group was sold, 1906, and sever abandoned, including the Dugald River group of mine, area 40 acres, has a strong vein, paralleling t with estimated average width of 22′, opened to dept grade ore. The Magnet mine, opened to 200′ depth, to have 8,500 tons of ore developed, averaging 10.28% include the Mt. Wheeler, Una, Pilgrim, and Pilgrim the company shipped 53 tons of ore, of about 30% av since circa 1909.

LEICHHARDT COPPER CO.

Dead. Former office was Queen St., Brisban Capitalization was £62,500. Was succeeded, October, curry Development Co., Ltd. Property formerly Gregor, Una, Magnet, Idaho and other more or less d pects. Formerly at Cloncurry, Beaconsfield Co., Que

LEIGHTON-GENTRY COPPER CO.

Dead. Was reorganized, 1904, as Independence Rawlins, Carbon Co., Wyo.

LEIGHTON-WYOMING COPPER CO.

Office: 417 Seventh St., Milwaukee, Wis. Mi Co., Wyo. Jos. T. Leighton, president and general vice-president; H. E. Dankoler, secretary; Spencer S. ceding officers, F. M. Nolan, Jas. Kinney, Albert H directors; W. L. Mathews, superintendent. Organize $1,000,000, shares $1 par.

Lands, 8 claims, adjoining the Ferris-Haggarty m Dillon, in the Battle Lake district. Development is gold ore, and a shallow shaft, sinking on contract, 191 to average 10% in tenor. Equipment includes a sawn plant, bought, 1909, from the Haskins mine. Was dev at last accounts.

LELAN GOLD & COPPER CO.

Mine office: McCabe, Yavapai Co., Ariz. Jos at last accounts. Has gasoline power and a 10-stamp

LENA MINING CO.

Dead. Formerly at Lordsburg, Grant Co., N.

LENAPE GOLD & COPPER MINING CO.

Office: Dover, Del. Mine office: Searchlight, J. Frank Allee, president. Mine, known as the Go the Homestead and Cyrus Noble properties, near Sea showing auriferous chrysocolla.

LENAWEE MINING, MILLING, TUNNEL & TRANSPORTATION CO.

Mine office: Dillon, Summit Co., Colo. Jas. H. at last accounts. Mine has auriferous and argentifer ment includes a steam plant and 20-stamp mill.

MILLING CO. **UTAH.**

City, Utah. Letter returned unclaimed from former aver Co., Utah. Miles L. Burns, president; P. C. Evans, away, general manager. Organized Dec. 19, 1903, with 000 shares. Lands, 9 claims, known as the Lenora group, rrior on the north, carrying the NS. ore zone of the Red ng EW. fissures. Development is by a 400′ tunnel, and May, 1910, sinking a 500′ shaft. Mine is said to have high grade silver ore in the past.

ICKER COPPER **BRITISH COLUMBIA.**

TD.

was sold, 1907, to Vancouver Copper Co., Ltd. Formerly er Island, B. C. Fully described Vol. VI.

O. **UTAH.**

St., Salt Lake City, Utah. Letter returned unclaimed e, Bingham Canyon, Salt Lake Co., Utah. E. McCarrick, , secretary and treasurer. Organized 1900, under laws of ation $400,000, shares $1 par, assessable; fully issued. nted, 12 miles from a railroad, showing auriferous and ar- copper sulphides, slightly developed by tunnel.

N MINES CO. **MONTANA.**

Sheridan, Madison Co., Mont. C. E. Lentz, manager, esumably idle.

PPER MINING & REDUCTION CO. **MONTANA.**

nn Ave., Pittsburg, Pa. Mine office: Sheridan, Madison Lentz, president and general manager; F. J. Mangus, vice- cChesney, secretary and treasurer; S. E. Brimm, superin- unts. Organized under laws of Arizona, with capitalization 2 par. Annual meeting, third Friday in February.

s, area 220 acres, also a 20-acre millsite, in the Tidal Wave m the Northern Pacific railway, showing granite-porphyry, , said to carry 10 ore bodies, occurring as fissures in porphyry ween limestone, gneiss and granite, of which 3, partly devel- by the company, to have average widths of 16′ to 30′, with are claimed to carry all varieties of copper ore, presumably estimated average values of 2% copper, 12 to 50% lead, 12 to $8 to $600 gold per ton. Property is opened by shafts of 0′, and by tunnels of 80′, 100′, 120′ and 1,600′, with a total of kings, estimated by company to show 8,000 tons of high- 000 tons of low-grade ore, which figures are considered exces- mated average values.

ned, 1906, to have an air-compressor and two 60-h. p. hoists, buildings, but neither hoist nor compressor were erected. mine of the company is in litigation. Property has been idle mpany apparently is moribund.

ER CO. **ARIZONA.**

ed unclaimed from former office, 82 Devonshire St., Boston, e: Gleeson, Cochise Co., Ariz. Nathan L. Amster, general Penberthy, superintendent. Organized circa 1910, by inter- cted with the Shannon Copper Co.

ns, known as the Copper Belle mine, in the Turquoise district, sale, July 25, 1908, for circa $90,000, from the bankrupt Cop- Co. The mine was developed by John Gleeson, with fairly s, but the Copper Belle Mining Co. mismanaged matters sadly. 200′ two-compartment shaft, showing ore claimed by former

owners to average 7% copper, which was a seriou
and silver values.

The old smelter, of 50 tons daily capacity, fo
is antiquated, and of no present value.

Production was 64,982 lbs. fine copper, 20,843
1907; 63,225 lbs. copper, 25,849 oz. silver and 517
copper, 47,485 oz. silver and 596 oz. gold in 1909.
ing and management good.

LEONARD MINE.

Owned by Anaconda Copper Mining Co., at

LEÓN MINING CO.

Office: 100 Broadway, New York, N. Y.
Pedro, Galeana, Chihuahua, Mex. Geo. A. Laird,
superintendent, at last accounts. Mine carries
lead and copper ores. Equipment includes a stea

MINAS LEONORA y HUERTA.

Office: care of James M. Daniel, owner and
16, Aguascalientes, Mex. Letter returned unclain
Villanueva, Zacatecas, Mex. Jas. M. Daniel, Jr.,
Manuel Varila, mine superintendent, at last accou
500 acres miscellaneous lands, in the Jalpa distric
porphyry, of 10′ average width, carrying argentife
conite and azurite, with clay gangue, said to give
copper, 10% lead, 200 oz. silver and 29 milligrams
circa 1820, and reopened 1883, has shafts of 300′ an
of underground workings. Equipment includes stea
having one crusher and 12 planillas, for treating lo
and smelting ores are shipped, 75 miles, by bu
smelter, when the mine is operated. Idle.

LEONORA MINING & MILLING CO.

Office: 37 Commercial Block, Salt Lake City,
ford, Beaver Co., Utah. John Matson, president;
secretary and treasurer; A. N. Holdaway, general
H. W. Horne and H. M. Eakin, directors; N. C. Ch
ent. Organized Dec. 19 1903, with capitalization
par, assessable; issued, circa $50,000.

Lands, 13 claims, in the North Star district, n
gold, silver and lead ores, developed by tunnels of 5
shallow shafts of 25′ to 100′ depth. Mine is reporte
duced about $100,000 worth of ore.

LEONTINE CONSOLIDATED MINING CO.

Letter returned unclaimed from former office, P
office: Poland, Yavapai Co., Ariz. Meredith E.
8 claims, in the Big Bug district, bought, Jan. 1, 1908
a 153′ shaft, with a level at 100′, showing ore assay
$200 gold per ton. Idle and presumably moribun

LEOPOLD-TYRONE COPPER CO.

Dead. Formerly at Tyrone, Grant Co., N. M.

LEPANTO MINING CO., INC.

Office: P. O. Box 964, Manila, Philippines.
Lepanto, Luzon, Philippines. Geo. E. Wolf, preside
ident; M. F. Loewenstein, secretary; J. A. Hami
Wright, superintendent. Organized September, 190
pines, with capitalization 1,000,000 pesos, shares 100
a franchise for a railway, from Mancayan to Banga
Luzon. The copper property, but slightly develope

ne Tellus Aktiengesellschaft, of Frankfurt-am-Main, vas surrendered, 1910. Presumably idle.

S, LTD. **SPAIN.**

ed, voluntarily, September, 1902. Formerly at Described Vol. III.

MINERA BELGA DE LOS COBRES **SPAIN.**
NADA.

ish incorporation of Lerida Copper Mines, Ltd. Was September, 1902. Formerly at Senterada, Lérida,

VRES DE LÉRIDE-GRÉNADE. **SPAIN.**

ch incorporation of Lerida Copper Mines, Ltd. Was 2. Formerly at Senterada, Lérida, Spain.

ARIZONA.

an, Mohave Co., Ariz. Maj. W. A. Mensch, man- eloped, are in the Enterprise camp. Presumably idle.

LTD. **BRITISH COLUMBIA.**

y House, London, E. C., Eng. Mine office: Ross- T. D. Grimke-Drayton, J. P., chairman; Anthony rector and liquidator; preceding officers, G. W. Wilson directors; Harold A. Wesson, secretary; Andrew G. W. A. Carlyle, consulting engineer.

98, under laws of Great Britain, with capitalization r, fully issued and fully paid. Has paid dividends as 9; 1s. 6d., March 3, 1906; 2s., November, 1906. Con- rship, the Northport Smelting & Refining Co., Ltd., bed. Fiscal year ends Sept. 30th. Went into volun- th net indebtedness apparently of about £11,000 only. reehold, and the I. X. L. mine, held under lease, also a ng. The Spitzee and Townsite claims were held under dy increases in width with depth, but carries decreased having only 3′ to 5′ of smelting ore, though the con- nsiderably greater depth has been proven by diamond the bottom of the shaft. The company did 27,000′ –1910, with 3 machines. Smelting ore formerly aver- , 0.5 oz. silver and 0.4 to 0.5 oz. gold per ton. The has 5 compartments. There is considerable low grade arge amount of discarded material on the dumps that to advantage.

a good mining plant with hoist, air-compressors and a s include necessary shops and warehouses.

nged $10 to $12 per ton in gross values, with treatment some years past. From February, 1894, to September, ,445,246 tons of ore, returning 41,600,740 lbs. copper, 1 689,057 oz. gold, of the gross value of $20,406,627, r ton of ore. Largest copper production was approxi- 1902, and recent production has been as follows: circa r in 1907; circa 1,500,000 lbs. in 1908; circa 550,000 lbs. and 17,334 oz. gold in 1909. Production for fiscal year vas 26,935 tons of ore, averaging 0.85% copper, 0.33 oz. per ton. Work was suspended, 1909, and the prospects The property is for sale.

BRITISH COLUMBIA.

ury House, London, E. C., Eng. Mine office: Ross- C. Employs circa 110 men. Lord Ernest W. Hamilton, icer, A. B. Dealtry, F. C. D. Haggard, and H. W. Ham-

ilton, directors; F. A. Labouchere, secretary; Ernest L
Hill & Stewart, consulting engineers.

Organized June 1, 1900, under laws of Great B
£600,000, shares £5 par; fully issued and fully paid
follows: 5s. in 1901; 5s. in 1902; 3s. in 1904; 4s. in 190
6s. in 1908; 6s. in 1909; 6s. in 1910. Total divide
£2 3s. per share, or £264,000. For fiscal year endin
was £37,707 2s. 10d., after writing off £28,474 1s. 6
company holds a share interest in the Cloncurry Sy
thirds interest in the Van Roi Mining Co.

Lands, 72 acres, including the Josie No. 1 and An
tain, also 8 claims near the old mine, 2 claims near the
in the Ymir district of British Columbia. Considers
been done, upwards of 1 mile of borings having been
than 2 miles in 1910. New underground openings n
and 4,362′ in 1910.

The property has 2 veins, known as the Annie
ment is by the 1,300′ Josie main shaft, and by 3 tunne
the Poorman claim. The Josie vein is narrower than
but has ore about twice as rich as the average, the bot
carrying up to 4% copper and 15 dwts. gold per long to
a whole is auriferous and argentiferous chalcopyrite, s
pyrrhotite, in a silicious gangue, with average assay
silver and 0.8 oz. gold per ton. Concentrating ore ran
tenor, with only about 20% of the copper saved, the
in gold being 56 to 60%. Ores carry values in gold,
order named, and production is divided into smeltin
Ore reserves were estimated by the management, early
including some ore shoots of considerably better than
camp.

Equipment at the Josie shaft includes a 150-h. p
quarter-mile depth. Buildings include a machine-sh
superintendent's dwelling, etc.

The mill, across a small gulch from the Josie shaf
capacity, having Blakes and Gates crushers, 2 Chile
and 6 Wilfley tables. An Elmore oil concentrator, fu
installed 1903, proving a technical but not a commerci
seded by Wilfley tables. Concentrates average circa
and 1.3 oz. gold per ton.

Largest copper production was 3,001,027 lbs. in
has been as follows: 803,409 lbs. fine copper, 22,054
gold in 1906; 539,048 lbs. copper, 13,393 oz. silver an
910,354 lbs. copper, 20,488 oz. silver and 28,452 oz.
copper, 22,401 oz. silver and 28,352 oz. gold in 1909; 9
oz. silver and 26,447 oz. gold in 1910. Property cons
agement good.

LEROY GOLD & COPPER MINING CO.

Office: Wallace, Idaho. Mine office: Saltese
Hon. Herman J. Rossi, president; C. E. Clark, secretar
officers, Geo. Steward, Albert Honeker and Chas. Bo
adjoin the Monitor mine, and survey for the extensi
runs through this property. Idle, except for annual

LE ROY MINING CO.

Mine office: Pilares de Teras, Moctezuma, Sonor
erous and argentiferous copper ores. Idle several yea

ING CO. **IDAHO.**
St., Wallace, Idaho. Mine office: Mullan, Shoshone
erett, president and manager; A. W. McLaughlin, vice-
J. Rossi, secretary and treasurer, preceding officers,
. Peppard, directors. Organized February, 1899, under
talization $100,000, shares 10 cents par.
rca 220 acres, adjoining the Amazon-Dixie, also a mill-
lying east of Mullan. Property has 4 fissure veins, in
, of circa 12′ average surface width, having a 35′ shaft,
y by tunnels, giving about a mile of underground open-
ngs show galena and copper ore, and a lower tunnel is
of 650′. The property carries mainly silver-lead ore, of
ith a narrow copper paystreak. Equipment includes
pressor, and several mine buildings.

VRE DE LA FARE, LTD. **FRANCE.**
dated, voluntarily, 1910. Formerly at Vaujan, Isère,
ed Vol. VIII.

OPPER **NEW BRUNSWICK & NOVA SCOTIA.**

tete, Charlotte, Co., N. B. Property is the old Johnson
0, and reopened 1902, having 2 short tunnels and a 145′
e of good assay value. Has a steam plant, and shipping
Company also owns mineral lands in Nova Scotia. Idle
ently moribund.

O., LTD. **ENGLAND.**
R. S. O., Cornwall, Eng. Mine office: St. Just, Corn-
litho, chairman; preceding officer, Peter Olds, Sr., W.
k Oats and F. Freathey Oats, directors; Maj. Richard
Benj. Nicholas, general manager. Organized 1872, under
a cost-book company, with 2,500 shares; issued, 2,385
13s. 6d. per share has been paid in, last call having been
ith no previous calls 1898 to 1908, with dividend disburse-
per share, last dividend having been 10s., October, 1907.
every 16 weeks. The mine has been worked continuously
170,000 in dividends during its first 20 years of operation.
all producer only, of tin and copper ores, mainly the former,
d 2,140 long tons of copper ore, of 12% average tenor,
0 lbs. fine copper, rendering the Levant the largest copper

MINING CO. **MONTANA.**
ony, Madison Co., Mont. Chas. E. Morris, general man-
. Property carries auriferous and argentiferous copper ores,
n gold. Equipment includes a hydro-electric power plant,
a 100-ton concentrator.

E. **MONTANA.**
rance Copper Co., at Butte, Silver Bow Co., Mont.

MINING CO. **IDAHO.**
: Mullan, Shoshone Co., Idaho. J. Wm. Grismer, presi-
nedy, secretary. Organized 1907, under laws of Idaho, with
0,000, shares $1 par. Lands, 12 claims, northeast of the
g a strong vein having a gossan. Property has little or no

LORATION & MINING CO.
1 Broadway, New York, N. Y. Frederick Lewisohn, presi-
velt, secretary; Walter Lewisohn, treasurer; preceding officers,
. S. Henry, O. B. Van Sant and Kenneth K. McLaren, direct-

ors. Organized Jan. 6, 1906, under laws of Ne
$5,000, and was said to plan increasing its capitali
stages, as properties were acquired. Is controlled

LIBERAL MINING CO.

Dead. Was merged, 1903, in Butler-Liber
Formerly at Bingham Canyon, Salt Lake Co., Ut

COMPAÑÍA MINERA LIBERTAD DE SANTA

Office: Iquique, Chile. Mine office: Huan
ganized Nov. 13, 1904, under laws of Chile, with
shares 100 pesos par. No trace of operations sec

LIBERTY COPPER MINING CO.

Office: La Crosse, Kans. Letter returned
office, Chewelah, Stevens Co., Wash. T. F. Wil
L. C. Dougherty, vice-president; L. Bryant, se
manager; preceding officers and W. W. Morris, dir
watered and timbered, on Blue Creek, about 1½ r
and 6 miles northwest of Chewelah. The prope
blind veins. The main vein, developed by 2 tu
accounts, is of about 7′ average width, carrying
copper and lead ores.

Equipment includes a Fairbanks-Morse stea
an air-compressor. The mine has been under st
and made its first carload shipment circa March, 19
Management is said to plan a concentrator. Con
building, at La Crosse, Kans.

LIBERTY COPPER MINING & MILLING CO

Dead. Property was sold to Virginia Consoli
at Libertytown, Frederick Co., Md. Described

LIBERTY GOLD & COPPER CO.

Letter returned unclaimed from former office,
Mine office: Swansea, Yuma Co., Ariz. Fran
accounts. Mine, near the Clara Consolidated, s
said to have a promising showing of auriferous co

LIBERTY MINES CO.

Dead. Formerly at Turkey, Yavapai Co.,

LIBERTY MINING & SMELTING CO.

Dead. Was succeeded, circa January, 1911, b
tion Co. Formerly at Arivaca, Pima Co., Ariz.

SOCIETÀ ANONIMA PER L'ESERCIZIO DEL
DI LIBIOLA.

Mine office: Sestri Levante, Genoa, Liguria
under lease to the Libiola Copper Mining Co., L

LIBIOLA COPPER MINING CO., LTD.

Office: 138 Leadenhall St., London, E. C.
Levante, Genoa, Liguria, Italy. Kenneth Hawei
officer, Thomas V. Anthony and Albert Straube, di
tary; Robert H. Craven, mine manager. Organiz
of Great Britain, and reconstructed, 1888, with c
£5 par. Paid dividends of 2s. 6d. in 1903; 3s. 6d
6d. in 1907; 2s. in 1908; 1s. 6d. in 1909, with total
1909.

Lands, 4 claims, leasehold, area 1,000 hectare
mining land including the Libiola mine, in the
worked by the Romans, and reopened 1867, now h
The property has veins of good average size, in ser
a little malachite in the upper workings, but mainly

aging 5.76% copper, now being estimated by manage-
copper and 45.9% sulphur, with 66,750 tons of ore
t the end of 1910.
150-h. p. steam plant, 60-h. p. electric plant, and a
ith 90 h. p. used at the mine, and 150 h. p. at the mill.
air-compressors, of 12 drills aggregate capacity. The
smithy and carpenter-shop, all of stone, and there is a

50 square meters, is built of reinforced concrete and
acity of 180 tons.
88 tons of ore in 1905, and circa 24,000 tons in 1909,
copper ore, averaging 4.98% in copper tenor in 1909,
at year, of circa 500,000 lbs. fine copper. The com-
d, by careful handling, the property, though small, and
e to return satisfactory profits.

DE LA LIENNE. **ITALY.**

t Alagna, Novarra, Piedmont, Italy. Described

MIFERA. **ITALY.**

y. Mine and works office: Casarza, Genoa, Liguria,
number of small and old copper properties, including
ria mines at Casarza, Genoa; the Bordencto and Monte
one, Genoa, and the Monte Capra, Fontanelle, Rio Al-
nd Rio dei Fichi mines, in the vicinity, these properties
e, with quartzose gangue. The Bargonasco works, at
rom these different mines. Production is estimated at
n 1909. .

). **UTAH.**

he Little Cottonwood district, were but slightly devel-
ld, 1908, to Alta & Hecla Mining & Milling Co. For-
e Co., Utah.

ILLING CO. **COLORADO.**

d was superintendent. Mine, slightly developed, had
erous lead and copper ores, and, 1904, had steam power,
nen. Formerly at Idaho Springs, Clear Creek Co., Colo.

G CO. **BRITISH COLUMBIA.**

ay, Queen Charlotte Island, B.C. Property, on Moresby
Charlotte group, is in the vicinity of the Awaya-Ikeda

UTAH.

eka, Juab Co., Utah. Lands, 3 claims. Is controlled,
ock ownership, secured 1908, by the Eureka-Lily Mining
l intents and purposes is out of business, and a part of the

SOLIDATED GOLD & COPPER CO. **ARIZONA.**

was sold to Kentucky-Arizona Consolidated Mining,
ent Co. Formerly at Cave Creek, Maricopa Co., Ariz.
V.

NG & MILLING CO. **MONTANA.**

St. Regis, Missoula Co., Mont. Gunnar W. Nordquist,
on, vice-president; Wm. Ness, secretary and treasurer;
ctor Carlson, Ed. Lawrey, Thos. Lawrey and Sivert An-
rganized November, 1909, under laws of Montana, with
00. No trace of operations secured, and presumably

LIME MOUNTAIN COPPER CO.

Mine office: Johnson, Cochise Co., Ariz. C Arizona, with capitalization $1,000,000, by Davis tensbroth. Lands, 21 claims, known as the Georg Empire mine, in the Dragoon Mountains, slightly sumably idle.

LIMIT LODE MINING CO.

Dead. Formerly at Bingham Canyon, Salt Vol. VIII.

LIMON MINING CO.

Mine office: Alamos, Sonora, Mex. Geo. V last accounts. Has auriferous and argentiferous mill. Presumably idle.

LINARES MINING SYNDICATE, LTD.

Letter returned unclaimed from former offic office: Linares, Jaen, Spain. S. Moos, manager 1903, to exploit lead, copper, zinc, iron, and coal Linares, and to construct a warehouse and ship Idle several years and apparently moribund.

LINCOLN CONSOLIDATED COPPER CO.

Dead. Formerly at Jarilla, Otero Co., N. M.

LINCOLN CONSOLIDATED MINING CO.

Office: Wilmette, Ills. Mine office: Tucs A. Wightman, president; Geo. E. Fernald, secre Kneeling, manager. Organized June, 1904, unde talization $2,000,000, shares $1 par.

Lands, 35 claims, 21 surveyed for patent, a García group of 31 claims, and a 100-acre millsite 1,000 acres, in the Papago district, 12 miles fro Property shows limestone, granite-porphyry and d number of ore bodies, of which 5, slightly developed are opened by a 150′ tunnel and 6 shafts, of 50′ ments are said to have given average returns of gold and silver values, and property is claimed to worth of ore.

Equipment includes two 15-h. p. gasoline hois 15-drill Rand air-compressor. There are 5 buildi chine-shop, 14x60′ smithy, store and 2 dwellings.

LINCOLN COPPER CO.

Dead. Was succeeded, circa 1904, by Linc Formerly at Tucson, Pima Co., Ariz.

LINCOLN COPPER MINING CO.

Dead. Formerly at Tucson, Pima Co., Ariz.

LINCOLN COPPER MINING CO.

Letter returned unclaimed from former office Helena, Lewis & Clark Co., Mont. Jas. A. Talbo Organized July, 1903, under laws of Montana, w shares $1 par. Among the incorporators given w ator Carter states that his name was used witho Lands were said to be 10 claims, in the Little Bo from Helena. Idle some years and apparently mo

LINCOLN GOLD & COPPER MINING CO.

Office: 33–42 New St., New York, N. Y Wilkes Co., Ga. Company was promoted solel Fully described Vol. VIII.

G & MILLING CO. **ARIZONA.**
dt, Yavapai Co., Ariz. Chas. J. George, president
ine, in the Bradshaw Mountains, is developed by
, 1910, after several years idleness. Production was
2 oz. silver and 835 oz. gold in 1907.

, N. L. **AUSTRALIA.**
Lincoln, Canbelego Co., N.-S. W., Australia.

MILLING CO. **COLORADO.**
Springs, Clear Creek Co., Colo. Ores carry gold,
Has steam power and a 15-stamp mill. Idle.

NING & MILLING CO. **NEVADA.**
St., Columbus, Ohio. Mine office: Pioche, Lincoln
president; A. H. McCullough, secretary; Dr. Frank
ganized July, 1906, with capitalization $1,000,000,
ble. Lands, 10 claims, 8 patented, shortly southeast
aving about 800′ of workings, carries auriferous and
lead ores, and is said to have produced approximately
der former ownership, which seems doubtful, in view of
Equipment includes a hoist, with a 10-stamp mill and
mably idle.

COPPER CO. **MÉXICO.**
ce was 25 Equitable Bldg., Boston, Mass. E. M.
Organized 1907, under laws of Maine, with capitaliza-
ning work was done. Formerly at La Cananea, Arizpe,

ILLAGOE, LTD. **AUSTRALIA.**
sold to Irvinebank Mining Co. Formerly at Chillagoe,
Australia.

R CO. **MARYLAND.**
Md. Mine office: New London, Frederick Co., Md.
, president and general manager; Melvin P. Woods, first
ayward, second vice-president; Dr. J. O. Hendrix, secre-
tz, treasurer; preceding officers, Jas. H. Gambrill, Jr.,
. E. Brown and J. W. Dietrich, directors; C. W. Hendrix,
Stewart, Sr., mine superintendent. Organized March,
zona, with capitalization $1,000,000, shares $1 par, non-
,000. Annual meeting, third Thursday in January.
including the Linganore or New London mine, and the
r including a good farm, at Libertytown, near Monrovia.
or Linganore mine, area 86 acres, with 14 acres of timber
der a 25-year lease from Capt. Edw. S. Wertz, but bought
), was opened and worked, 1835–1855, apparently at a
er 1881, except for unwatering and retimbering the shaft,
ened by the p esent company, May, 1907. The property
veins in slate, with NE. strike, carrying bornite and gray
management to average 3% copper and 16 oz. silver per
old. Development is by a 210′ shaft, planned to be deep-
tunnels, longest 340′, with a total of 1,095′ of workings,
agement to block out 17,307 tons of ore for stoping.
mine, area 220 acres, was the principal copper property of
ot a large producer, and in early days shipped, without
e ore of good average tenor. The mine has contact de-
d phyllite, carrying a little malachite in the upper workings,
v depth, by bornite and chalcopyrite. This mine is idle,
ns reopening it, 1911.

The New London mine has a 65-h. p. steam pl good for 500′ depth, and an 8-drill Sullivan air-c buildings, including a 24x36′ machine-shop, 20x24′ shop, office, engine-house, sawmill and 6 dwellings.

The mill is 44x54′ with a 26x76′ concentrating r h. p. steam plant, 15x30″ Cresson crusher, of 100 ton rolls, 1 Richards jig, 5 James tables, 5 trommels, s The mill, under erection, was expected to be in commi erty considered promising and management good.

LINWOOD GOLD & COPPER CO.

Dead. Was a swindle, without lands. Describe

LION COPPER CO.

Dead. Formerly at Palouse, Whitman Co., Wa

LION COPPER MINING CO.

Office: 313 West Second St., Los Angeles, Cal. Yavapai Co., Ariz. Chas. Matthews, president; O. A urer; Henry Reifsnyder, general manager, at last acc ary, 1903, under laws of Arizona, with capitalization succeeding Rambler Copper Mining Co. Lands, 13 the Agua Fria district, 6 miles from a railroad. Cou quartzite and porphyry, showing numerous veins carr sulphide ores, claimed to give average assays of 24% of 50′, 100′ and 300′, with 515′ of underground worki Idle several years and apparently moribund.

LION GULCH DEVELOPMENT CO.

Dead. Company expended about $300,000, ar factory, bond was forfeited, November, 1909. Forme son Co., Mont. Described Vol. VIII.

LISBON VALLEY COPPER CO.

Office and mine: Moab, Grand Co., N. M. last accounts. Mine apparently is but slightly deve said, 1907, to plan a 100-ton concentrator, but closed of funds, and has remained idle since.

LISTA BLANCA COPPER CO.

Dead. Former offices were Cincinnati, Ohio, an were John Henderson, president; Wm. Kemp, vice-p secretary and treasurer; Henry Levin, agent. Organi laws of Arizona. Company held title to lands throu Cobre Lista Blanca, S. A., organized under laws of miles west of Caborca, carried auriferous and argentife developed by a 400′ main shaft, with 4 levels opene Altar, Sonora, Mex.

LITHGOW SMELTER.

Owned by Great Cobar, Ltd., at Lithgow, Cook

LITTLE BEAVER MINING & REDUCTION CO.

Office: 140 A St., Salt Lake City, Utah. Letter former mine office, Milford, Beaver Co., Utah. W. V uel A. Tarbet, vice-president; Victor B. Wells, secreta ized 1908, under laws of Utah, with capitalization Lands, known as the Kitty Clough group, are in the district. Presumably idle.

LITTLE BELL CONSOLIDATED MINING CO.

Office: 161 South Main St., Salt Lake City, U City, Summit Co., Utah. Solon Spiro, president; Sid president; J. B. Bean, secretary; preceding officers directors. Organized 1902, under laws of Wyom

nassessable; fully issued. Began payment of 5-cent
ber, 1909, and, up to and including Sept. 2, 1910,
nds, of $15,000 each. Shares are listed on the Salt

ented. Mine, having considerable development,
nd copper ores, and has been opening new ground
umed, circa 1909.
eam power, with a hoist and an air-compressor,
rom the Knight plant, at Provo. Company bought,
0-ton mill of the Fortuna Mining Co., at Bingham
e at Park City, late 1910. For the third quarter of
y tons of ore averaging 1.586% copper, 13.96% lead,
oz. gold per ton, yielding 11,578 lbs. fine copper,
silver and 12 oz. gold.

NG CO. **BRITISH COLUMBIA.**

a, Texada Island, B. C. J. C. Taylor, superintend-
perty is the Little Billy mine, having an ore body
h, developed by a 100′ shaft, planned to be deepened
ear. Equipment includes an 80-h. p. boiler, 7x10″
ngle-drum hoist, and a 5-drill Canadian Rand air-
ver-house. There is a small mill, with sorting tables,
ble-track gravity tram to a shipping bunker on tide-
0 tons of ore, 1908. Idle several years and presum-

R MINING CO., LTD. **AUSTRALIA.**

Robinson Co., N. S. W., Australia. Organized 1907.
er lands about 20 miles from Cobar, on the railroad
dle.

INING & SMELTING CO. **CALIFORNIA.**

med from former office, San Francisco, Cal. Mine
Co., Cal. Capitalization $1,000,000, shares $1 par.
join the Bully Hill mine, said to be opened by a 130′
s, said to show sulphide ore. Company's prospectus
. Idle several years and apparently moribund.

LIDATED MINES CO. **ARIZONA.**

. Mine office: Bouse, Yuma Co., Ariz. C. B.
dale, vice-president; E. A. Goodrich, secretary; Geo.
nn W. Sharpe, general manager; preceding officers,
B. King, directors; J. C. Denton, superintendent, at
June 16, 1909, with capitalization $3,000,000, shares
n of a preceding Little Butte company.
a district, adjoining the Pay Car mine, circa 4 miles
le the Manipulator group of 9 claims, Sidetrack group
in the Otis group of 20 claims, lying between the other
hows a vein of 6′ to 14′ reported surface width, increas-
main shaft, on the Manipulator claim, planned to be
us copper ore for depth of about 100′, followed by a
epth of 385′ carrying only gold values, with sulphides
ccounts. There also is a shallow shaft on the Little

a 60-h. p. hoist at the Manipulator shaft, and a small
shaft. Buildings include an assay office and 50-ton
00′ spur from the Arizona & California railway. Ship-
to 13% copper and $9.70 gold per ton. Production
per and 108 oz. silver in 1909, and 20 carloads of high
ate 1910. Property was bonded, circa 1910, to Louis A.

Dunham, et al, who were prospecting, with a
Property considered promising.

LITTLE CHIEF MINING & MILLING CO.

Dead. Former office was Marquette, Mi
president; F. D. Kimball, vice-president; Jas. F
urer; preceding officers and H. T. Moritz, di
intendent. Mine had a 1,400' shaft, showing
hoisting plant was burned, September, 1908.
solidated Mining Co., entire outstanding stock
property surrendered April, 1910, and comp
Eureka, Juab Co., Utah.

LITTLE CHOPACA MINING CO.

Office: Wooster, Ohio. Mine office: L
C. A. Andrus, president; Jas. A. Hower, vice-pre
treasurer; F. M. Dallam, assistant secretary.
ington, as successor of Six Eagles Mining C
auriferous and argentiferous lead and copper o
for annual assessment work.

LITTLE EDDIE GOLD & COPPER MINING

Letter returned unclaimed from former min
Lake Co., Utah. Edw. McCarrick, general ma
were 4 claims, known as the Eddie, Puritan, P
near the mouth of Bingham Cañon. Sundry su
1908, for $17,500, to the Utah Copper Co., to p
burden, and mineral rights were sold, circa 190
solidated Mining Co., which was reorganized Ju
ham Consolidated Mining Co. This company
against the Bingham-Butte Consolidated Min
mortgage on the Papea claim. The property h
showing of ore. Idle several years, except for
LITTLE GIANT MINING, MILLING & SMEL

Dead. Formerly at Marcus, Stevens Co.,

LITTLE LIGHTNING COPPER CO.

Mine office: Sierra Blanca, El Paso Co., T
Lands are near Lasca station, on the Southern
developed copper sulphides, and was making sm
larly, 1910, to the El Paso smelter.

LITTLE MARY MINING CO.

Office: Douglas, Ariz. Mine office: Pea
Yost, president; E. E. Williams, vice-president;
Thompson, treasurer. Lands, 12 claims, near
mile east of Pearce, and about 2 miles from the
velopment is by a shaft, on the Copper Mill clai
to 23% copper, from 10 to several thousand ounc
LITTLE MATTIE MINING, MILLING & PO

Mine office: Idaho Springs, Clear Creek
president; Louis P. Scoville, secretary; F. V. S
last accounts. Organized under laws of V
$3,000,000. Mine, on Chicago Mountain, abou
has auriferous and argentiferous lead and copper
ings. Equipment includes steam and water pow
duction, mainly by lessees, is said to have bee
1903–1909. Property is said to have been bond
Reno and associates.

LITTLE MIAMI COPPER MINES CO.

Office: 15 Broad St., New York, N. Y.

›resident; C. F. Bonsor, vice-president; C. A. Miller, Richard Fleming, general manager; preceding officers s. Organized January, 1910, under laws of Arizona, 0,000, shares $1 par, nonassessable; issued, $617,000. gistrar Co., New York, registrar and transfer agent. New York curb. Annual meeting, first Tuesday in

ıpatented, area 400 acres, including a group of 3 claims, tright, in the Miami district, and the Cole & Goodwin 40 acres, held under a $200,000 bond and lease. Appar- ght the Wild Air group for 600,000 shares of stock, ıth the Empire Trust Co., New York.
› of 3 claims has a 210′ two-compartment shaft, several ıe Red Springs shaft of the Miami, started in Gila con- crosscut at depth to the schist contact, but at circa 150′ schist, showing some chrysocolla. The shaft has a 25-

vin group is 4 claims wide and 4 claims long, extending miles west of the Gibson mine of the Summit Copper Co. hwest of Miami, the nearest available rail point, and 10 but is separated from Ray by some extremely rugged coun- ilway is likely to build within a generation or more. Coun- , carrying the Cole & Goodwin fault, traceable about 1½ hist diagonally. This property carries fissure veins in inated ores in schist. Development is by the 420′ Cole everal bodies of low grade ore, and a 35′ vein carrying an f bornite, with a little chalcocite, somewhat similar to the , estimated to average about 8% copper. There also are showing schist carrying impregnations of disseminated ing a 135′ crosscut tunnel about one-half mile from the scut tunnel 1,700′ west of the shaft, with portal 500′ ver- ar of the shaft. Equipment includes a 22-h. p. gasoline Goodwin property yielded 50,263 lbs. fine copper in 1908. er, 1910, but management hopes to resume, 1911.

INE. **MONTANA.**

onda Copper Mining Co., at Butte, Silver Bow Co., Mont.

NING CO. **MONTANA.**

unclaimed from former office, Wallace, Idaho. Mine oula Co., Mont. L. J. St. Jean, president; J. E. Gyde, ation $1,500,000, shares $1 par. Lands, 11 claims, 2½ , showing 2 veins, of 25′ to 30′ estimated average width on per, silver and gold values, associated with spathic iron. vorkings, with necessary mine buildings, and, 1908, shipped urning about $30 per ton. Presumably idle.

ORK COPPER MINING & **IDAHO.**
, LTD.

ıe: Wardner, Shoshone Co., Idaho. F. P. Matchette, rter, vice-president; Herbert Morris, secretary; T. R. Mason, ral manager. Organized September, 1903, under laws of zation $1,500,000, shares $1 par, assessable.
s, surveyed for patent, known as the Handspike mine, 12 d. Development is by the 232′ No. 1 upper tunnel, showing 28.8% copper, 1 oz. silver and $1.20 gold per ton, and the No. rca 1,500′, showing a vein having an 18″ paystreak of argent- hat had given assays up to 44% copper and 34 oz. silver per veral small buildings.

LITTLE WONDER COPPER MINING CO.

Mine office: Walcha, Vernon Co., N. S. W., Au
at last accounts. Property was undergoing develo
circa 1907. Presumably idle.

LITTLE YERINGTON COPPER-GOLD MINES

Dead. Was a concern that peddled install
Yerington, Lyon Co., Nev. Described Vol. VIII.

LIVE OAK COPPER MINING & SMELTING C

Office: 438 Broome St., New York, N. Y. Mi
Ariz. Forest J. Kaldenberg, Sr., president; Forest J
Organized under laws of Arizona, with capitalizatio
Property is under bond, expiring December, 1912, to
and is described under title of that corporation. F

LIVE OAK DEVELOPMENT CO.

Office: 505 Lonsdale Bldg., Duluth, Minn.
Co., Ariz. Hoval A. Smith, president; Henry B
David L. Fairchild, treasurer; preceding officers, J
Flather, Samuel R. Kaufman, Geo. J. Maas, Oliver F
directors; Harvey P. Smith, secretary; Michael McC

Organized Jan. 21, 1909, under laws of Arizona, v
shares $10 par. increased Jan. 24, 1911, to $1,000,0
$625,000, fully paid. An issue of 12,500 shares wa
with pro rata rights of subscription to old sharehold
at $20, payable $5 on subscription, and balance of $1
issue was underwritten by Hayden, Stone & Co. Fr
1910, receipts were $391,501, company ending 1910
$89,219. Price of property, held under bond and
Copper Mining & Smelting Co., is $438,600, of wh
leaving $10,800 payable Dec. 3, 1911, with a final pa
3, 1912.

Lands, 14 claims, partly fractional, in a single
lying about a mile from the Miami mine, and a mile
& Northern railway. The property was located 18
velopment secured by the former owners, the Live O
ing Co. Litigation over the fractional Copper Kin
decided in the company's favor, early 1910. Deve
present company includes underground workings, an
churn drilling.

The property shows Pinal schist and quartz-por
contact deposits, of which 3, developed by former
in width by 700′ in proven length. About three-f
covered by Schultze granite, having veins from a
carrying mainly chrysocolla. The lands show exposu
which has a capping of Schultze granite, with some
the opinion of the management that there are about 7
underlaid by ore. The schist carries disseminated c
eastern ore body has an EW. length of about 1,400′,
At the western end there is a heavy capping, of 650
thereunder is thought to be thicker, and the ore riche
eastern ore body, 33 acres have been drilled, with
sunk to depth of 805′ with the ore zone encountere
chalcocite, having been completed March 20, 1911.
of churn drilling to the end of 1910, and the man
holders, March, 1911, that the mine had developed 7,0
average assay of 2.25% copper, and that circa 2,750,
oped. Some of the disseminated ore has assayed

bably of a trifle better than 2%. There are surface
silicious ore, over an area of approximately 30 acres,
20′ to 100′ in height, ores including chrysocolla and
he upper zone, succeeded by disseminated chalcocite

1897, had a 100′ incline shaft, a 300′ vertical shaft,
75′, 185′, 725′ and 1,059′. Openings were mainly on
e Live Oak claim, and the 725′ Silicate tunnel was in
colla, for the entire distance, this tunnel yielding the
ion, of about $600,000 worth of ore, that was shipped
ter. The present company made 4,039′ of new work-
200′ squares, to July 1, 1910, and then discontinued
March 17, 1911. The 1,059′ Sulphide tunnel, remain-
gement, driven to No. 1 shaft from the southeast, has
ninated sulphide ore above the tunnel level, apparently
r. The old Vertical or Sulphide shaft, now known as
porphyry, succeeded by schist, and is connected with
epth of 272′. Sinking was resumed March 17, 1911,
deep, planned to be deepened to 450′. Underground
he 3d level of No. 1 shaft.
anned starting No. 2 shaft circa April, 1911, on the site
e western part of the property, about 1,600′ from No. 1
in the press that it was planned to sink this shaft to
e body lies much deeper than that to the eastward.
1 shaft includes a steam plant with a 200-h. p. hoist,
nd an 8-drill Sullivan air-compressor. A new 10-drill
ground, March, 1911, for No. 2 shaft. Fuel is crude
12 buildings, and ore-bins for shipping. The manage-
tion to the matter of a mill. About 50 men were em-
oduction of the mine, secured by the old company, was
in 1905; 1,714,074 lbs. in 1906, and 588,347 lbs. in 1907,
on. Property considered promising and management

& COPPER MINING CO. **WYOMING.**
at Laramie, Albany Co., Wyo. Described Vol. IV.

CO. **MONTANA.**
cey, Jefferson Co., Mont. John Hamilton, superintend-
Property shows auriferous and argentiferous copper and
nent includes a steam plant and air-compressor.

& COPPER CO., LTD. **ENGLAND.**
dnes, Lancashire, Eng. Property is a small reduction
olytic refinery.

NG CO. **MÉXICO.**
ffice was Primera Independencia 22, México, D. F.
mall mines carrying argentiferous and auriferous copper
ing about 40 men, 1905. Formerly at Temascaltepec,

. **MÉXICO.**
erican Bank Bldg., Kansas City, Mo. Mine office:
onora, Mex. C. C. Courtney, president; C. L. V. Hed-
ohn S. Hollis, secretary and treasurer; preceding officers,
Harry G. Kyle, directors; Ira E. Bowers, general manager.
05, under laws of Arizona, with capitalization $1,500,000,
), to $2,000,000, shares $1 par, nonassessable; issued,
istered and protocolized May 30, 1908, under laws of
ting, first Monday in June.

Lands, 10 groups, area 526 hectares, on Caracs of Noria, the nearest rail point, also 5,000 hectare shows limestone, diorite and porphyry, with an ore average width, traceable 6,000′ on the company's bornite and chalcopyrite, with a little native coppe average about 7% copper, 6 to 10 oz. silver and $2 oped, but occurring irregularly. Development is and by the No. 1 shaft of 105′, No. 4 shaft of 80 with tunnels of 50′, 200′, 577′ and 750′. Compar on No. 4 vein, on the 500′ level, to the intersection at right angles, near the top of the mountain, which 1,200′ at the point of intersection. Ores develope commercial production.

Equipment includes a 125-h. p. steam plant, and a 6-drill Ingersoll-Rand air-compressor.

MINAS LLANOS BLANCOS y LOS PATOS.

Mine office: Tamaya, Ovalle, Coquimbo, Chile have a 250′ shaft. Idle some years.

LLOYD CONSOLIDATED COPPER CO.

Office: Marion, Ind. Mine office: Jerome, Teter, president; C. W. Paget, vice-president; A. Nash, treasurer. Capitalization $1,000,000, shar Squaw Peak district, carry a mineralized zone, Equipment includes a 40-h. p. gasoline hoist, and a s drills and lighting. Was developing with a small fo

"LLOYD" COPPER CO., LTD.

Letter returned unclaimed from former office, 10 Australia. English office: 195A Winchester Ho Mine office: Burraga, Bathurst Co., N. S. W., A chairman; W. Soutar, colonial director; preceding Aaron, Alex. Creighton Arthur and J. T. Mail, general manager; Dr. R. Logan Jack, consulting en

Organized May 9, 1899, with capitalization £25 1906, to £300,000, shares £1 par; issued, £280,000. £50,000 to extinguish an equal amount of 10% de share interest in the Murrin Copper Co., Ltd., whic 1907, were £32,419, from which a 1s. dividend, of 1907. Statement for fiscal year ending June 30, 191 operations of £3,493 9s. 9d., with a credit balance of

Lands, 380 acres freehold, and 385 acres leasel Burraga and Thompson's Creek mine, one mile fro district, which is arid, and operations are suspended intervals, from lack of water, though the mine has tank, holding about 9 months water supply.

The mine, opened 1877, is bottomed in bad slightly argentiferous chalcopyrite, with quartz g traversing acid diorite. The main vein has an ore worked to depth of circa 750′. The vein ranges 3′ to of about 5′. The ore is highly silicious, and gave ave copper. To the eastward is a fault, cutting off the the first to the fourteenth levels, but protracted sear of the vein, to the eastward of the fault, which has g throw, the discovery of the extension greatly imp property. The future of the mine apparently depen as the mine is practically worked out between the M

eam and electric power, with hoists. Buildings in-
ine structures. Fuel is hardwood, about 75 choppers
property is in operation, as fuel requirements are
Much trouble is experienced from shortage of wood,
surveyed, for a wood-line, but not built, apparently
nated cost was £20,000. Rail connection is needed
erative preliminary requisite for successful operation.
ed, normally.
ncludes a concentrator and smelter, built 1901, at a
uled and enlarged, 1906. The works formerly had 2
was sold to the Murrin Copper Co., Ltd., which was
o the furnace was practically lost, and the other blast-
reat Cobar mine. Present equipment includes a 40-
48′ over all, treating 40-ton charges of matte, and a
65′ over all, hearth having an inside width of 20′, with
harging hoppers. The smelter is said to have a con-

of mining, in 1880, to the end of 1906, the company
of ore, yielding 14,122 long tons fine copper, largest
,947,200 lbs. in 1902. Production was 2,058,560 lbs.
,520 lbs. in 1906, and 2,150,400 lbs. in 1907. Produc-
April, 1908.

INING CO. **MÉXICO.**

City Life Bldg., Kansas City, Mo. Mine office:
x. Job Hollinger, president; W. M. Rynerson, vice-
d, secretary and treasurer; E. J. White, assistant secre-
layton Bell, L. G. Middaugh and W. D. Coldren, direct-
general manager; Thos. Lake, superintendent. Organ-
nder laws of Arizona, with capitalization $3,000,000,
1907, to $5,000,000.
n San Juan Mountain, in the Papago district, circa 30
nowing auriferous and highly argentiferous sulphides,
33% copper, 560 oz. silver and $7 gold per ton, which
ecured from very carefully selected samples. Develop-
phine shaft.
s a 10-drill air-compressor, and company was claimed,
lding a small matting furnace. The company's adver-
id. Closed down 1907, resumed 1909, and was develop-
t last accounts. Is not regarded favorably.

RAL COPPER MINE. **AUSTRALIA.**

dra, Wallace Co., N. S. W., Australia. Property has 3
f 3′ to 15′ width, carrying high grade sulphide ore, assay-
Development is by a 130′ main shaft. Several small
ed 25 to 30% copper. Presumably idle.

ER MINE, N. L. **AUSTRALIA.**

ouse, Martin Place, Sydney, N. S. W., Australia. Mine
ace Co., N. S. W., Australia. T. W. Horton, chairman;
chairman and general manager; Alex. Jobson, secretary;
ndent; John M. Bridge, smelter superintendent. Organ-
der laws of New South Wales, with capitalization £60,000,
full-paid and half 10s. paid shares.
leasehold, area 140 acres, 12 miles from Kiandra, and 45
are located in the bottom of a deep gorge, with transpor-
w 3 to 4 months each winter. The property shows fissure
e, the main vein, traceable 1,500′, ranging up to 4′ in ex-
raging 4″ to 18″, with a paystreak of about 7″ width carry-

ing mainly massive chalcopyrite, estimated to averag
easily hand-sorted to 28% average copper tenor.
main shaft, with crosscut tunnels of 50′ and 120′, the
of workings.

The mine was discovered 1874, and worked inter
by the present company, yielding, to end of 1906, ab
ore, averaging about 28% copper, with 2,000 tons of s
the mine, part of which has been washed away by floo

A hydraulic installation with a Pelton wheel de
Yarrangobilly River, and there is one hoist.

The smelter, receiving ore from the mine by tra
tory furnace, making matte of 45 to 50% copper teno
in February, 1910, and for fiscal year ending June, 1
of ore, yielding 195.8 tons of 47.2% matte, equivalent
copper. Mine was let on four years' tribute, May 9

LODI GOLD & COPPER CO.

Office: 59 Commercial Bldg., Salt Lake City, U
claimed from former mine office, Rhyolite, Nye Co.,
dent; H. P. Henderson, vice-president; Samuel L. Kin
John P. Buzanes, superintendent. Organized May,
Dakota, with capitalization $1,250,000, shares $1 p
$850,000.

Lands, 25 claims, unpatented, adjoining the Lod
in Skull Valley, 40 miles from a railway. Developme
ing mainly auriferous and argentiferous lead ores. P

LOGAN COPPER CO.

Office: 1008 Commerce Bldg., Kansas City, Mo.
Yavapai Co., Ariz. Jos. Knoche, president; M. C.
D. Barr, general manager; preceding officers, Geo. P.
tors; Louis Tippe, secretary and treasurer; W. L. Rob
Dec. 7, 1906, under laws of Arizona, with capitalizatio

Lands, 11 claims, patents applied for, area 215
Copper Basin, 5 miles northeast of Skull Valley, the
miles west of Prescott. Property shows Yavapai sch
showing copper carbonates. Development is by a nu
pect pits, with a 160′ tunnel, and a 155′ two-compar
opened at 35′, 65′, 80′, 95′ and 115′, which is very po
onite, malachite, chalcocite and chalcopyrite, giving
4.5% copper. Equipment includes a 40-h. p. steam h
Was developing with a small force at last accounts.

PRINCE G. G. LOGANOFF.

Mine office: Naukutsky, Namagan, Ferghan
includes the Naukutsky and Rostovsky copper min
equipped with steam power. Forces, 1909, averaged
40 on surface, and production, 1909, was circa 600,000
copper ore, estimated to have yielded circa 750,000 l

LOG CABIN GOLD & COPPER CO., LTD.

Dead. Was merged, 1906, in Utah Gold Mount
at Marysvale, Piute Co., Utah, and Mine Centre,
Very fully described Vol. VI.

LOGOS MINES CO.

Office: 650 West 27th St., Los Angeles, Ca
Yavapai Co., Ariz. Dr. Sara Thacker, president, se
ager; Henry W. Thacker, vice-president and treasur
Earl H. Tate, directors. Organized June, 1906, un
capitalization $1,000,000, shares $10 par. Lands, 4

20 acres of miscellaneous lands, in the Big Bug dis-
Mayer. Development is by numerous test-pits, and
nnel, with circa 2,000′ of workings. Equipment in-
e hoist, and 2-drill air-compressor. The president
ne company was still in infant's clothes, but expected
1909. Apparently the trousers are still missing, and
s walking around in a barrel.

PERÚ.

ña, Arequipa, Perú. Lands, 70 hectares, including
rde mines. Los Tres Cerros mine, in the district of
rom Arequipa, produces sulphide ores said to average
nd 3 to 4 grams gold per metric ton, employing about
rro Verde mine, in the district of Uchumayo, 4 hours
ced copper ores, including cuprite and chalcopyrite,
show large bodies of ore of good average copper tenor.

A LOMA DE TORO, S. A. **MÉXICO.**

imed from former office, México, D. F. Mine office:
Enrique Langenscheidt, manager. Organized July 2,
ico, with capitalization 84,000 pesos. Lands include
uz, San Antonio, San Miguel and Monserrate mines,
gentiferous lead, copper and zinc ores. Presumably idle.

OPMENT CO., LTD. **RHODESIA.**

s sold to Amalgamated Properties of Rhodesia, Ltd.,
1910. Formerly at Lomagunda, Mashonaland, Rho-
III.

R CO. **ARIZONA.**

dle. Formerly at Tucson, Pima Co., Ariz. Fully de-

CO. **OREGON.**

Baker City, Baker Co., Ore. Described Vol. IV.

& MILLING CO. **IDAHO.**

Kellogg, Shoshone Co., Idaho. Peter Albinola, presi-
er; Hon. Herman J. Rossi, vice-president; Edw. Albin-
surer; John Dominic, superintendent; Robt. Sterling,
pril, 1898, under laws of Idaho, with capitalization
ar. Annual meeting, fourth Thursday in April.
aving a contact vein of 27′ estimated average width, with
tzite hanging, traced 800′, carrying ore with small and
er, up to 47% lead and 33 oz. silver per ton, formerly
lso. Development is by shafts of 30′ and 32′, and tun-
ith about 1,500′ of workings. Idle.

COPPER CO. **ARIZONA.**

ity Bldg., Los Angeles, Cal. Mine office: Winkelman,
. E. Finney, president; Chas. S. Gleed, vice-president;
tary and treasurer; Edw. W. Brooks, consulting engineer;
H. Neff, B. L. Winchell, Hon. Frank M. Murphy and
tors; Harry Scott, superintendent.
12, 1907, under laws of Arizona, with capitalization
0 par. Debentures, $152,000, at 6%. A considerable
by the Development Company of America. Commercial
Arizona, registrar and transfer agent. Annual meeting,
nuary.
s, known as the Dripping Springs or O'Carroll group, on
the Banner district, 7 miles north of Winkelman, the
d about 10 miles from Kelvin and 20 from Globe. Prop-
railway, with a good wagon-road connecting.

Property shows limestone of the upper Carbon
on quartzite, with frequent intrusions of porphyriti
having the same petrographical members as the B
occurring similarly, as replacements in limestone.
great monzonite laccolith, which presumably is the
and is said to carry copper values of about 2.5%, i
and chalcocite. The limestone shows an ore-bea
traceable circa 4,000′. The property has about 4,00
from former ownership, showing considerable carb
average copper tenor, but estimates, in the pres
developed were excessive. New workings include
tunnel of 450′, and No. 2 tunnel of 250′. Manag
Curtin shaft.

The company planned a 1,000-ton smelter, a
works, at a site on the Gila River, 2 miles north
miles from the mine. The company advertised ex
page advertisements in the newspapers, but these w
gerations and false statements, it being the usual ru
tisement, the more untruthful. Property consider

LONDON-COLORADO PROPERTIES, LTD.

Dead. Was an English company that held a l
mine, which was said to have a good showing of co
tral City, Gilpin Co., Colo.

LONDON-CORBIN EXPLORATION CO.

Letter returned unclaimed from former office,
Corbin, Jefferson Co., Mont. Chas. A. Lammers,
vice-president; A. A. Ferns, secretary and treasur
tendent. Organized May, 1910, under laws of M
$1,500,000, shares $1 par. Lands, 8 claims, near
midway between Corbin and Wickes, said to show
a shallow 2-compartment shaft, planned to be su
equipped with a hoist good for 900′ depth, and a
from the portal, 4′ of leached ore, assaying 3% copp

LONDON-GILA MINING & POWER CO.

Mine office: Winkelman, Pinal Co., Ariz. D
and general manager; S. H. Stewart, secretary; Th
neer; preceding officers, Chas. A. Mecker, Thos. A.
Geo. A. Haas, directors. Organized May, 1908, wi

Lands adjoin the London & Arizona, near Lond
1910, is said to have shown considerable quantities
some native copper. The following description is
holes that have been drilled are on what might be c
The body of the crab is represented by an enorm
center, and the tentacles by cracks through which co
flowed, precipitating its metal along the way."
description will not crab the game. Messrs. Louis
Treadwell were mixed up with the promotion, but
The company was said, 1908, to plan a concentra
concentrator is of no use until a mine is opened.

LONDON GOLD & COPPER MINING & MIL

Mine office: Ward, Boulder Co., Colo. Orga
of Kansas. Property includes the London and Lo
Gold Lake, slightly developed by tunnel. Some or
face workings.

LONDON METAL BANKING CO., LTD.

Office: 18 Fenchurch St., London, E. C., Eng

Australia. Hector Stewart, general manager; W. A. ent; Robt. Schloesser, consulting engineer.
own originally as the Cornish, and latterly as the Gulf n Barraba, the nearest rail point, held under a 20-year ws schist and quartzite, of early Silurian age, altered and indurated clay-slate of Carboniferous age, with ere are 3 parallel veins, known as the Cornish, Middle nd 38′ estimated average width, traceable 350′. The mine carried melaconite, azurite and malachite, but ted, and the ore at depth is slightly auriferous and e, in a gangue of about 50% pyrite, 15% silica, 7% The Big vein was on fire, from spontaneous combustion, 05, and as a result yielded 500 tons of natural matte, of , from ore averaging about 3% copper. The mine has atter opened to the 7th level, 1910, with 6,400′ of work- about 80,000 long tons of ore blocked out for stoping, of were developed between the fifth and sixth levels.
s a 25-h. p. steam plant, with a 10-h. p. hoist good for essor. There also is a small sawmill.
cted with the mine by a half-mile ground-tram, was built on reverberatory furnaces and a 100-ton blast-furnace, about 35% copper tenor. There also is a very small argest production was 1,254,400 lbs. fine copper in 1901, 150,000 lbs. in 1906.

N SMELTER & MINING CO. **MÉXICO.**

uco de Monclova, Coahuila, Mex. Company planned, rn smelter at Estación Adjuntas, about 15 miles from f such a smelter secured, and company probably abortive.

N COPPER CO. **ARIZONA.**

Ariz. Mine office: Winkelman, Pinal Co., Ariz. Theo. general manager; Louis Melczer, vice-president. Organ- capitalization $3,000,000. Lands, 23 claims, on London the London-Gila, London-Arizona and London-Range ment is by 3 shallow shafts, and a 270′ tunnel, drifting for 100′ wide at surface. The property is said to show auri- us copper sulphides, of about $15 per ton average value. have been under development, early 1910.

OPPER CO. **ARIZONA.**

rity Bldg., Los Angeles, Cal. Mine office: Winkelman, as. E. Finney, president; John Mason Ross, secretary and Brooks, consulting engineer; preceding officers and Hon. directors; Harry Scott, superintendent. Organized Dec. of Arizona, with capitalization $6,000,000, shares $10 par; ls controlled, through ownership of $1,940,250 stock, by per Co. Bonds, $68,500 issued. Annual meeting, second Lands, adjoining the London-Arizona on the west, with nditions, are developed by the 200′ Arizona shaft, which is ned, 1911, to 800′.

ELIEU MINING & **BRITISH COLUMBIA.**

NT CO.

ly at Rossland, Trail district, B. C. Described Vol. VIII.

OCK COPPER CO. **ARIZONA.**

curity Bldg., Los Angeles, Cal. Mine office: Winkelman, has. E. Finney, president; Edw. W. Brooks, vice-president neer; Robt. J. Simpson, secretary and treasurer; preceding tt and P. McHugh, directors; Harry Scott, superintendent.

Organized July 21, 1910, under laws of Arizona, with shares $10 par, nonassessable. Annual meeting, thi Lands, 18 claims, unpatented, area circa 300 acres, in vicinity of London Mountain, developed by a shallo Bird, which it is planned deepening, 1911.

LONE PINE COPPER MINING & REDUCTION

Dead. Formerly at Gray Rocks, Laramie Co., W

LONE PINE MINING CO.

Dead. Was a swindle. Was absorbed by Pan-A ing Co. Formerly at Prescott, Yavapai Co., Ariz.

LONE STAR CONSOLIDATED COPPER CO.

Office: 904 Barrister's Hall, Boston, Mass. M ham Co., Ariz. Hon. Wm. H. Powers, president; Du dent; Henry H. Folsom, secretary; A. G. Smith, treas eral manager; Chas. B. Spalding, superintendent. under laws of Maine, with capitalization $5,000,000, as successor of Maravilla Copper Co.

Company controls the Mineral Mountain Copp of a two-thirds share interest, and controls, through the Chase Creek Copper Co.

Lands, 32 claims, including the Little Clara m shaft, and the Lone Star mine, in the Gila Mountai Solomonville, having a 900′ shaft showing a 5′ vein of ous sulphide ore, claimed to carry 8 to 10% copper, wi little gold. The shaft also shows stringers of ore giving

LONE STAR COPPER CO.

Dead. Formerly at Henrietta, Clay Co., Texas.

LONE STAR COPPER MINING CO.

Office: P. O. Box 2107, Spokane, Wash. Mine Co., Wash. Oscar De Camp, president; Wm. S. Thyr preceding officers and R. C. Rimertsen, directors. Or laws of Washington, practically as a reconstruction o & Milling Co., with capitalization $1,500,000, shares first Monday in September. Lands, 2 claims, area 4 per Hill mine, near the Conquest, having shafts of 25′ of 20′, 140′ and 171′. Mine has an 18′ vein, carryi nated in pyrrhotite. There is no machinery. Idle annual assessment work.

LONE STAR MINING CO.

Dead. Was succeeded by Maravilla Copper C by Lone Star Consolidated Copper Co. Formerly at S

LONG BEACH & ARIZONA MINING CO.

Dead. Was succeeded, 1907, by Swastika Copp rome, Yavapai Co., Ariz. Described Vol. VI.

LOOKOUT COPPER CO.

Office: 11 Pine St., New York, N. Y. Mine Co., Ariz. Hon. Frank M. Murphy, president; Orl president and general manager; A. W. Edwards, Is controlled, through ownership of $1,716,300 stock pany of America. Lands, in the Slate Creek distric the mine has steam power. Idle.

LOOKOUT MINING CO.

Letter returned unclaimed from former office, office: Niblack, Prince of Wales Island, Alaska. Ar manager, at last accounts. Property shows a mediu copper ore, and is equipped with steam power. Idle.

4% copper, 200 oz. silver and $4 gold per ton. Th
for some years, before turning its attention to copper

LOS ANGELES & JALISCO MINES CO.

Dead. Was succeeded by Magistral-Ameca
Etzatlán, Ahualulco, Jalisco, Mex. Described Vol

LOS ANGELES METAL REDUCTION CO.

Dead. Formerly at Kelvin, Pinal Co., Ariz.

LOS ANGELES MINES CO.

Dead. Lands, near Moctezuma, said to carry
slightly prospected before suspension, October, 1907.
Sonora, Mex.

LOS BRONCES MINING CO.

Dead. Formerly at Santa Bárbara, Hidalgo, C
Vol. VIII.

LOS CERROS COPPER CO.

Office: Blackstone Bldg., Cleveland, Ohio. M
Clara, Cuba. S. S. Saffold, president; W. C. Watki
C. Dalbey, secretary; W. L. Rees, treasurer; Col.
ager, at last accounts. Organized Aug. 12, 1905,
capitalization $500,000, shares $100 par.

Lands, 2 claims, area 100 acres, also 1,500
opened by shafts of 25', 85', and 50', and by tunne
250', showing ore assaying 10% copper, 20 to 25%
silica, with gold and silver values. Zinc apparen
The vein has a 12' to 15' gossan outcrop along its stri
last operated circa 1750. Idle several years.

LOS MARCHES MINING CO.

Dead. Property included mining lands and a
company was said to have completed a small smelter
this never was blown in. Formerly at Indé, Dura

LOS MUERTOS MINING CO.

Mine office: Velardeña, Cuencamé, Durango,
perintendent, at last accounts. Mine has argentifero
steam power.

LOS OSOS MINE.

Office: care of J. M. Gleaves Estate, owner,
returned unclaimed from former mine office, San L
Co., Cal. Lands, on the southern side of Los Osos
San Luis Obispo, have a fissure vein, traversing san
oxidized copper ores, with porphyritic gangue. M
short tunnel, from which several hundred tons of hig
Swansea, circa 1863. Idle since circa 1865.

LOS PLATANOS DEVELOPMENT CO.

Dead. Was reorganized December, 1909, as
Formerly at Choix, Fuerte, Sinaloa, Mex. Describe

LOS PLATANOS MINING CO.

Office: 516 Grant Bldg., Los Angeles, Cal.
Sinaloa, Mex. A. M. McDermott, president and ge
vice-president; J. L. Davidson, secretary; precedin
W. W. Thomas, directors; E. B. Hosford, mine
December, 1909, under laws of Arizona, with capit
$10 par, nonassessable; issued, $280,000. Holds
Esploradora de Los Platanos, S. A., organized un
chants' Trust Co., Los Angeles, transfer agent. An
in October.

[redacted] per [redacted] 96 acres, bought of

was idle thereafter. The gold is very fine, and the a
ton, and not $30 per ton, as claimed. Apparently t
handled as a straight cyanide proposition, but must
and not a copper mine, as copper values are inade
alone, and cannot be recovered if the ore is cyanided

LOST PACKER EXTENSION MINING CO.

Letter returned unclaimed from former offic
office: Ivers, Custer Co., Idaho. W. W. Chisholm
holm, secretary and treasurer. Lands are near
holdings of the Lost Packer Mining Co. Idle sev
moribund.

LOST PACKER MINING CO.

Office: Salt Lake City, Utah. Mine and work
Idaho. Jas. Ivers, president; J. T. Finlen, vice-pre
tary and treasurer; preceding officers, J. Frank Judg
Henry L. Charles, superintendent; Robt. Francis,
under laws of Utah, with capitalization $750,000,
said to have wiped out its indebtedness, and to hav
1909 operations.

Lands, 9 claims, in the Loon Creek district, circ
the nearest rail point, the mine being seriously
transportation facilities, while deep snows preclude
is by drift tunnels, No. 1 having a back of 450', N
a back of 870', latter showing rich ore, and planned t
ultimately. Tunnels are drifts on a vein of 2' to 7
mum width of 12' to 15', carrying ore averaging 2 to
per ton, with a paystreak of 6" to 5' width, proven
tance of 500' and depth of 400', carrying sulphide o
per, 10 to 12 oz. silver and $40 to $75 gold per t
actual results, not promoters' estimates.

About $115,000 has been expended on surfac
ment, including the smelter. The property has w
light plant, assay office and necessary mine buildin

The smelter has a 100-ton water-jacket blast-
averaged, 1907–1909, about 50% copper, 20 oz. sil
with slags running only about 0.2% copper. A c
but was not installed.

Production was circa 425,000 lbs. fine copper, 1
gold in 1907; 773,247 lbs. fine copper, 19,053 oz. silv
The property, though very difficult of access, and
vorable to operations, is of exceptional promise.

LOST PACKER MINING & SMELTING CO.

Office: 1204–37 Wall St., New York, N. Y.
Co., Idaho. John T. Clarke, treasurer and managin
under laws of Wyoming, with capitalization $3,000,
ing company, to gradually acquire the outstandin
Mining Co. Company also planned acquiring st
panies. Apparently inactive.

LOST RIVER COPPER CO.

Office: Idaho Falls, Idaho. Mine office: N
Mine is said to have a 7' vein, between quartzite
phide copp Idle seve and apparen

NUEVA S D COMP LOTA i C

Offic , Chi ines: Car
Chile, an Chile. W
ción, Ata Santiag

vein carrying low grade copper ore. Equipment inc
sumably idle.

ASOCIACIÓN DE PROPRIETARIOS DA MINA DO LOUZAL.

Dead. Former office was 4 Praca dos Remolare
hor Waldemar d'Orey was general manager; Joaquin
ent. Was a syndicate of 6 owners, with £5,000 c
Louzal mine. Lands, 1 square kilometer, show schist
largest, with maximum width of 24 meters and sup
meters, carrying cupriferous pyrite, estimated to av
12 oz. silver per metric ton, with traces of lead, zinc ar
carrying occasional oxidized ores, with a little native
oped by a 400-meter tunnel, one shaft of 18 meters,
each, and was estimated to show circa 2,000,000 tons c
mine, operated by the Romans, and reopened, 1901,
portation facilities were poor. Formerly at Lou
Portugal.

LOVEDEN MINING CO. (1903), LTD.

Office: 52 Queen Victoria St., London, E. C.,
rhyngerwyn, Cardiganshire, Wales. Wm. E. Ma
Dec. 9, 1903, under laws of Great Britain, with cap
5s. par. Debentures, £3,500 authorized; £2,700 out
lease of a lead and copper mine, area 150 acres, on
Idle some years, and presumably moribund.

LOW CREEK COPPER CO.

Mine office: Baring, King Co., Wash. Lands
River, opposite Baring. Was developing, 1908, with

LOW DIVIDE COPPER MINING CO.

Office and mine: Crescent City, Del Norte
president. Lands are the Alta, Occidental and Co
several different veins have been opened slightly,
bonate and sulphide ores of good grade. Idle sever

LOWER MAMMOTH MINING CO.

Office: 516 Dooly Bldg., Salt Lake City, Utah.
Juab Co., Utah. John Dern, president and gener
vice-president; A. Reeves, secretary; W. S. McCorn
superintendent; preceding officers, A. T. Moon, M.
heimer, directors. Organized July 3, 1896, under l
ization $150,000, increased, 1906, to $190,000, and
$250,000, shares $1 par, assessable. Bonds, $60,000
parently not issued. To Nov. 1, 1908, company paid
and levied total assessments of $127,500. Paid a div
1909, bringing total dividends to $65,073, and levied
months later. Shares are listed on the Salt Lake
meeting, second Monday in January.

Lands, 6 claims, patented, adjoining the Man
mines, carrying a continuation of the Mammoth ore
a 700' tunnel, and a 2,000' three-compartment shaft
showing large bodies of low grade ore, decreasing in
oxidized zone extends to depth of at least 1,800', an
lead carbonates, ruby silver and native silver.
footwall of the Mammoth vein, which is overlaid by
grade, the segregation of the copper and lead ores b
[redacted] sulphide zone show auriferou
[redacted] in at a depth of 1,8
[redacted] opper, 52 oz. silve

LUCKY CALUMET MINING CO., LTD.

Office: Wallace, Idaho. Mine office: Mulla John H. Nordquist, president and general manage president; Everett H. Pattison, secretary and tre John H. Wourms and O. A. Larson, directors; Al. Organized October, 1906, under laws of Idaho, with shares $1 par, assessable.

Lands, 10 claims, patented, area 181 acres, on the Independent and Snowstorm mines, and abou latter, circa 5 miles northeast of Mullan, and about t of Burke. Property shows 2 fissure veins, of 10′ Development is by 10 pits and 3 tunnels. The up length, with a quarter-mile of drifts and crosscuts, to be the extension of the Snowstorm vein, showing ore carrying disseminated carbonates and bornite, of tenor. The lower tunnel, a crosscut, from the head about 1,000′ long, and is planned to intersect the sc about 1,900′ from the portal, at a vertical depth of 1,500′ on the dip of the vein.

Equipment included electric power, with 2 mot pressor, but the plant was burned by the forest fire insured, and is to be replaced, 1911.

LUCKY DAY MINING CO.

Dead. Formerly at Silverton, Snohomish Co.,

LUCKY DUTCHMAN MINING & DEVELOPMENT

Office: Continental National Bank Bldg., Salt office: Crescent, Lincoln Co., Nev. Letter return mine office, Alta, Salt Lake Co., Utah. Edw. Copley, vice-president and manager; John W. Geiger, secreta officers, Wm. H. Child, H. B. Cole, C. E. Anderson Organized Oct. 28, 1905, under laws of Utah, with cap 25 cents par, assessable; issued, $68,750.

Lands, 4 claims, patented, 2½ miles north of Cr with 856′ of drifts, developing a 3′ vein of ore giving ton, with a little silver. Equipment includes a 25-h.

Lands formerly included 6 claims, area 100 ac mine, adjoining the Columbus Consolidated, at Alta, also a third interest in the Anna tunnelsite. The Su ore giving assay values in copper, lead, silver and g in depth. Apparently the Alta property has been a

LUCKY FRIDAY GOLD & COPPER MINING C

Office: Carson, Nev. Mine office: Pine Gr O. H. Gallup, president; S. L. Lee, vice-president; treasurer. Organized Sept. 26, 1906, under laws of N $1,000,000, shares $1 par. Lands, 5 claims, on Copp River district, having a 90′ shaft, claimed to show Presumably idle.

LUCKY FRIDAY MINING CO.

Mine office: Wallace, Idaho. Walter A. Jones secretary. Capitalization $1,500,000, shares $1 par. ing the Hunter mine on the south, having a 90′ shaft, ncl, and a 700′ lower crosscut tunnel, developing a 1 giving ass % copper, 29% lead and 89 o

LUCKY PER MINING CO.

Dea Kelvin, Pinal Co

LUNING CONSOLIDATED COPPER MINING C
Dead. Formerly at Luning, Esmeralda Co., N

LUNING COPPER CO.
Dead. Formerly at Luning, Esmeralda Co., N

LUNING COPPER MINING CO.
Formerly at Luning, Esmeralda Co., Nevada.

LUNING GOLD MINES SYNDICATE.
Dead. Formerly at Luning, Esmeralda Co., N

LUSTRE MINING CO.
Dead. Was succeeded January, 1906, by Lust
Formerly at Santa Maria del Oro, El Oro, Durango,

LUSTRE MINING & SMELTING CO.
Dead. Was reorganized, 1911, as National M
merly at Santa Maria del Oro, Durango, Mex. Full

LUTZ MINES CO. A
Office: Pittsburg, Pa. Mine office: Silverto
Letter returned unclaimed from former mine office, I
Ariz. Anton Lutz, president; G. Grossman, mana
intendent, at last accounts. Organized June 5, 190
with capitalization $100,000, shares $100 par.
Colorado property is the Bonner group, on the mi
near Silverton, which was under development with a s
Arizona lands are 7 claims, known as the In
north fork of Ash Cañon, in the Hartford district of
Development was by a tunnel that was planned to be
includes a 17-h. p. gasoline engine, and a 6-drill air-c

COMPAÑÍA MINERA LA LUZ.
Mine office: Cuatro Ciénegas, Monclova, C
hectares, known as the Mina La Paz, carrying argent
per ore, developed by shafts. At last accounts, 190
circa 40 men, and was yielding about 25 metric ton
ment includes steam power and an air-compressor.

LYELL BLOCKS CONSOLS MINING CO., N. L.
Dead. Formerly at Gormanston, Montagu Co

LYELL-COMSTOCK CONSOLIDATED COPPER
Dead. Was succeeded June 1, 1907, by Mour
Co., Ltd. Formerly at Mount Lyell, Montagu Co., T
Vol. VI.

LYELL EXTENDED COPPER CO.
Office: Equitable Bldgs., Collins St., Melbourn
Mt. Lyell, Montagu Co., Tasmania. W. P. Jarvie
secretary; Wm. Madden, agent; Jas. Elliott, mine
1908, as successor of Mount Lyell Extended Co., N.
Mount Lyell, and 80 acres on Mount Darwin, wh
preceding company, 1906, and bid in by the compa
The Mount Lyell property, having a 50' shaft, in cup
ing, in a small way, at last accounts.

LYELL PIONEER CONSOLIDATED MINING CO
Office: 30 Queen St., Melbourne, Australia.
Montagu Co., Tasmania. C. E. Packer, manager, at
tion £72,000, shares £1 par. Lands, 56 acres, leas
Idle several years and apparently moribund.

LYELL THARSIS MINING CO., N. L.
Dead. Was wound up circa 1906, and lease so
Mining & Railway Co., Ltd. Formerly at Gorma
mania. Described Vol. V.

MACDONALD COPPER MINE, LTD.

Office: 88 West Regent St., Glasgow, Scotlan
Lynd Co., Queensland, Australia. A. Hughes, sec
1910, under laws of Great Britain, with capitalizat
Property is the Jubilee mine, near Mungana.

MACGREGOR CLONCURRY COPPER MINES,

Office: 395 Collins St., Melbourne, Australia.
ton House, London, E. C., Eng. Mine office: C
Queensland, Australia. D. W. Harvey Patterson,
E. A. Weinberg, V. J. Saddler, W. D. Reid and G.
Hughes, secretary; E. Habben, London secretary
agent. Organized Dec. 19, 1906, under laws of V
£150,000, shares 10s. par, and was reconstructed, 19
with capital to secure either a railway connection
present capitalization is £150,000, shares 10s. par;

Lands, 268 acres, including the Wee Macgrego
and Wattle mines, about 60 miles west of Cloncurry,
properties for fluxing, and the Greater Esmond min
of Cloncurry.

The Wallaroo mine has a vein traceable circa 1,5
of 116′ length, carrying ore of about 12% copper te
shafts, 240′ apart. No. 1 shaft shows a 28′ vein ass
has a 40′ vein giving assays of 15% copper.

The Greater Esmond mine, leasehold, about
Wallaroo, has a 200′ shaft, showing a vein of 4′ to 5
width, carrying chalcopyrite estimated at 8% coppe

The Wee Macgregor mine, area 55 acres, bought
Development Co., Ltd., is the principal property, 26
Cloncurry railway line, having a vein traceable circa
of 10′ to 40′ width. Development is by a 340′ shaft,
a vein up to 80′ in width, a considerable part of wh
6.7% copper. The 320′ level carries paystreaks of 3′
of 3 to 20% copper, but this level is not as promisin
whole. Ore reserves are estimated by the manage
averaging 10.25% copper, with an estimated value
includes a steam plant, hoist, and a pump good for 200
mine was idle pending the reconstruction of the com

MACK COPPER MINING CO.

Dead. Formerly at Thermopolis, Frémont Co., W

MACKEY-BURROUGHS MINING CO.

Dead. The mine, carrying auriferous and arge
under development, with a small force, circa 1904.
power. Formerly at Central City, Gilpin Co., Colo.

MACKINAW COPPER CO.

Dead. Was succeeded, circa 1909, by Macki
Formerly at Hailey, Blaine Co., Idaho. Described Ve

MACKINAW COPPER MINING CO.

Office: 76 Main St., Auburn, Me. Letter return
mine office, Hailey, Blaine Co., Idaho. Clark B. D
ized circa 1909, under laws of Maine, as successor of

Lands, 10 claims, known as the Daft and Denton
watered, at the head of Lost River, near the Lost R
miles east of Hailey, and connected therewith by a
company's fiscal agents claimed, in an advertisement,
an ore body 1,500′ wide and 1 mile in length, which w
tion worthy of a better cause. The old company had

GRUBE MAGDALENA.

Mine office: Morsbach, Rheinprovinz, Prussi
iron ore, from which an annual production of about 4
also lead and copper sulphides, of which the produc

MAGDALENA COPPER CO.

Dead. Formerly at Magdalena, Socorro Co., N

MAGDALENA SMELTING & MINING CO.

Dead. Formerly at Magdalena, Nochixtlán,
Vol. VIII.

MAGDALENE SYNDICATE.

Letter returned unclaimed from former office, D
Undweni, Zululand, Natal. Lands, near the Sub
border, show a shear zone in granite, having occasio
pregnations carrying copper carbonates, silicates an
ous, of high average copper tenor. Mine is but sli
ably idle.

MAGENTA GOLD MINING CO.

Dead. C. E. Barrie was superintendent. M
auriferous and argentiferous copper ore, and was e
employing about 20 men, 1903. Formerly at Granit

MAGGIE MURPHY COPPER CO.

Office: 16 State St., Boston, Mass. Mine offic
Wyo. Hon. Chas. S. Ashley, president; John O'
Lee, secretary; Dr. F. M. Kennedy, treasurer; preced
and Capt. Robt. A. Hammond, directors. Organize
of Wyoming, with capitalization $1,000,000, shares $

Lands, 12 claims, area 180 acres, and a 60-acre
on the northwestern side of Horseshoe Cañon, in
showing country rock of granite, fissured with diorite,
7 contact veins between gneiss and mica-schist, of whi
by a 114′ shaft, ranges 30′ to 60′ in width, carrying
copyrite, associated with pyrrhotite, assaying 1 to 6%
40 cents to $4.50 gold per ton. Idle, several years
ment work.

COMPAÑÍA MINERA DEL MAGISTRAL.

Dead. Formerly at Santa Bárbara, Hidalgo,
described Vol. VII.

NEGOCIACIÓN MINERA DEL MAGISTRAL, S.

Office and mine: Ap. 22, Zacatecas, Zacatecas,
president; Chas. O. Gilbert, manager. Company,
corporation, is said to have paid for improvements
include the Refugio de Magistral and San Roberto mi

The San Roberto mine, about 300′ deep, has iro
in copper, silver and gold, used for fluxing, and also h
and silver-lead ore.

The Magistral mine carries auriferous chalcopy
produced returning about 6% copper and up to 200 g
Development is by a 900′ tunnel and 2 shafts, one, o
h. p. gasoline hoist, the second, with 3 compartments,
having a 150-h. p. steam hoist.

The reduction plant, at Magistral Siding, on
connected with the mine by a narrow gauge railway,
mill, and a 200-ton smelter, latter blown in March,
250-ton El Paso Foundry & Machinery Co. blast-fur
hearth, Connersville blower and 103′ brick stack.
and matte is sent for conversion to the Torreón s

GRUBE MAGDALENA.

Mine office: Morsbach, Rheinprovinz, Prussi
iron ore, from which an annual production of about
also lead and copper sulphides, of which the prod

MAGDALENA COPPER CO.

Dead. Formerly at Magdalena, Socorro

MAGDALENA SMELTING & MINING C

Dead. Formerly at Magdalena, No
Vol. VIII.

MAGDALENE SYNDICATE.

Letter returned unclaimed from fo
Undweni, Zululand, Natal. Lands,
border, show a shear zone in granit
pregnations carrying copper carbo
ous, of high average copper teno
ably idle.

MAGENTA GOLD MINING

Dead. C. E. Barrie wa
auriferous and argentiferous
employing about 20 men, 1

MAGGIE MURPHY CO

Office: 16 State St.,
Wyo. Hon. Chas. S.
Lee, secretary; Dr. F.
and Capt. Robt. A. H
of Wyoming, with e
Lands, 12 chain
on the northweste
showing country r
7 contact veins b
by a 114' shaft
copyrite, assor
40 cents to
ment work.

COMPAÑ

Dead
describe

NEGO

O
presi
corp
incl

in
s

alizati
be sold for
and lease from
mine, 13 claims, a
These holdings are abo
Ray Consolidated, and
respective owners, the Lak
the Silver Queen Mining Co.
rolled by Thompson & Gunn, ex
in the copper field.

MINING CO.

merly at Burks Falls, Parry Soun

OLD & COPPER MINING CO.

ormerly at Northport, Stevens Co.,

D & COPPER CO.

ormerly at Encampment, Carbon Co.

NING CO.

ormerly at Silverton, Snohomish Co.,

ARA COPPER MINES, LTD.

ffice: Woodville, Waipawa Co., N. Z
of sulphide ore, and small test smel
1907. Idle at last accounts, but was st
olytic Smelting & Refining Co. of Aus
thereon.

& MONTANA COPPER CO.

Ft. Fairfield, Me. Letter returned
, Jefferson Co., Mont. Lands are said
development. Idle since circa 1902, a

& NEBRASKA MINING CO.

Broken Bow, Neb. Mine office: R
M. Currie, president; H. Lomax, secreta
al manager; Walter E. Koch, consulti
dent. Organized 1907, under laws of
, shares $10 par, nonassessable.
43 hectares, with a 4 hectare millsite a
The Santa Lucía group has 4 contact d

of Colorado, with capitalization $750,000. Property to L. H. Taylor, Jr., and passed to Las Moras Copp to the Magistral-Ameca Copper Co. Formerly Jalisco, Mex.

MAGISTRAL MINING SYNDICATE.

Dead. Was succeeded, 1907, by Los Angeles merly at Etzatlán, Ahualulco, Jalisco, Mex. Descri

MAGISTRAL SMELTING CO.

Dead. Formerly at Santa Bárbara, Hidalgo, Ch Vol. VIII.

MAGMA COPPER CO.

Office: Salt Lake City, Utah. Mine office: E. M. Leavitt, president and treasurer; Jas. Nea Schmidt, engineer. Organized circa June, 1910, u capitalization $1,000,000, shares $1 par.

The company has taken a bond and lease, da property of the Lake Superior & Arizona Mining & $500,000, payable all in cash, or, part in cash and b par, up to the amount of $300,000, at the option of th The agreement with the Lake Superior & Arizona is t the life of this agreement, increase its capitalization, shares, and that none of the stock shall be sold for les

The company also holds a bond and lease from t on the Queen, or Silver Queen, mine, 13 claims, adj Arizona, until Jan. 1, 1912. These holdings are about and 12 miles north of the Ray Consolidated, and ar under the titles of their respective owners, the Lake & Smelting Co., and the Silver Queen Mining Co. supposed to be controlled by Thompson & Gunn, exp tors and promoters in the copper field.

MAGNETAWAN MINING CO.

Dead. Formerly at Burks Falls, Parry Sound

MAGNOLIA GOLD & COPPER MINING CO.

Dead. Formerly at Northport, Stevens Co., W

MAGPIE GOLD & COPPER CO.

Dead. Formerly at Encampment, Carbon Co., W

MAGUS MINING CO.

Dead. Formerly at Silverton, Snohomish Co., W

MAHARAHARA COPPER MINES, LTD.

Mine office: Woodville, Waipawa Co., N. Z. a large body of sulphide ore, and small test smelte were made, 1907. Idle at last accounts, but was state to the Electrolytic Smelting & Refining Co. of Austr done no work thereon.

MAINE & MONTANA COPPER CO.

Office: Ft. Fairfield, Me. Letter returned un office, Basin, Jefferson Co., Mont. Lands are said t but slight development. Idle since circa 1902, and

MAINE & NEBRASKA MINING CO.

Office: Broken Bow, Neb. Mine office: Rio Mex. F. M. Currie, president; H. Lomax, secretary wick, general manager; Walter E. Koch, consulting superintendent. Organized 1907, under laws of A $4,000,000, shares $10 par, nonassessable.

Lands, 43 hectares, with a 4 hectare millsite and lands. The Santa Lucía group has 4 contact dep

FUNDICIÓN DE MAITENES.

Owned by Nueva Sociedad Compañía de Lots

JOAQUIN MAIZ y CA.

Office and mine: Villa Aldama, Décimo, Nue manager, at last accounts. Property is the Blanc by tunnel, developing copper ore.

SOCIÉTÉ ANONYME DES MINES DE CUIVRE DE MAJDANPEK.

Office: Brussels, Belgium. Mine office: Ma 500 men. Emile Thorez, chairman; Emile Fromont secretary; Leo Zenzes, manager; Alfred Müller, sm Hermann, engineer. Organized 1903, under laws o Servia, with capitalization 5,000,000 francs, shares 5

Lands are mineral concessions covering 18,800 Danube and circa 75 miles NE. of Belgrade, showi carrying native copper, malachite, azurite and cha being almost exclusively sulphide, and mainly cha cocite, bornite and covellite, associated with pyrite in quartzose gangue, ores averaging about 3% coppe gold per ton. The property was worked on a limited ship, and was estimated, 1906, by the company, to sh 250,000 tons blocked out for stoping, which figures s

Transportation is furnished by a 10-mile Bleic mine to the Danube, and there is a half-mile Bleich mine and smelter.

The smelter formerly had three 40-ton Herres naces, and a 200-ton blast furnace was installed, 19 pyritic process of smelting. Product is blister co copper, 14 oz. silver and 1.5 oz. gold per ton. The 250-ton leaching plant, for treating of low grade pyrit

MAJESTIC COPPER CO.

Office: First National Bank Bldg., Kansas Oracle, Pinal Co., Ariz. E. A. Hosier, president; president and treasurer. Company was organized Mining Co., but sold its property, in the Globe distr per Co., and changed its name, March, 1909, to the understandings.

Property now consists of a group of claims near at end of 1910, to 6 claims, on which assessment wor

This company received, from the sale of th $1,500,000, paying a 10% commission to Messrs. Hen the deal through, but was sued, late 1910, by Chas Dunham, for $150,000, as a commission claimed to mine. The answer of the company is that Stewart option on the property, in 1908, and this option was son, but expired 6 months before the property wa through the efforts of Mr. Krumb.

MAJESTIC COPPER CO.

Dead. Entire assets were sold to Majestic Min was liquidated, 1910. Formerly at Milford, Beav scribed Vol. VI.

MAJESTIC COPPER MINING & SMELTING C

Office: 1102–79 Milk St., Boston, Mass. Mi Co., Utah. To all practical intents and purposes th 1904, by Majestic Copper Co., which was succeeded Co., but the Majestic Copper Mining & Smelting

compartment vertical main working shaft, with drift
level, where there is a body of high-grade ore, assays
1% copper, 37 to 55% lead, 18 to 22 oz. silver, and
The Old Hickory group of 9 claims has a vein of
width, carrying a gossan up to 250′ wide, opened by
deepest 212′, showing ores formerly claimed to ass
combined gold and silver values of $2 to $4 per ton.
The Vicksburg group of 4 claims, formerly wor
cally vertical fissures, of 2′ to 20′ width, with miner
oped by a 2-compartment working shaft, and numero
It is said that high grade ore has been encountered
mine.
The Hoosier Boy group of 10 claims has a 250′
carrying auriferous and argentiferous copper and lea
5% copper, 17.2% lead and 192 oz. silver per ton.
The Larkspur group of 8 claims has a 60′ conta
and limestone, carrying irregular bunches of high-gr
The Copperfield group of 17 claims, lying betwee
mines, is undeveloped.
The Apex group of 4 claims adjoins the Old Hick
without development.
The Ben Harrison group is undeveloped.
Equipment includes steam and gasoline power fo
for lighting and pumping, is taken from the Telluri
34-h. p. Fairbanks & Morse gasoline hoist at the O
hoist at the Harrington-Hickory shaft. The Harri
gallon electric pump, and an Ingersoll-Sergeant air-c
There is an undeveloped water power on Beaver
to be capable of generating circa 2,000 h. p. and tra
to the mine and smelter, at a cost of circa $100,000
lation and transmission line.
The reduction plant, at Lewisville, which is prac
from the various mines, includes a small sampling
smelter, of steel frame on stone foundations, has ro
furnaces, and has one 250-ton blast-furnace for copp
furnace for lead, with Nesmith hot-blast stoves, heati
entering the tuyeres. This smelter is small and a
warmed, having run only about 40 days, giving half t
ing only about 5,000 tons of ore. This smelter wa
for five years, with privilege of further extension, an
Smelting Co., organized by F. Augustus Heinze, whi
in tinkering up the plant, but did not blow it in, a
Smelting Co. is dead.
Shipments were begun, circa March, 1910, to
at West Jordan. Production, by the old compa
copper, 1903. The property as a whole has nume
ore, but these are very pockety, and apparently t
considerable tonnage of low-grade ore, of rather do
MAJOR EVANS CONSOLIDATED MINING & M
Office: Provo, Utah. Mine office: America
Jesse Knight, president; R. E. Allen, secretary. Org
with capitalization $100,000, shares 10 cents par. S
Lake exchange. Lands, 31 claims, in American Fork
and 150′ tunnel, showing auriferous and argentifer
Presumably idle.

MAMMOTH COPPER MINE, LTD.

Office: 88 West Regent St., Glasgow, Scotland Lynd Co., Chillagoe, Queensland, Australia. R. K officer, John Millar, Dr. D. Gardner, J. S. Allan, directors; W. A. Hughes, secretary; W. R. Becket, loc general manager. Organized May 20, 1907, under capitalization £10,000, increased, 1909, to £25,000, sh

Lands are 4 groups of claims, 1 to 12 miles fro miles northwest of Mungana, including water-right

The Keppoch mine, area circa 20 acres, about 1 6′ vein carrying 18″ and 24″ footwall and hanging-w of about 8% copper and 1 oz. gold per ton, developed steam hoist.

The Mountain Maid mine, about 5 miles sou prominent outcrops, is developed by a 42′ incline vertical shaft, sunk for first 25′ vertically, and for 1 the bottom are in ore assaying up to 15% copper, w Equipment includes a 6-drill air-compressor.

The company has an office building and other s may plat a townsite. The mine employed 28 men, work.

MAMMOTH COPPER MINING CO.

Dead. Formerly at Saratoga, Carbon Co., W

MAMMOTH COPPER MINING CO. OF MAIN

Office: 55 Congress St., Boston, Mass. Mine Shasta Co., Cal. Wm. G. Sharp, president; C. G. Ri officers, B. Preston Clark, Albert F. Holden, E. L. row, directors; F. W. Batchelder, secretary and treas ager; Robt. E. Hanley, mine superintendent; W. J. Quartz Hill mine; Jas. H. Kerwin, smelter superi engineer. Organized Aug. 2, 1904, under laws of through ownership of entire stock issue, by the Un ing & Mining Co.

Lands, 25 claims, partly fractional, patented, and miscellaneous lands, giving total holdings of ab cipal mineral holdings are on Little Backbone Creek in the Big Backbone district. Lands are well timb tain streams available for water supply and power. with mines opened near the tops of the mountains. quarry, but limestone for fluxing is now taken from electric cars. Extensive diamond drill borings have

The company's holdings include the Iron Moun Fernley, Nevada Co., Cal. This mine has a 12′ fiss gossan up to 300′ in width, traceable for a half-mile, compartment vertical shaft, developing auriferous c chite and chalcopyrite, associated with hematite and is Grass Valley, with a good wagon-road connec boilers, and a 25-h. p. double-cylinder link-motio include a power-house, smithy and bunkhouse.

The Mammoth group, which is the principal p side of the Sacramento River, and ore bodies consist lenses, occurring irregularly in a rhyolitic zone of pre- mainly as replacements of rhyolite in fissure and quartz phenocrysts are distinguishable, but usually the original rock. Ore is mainly auriferous, argentif chalcopyrite, disseminated in massive pyrite and p

in train-loads. In addition to the bin-house, ther lower branch of the aërial tram, and a 20,000-ton trains are run underneath the 3 sets of ore-bins. T mill for custom ore.

The 72x222′ blast-furnace building has three furnaces, designed by Carl F. Moore, with water- furnace being held as a spare. Semi-pyritic smel only 3 to 4% coke charges. Notwithstanding the naces have been lost by freezing, and when the zin 5%, Mr. Kerwin has run the furnaces with as small a periods, and although ore has run as high as 10% have obviated all trouble from freezing. This plan handling of zincy ores, which are such a bugaboo in

The 3 old furnaces have 6′ 9″ settlers, and t settlers, each with a water-jacketed top, of cor The 3 new furnaces have water-jacketed tops with the furnace bottoms to the charge floor, built in vert extending from the furnace floor to the feed floor. cold blast. Charge trains consist of four 5,000-l drawn by 4-ton Baldwin-Westinghouse electric l either side of each furnace, charging alternately. drawn by 6-ton Baldwin-Westinghouse electric charged from the spouts of the settlers into a trav 40′ long, from which chilled matte is dropped into matte being resmelted.

The blast-furnace building has a 12x30′ exp nace, installed 1909, formerly burning coal and co fornia crude petroleum.

The 92x204′ converter building has two 50-t cranes of 50′ span, with two 15-ton auxiliary hoists, e 440-volt induction motors. There are 2 Allis-Cha room for a third, and eight 96x150″ shells, takin converters blow off into hoods leading to the old st ing, which has a self-supporting steel chimney 1 There is a slag-casting machine for converter slags

The relining department, in the converter b quartz and clay, two 7′ Carlin grinding pans, and t tamping machines, each on a hydraulic jib crane.

Fumes from the blast-furnaces go through in dustflue, 200′ long, with sectional area of 407′, built hopper bottoms, leading to a horizontal dust-cha 500′ long, running to a 200′ steel stack, of 18′ dia An electric tram-line running under the dustflue b ting plant, in the furnace building, which has a 6- press, making briquettes from a mixture of flue-du

Much trouble has been experienced with th county, over the matter of fumes from the smel extensive litigation, and caused the company to purchasing smoke easements from land owners, baghouse. For its easements the company paid has agreed to pay $50 to $100 per year, until d eliminated.

The 75x250′ baghouse, built by the America $250,000, was begun October, 1909, and required the frame, which is sheathed with corrugated iron ated by a 400-h. p. electric motor. Fumes from

per, silver and gold, with somewhat aluminous ga
a small steam plant. Management planned shippi
smelter, but apparently failed to do so.

MAMMOTH LODES MINING CO.

Dead. Formerly at Princeton, Yale district,

MAMMOTH MINING CO.

Office: 409 Hooper Bldg., Salt Lake City, Utah
Juab Co., Utah. Samuel McIntire, president an
McIntire, Jr., vice-president and superintendent; M
tary. Organized 1881, under laws of Utah, with ca
25 cents par, and reincorporated Dec. 5, 1906, unde
italization $1,000,000, shares $2.50 par. Controls
through ownership of 70% of capital stock. Divi
$2,220,000, last having been 5 cents, paid March
9 years litigation, a judgment in favor of the Gra
rendered, 1910, against the Mammoth Mining Co.
same time as the accidental wrecking of the hois
levying of a 10-cent assessment, 1910, the first in
Annual meeting, first Tuesday in February.

The mine, opened circa 1870, is developed ex
main shaft, the deepest in the Tintic camp. Irre
of argentiferous and auriferous lead and copper ore
in silver and lead. October, 1910, it was planned
level, to intercept the Centennial-Eureka vein.

Equipment includes a new machinery plant, in
dental wrecking of the old hoist. There is a mill w
was 477 carloads, or circa 23,000 tons of ore, in 1907.

MAMMOTH MINING & POWER CO.

Dead. Allan C. Sanders was superintendent.
and having a 50-ton concentrator, employed about
by receiver, circa September, 1910. Formerly at Ma

MAMMOTH NO. 2 MINING & MILLING CO.

Office: 409 Hooper Bldg., Salt Lake City, Utah
Juab Co., Utah Wm. H. McIntire, president; Sam
and treasurer; Isaac Jennings, secretary. Organize
with capitalization $300,000, shares $1 par, assessa
claims, patented, adjoining the Mammoth Mining
argentiferous lead and copper ores. Idle several ye

MAMMOTH TUNNEL & MINING CO.

Dead. Former office was 403-331 Fourth A
Brown was manager. Lands were claimed to be 600
bodies assaying 22% copper and 160 oz. silver pe
grossly exaggerated, and there also was said to be a
ized ostensibly to drive the Mammoth tunnel, whic
at all. It was claimed that this hypothetical tunne
at depth of 2,000' from surface. Apparently the c
bery. · Formerly at Silverton, San Juan Co., Colo.

MANCAYÁN COPPER SYNDICATE, LTD.

Dead. Was wound up, voluntarily, August, 190
Lepanto, Luzon, Philippines.

MANGAS DEVELOPMENT CO.

Office: 29 Hall Bldg., Houghton, Mich. Op
St., Silver City, N. M. Mine office: Tyrone, Gran
W. Haire, president; Jos. E. Saint, vice-president;
Jos. W. Selden, treasurer; preceding officers and Ge
S. Roome, mine superintendent. Organized Oct.

Lands, 37 claims, patented, area 600 acres, ov district, carrying upwards of 2 miles of the outcrop west and north of the holdings of the Chiracahua ment is by several shallow shafts, deepest 80′, and showing leached ore and a little high-grade ore, w values at greater depth. Property considered prom Idle some years, but resumption planned when co rant further development.

MANHATTAN ELY COPPER CO.

Office: 25 Broad St., New York, N. Y. Let former mine office, Ely, White Pine Co., Nev. Co Jos. H. Everett, vice-president; Willard B. Moore, ceding officers, Jos. P. McQuaide, Mortimer C. Mac Keagy, directors. Organized 1907, under laws of $5,000,000, shares $5 par. Lands were 10 claims, Velvet group, in the western part of the camp, no Giroux Consolidated, but the company lost this g $20,000 on the bond, but apparently some sort of the same property, 1909, in which year the compa ganize. Idle and presumably moribund.

MANHATTAN GOLD & COPPER MINING CO

Dead. Lands were sold, June 10, 1907, to Nev Corporation. Formerly at Pioche, Lincoln Co., Ne

MANHATTAN MINE.

Letter returned unclaimed from former min Hancock Co., Me. Property includes the Manhattan ore assaying about 5% copper, which were reopened, many years of idleness. Idle since 1907.

MANHATTAN MINING CO.

Letter returned unclaimed from former office, office: Saltese, Missoula Co., Mont. J. E. Baile superintendent. Lands, 10 claims, shortly northw on the Idaho side of the divide of the Bitter Root M tunnel, showing a 7′ vein assaying up to 12% copper

MANHATTAN-RAMBLER MINING CO.

Office: 54 Zeigler Blk., Spokane, Wash. Le mine office, Manhattan, Nye Co., Nev. H. S. H Harris, vice-president; A. C. Shaw, secretary and 12, 1908, under laws of Washington, with capitaliza par, assessable. Lands, 4 claims, unpatented, 26 mil held by the Rambler-Tonopah Mining Co., showi Presumably idle.

MANICA COPPER DEVELOPMENT CO., LTD. PORT

Dead. Formerly at Sierra Isataca, Macequece, East Africa. Fully described Vol. VIII.

MANICA COPPER EXTENSION, LTD. PORT

Dead. Formerly at Sierra Isataca, Macequece, East Africa.

MANICA EXPLORERS, LTD. PORTU

Offices: 615 Salisbury House, London, E. C., I Isataca, Macequece, Mozambique, Portuguese Eas chairman; J. W. Youd, secretary. Organized Jan. 23, Western Explorers, Ltd., and reorganized Dec. 3, 190 with capitalization £100,000, shares £1 par; issued, 200 copper claims, 770 gold claims, 16 acres of towns

Lands are very extensive, including the Mansfeld
falen, and a potash bed near Wansleben, opened by
operation since 1903. Landed holdings also include c

The coal mines at Langendreer, near Hamm,
adjoining mines, with 4 operating shafts, and in co
about 225,000 metric tons yearly capacity, producti
metric tons of coal and coke daily. There are 2 crush
werke, and the other at Rothenberg.

The Mansfeld mine was opened A. D. 1199, and,
feld, attained a high state of development, and was in
the Fourteenth and Fifteenth centuries, but the indu
tion during the Thirty Years' War. Activity was
right of working the mines was declared free, this resu
great number of small independent operators. A
stalled in 1785, this being the first commercial steam
The present company was first formed, 1852, as a c
small mine operators and smelters, and the merging
resulted in a nearly tenfold increase of production, f
copper in 1867.

The principal ore body of the Mansfeld mines is
grained bituminous shale, lying nearly horizontal, hav
with average thickness of only 2′ to 3′, but coverin
The principal ore is slightly argentiferous chalcopyrit
bornite and chalcocite, and there are very limited qua
ores, occurring as speiss, disseminated in very fine g
schiefer. Lying just under the kupferschiefer is an
chalcopyrite, and a limited quantity of copper car
slightly cupriferous limestone bed, known as the
schiefer carries 1.8 to 3.7% copper, and ores smelted
and 0.015 to 0.020% silver.

The mine has been modernized, in methods and e
ning of the century. Owing to the great age and exte
headings usually were 2 to 4 kilometers from the shaf
was done under considerable disadvantages, the thi
great extent of the workings rendering it necessary for
sides, bellies or backs, as in coal mines, wearing boa
thighs, in order to protect themselves from the roc
operations are through a row of 9 deep-level hoisti
kupferschiefer at depths of 600 to 700 meters. The
meters in diameter, with a lining of brick, backe
the scores of old shafts, which average about 400
for ventilation, safety and raising water. The pri
Johannes, at Hohenthal, and the Hermann, at Hel
steel headgears. Underground haulage, formerly do
planted by electric locomotives, in the newer workin
reaching surface, and waste rock, including consider
underground filling.

Water from the entire mine is drained to the Seg
raised by two 1,100-h. p. twin-tandem-compound st
adit, 150 meters below surface, the pumps taking st
insulated pipes. There are 6 Weisse & Monski duple
ground stations.

The machinery equipment of the mine is very co
mainly cross-compound steam hoists, with conical dr
the Hermann shaft has an Ilgner electric hoist. All
deck cages, raising 4 trucks. Electric power is used ex

plant at the Kupferkammerhütte has 82 kilns and 6
out circa 50 metric tons of 50° Beaumé sulphuric ac

The Gottesbelohnunghütte is one of the smalle
equipment consisting of 10 small reverberatory furn

The Saigerhütte is mainly a refinery, including
ting on the Ziervogel process, which roasts the matt
sulphate, which is dissolved in water, and the
copper, which precipitates the silver, the cement silv
and resmelted to metal .999 fine. The final furnace
of the silver, is blister copper of 99.7 to 99.8% tenc

The electrolytic refinery, formerly of about 5
with electrodes arranged on the multiple plan, has
employs a new process, in use since circa 1907, by wh
an anode, with an electrolyte carrying copper chl
and free hydrochloric acid. Copper chloride is add
electrolysis, and when the electrolyte is sufficiently
arated from the solid residue of the anode, and sub
insoluble anodes, for the purpose of separating the
The remainder of the copper is chemically precipita
the material then electrolyzed with insoluble anoc
The chlorine produced at the anode is used as a reg
further copper chloride from suitable copper ores.

Production, which was only 5,865,898 lbs. in 18
lbs. in 1877, to 29,176,000 lbs. in 1887, and 40,230,40
duction has been as follows: 42,500,278 lbs. in 19
43,824,141 lbs. in 1905; 40,108,000 lbs. in 1906; 38,822
lbs. in 1908; 41,891,400 lbs. in 1909; and for first ha
tons of fine copper. Production of 1907 was secure
of kupferschiefer and 151,890 metric tons dachberg, gi
ric tons of cupriferous material smelted. The Ma
technical skill, and its ore bodies, by reason of their
very largest known to man.

MANSFIELD MINING & SMELTING CO.

Office: 303 Midland Bldg., Kansas City, Mo.
Santa Cruz Co., Ariz. A. E. White, president; Fr
dent; C. E. Sweet, secretary; Chas. L. Cookson, tr
Herman A. Sutermeister, Harry J. Richards, A. W.
M. J. Allen, H. K. Van Horn and A. J. Poor, di
general manager; Edw. McFarland, mine superinte

Organized May 26, 1906, under laws of Ar
$8,000,000, shares $1 par, nonassessable; issued, $6,
authorized, at 6%; issued, $40,000. A statement, of
of $165,632.06 from sale of stocks and bonds, and $9
Annual meeting, second Monday in January.

Lands, 31 claims, 27 patented, area 660 acres,
the station of Crittenden, all in the Wrightson distri
branch of the Southern Pacific railway. Property sh
ite and rhyolite tuff, carrying 9 ore bodies, of 4′ to 30
3, of 6′ estimated average width, carry chalcopyri
tetrahedrite, lyingly claimed by the former managem
and 40 oz. silver per ton, and claimed by the prese
12% copper, 20 and $1 gold per to
excessive. The ed b ft, o
and 8 shafts of 100
is reported to
ment includes

MINA DE MARACÁS.

Office and mine: Maracás, Bahia, Brazil. Col
Property is a small copper mine. Presumably idle.

TOMÁS MARAMBIO.

Office and mine: Peña Blanca, Freirina, Ataca
Labrar, Freirina, Atacama, Chile.

The property includes a number of mines, and a
mine, at Fragüita, 8 leagues from Peña Blanca, is 220
tal workings for 500 meters, on a vein of 6′ to 7′ ave
strike, with dip of 45°. Production, 1903, was circa
copper ore.

The Mina Verde, near the Santa Rosa, opened
carries rich ore, and production, 1903, was 150 metric
copper tenor.

The Mina Pequeña, 4 leagues from Peña Blanca
meters only, showing an oxidized zone of about 30 m
tion, 1903, was circa 200 metric tons of ore, of about 2

The Mina Serena is opened to a depth of 70 me
horizontal length of 160 meters, and production, 1903,
of ore, of about 20% average copper tenor.

The Mina Manto has an outcrop traceable circa
to depth of 120 meters. Production, 1903, was only ab
ore, and apparently this mine is idle.

The Mina María Luisa is opened to depth of 14
1903, was 125 metric tons of ore, of about 20% averag

The Mina San Juan was worked originally for si
copper with depth, and is said to have an 1,800′ sh
mistaken figure.

The Mina Quebradilla, at San Juan, 13 kilometers
vein of about 1 meter width, traversing syenite, and
about 300 meters. This property, which is the princi
men, 1909, at wages of 2.5 to 3 pesos per day, and yield
of 18% copper ore, sent for smelting mainly to the
The smelter, known as the Fundición de Labrar, i
Blanca, and 18 kilometers from a railway, employing
age wages of 3 pesos daily. The smelter has a 11x2
with a 50′ smokestack, and, 1907, smelted circa 4,000 m
14% average copper tenor, with the addition of 300
consumption of 1,100 metric tons of coal, about half do
yielding 900 metric tons of 91% Chile bars, with slags

Recent production has been as follows: 1,335,32
1,011,911 lbs. in 1907; 1,349,078 lbs. in 1908; 939,518

MARAVILLA COPPER CO.

Dead. Formerly at Safford, Graham Co., Ariz.

MARBLE BAY MINING CO.

Dead. Mine was sold to the Tacoma Co. Form
Island, B. C. Described Vol. V.

MARCIONELLI é HANZA.

Office and mine: Morococha, Junín, Perú. L
which mining was begun 1902. Production, 1904, with
was 97,355 lbs. fine copper, from ore averaging 12% co
idle.

MAREQUITA **MENT**
Dead. Mex.

COMPAÑÍA **HUASI.**
Office:

MINA DE MARACÁS.

Office and mine: Maracás, Bahia, Brazil. Co
Property is a small copper mine. Presumably idle

TOMÁS MARAMBIO.

Office and mine: Peña Blanca, Freirina
Labrar, Freirina, Atacama, Chile.

The property includes a number of mi
mine, at Fragüita, 8 leagues from Peña B
tal workings for 500 meters, on a vein
strike, with dip of 45°. Production
copper ore.

The Mina Verde, near the Se
carries rich ore, and production,
copper tenor.

The Mina Pequeña, 4 lea
meters only, showing an oxi
tion, 1903, was circa 200 m

The Mina Serena is
horizontal length of 160 n
of ore, of about 20% av

The Mina Manto
to depth of 120 meters
ore, and apparently

The Mina Ma
1903, was 125 met

The Mina S
copper with de
mistaken figur

The Mir
vein of abo
about 300
men, 190
of 18%

Th
Blanc
age
wit
1
c

Oak
ging direct
a, said to have a
merly at Ejutla, Oax

NERAL LAFAYETTE.

aimed from former mine of
e Luis Laffaye, owner. Proper
stimated average width. Produc

re, of about 5% average copper ten
er. Idle.

L & RUSSELL GOLD MINING, MILL
TUNNEL CO.

ve: 347 West Broad St., Columbus, Ohi
Creek Co., Colo. W. A. Miller, president; H. A
Marihugh, secretary and general manager; E.
officers, Ralston Russell and B. W. Foster, dir
sident. Organized May, 1901, under laws of Col
$5,000,000, shares $1 par, nonassessable; issued, $7,0
Lands, formerly 62 acres, are reported by comp
5 acre millsite. Development is by a 5,300′ main tu
for 12,000′, piercing Miller, Covode and Red Elephan
shows auriferous and argentiferous copper ores, a
Equipment includes water power.

MARS HILL MINING CO.

Dead. Alfred Sliter was superintendent. Land
the Jennie mine, 4 miles from Orient, having a vein
between a granite foot and porphyry hanging, carryi
iferous copper and lead ores, with values mainly in go
a drift tunnel, with a 75′ winze 250′ from the por
Ferry Co., Wash.

MARTINEZ SMELTER.

Owned by Mountain Copper Co., Ltd., at Martin

GRUBE MARTINI.

Mine office: Hörde in W., Rheinprovinz, Pru
Vlatten, manager
ccounts. Has spathic iron
only i
which the production

ized Sept. 29, 1906, under laws of Maine. Formerly ownership of one-half of stock issue, by Utah-Apex M 200-ton concentrator, on the site of the old Red Wing

MARQUETTE & ARIZONA MINING CO.

Office: Marquette, Mich. Mine office: Bisbee, Marks, president and general manager; Jos. J. Wirt Dec. 6, 1902, under laws of Arizona, with capitaliza par. Lands, 37 claims, area 740 acres, having a hea similar to that of the Copper Glance, next west. Min ment shaft, substantially timbered, passing through lin able iron, much of it assaying about $2 gold per ton and south drifts, on the 400′ level, and one short drif since 1903.

MARQUETTE COPPER MINING CO. MIC

Dead. Formerly at Brampton, Delta Co., Mich

ANGEL MARQUIEQUI.

Office and mine: Coro Coro, La Paz, Bolivia. P and Toldo mines, carrying native copper in conglom power, and has been a small producer of barillas de cob

MARSEILLES MINING CO.

Dead. Former office was 210 Bacon Bldg., Oakl was president; W. H. MacMeekin, managing directo Ocotes mine, 5 miles southeast of Ejutla, said to have a good ore on the 100′ level. Formerly at Ejutla, Oaxa

MINA MARSELLESA i JENERAL LAFAYETTE.

Letter returned unclaimed from former mine offi Atacama, Chile. José Luis Laffaye, owner. Propert of about 4 meters estimated average width. Producti metric tons of ore, of about 5% average copper teno lbs. fine copper. Idle.

MARSHALL & RUSSELL GOLD MINING, MILLI & TUNNEL CO.

Office: 347 West Broad St., Columbus, Ohio. Clear Creek Co., Colo. W. A. Miller, president; H. A. O. N. Marihugh, secretary and general manager; E. ceding officers, Ralston Russell and B. W. Foster, direc intendent. Organized May, 1901, under laws of Colo $8,000,000, shares $1 par, nonassessable; issued, $7,00

Lands, formerly 62 acres, are reported by compa 50-acre millsite. Development is by a 5,300′ main tun for 12,000′, piercing Miller, Covode and Red Elephant shows auriferous and argentiferous copper ores, an Equipment includes water power.

MARS HILL MINING CO.

Dead. Alfred Sliter was superintendent. Lands the Jennie mine, 4 miles from Orient, having a vein up between a granite foot and porphyry hanging, carryin iferous copper and lead ores, with values mainly in gol a drift tunnel, with a 75′ winze 250′ from the port Ferry Co., Wash.

MARTINEZ SMELTER.

Owned by Mountain Copper Co., Ltd., at Martinez

GRUBE MARTINI.

Mine office: Horde in W., Rheinprovinz, Prus Vloten, manager, at last accounts. Has spathic iron being mainly iron of which the production av

Francisco Ponce de León, secretary and treasurer; R
manager. Organized Nov. 5, 1906, under laws of M
300,000 pesos, shares 50 pesos par, divided into 2,000
shares. Has levied $40,000 assessments.

Lands, 262 hectares, in the mineral district of San
ing antigua workings. Development is by a 125-mete
carrying auriferous and argentiferous chalcopyrite and
average assays of 9.5% copper, 30 oz. silver and $5 go
way is the National Tehuantepec, 50 kilometers dista
a steam plant, burning wood, and a 4-drill air-compresso
1909, via Tehuantepec.

MASCOTA COPPER CO.

Office: 513 Germania Life Bldg., St. Paul, Minn
Jalisco, Mex. Chris. D. O'Brien, Sr., president; J. M
Byron J. Mosier, secretary and treasurer; Chris. I
manager; preceding officers and Patrick Conley, di
superintendent. Organized June, 1908, under laws of
Independence Mining & Smelting Co., with capitali
$1 par.

Lands, 46 hectares, said to include antiguas, in t
of the Mascota district, 24 miles from the Mexican Ce
fissure vein in porphyry, traceable circa 2,000′ and
giving average assays of circa 5% copper, 7 oz. silver
from oxide, carbonate and sulphide ores. Mine has a
nel, with 4,825′ of workings, estimated to show 40,000
tons blocked out for stoping.

Equipment includes a 50-h. p. steam plant, with
pressor. There are 17 mine buildings, including a stor

The reduction plant includes a 25-ton wooden st
Chalmers gravity stamps, and a small concentrator, equ
tables, a vanner, 4 slime tables and a sizer.

The company plans continuing the tunnel to le
shafts and building a small smelter. Some high grade

MASCOTA MINING CO.

Office: Chicago, Ills. Letter returned unclaimed
Talpa de Allende, Mascota, Jalisco, Mex. Harry S. Ch
general manager, at last accounts. Lands, 32 hectare
mine, 9 miles west of Talpa, in the cañon of the
timbered, furnishing fuel for ordinary mine operat
worked by German and Mexican companies, has a vein
a paystreak of 4′ to 20′, carrying auriferous and argen
sulphides. Development is by tunnels and shafts,
quantity of ore.

Equipment includes a water power plant, taking wa
Reduction works include an experimental leaching plant
smelter, with calcining furnace and a water-jacket blas
erous, and difficult of reduction. Idle and presumably

MASCOT COPPER CO.

Offices: American Trust Bldg., Chicago, Ills., an
City, Utah. Mine office: Dos Cabezos, Cochise Co., A
president; David S. Stevenson, vice-president; J. C. K
Ramsey, treasurer; Thos. N. McCauley, general mana
tendent; Capt. B. W. Tibby, consulting engineer. Or
under A[illegible]ion[illegible]lization $10,000,
$1,000[illegible]common shares.
necti[illegible]perating in the

ton, is milled to $140 concentrates, which are shippe
grade ore carrying 7 to 9% copper and up to 2 oz. gol
shipped, 1909, to the El Paso smelter. Presumably i

MASCOT TUNNEL CO.

Mine office: Turret, Chaffee Co., Colo. Elmer
at last accounts. Property carries auriferous and arg
was under development with a force of 10 men, 1903

MASHELL COPPER MINING & REDUCTION C

Dead. Formerly at Etonville, Pierce Co., Was

MASON & BARRY, LTD.

Office: 87 Cannon St., London, E. C., Eng.
Alemtejo, Portugal. Jas. Francis Mason, J. P., M. P
deputy chairman; Edw. O. Barry, managing director;
E. Beddington and Francis Ricardo, directors; Philip
Wm. Neville, resident manager; Harvey & Wilbrahan

Organized June, 1878, under laws of Great Britai
1892, with capitalization £210,000, shares £1 par; iss
zation was reduced from £1,050,000 by returning to s
in 4 payments of £1 each. Net profits were £68,325
in 1906, and net profits were £66,135 and dividend wa
pany has paid dividends regularly since organization
65%. Recent dividends have been as follows: 13s.
in 1903; 7s. in 1904; 7s. in 1905; 7s. in 1906; 6s. in 190
The company has a staff pension fund.

Lands, near the Spanish border, are leasehold, wit
a 50-year term, ending November, 1958. The pro
Domingos mine, originally was opened and worked ex
and has been operated by the present company, and it
Development is by several shafts, deepest level being a
A mineral zone of about 200′ width, and proven leng
lenses of cupriferous pyrite, averaging slightly under 1
sulphur, the principal values being in sulphur rathe
depth copper values decrease, slowly but steadily. A
has been walled off. Ore reserves were 5,250,000 lon
and were increased to circa 7,500,000 at the end of 19
to the extent of 524,353 tons was removed, at a cost of

Ore is leached for copper values, on the same g
Tinto, and there are about 345,000 long tons of ore i
taining about 1,500 long tons fine copper. Sulphur
works for burning.

The company owns a railway to Pomarão, a ti
Guadiana, where there is a shipping pier and tugs.

Ore shipments 1909 were 264,914 long tons, givi
£18,582. Maximum production was 8,353,229 lbs.
recent production has been as follows: 6,605,760 lbs.
1905; 5,519,360 lbs. in 1906; 5,871,040 lbs. in 1907
5,299,840 lbs. in 1909; 6,619,200 lbs. in 1910. Appa
Domingos has passed as an important copper producer
the largest secured for 8 years, and the property, which
record of production, is carefully managed, and is made
its sulphur ores.

MASONIC MOUNTAIN GOLD MINING CO.

Office: 122 South Main St., Salt Lake City, Utah
Mono Co., Cal. F. E. [illegible] dent; Caleb Dorse
Paul, [illegible] tre[illegible] ng officers, Dr.
Gies[illegible] [illegible] ndent. Orga

Boston Safe Deposit & Trust Co., transfer agents. Boston and Salt Lake stock exchanges.

Lands, 7 claims, patented, area 140 acres, and a fra acres, known as the Spragg mine, lying south of the Bl miles west of Mason. Company also owns circa 1,200 near the railway. The property shows a strong gossan, contact deposit between limestone and andesitic and rh comparatively soft, and have been eroded into steep valleys, the latter rocks apparently not being intrusive. tact vein, and as big replacement deposits in limestone, estimated width. Surface ore is mainly malachite, wi ceeded, at circa 100′ depth, by cupriferous pyrite, largel in the form of chalcocite and chalcopyrite. The mine i averaging 10% copper, but apparently the average ten with circa $1 per ton in combined gold and silver values shows 16 to 17% iron, 16 to 18% lime, 12% sulphur and

Considerable bluestone was produced from this pro the Comstock lode, circa 1870–1875, and a record of ove ore shipped, from surface pits, gives an average of be

Development is by 5 tunnels, reaching a depth of 5 of the strike of the main contact deposit. In addition which is known locally as the west vein, there is an app body, occurring as a replacement deposit in limestone. been proven for 18′ to 120′ in width, with an average The ore as a whole is of low grade, but there are occasiona of which, up to 20′ in width, carries ore assaying 15 to 65 to the tunnel levels, sub-levels have been driven at 12′ levels, and some winzes have been sunk to depth of 50′ have shown the existence of good sulphide ore to depth

No. 1 tunnel is a crosscut, intersecting the vein abo and was driven through garnetiferous limestone, at a c vein, at depth of 100′, dipping to the east, being about chalcopyrite, with garnetiferous gangue.

No. 2 tunnel, cutting the vein with a back of 200′ about 35′ width, carrying high grade ore. An intermed nels Nos. 1 and 2, shows the vein to have a total width o ore up to about 10% in copper tenor.

No. 3 tunnel, of circa 1,000′ length, cuts the vein proving a replacement deposit in limestone of about 45′ separate and entirely distant from the main contact vei tram-cars of ore extracted gave average assays of about body carries some cuprite and native copper.

No. 4 tunnel, of circa 1,400′ length, is connected upraise, and cuts a vein of about 25′ average width, pro cuts, on this level, to have an extreme width of about 13

No. 5, the bottom tunnel, gives a back of about 6 connected with workings above by an upraise. Work continued August, 1910, the drifts having encountered thoroughly leached of values.

The mine has developed a very considerable tonnag ate and sulphide ores, with a smaller quantity of high agement estimated ore reserves, Dec. 31, 1910, at 1,0 3.95% copper, with 92,000 tons of 2.38% ore, and ab tional of material assaying 1.9% copper, with average a $1 per ton in combined gold and silver values. Actual

Nicholas Clymo, master mechanic at mill. Organiz
Michigan, with capitalization $2,500,000, shares $25 p
$21, last assessment having been $2, March, 1910, b
levied May, 1911. Company controls the Evergreen B
ownership of circa 23,000 shares out of 24,756 shares c
$7 per share for the greater part of this stock. The
to be wound up, 1911, and lands will be taken over by
which needs them very badly.

Lands, circa 2,900 acres, lying in a very irregular b
in Sections 33, 34 and 35, T. 51 N., R. 38 W., and in S
W., holdings being bounded on the north by the Unio
lands, on the east by the Adventure, Toltec and Everg
by the Evergreen Bluff, Flint Steel, and the Knowlton
and on the west by the Flint Steel, Adventure and St. M
Lands include three old mines, the Ridge, Mass and O
pects, the Merrimac and Hazard, joint production of
managements, was 11,131,023 lbs. fine copper. The
1850-1874, made 5,134,449 lbs. copper, and paid dividen
Mass mine, opened 1856 and worked, intermittently, un
output of 5,014,266 lbs. copper, and the Ogima, opene
made 982,308 lbs. copper. The Merrimac and Hazard
tions, without recorded production. These five prop
detail, in Vol. II.

Lands include former holdings of 5 different minin
a considerable part of the real estate stood in the nam
Co. controlled, through ownership of practically the e
issue, by the Mass Consolidated. It has been plan
to wind up the Ridge, as it no longer has any p
trouble was had, at the beginning of the company's ex
years afterward, through defective or inadequate titl
been born scarce half made up, but gradually these troub
and, with the winding up of the Ridge Mining Co. and
Co., and transfer of titles direct to the Mass Consolidate
all titles, and rounding out the property satisfactorily, w

Circa 1863, the Ogima Mining Co. transferred, to t
ing Co., all right and title to the Evergreen bed under th
in exchange for which the Evergreen deeded to the Ogi
its northeast corner, adjoining the Ridge mine, to enab
shafts and work the cupriferous beds lying north of th
existence of this old agreement, between the Evergreen a
to the Mass management, at the time of taking charge,
the Evergreen Bluff, 1903, that mining on the Evergre
tinued, in consequence of which all operations were tran
and Butler beds.

The Mass tract carries 6 of the 7 cupriferous ar
Evergreen belt, these varying greatly in width, from poin
about 10', with a sharp bend in their strike, which varie
north, to N. 37° E. at the southern boundary. The dip
38° at the Ridge to 47° at the old Mass mine. The co
Evergreen belt, on the land[illegible] Mass Consolidated a
to south:

1. Knowlton. Ca[illegible] and stamp
2. Mass. Lies 1[illegible] Knowlton
copper and stamp rock
3. North Butler.
fairly mineralized in pl[illegible]

occasional heart-breaking stretches of almost barren some beautiful stopes, that were both wide and rich. with the Evergreen Bluff Copper Mining Co., this sh years, but unwatering was begun November, 1910, an March, 1911. The winding up of the Evergreen Bluff actual production from this shaft, which was materially sidered, of the mine.

"C" shaft, 2,148′ southwest of "B," with collar deep, bottomed on the 9th level, at the beginning of 191 shaft, cut down, retimbered and deepened, and is sunk makes a fair copper showing. The Evergreen bed tr opened by a 400′ crosscut on the 5th level. Some opened, in the 7th level west, on the Butler bed, durin The company centered work, 1910, upon the Butler ope was done also on the Ogima and Knowlton beds, tribut on the whole being promising. It is planned eventua ings of "C" with "A" and "B" shafts.

"D" shaft, 1,800′ southwest of "C," was sunk onl for some years.

There are a number of old shafts, the 450′ main sh proper having 7 levels, opened on the Knowlton bed. 1901, and the showing pronounced satisfactory. Th opened at several points, by crosscuts from "A" an found bunchy, though showing occasional good stope

Considerable diamond drilling has been done, and 1909, one drifting south from the Evergreen bed into the so-called Adventure lodes, cut by diamond drills on while the other drill was testing the territory north of drills operating from underground stations in "A" s was done, 1910, also, a hole having been started in th to test amygdaloidal and conglomerate strata outcropp is quite a distance under the hypothetical horizon of lodes, with distance to the eastern sandstone undetermi

The shaft-rockhouse at "B" is of wood, iron-shea 80′ high, equipped with a steam-hammer, 2 Blake crus berg engine. "C" shaft has a 40x55′ shaft-rockhouse. been equipped with devices permitting automatic handl itself by gravity, 4 men doing the work formerly done

The central power-house, 48x150′, of wood, iron-she "B" shafts, has a 24x48″ Allis-Chalmers duplex hoist v 11′ faces, grooved for 1 ½″ cable, good for one-half mile includes a 50-drill Rand 2-stage cross-compound air-co mo for electric light, and two 250-h. p. Stirling water-

In addition to the usual mine buildings, there are The company also has a townsite, Mass City, which is eral Range railroad, and a station on the C., M. & St having a considerable population, with a number of st houses.

The Mass mill is at Keweenaw Bay, on an arm junction on the Mineral Range and Duluth, South Sh 16 miles south of Houghton and 34 miles northeast sand-room, deep water, and immunity from heavy s built by the Wisconsin Bridge & Iron Co., is of steel fra Equipment includes 2 Nordberg stamps, having vertica with automatic hydraulic cleaning devices. Each head capacity of about 525 tons daily, with actual daily averag

The ore not being adapted to wet concentration, o
a 50-ton experimental mill has been built, using the El
process, with Blake and centrifugal crushers, and 3 Je
Idle since 1909.

MATEHUALA SMELTER.

Owned by American Smelters Securities Co.,
S. L. P., Mex.

W. M. MATHEWS.

Office and mine: Etzatlán, Ahualulco, Jalisco, M
including the Cinco Minas, Casa Blanca, Palos Verd
Tremillo groups, and a number of miscellaneous clai
shafts and tunnels, and mines were limited producers,
carrying gold, silver, copper and lead values.

MATSUKAWA MINE.

Mine office: Sawauchi-mura, Waka-gori, Rikuch
slightly auriferous copper ore. Production was 46,
92 oz. fine gold, 1907. Presumably idle.

MAVERICK COPPER CO.

Mine office: Florence, Pinal Co., Ariz. Geo. L
bury, managers. Property, known as the Iron Sprin
$100,000, to the Copper Queen Consolidated Mining
bond, late 1910. Property shows a strong outcrop, car
chalcocite, with some oxides, carbonates and a little
to average 3% copper. Development is by a shallow
prospect pits and shafts.

GEWERKSCHAFT KUPFERBERGWERK MAXIMI

Mine office: Nieder-Ludgwigsdorf, Schlesien,
mann, superintendent. Development is by the 75-m
25-meter August shaft, neither deepened for some yea
men, and production, at last accounts, was circa 175,00

MAY DAY MINING & MILLING CO.

Office: Salt Lake City, Utah. Mine office:
Utah. John Dern, president and general manager; J
dent; A. Reeves, secretary; W. S. McCornick, treas
N. S. Neilson and M. P. Braffet, directors; C. C. Griggs,
ized April 1896, under laws of Utah, with capitalization
1907, to $200,000, shares 25 cents par; fully issued.
ments, 8 in number, aggregated $68,000. Dividends w
$44,000 in 1908, with none later, aggregating $108,000.
controlled, through ownership of one-half of stock issu
dated Mining Co., but the 400,000 shares held by that c
to shareholders of the Uncle Sam, as a stock dividend.
a deficit of $16,266. Shares are listed on the Salt
Exchange. Annual meeting, first Monday in April.

Lands, 7 claims, formerly operated in connection w
extraction through the Uncle Sam shaft. Developmen
showing a 15′ ore body between the 100′ and 200′ lev
lead and copper, in about the order named, and the m
high grade silver-lead ore on the 1,000′ and 1,100′ lev
zinc. An ore body of promise was being developed on
February, 1911. Upper levels were ...d over to l
Ore shipment... 1911, retur... 30% lea
per ton.

The 5... operatin... ...res pro
is a tram-l... ...ill to th... which
concentrati...

the contact between the trap beds and the eastern sand
ments include a steam plant, with boilers and hoist g
compressor. There are necessary mine buildings.

MAY MINING CO.

Office: Sidney, Ohio. Mine office: Mayer, Ya
Heffelman, president and general manager; Wilson C
J. D. Barnes, secretary and treasurer; preceding offi
Goeke and P. Smith, directors; H. C. Heffelman, su
1902, under laws of Arizona, with capitalization $200
assessable. Bonds, $50,000 authorized, partly issued
1st each year.

Lands, 2 claims, patented, area 40 acres, known a
3 miles south of Mayer, in the Big Bug district, showi
and a contact deposit between schist and quartzite, o
average width, respectively, carrying sulphide ore, es
average 3% copper. Development is by shafts of 2
including a 50-h. p. steam hoist, with 3 buildings. I

MAYO MINING CO.

Office: Canton, Ohio. Mine office: Jesús Ma
Mex. John E. Carnahan, manager; Carlos Smythe
accounts. Capitalization $1,000,000. Is a twin of
Lands, said to be 3 mines, presumably are 3 pertenenci
and auriferous copper ore. Idle.

MAZAPIL COPPER CO., LTD.

Office: 47 Peter St., Manchester, Eng. Mine offi
Mazapil, Zacatecas, Mex. Works office: Ap. 17,
Employs about 5,000 men at Concepción del Oro, an
Crewdson, chairman; preceding officer, Wm. Andrew
Burrows, Jos. Robt. Heaven, Jacob Higson, Wm. Jo
Wm. Purcell, directors; Percy E. O. Carr, general mana
mine superintendent; T. S. Abbott, engineer. Orga
reorganized Apr. 21, 1896, under laws of Great Bri
increased, 1903, to £300,000, shares £10 par; issued,
£120,000, at 6%. Reserve fund, £156,660, Dec. 31,
£171,660, Dec. 31, 1909. Profit and loss balance w
after £74,837 1s. 11d. allowance for depreciation, and
amounting to £14,083.

Lands, formerly 530 hectares, in 8 groups, now ar
mineral land, in 4 principal groups. The main grou
Cabrestante mines, carrying copper ores, the San El
Francisco and Protrero mines, carrying silver-lead or
group, producing mainly fluxing ores, with some ore of
with good gold values. There also are other groups, kn
San Pedro mines. Copper ores occur in irregular m
granite-porphyry contacts.

The various mines of the company have 83 diff
many of which are small and worthless, remaining from
wards of 25 miles of workings. The Aranzazú mine
meter tunnel, starting from Concepción del Oro, and t
of 500 meters, 200 [illegible] below the old workings, serv
developing new [illegible], draining th[illegible] and
for the mill. O[illegible] 1906, gave [illegible]
silver and 0.02 [illegible]

Transporta[illegible] tram[illegible] in
the smelter, bein[illegible]
built by Ropew[illegible]

Equipment includes a 50-h. p. steam plant, with a 2-drill Ingersoll air-compressor. There are 5 buildir promising and management good.

MAZE MINE.

Mine office: Terado-muri, Nishi-Kambara-gori opened A. D. 1688, has several small veins, averaging copyrite and pyrite, frequently associated with sph mainly in propylite. Ore yields 17 to 20% copper Production was 110,582 lbs. fine copper in 1900; 77,0 20,967 lbs. in 1908.

MAZEPPA CONSOLIDATED MINING CO.

Dead. Was succeeded by Aguila Amalgamated Hostotipaquillo, Ahualulco, Jalisco, Mex.

McALLISTER-ROWLAND COPPER MINING CO.

Dead. Formerly at Index, Snohomish Co., Wash

McCABE EXTENSION MINING & MILLING CO.

Office: Prescott, Ariz. Letter returned uncla office, McCabe, Yavapai Co., Ariz. Moribund. Des

McCONNELL COPPER MINING CO.

Letter returned unclaimed from former office, Salt office: Yerington, Lyon Co., Nev. E. B. Critchlo claims, adjoining the Yerington-Malachite Mining C strong iron gossan along the contact of limestone an was formerly under option to the Nevada-Goldfield R a 400' shaft, showing ore giving good assays, and is sai ore ranging as high as 50% copper tenor. Idle severa

McCOY MINING CO.

Dead. Formerly at Otto, Macon Co., N. C. D

McDONALD-ELY COPPER CO.

Office: Boyd Park Bldg., Salt Lake City, U White Pine Co., Nev. D. C. McDonald, president a Enos A. Wall, vice-president; Geo. W. Parks, secretar preceding officers, Frank J. Westcott, Geo. W. Lamb directors. Organized November, 1906, under laws of $1,000,000, shares $5 par, nonassessable; issued, $790,(the Salt Lake stock exchange. Annual meeting, Jan.

Lands, 28 claims, patented, area 325 acres, with good spring. Apparently 19 claims are held under bo on the lime belt, in the northeastern part of the Ely deposits, between porphyry and limestone, showing Management estimates veins as 20' wide, carrying o zone not having been reached, assaying 1 to 40% coppe per ton. Development is by the 205' Mill shaft; 400 Robust shaft; 80' No. 2 shaft; 65' No. 3 shaft; 80' Wall tunnel, showing 21' of heavy iron. A 218' cro shows copper ore of fair grade. The mine as a whole ha

Equipment includes a 25-h. p. gasoline hoist, 40-h drill Ingersoll-Sergeant air-compressor. There are essary shops. A pumping plant and pipe-line supply ranch.

An old 50-ton mill, with rolls and system ownership. The 100-ton concentrator has rolls. Property considered promising and November, 1907.

McGREGOR COPPER CO.

Dead. Former office was Queen St.,

group has a vein of 60′ claimed width, carrying surfac copper, with good gold values, developed by the Pea sunk to 700′, showing sulphide ore giving assays up and $6 gold per ton.

Equipment, according to company's report, inclu gasoline and air power, with 2 hoists, one good for 1,0 reported, circa 1908, that it had placed a $60,000 or equipment, but this failed to materialize. There ar pany came to grief financially, but was said to have vember, 1910, and planned resumption.

McKINLEY MINING & SMELTING CO.

Dead. Was succeeded, circa 1906, by McKinley also dead. Formerly at Ely, White Pine Co., Nev.

McMILLEN-STONEWALL MINING CO.

Office and mine: Globe, Gila Co., Ariz. V. Y. eral manager; H. L. Coombs, treasurer. Organized laws of Arizona, with capitalization $1,000,000, shares

Lands, 32 claims, in the Richmond basin, circ carrying 3 miles of the strike of the Stonewall Jackson v width. Property includes the Stonewall Jackson min an estimated production of about $500,000 of silver Development is by the 200′ three-compartment Mc 600′ Stonewall Jackson shaft, latter showing no stopi mine is said to have considerable reserves of ore carr ton, and is said to have about 40,000 tons of discar dumps, on which cyanide tests were being made, 1910 old stamp-mill and a small cyanide plant.

MEADOW CREEK COPPER & MOLYBDENITE

Letter returned unclaimed from former office, office: Keller, Ferry Co., Wash. J. E. Jennot, m Lands, on Meadow Creek, about 5 miles northwest of nel, show 4 veins, of which 1, claimed to be 45′ wide, i ized with copper, lead, molybdenum, silver and gold, per ton in gross values. Idle.

MEADOW MINING CO.

Office: 50 State St., Boston, Mass. Mine office: Co., Mich. Geo. Napier Towle, president; John Brook Capt. Wesley Clark, agent. Organized 1898, under la italization $1,500,000, shares $25 par, as a reorganizati name organized 1863, under special Michigan charte joining the Humboldt and Phœnix mines, carrying th first opened 1851, with a little mining previous to 186 by several transverse fissures, showing pits of prehi copper has been obtained therefrom. Idle some years.

MEADOW MOUNTAIN MINING CO.

Dead. Formerly at Crystal, Gunnison Co., Colo.

MEAL TICKET MINING CO.

Mine office: Jedway, Moresby Island, Queen Property, on Collison Bay, in the [illegible] of the Ikeda ising, though but slightly develop[illegible]mably id

MEDFORD COPPER CO.

Dead. Formerly at Gal[illegible] Ore

MEDICINE BOW'S MINES CO

Office and mine: Albany, [illegible] G. S. Simmons, [illegible] treasurer and [illegible]

dated Copper Co. Under this transfer, Apr. 10, 1906
was to pay back to the Copete Consolidated Copp
interest, and any proceeds of sales of stock of the Melc
divided equally between the Copete Mining Co. and
Copper Co. For further light on a complicated an
Copete Mining Co.

MELIK-KARAKOSOFF & CO.

Mine office: Zangezhur, Elizabethpol, Russia.
ski mine, in the vicinity of the Ugurchaiska and Gali
under development, 1909, and had not become a proc

MELKEDALEN COPPER MINES, LTD.

Dead. Was reorganized, 1904, as Melkedalen, Ltd
Ofoten Fjord, Tromsö, Norway. Described Vol. IV.

MELKEDALEN, LTD.

Office: 23 Leadenhall St., London, E. C., Eng.
Ofoten Fjord, Tromsö, Norway. Geo. Brooke Mee, ch
and H. Higgs, directors; W. A. Stearns, secretary; J
engineer. Organized Apr. 26, 1904, under laws of Grea
tion of the Melkedalen Copper Mines, Ltd., with capita
10s. par; issued, £78,103.

Lands, 440 acres, freehold, carrying cupriferous p
June, 1907, on a 150-ton mill, near Rosevanden, and
to have under construction an electric railway, to conne
Company's former plans provided for operation on the b
production of cupriferous pyrite and iron pyrites yearl
actually was circa 480 tons of ore, assaying 2% copper a
to reconstruction, and failure to make its ambitious pl
regarded favorably. Presumably idle.

MELROSE COPPER MINE.

Office: 10-114 Pitt St., Sydney, Australia. M
Cunningham Co., N. S. W., Australia. H. Ernest A. M
and secretary; Geo. Eason, treasurer; preceding office
directors; Malcolm Darrach, mine superintendent, at l
Dec. 1, 1903, under laws of New South Wales, with
shares £5 par.

Lands, 2 claims, area 120 acres, held under 21-ye
with option of renewal, at 5s. royalty per acre yearly, a
in the Melrose and Condoblin districts. Property is w
scarce, nearest permanent water being the Lachlan Riv
government railway is 29 miles distant. The mine was
West, and later as the Anaconda.

The property shows uptilted Silurian slates, mer
carrying fissure veins with shoots, of which 4 are pr
20′ in width, 30′ to 50′ in length, and depth, proven
280′. Development is by shafts of 95′, 280′, 65′ an
No. 1 shoot carries 3′ of chalcocite and 3′ of mixed
paystreak carrying cuprite and chalcocite, balance of v
of circa 4% tenor, with combined gold and silver values
with gangue of altered iron sulphides. No. 3 shoot sh
ores. Values are erratic, ranging fr[illegible] to 30
average, for pay ore, of 6 to 8% [illegible]
ton. Management estimates abo[illegible]
8,000 tons blocked out for stopi[illegible]

The mine has no ma[illegible]
Property considered p[illegible]

in the precious metals. Equipment includes ste
stamps, one 6′ Huntington mill, 1 Wilfley table
trators. Idle and presumably moribund.

MENLO PARK COPPER MINING CO., LTD.

Dead. Former office was Camden, N. J.
apparently as a copartnership between Christian
and Jos. H. Ross, which copartnership was dissolve
Formerly at Menlo Park, Middlesex Co., N. J.

SOCIEDAD ANOMINA COBRES DE MENOR

Dead. Formerly at Mercadal, Mahón,
Vol. VIII.

JOSÉ DEL C. MENSES.

Mine office: El Cobre, La Ligua, Aconca
Nueva and La Esperanza mines, showing a vein o
NE. strike, carrying sulphide ores. In 1903 pro
copper ore with 14 men. Presumably idle.

AKTIESELSKABET MERAKER GRUBER.

Office: Trondhjem, Norway. Mine office:
Norway. Peter C. Soelberg, chairman and man
chairman; Johan Carl Andresen, managing dire
Christian Andresen, Herbert Frithjof, Plathem Hö
Schwartz, directors; Fr. Krohg, secretary; R. S
mussen, superintendent; Harald Dahl, mill supe
under laws of Norway, with capitalization 1,200,0
par, as successor of Vigsnes Kobberværks Aktieb

Property includes the Vigsnes and Stavanger,
mines, which were among the principal copper pr
worked, 1865–1894, by a Franco-Belgian company
of cupriferous pyrite. Mines are extensively open
Ore carries 1.5 to 6%, with an average of about 2
phur. About 175 men are employed.

Equipment includes a hydro-electric power pl
are about 10 miles of aërial trams, connecting the
built 1907. Company planned a production of c
priferous pyrite yearly, beginning 1909, but actu
of 18,600 metric tons of cupriferous pyrite, assay
phur, and smelted 1,250 metric tons of copper o
2,150,400 lbs. fine copper in 1895, under former m
at 550,000 lbs. fine copper for 1909.

MERCEDES COPPER CO.

Dead. Former office was Nogales, Ariz. I
Company was the first to operate in the Santa Cru
Nogales, and did a little work, 1905–1907. Former
Sonora, Mex.

MERCER-SAN RAFAEL MINING CO.

Office: Mercer[illegible] eturned unclai
Tapalpa, Sayula, J[illegible] V. Tyrrell, pr
tary; Jas. M. Your[illegible]; Geo. J. Gr
accounts. Organiz[illegible]ws of Ne
$3,000,000, shares [illegible]

Lands, 112 hec[illegible] n R
the Sierra Cacoma, [illegible]
The property, which[illegible]
carrying auriferous a[illegible]
sulphides, in fissure v[illegible]
workings.

R. J. Frecheville, John S. P. Samborne and John
Stuart, chairman local board; Wm. J. Challis, se
secretary; J. M. Calderwood, consulting engineer

Organized Jan. 30, 1905, under laws of Gres
£110,000, increased, Jan. 27, 1908, to £200,000, sh
fully paid. Debentures, £150,000 authorized, at 6
pany reserving the right to redeem all or any par
6 months notice. These debentures were convert

Lands, circa 20,000 acres, including 1,200 cla
held under a 99-year lease from the Transvaal
farms having a total area of circa 14,000 acres, to
1423, area 6,646 acres, adjoining the farm Berkenr
disputes over titles, with the Oceana Consolidated
factorily. Lands, about 6 miles from the Limpo
north of Pietersburg, carry some timber fit for m
with good timber about 50 miles distant, and wate
depth.

The Messina mine shows extensive remains o
strike of the North lode for a distance of more th
operations including shallow shafts and opencuts,
operations. The deepest workings extended to ab
ties of ore were extracted by unknown miners, in v

The country rock is granite, with a miners
carrying 5 parallel veins, traceable for about 5 m
There are 3 principal ore bodies under developme
dle and Bonanza lodes, and a little work has been
which has been proven for about 2,400′ length.
width, and the Middle lode carries chalcocite a
oxidized ores for about 100′ depth, succeeded by
cite, with considerable quantities of bornite and
age grade of ore being exceedingly high.

The mine is opened by 9 shafts, mainly shallo
system, a modification of the caving plan, with 3 l
at 300′, showing, in No. 3 shaft, a 42″ vein of chalc
25.25% copper. The mine has about 4 miles of w
estimated, June 30, 1909, as equivalent to 5,335 lo
tons of probable ore additional. The figures of
and, despite the exceedingly high average assay
values are reliable. No. 4 shaft was enlarged, 191

Power is furnished by a Tangye suction gas
which is the cheapest fuel available. Equipment
Robey hoist placed at No. 4 shaft, 1910, and a 3-
plemented, shortly, by a 10-drill Riedler air-comp

The mine has a number of good building
engine-houses and dwellings for officials. Wood
thought that coal exists on the Rhodesian side

The mill, originally of 50-ton capacity, desig
put in commission Apr. 30, 1908, and its capacity
tons daily. A Blake crusher delivers ore to a 70-
matically to coarse crushing rolls, and delivered t
which leaves crushed ore at the top of the mill, w
spout, to the first of a series of 4 revolving tromm
wash department includes Hartz jigs, 2 Wilfley
water is taken from the mine and a well, and wate
centrates are of phenomenally high grade, avera
rich middlings and slimes accumulated for future t

veins in conglomerates of Huronian age, carryi
copper, 2 oz. silver and $5.50 gold per ton,
three tunnels, longest 564'. Has available water
years, except for annual assessment work.

METROPOLITAN MINING CO.

Dead. H. J. McIntosh was superintendent.
argentiferous copper ore, slightly developed by t
of about 15 men. Equipment included a small
at Berlin, King Co., Wash.

COMPAÑÍA METALURGICA MEXICANA.

Office: 82 Beaver St., New York, N. Y.
Monclova, Coahuila, Mex., and Concepción del
Works office: San Luis Potosí, S. L. P., Mex.
treasurer; A. Foster Higgins, first vice-president;
president and general manager; R. E. Safford, sec
Geo. H. Carnahan, general mine superintendent
superintendent; C. M. Van Cleve, smelter superin
superintendent at Concepción del Oro; J. M. W
ent at Sierra Mojada; W. K. Woodruff, local supe
Frank W. Carnahan, engineer.

Organized 1890, under laws of New Jersey,
shares $100 par, fully issued, in $1,000,000 cu
$1,250,000 guaranteed 6% second preferred stock,
Debentures, $3,000,000 first-mortgage 5% bonds
with a 2% annual sinking fund, bonds being sub
interest; issued, $2,265,700. Company is not a d
Co., New York, registrar. Annual meeting, first

The company's interests are extensive, in
subsidiary mining, transportation and land comp
tant being the Sombrerete Mining Co. and the Me
Zacatecas, Mex.; the Montezuma Lead Co.; Alva
can Mineral Railway Co., and Potosí & Rio Verd
also owns extensive tracts of timber lands.

The Veta Rica mine, at Sierra Mojada, produ
latter averaging circa 3% copper, 5% zinc and 2
ment is by a 600' main shaft, and values are mai

The Cerro Prieto and adjoining mines, at C
oped by tunnels, producing auriferous copper o

The San Pedro and San Pablo mines also are

The Minas Flojonales, in the state of Hid
argentiferous lead and copper ores, are under deve
also to have property in the vicinity of Taxco, in

The smelter, of about 750 tons daily capac
including 12 furnaces for the reduction of gold, sil
copper department of 100 tons daily capacity. T
tric power, and employ circa 1,000 men. The c
lead and silver, with considerable outputs of copp
by-products, and [illegible]nd enterprising in the
and the develo[illegible]nes.

COMPAÑÍA [illegible]ANA.

Mine of [illegible] Itu
president; L.[illegible]
hectares, carr[illegible]

MEXICAN-A[illegible]

Dead. W[illegible]
Ltd. Formerly[illegible]

veins in conglomerates of Huroni... N. Marsh
copper, 2 oz. silver and $5.50 ... to have auri
three tunnels, longest 564′. H... g scheme, and
years, except for annual ass

METROPOLITAN MINI... DEVELOPMENT

Dead. H. J. McIn... New York, N. Y. Op
argentiferous copper ... Autlán, Jalisco, Mex.
of about 15 men. ... resident; Wm. Eaton, sec
at Berlin, King C... ager; S. N. Craig, superint

COMPAÑÍA M... organized under laws of Arizona,

Office: ... is controlled, through entire stoc
Monclova, ... ment Co.
Works ... 158 acres of mineral property and
treasur... very rugged country, 30 miles northea
presi... way. Property is well timbered and well
Ge... for a hydro-electric installation.

The Agua Blanca mine, area 40 hectares, was
Edward Blake, originally from Vermont, w
imported machinery in sailing vessels that rounde
Chamela, whence the machinery was brought by o
block and tackle over the many rough spots in
equipment and operation of this property by the
mortal monument to their persistence, ingenuit
The Blakes produced sheets and other forms of c
and controlled the Mexican market for many yea

The Agua Blanca mine shows diorite and ande
brecciated zone of 30′ to 50′ width, traceable 2,00
rite, of 4 to 5% copper tenor. The Agua Blanca i
the district in that it carries only traces of gold a
from antimony, zinc, bismuth and other deleterio
are nearly vertical, lacking clearly defined walls,
copyrite in the upper workings, with occasional na
being quartzite and crushed wall rock. Developn
1,000′ tunnel, and the mine is said to show about 3
ble for extraction.

Equipment includes a 75-h. p. steam plant an
at the mine, where there are 12 mine buildings, incl
shop.

The 50x150′ frame concentrator, of about 15
steam plant with a 75-h. p. engine, two 100-ton
four 3-compartment jigs, 2 Wilfley tables and 1
into 1, with an average monthly production, whe
metric tons of concentrates, which are shipped by m
to the Aguascalientes smelter. Presumably idle.

MEXICAN METALS CO.

Office: 13–8 Congress St., Boston, Mass.
Arizpe, Sonora, Mex., and Noria, Magdalena, Son
general manager ... ny took over the prope
circa Septemb... es are listed on the B

Property, ... ups, in
cludes a numb... min
circa 6,700 acr... Ma
northeast of I...
miles from the...
include the Al...
La Victoria of ...

tle commercial ore is said to have been developed, a
1905, to show about 5,000 tons of copper ore, assays
36.5% copper, with good gold and silver values.
chinery plant, and a tunnel was being driven, to deve
last accounts.

MEXICAN MINES-PROSPECTS DEVELOPMEN

Office: Cinco de Mayo 32, México, D. F. Mi
Ahualulco, Jalisco, Mex. J. L. Requeña, presiden
manager; J. H. Stagg, commissario; preceding offic
Horner and Col. A. G. Mills, directors. Organized,
and is said to hold a controlling interest in the Compa

Lands include the San Luis del Oro and Juanq
Luis del Oro mine, area 82 hectares, carries main
having some rich ore. The Juanquiniquilla mine,
southwest of San Marcos, has auriferous copper ore,
made small shipments. The property is said to inclu

MEXICAN MINES SYNDICATE, LTD.

Dead. Former office was Ap. 230, Chihuahua,
was president and general manager; Tillman Bell,
the Rio Sorimoba, carried auriferous and argentiferou
with values mainly in silver-lead. La Reina mine
some ore that was shipped to Torreón. Equipmen
and there was a 50-ton mill, having 3 Huntington
and a 20-ton water-jacket blast-furnace. Formerly
Chihuahua, Mex.

MEXICAN MINING ASSOCIATION.

Dead. Former office was Los Angeles, Cal. O
president and general manager; Horace Wilson,
Savings Bank of Los Angeles, treasurer; preceding of
H. Jory, directors; M. Hartigan, secretary. Organi
of Arizona, with capitalization $10,000,000, shares $
to hold Mexican properties through the Compañía
Properties claimed were 7 groups, including the E
to show 4 to 18% copper ore. The company's prosp
Jory, while a surveyor with the Sinaloa Land Co.,
mines within 2 years, in addition to surveying the
Sinaloa, and western Durango, which shows that M
surveyor, and it would be interesting to try to rea
Culiacán, Sinaloa, Mex.

MEXICAN MINING CO.

Office: Long Beach, Cal. Mine office: Alam
Clute, president; J. B. Randall, vice-president; J.
treasurer; Wm. Hitchcock, manager, at last accounts.
California, with capitalization $300,000. Lands, 10 h
Grande mine, developed by shafts, said to show a cons
and argentiferous copper ore, and company claims t
to medium grade ore on the dump. Equipment in
sumably idle.

MEXICAN MINING & DEVELOPMENT CO.

Dead. Formerly at Ocotlán, Oaxaca, Mex. D

MEXICAN MINING, REFINING & EXPLORATI

Office: 501 I. W. Hellman Bldg., Los Ang
unclaimed from former operating office, Hermosillo,
mine office, Soyopa, Sahuaripa, Sonora, Mex. Wm.
and general manager; Frank K. Rule, vice-president;
treasurer; preceding officers, Chas. S. Montgomery,

dent and general manager; Fredk. M. Perkins, superi
Lands, 200 hectares, including several antiguas, pri
mines, carrying auriferous copper ores, with values
power, and a 60-ton smelter with water-jacket blast-
ing furnace. Presumably idle.

MEXICAN UNION MINING CO.

Dead. Formerly at Unión de Tula, Autlán, Jali
Vol. VIII.

MEXICAN WESTERN DEVELOPMENT CO.

Dead. Formerly at Chamela, Mascota, Jalisco,

MEXICOLA GOLD-COPPER MINING CO.

Dead. Formerly at Howard, Frémont Co., Colo.
Co., Colo. Described Vol. VII.

MEYER-CLARK-ROWE MINES CO.

Dead. Formerly at Tucson, Pima Co., Ariz.

MIAMI COPPER CO.

Dead. The first company by this name, having
dent, was organized 1905, with capitalization $500,0
succeeded, Nov. 30, 1907, by the present company
merly at Miami, Gila Co., Ariz.

MIAMI COPPER CO.

Office: 42 Broadway, New York, N. Y. Mine
Ariz. Adolph Lewisohn, president; J. Parke Chann
H. Susmann, treasurer; preceding officers, Sam A. L
Wm. H. Nichols, Walter T. Rosen, F. W. Estabrook,
Freedman and Julius A. Lewisohn, directors; Her
Britton Gottsberger, general manager; N. O. Law
H. Kenyon Burch, mill superintendent; Edw. C. Ta

Organized Nov. 30, 1907, under laws of Del
$3,000,000, shares $5 par, increased November, 1909
increased, circa August, 1910, to $4,000,000; issued
increase in capitalization, 60,000 shares were offered
share. Of the issued stock, 300,000 shares were giver
ment for lands; 200,000 shares were issued April, 190
shares were issued August, 1908, at $10 per share;
August, 1910, at $18 per share, and of the balance, 8
for conversion of bonds, and 51,764 shares remai
$1,500,000 first-mortgage 10-year 6% gold bonds, cor
and redeemable at the option of the company, on any
on or before Jan. 1, 1912, at 105, plus accrued inte
published notice, and redeemable, after Jan. 1, 1915
and accrued interest. Of the bond issue, $1,433,000
1910. The company is controlled, through stock o
Development Co. Mechanics & Metals National B
Colony Trust Co., Boston, registrars; Bankers Trust C
can Trust Co., Boston, transfer agents. Shares are
exchange. nnual meeting, third Wednesday in Apr

Lands, 1,122 acres, partly patented and balance
acres are mineral ground, 555 acres are for the mill and
are held for water-rights, all in the Red Springs or M
west of Globe.

The shows highly silicified Pi
point , the schist bei
compo flow. The s
about W EW. direc
dike, is mineraliz

method by which the greatest amount of ore can be
waste. The system devised for mining is known as th
level stoping method, by which about 60% of the ore
and the remainder extracted by top-slicing and sub-lev
will give minimum timbering requirements, and the co
of the ore body is well adapted to this plan of extractio
ore from the 370′ level to surface first.

At the end of 1910 the company had developed, or
ground classed as mineral-bearing, and, of this area, 15
phides too low in grade to be termed ore, and it was e
by the management, that the 43 acres of proven groun
of ore, averaging 2.58% copper. These figures are enti
cause of the unusually thorough manner in which the
and blocked out underground, and the conservatism of
is not given to making claims that cannot be substanti
of this ore is actually blocked out underground, and
percentage is based upon thousands of careful assays,
taken at 5′ intervals, throughout the workings. Th
mineral ground yet to be tested, of which a large aggreg
New underground openings, 1910, were 31,641′, and
workings at the end of the year. It is probable, and p
tain, that further development of the mine, under the
will develop more or less additional ore, possibly abov
present payable limits, probably below, and almost
extensions.

The 70x264′ power-house is of steel and reinforced
flat below the mine, and reached by side-tracks from t
Valley, Globe & Northern railway. Power generated w
air, at 90 lbs. initial pressure, and a 25-cyle alternatin
There will be three 4-cylinder triple-expansion engines,
pressure, with 100° superheat, direct-connected to thr
cycle generators. There will be two 4-cylinder triple-e
with capacity of 4,000 cubic feet of air per minute, a
Electric current will be used for the mill, shops, pump
tion, and compressed air will be used for power drills

The boiler-house will have four 600-h. p. Edge
generating steam at 200 lbs. pressure, equipped with
and Foster superheaters, burning petroleum, and a 500
is to be built for oil storage. The boiler plant is so des
obtained later, and used with economy, automatic s
The boiler-house is to have a reinforced concrete chimn
Duller Co., of Los Angeles, 200′ high, with tapering
diameter of 23′ 4″ and inside diameter of 18′ 4″ at th
diameter at the top, lined, for one-third of the height,
brick, covered with 18″ of concrete at the base, and rei
rods on the inside.

The plant at the main shaft, one-half mile from th
will consist of 2 Nordberg hoists, the larger, for raising
10′ diameter with 55″ face, capable of handling 1,000′ of
hoist has 16x16″ cylinders, with a drum of 8′ diameter
the n[illegible]h hoists w[illegible]l by compre
ore-[illegible]o 7½-[illegible]h will be d
poc[illegible]uildi[illegible]s planned
2,0[illegible]rs, [illegible]roducti
per [illegible]

[illegible]6,000 t

before construction of the mill was started. Concentr
5-year contract, to the Greene Cananea Copper Co.,
Sonora, México, where they are smelted on a novel a
described in the article on Greene Cananea.

Buildings, mainly at the Red Springs shaft, in
house, bunkhouse, and upwards of 150 frame dwellin
for employés, all lighted by electricity. There is a st
erected at a cost of $15,000, and the company has built
summit overlooking Miami Flat, that is provided wi
tables and games.

The mine is served by the Gila Valley, Globe &
standard gauge, having an excellent average grade, a
favorable freight rates are given the mine and mill.

The Miami has grown vastly in ore tonnage, prod
since work was begun in January, 1907. At that time
planned, but the vast body of ore developed induced th
its milling plans twice, each time for a larger producti
of well-planned and thoroughly symmetrical developme
in consequence the cost of putting the Miami on a p
much larger than was anticipated at the start, but this
management deserves credit rather than censure, for eve
the original estimate, that has been put into the prope
of developed values. At the start, 300,000 shares of st
value, were given for the lands, since which time stock
realizing $4,580,000, less necessary underwriting comm
which has been put into the property, and in consequenc
copper on a basis of about 20,000,000 lbs. yearly, and
of at least double this amount. Mr. Channing estimat
the mine, with adequate development and equipmen
nished since, could lay down finished copper, in New
and has not changed this figure, which is entitled to a
that similar predictions, made by the same authority
development, were fully verified in the cases of the
Consolidated mines, where Mr. Channing laid bare t
deductions therefrom, that usually are withheld by en
the courage of his convictions, and reaping the rewa
man whose forecasts come true. The Miami is a very
and is in worthy hands.

MICHIGAN-ARIZONA COPPER CO.

Office: 2 Ingersoll Block, Lansing, Mich. Letter
former mine office, Bonita, Graham Co., Ariz. Em
John Holbrook, vice-president; Dr. Ely F. Allen, secre
urer; preceding officers and M. H. Jewell, directors.
under laws of Arizona, with capitalization $2,000,000,
80 acres, in the Sulphur Springs Valley, at the foot of
ing two 8' parallel veins of ore assaying up to 29% co
and silver, opened by a 4
.

MICHIGAN & ARIZO ENT CO.

Office: 905 Metro g., Minneapol
Helvetia, Pima Co., Ari , president; R
dent; Chas. W. Sexton surer.
the Helvetia Copper Co sine
was a considerable shar Yell
claims adjoining the He

MICHIGAN-ARIZONA

Office: 17 First St.,

parallel beds of the Evergreen belt, in addition to
copper-bearing beds of the Keweenawan series. Th
most, of the Evergreen belt of parallel beds, lies cir
Minnesota shafts, and the 7′ amygdaloidal bed suppos
to some extent in Penninsula Bluff, 2,000′ south of "B
copper and stamp-rock. There are 3 old shafts on th
cutting several parallel copper-bearing strata. Th
amygdaloidal outcrops north of the Calico bed, on whi

The Calico amygdaloidal bed parallels the conta
sota mine, which has been reopened to some extent b
rock is a melaphyr trap, and the Calico bed ranges fr
a conglomerate, carrying considerable felsite, with
large patches of prehnite, epidote and calcite. The str
imately N. 68° E., with a dip of about 47° to 50° at the
Calico is 5′ to 25′ in width, with an average of about
but, on the 2,000′ level is only 4′ to 6′ wide. Most
workings occurs in a 2′ to 3′ paystreak near the foo
patches of good ground occur in the center, and o
Calico copper carries a little silver, and is mostly
copper, with occasional barrel-work and some small
occuring mainly near the intersections of numerous c
with clay gouge. The bed is strong, standing well w
ous, both as to strike and dip, with very irregular
merging into the trap footwall by almost imperceptibl
marked tendency on the part of the Calico to split,
rich in such cases, but leaving the main bed very lea
a "hanging-wall vein," and branch veins, in addition t
contact and North Minnesota fissure veins, within 1

The Branch vein lies between the Calico amygda
sota vein, closely underlying the former on the 5th l
therefrom until it reaches the contact vein, just ab
Branch vein carried considerable mass copper to the
Minnesota and Calico, these contacts apparently ma
aries. Below the junction of the Branch with the Mi
and becomes worthless. The Branch vein formerly
copper per ton, of which approximately one-third wa
thirds stamp-rock.

The Michigan is opened by 3 shafts, all on the Ca
miles of workings. "A" shaft is 2,111′ deep; "B" is b
and "C" at the 11th level. The mine grew steadily p
Calico bed showed a tendency to pinch, being only
level of "A" shaft, though well charged with copper.
vein, circa 1908, were only 263 lbs. fine copper per fa
compared with 345 lbs. in 1906, and 350 lbs. in 190
down October, 1909, co · 25 men in explo
of 1910, when the pr · over to tribu
tracts until May, 191 aming the Cal

The company be lling cam
tinued until March, 1 time 33
several cross-sections
tract in the southern
bed cut was the Ogima
of 12′ to 15 width, w
payable quantities. Th
ing calcite and quartz, w
time drilling was suspend

boiler-house, with a hoist at the top of the trestle to l
track to the bins. Water is to be taken from K
1,200′ tunnel, nearly completed, connecting with a 7
have a motor-driven pump, taking energy from the

Recent production has been as follows: 2,875,34
2,665,404 lbs. in 1907; 3,000,206 lbs. in 1908; 1,979,3
has proven a disappointment, and untoward fina
stricted the exploratory and development work that
which probably will be taken in hand vigorously,
The management is excellent.

MICHIGAN & MONTANA COPPER MINING & SMELTING CO.

Office: Kalispell, Mont. Mine office: Altyn,
Harris, manager, at last accounts. Lands, some dist
tion, carry auriferous and argentiferous copper ores,
ty is said to have a 100-ton concentrator. Idle sever

MICHIGAN & MONTANA DEVELOPMENT CO.

Office: Hancock, Mich. Letter returned unc
office, Butte, Silver Bow Co., Mont. Capt. Richard
F. Burgan, vice-president; Andrew Bram, secretary
officers, Jas. T. Healy, W. A. Burritt and Thos. O. Be
ized March, 1907, with capitalization $500,000, sh
claims, held under bond and lease, in the Park Cañon
show a 75′ lode. Idle some years and presumably mo

MICHIGAN-NEW MEXICO COPPER CO.

Office: Grand Rapids, Mich. Letter returned
mine office, Lordsburg, Grant Co., N. M. J. L. H
Luton, secretary and general manager, at last accoun
80 acres, known as the Dakota-Pearl mine, in the Burr
assaying up to 8.5% copper, 5 oz. silver and $4 gold p
and planned installing a 50-ton leaching plant and sm
Idle some years and apparently moribund.

MICHIGAN & NEW MEXICO MINING CO.

Dead. Former office was Ishpeming, Mich. W.
Lands, known as the Mildon group, were slightly pro
merly at Nogal, Lincoln Co., N. M.

MICHIGAN SMELTING CO.

Office: 82 Devonshire St., Boston, Mass. W
Houghton Co., Mich. Wm. A. Paine, president; Jol
dent; Frederic Stanwood, secretary and treasurer; F
intendent; preceding officers and Chas. A. Snow,
assistant superintendent.

Organized 1903 [illegible] laws of Michigan, with
shares $25 par. [illegible] ough ownership of
mining companies, [illegible] e group holding 1
ton companies 8,[illegible] s in shares being
4,400 shares; Tri[illegible] altic,
3,200; Atlantic, [illegible] hu
turned back into [illegible]

The property [illegible]
stamp-mill, with fr[illegible]
and is the largest [illegible]
a capacity of 90,000[illegible]

The plant is te[illegible]
clusively automatic [illegible]
[illegible] sand-graded,

MICHOACÁN RAILWAY & MINING CO., LTD.

Office: 2 Suffolk Lane, Cannon St., London, E
Angangueo, Michoacán, Mex. Works office: Ocamp
Mex. Henry W. Forster, chairman; G. A. Mitchell, se
and Col. F. G. Steuart, directors; J. M. Pircher, repres
29, 1889, under laws of Great Britain, with capitaliz
par, in £21,015 "A" cumulative 7% preference shares
lative 7% preference shares, £70,745 ordinary shar
shares; issued, £99,370. Debentures, £27,090 of 5
£103,000 of 4% mortgage bonds. Is in arrears of int
railway rights originally held have been disposed of.

Lands, 537 hectares, known as the Angangueo
tunnels, and variously reported to have 14 to 30 kilo

The smelter, known as Los Trojes, of 250 tons
rebuilt, circa 1906, and has a 44x163" water-jacket bla
Coke and charcoal are burned in equal quantities, la
company's own timber. Equipment includes two
operated under a 450' head, a small electric plant, and
plant. The property was leased, 1906, for 10 years, t
gica de Michoacán, S. A., which forfeited the lease, a
leased, 1909, for 10 years, to the American Smelting &

MICHOACÁN SAN FRANCISCO COPPER MINES SYNDICATE, LTD.

Dead. Was liquidated, voluntarily, March, 190
gueo, Zitácuaro, Michoacán, Mex.

MICULICICH y VALENTINE.

Mine office: San Tadeo, Yauli, Junín, Perú. P
trudis, owned jointly with the Morococha Mining Co.,
of Mina Gertrudis.

MIDDLEMARCH COPPER CO.

Office: 212 Henne Bldg., Los Angeles, Cal. M
Cochise Co., Ariz. H. Bert Ellis, president; F. C
Wm. King Gird, secretary; Wm. LeMoyne Wills, tre
Mrs. M. M. O'Gorman and Mrs. Richard Gird, direc
eral manager. Organized Apr. 26, 1907, under laws o
zation $1,000,000, shares $1 par, increased, March 28,
$100 par. Absorbed the Cobreloma Consolidated
Annual meeting, first Monday in April.

Lands, 68 claims, area 1,360 acres, in the Drago
practically parallel contact deposits, between limest
having a generally NW. strike, with dip of 42° to 54
development, of 30' to 80' estimated width, show oxidi
succeeded by sulphides, mainly chalcopyrite, with son

Development is by shafts of 210', 248', 100', 1
40', and by tunnels of 62 450', 390' and
of workings, estimated t to show 2
100,000 tons blocked ou e Missouri m
erties, though not exten The ores
depth, and deficient in i ot s
well.

Equipment include
Laidlaw air-compressor.
house, 32x38' boiler-hou

The reduction plant
40x100' in The conc
ore nd-tran

mainly chalcocite, with some azurite and malachite, r
tenor, having a gangue of calcspar and quartz. The
depth of 150'.

On reaching surface, ore is hand-picked, crushed
blocks, with 5% of clay for a binder, bricks being dr
furnace, and partially roasted in a kiln.

The reduction plant, of an experimental nature
Roasted ore is crushed fine and leached in lead-lined t
the electrolytic baths containing about 5% of free
product, a liquor containing about 5% copper ar
put through a filter-press, then goes to electrolytic ta
of lead plates, in cloth bags, with thin copper catho
peres, at 2.5 volts, giving a current density of 1 an
of cathode surface. Deposition of copper is said to
pere-hour, nearly equal to the theoretical deposit, and
gram of copper deposited, is 2.48-kw.-hours. Liqu
hours, when it is returned to the extraction baths,
Cathodes remain in the bath for about one month, w
to 1¼" thick. Product is said to be of greater purit
copper. The process is simple, and requires but a si
operation.

MIHARA MINE.

Owned by Utsonomiya Mining Co.

MILAN MINING & MILLING CO.

Office: P. O. Box 666, Portland, Me. Mine
N. H. F. H. Bradford, president; R. C. Bradford, t
and J. B. Carper, directors; D. B. Andrews, superinte
1907, under laws of Maine, with capitalization $100
assessable.

Lands, 400 acres, freehold, including 240 acres
of timber land and a 20-acre millsite. The property
shows pre-Cambrian slates, schist and serpentine, ca
of 3' to 10' width, in an ore channel, in mica-schis
strike, with average dip of 70°. One lens, under de
and 20' maximum width, is reported by the compa
formerly was claimed to give average assays of about
oz. silver and 40% sulphur, but is now reported, by t
ing 2% copper, 4% zinc, 25% sulphur, 1 oz. silver
carloads of ore, shipped 1908, to the American Smelti
8% copper, 38.18% sulphur, 4 oz. silver and .08 oz.

Development is by 4 short tunnels, and shafts of
at 215', reported, 1908, to have about one-half mil
show 200,000 tons of ore, and reported, 1909, to have
300,000 tons of ore, with [illegible]-ked out, with
surface for milling. W[illegible] by present co

Equipment includ[illegible] am plant, wit
drill air-compressor. [illegible] ime building
chine-shop, 50x50' smit[illegible] arpenter-
The mill is 100x15[illegible] ncrete f
10x20" Dodge crushers[illegible] V
Richards classifier, mak[illegible] n
and 42 to 45% sulphur[illegible]

The property is serv[illegible]
mine and mill. An aut[illegible]
replacing the rubber-tire[illegible]
[illegible]ipany plans n[illegible]

mines of the Giroux Consolidated Mines Co., carrying veins, and other contact deposits, in limestone, adjoini Property has 5 veins, of 2′ to 100′ width, carrying copp little nickel, cobalt and platinum. Development is b tunnel.

Equipment includes steam power, and a 20-ton s tor. Idle since 1905.

MILTON COPPER CO.

Dead. Was wound up, 1902. Formerly at Victor Described Vol. II.

MILWAUKEE-MONTANA NATURAL BRIDGE GOLD & COPPER MINING CO.

Dead. Was promoted by C. T. McElroy. Forme Mont. Described Vol. V.

MILWAUKEE & NEW MEXICO MINING CO.

Dead. Formerly at Tres Piedras, Taos Co., N. M

MILWAUKEE-PALMER MOUNTAIN GOLD & COPPER MINING CO.

Dead. Formerly at Loomis, Okanogan Co., Wash

MINARET MINING CO.

Letter returned unclaimed from former office, I office: Nacozari, Moctezuma, Sonora, Mex. W. J. R at last accounts. Lands, in the western part of the Mo La Caridad mine, carrying zinciferous copper sulphide siderable amount of ore, of about 4% average copper ment, 1908, to the Copper Queen smelter, returned c pany installed, 1909, a secret process for leaching th which was not a success. Idle since June, 1910.

COMPAÑÍA MINERA DE MINAS NUEVAS.

Mine office: Alamos, Sonora, Mex. Mine has au copper ore, and has steam power.

MINE DEVELOPMENT ASSOCIATION.

Mine office: Socorro, Socorro Co., N. M. W. I A. True, secretary; Cony T. Brown, manager, at last cludes the Stonewall Jackson mine, carrying zinc-lead o lands. Presumably idle.

MINERAL CREEK COPPER CO.

Dead. Formerly at Globe, Gila Co., Ariz. Desc

MINERAL CREEK MINES CO.

Dead. Formerly at Globe, Gila Co., Ariz. Desc

MINERAL CREEK MINING CO.

Dead. Operated circa 1881. Formerly at Red

MINERAL CREEK MINING & SMELTING CO.

Office: 515 California Bldg., Tacoma, Wash. Lewis Co., Wash. Adrian F. Kirkpatrick, president; C Thos. W. Little, manager. Organized June 14, 1901, u with capitalization $2,000,000. Ores carry gold, s Equipment includes water power and an air-compressor have a 20-ton smelter. Was developing, 1903, with a

MINERAL DEVELOPMENT CO.

Mine office: Worthington, Algo C accounts. Property is the Worthing Equipment includes steam power and

MINERAL FARM MINING CO.

Office: 1025 Paulsen Bld Shoshone Co., Idaho. I

MINERAL HILL MINING CO.

Dead. Samuel Aughey was manager. Lands we
of Porthill, carrying auriferous copper ore, developed by
short tunnel at depth of 150'. Formerly at Porthill, Bo

MINERAL HILL MINING CO.

Dead. Was merged, circa 1908, in Penn-Wash
Formerly at Conconully, Okanogan Co., Wash. Desc

MINERAL HILL MINING & SMELTING CO.

Letter returned unclaimed from former office, 237
cisco, Cal. Mine office: Spenceville, Nevada Co., Cal.
at last accounts. Lands, 5 claims, opened by a 535' tu
ore. Has water power. Idle several years and appar

MINERAL HILL TUNNEL & COPPER MINING C

Office: 1140 Old South Bldg., Boston, Mass.
Ferry Co., Wash. Albert Vittum, president; A. L. B
F. W. Bewley, superintendent. Organized 1906, as
Copper & Gold Mining Co., with capitalization $1,500,

Lands, circa 700 acres, in 8 groups, about 5 miles f
lying at an average distance of 2 miles south of the int
in the Wannicutt Lake district of Okanogan county
Washington. The Minnehaha group, 4 claims, area c
shafts, deepest 250', and a 1,400' tunnel, planned to be
workings showing a vein of low grade auriferous copper
of ore of good average assay tenor. Some ore shipp
smelter, gave net returns of $250 to $400 per car. Idle

MINERAL MINING CO.

Mine office: Huntington, Baker Co., Ore. A. J.
accounts. Has a tunnel, showing copper ore, also a sm
years and apparently moribund.

MINERAL MINING & SMELTING CO.

Letter returned unclaimed from former office, R
Palisade, Eureka Co., Nev. Lands, on Mineral Hill,
and Palisade, are said to show a 16' vein, carrying aur
copper and lead ores, giving assays up to $1,108 per t
have begun the erection of a 60-ton smelter. Idle seve
moribund.

MINERAL MOUNTAIN MINING CO.

Dead. Operated circa 1902. Formerly at Calabas

MINERAL MOUNTAIN MINING CO.

Dead. Formerly at Canyon Ferry, Broadwater
Lewis & Clark Co., Mont. Described Vol. IX.

MINERAL MOUNTAIN MINING CO.

Dead. Former office was 147 South State St.,
Benj. M. Roberts was president; Frank B. Platt, vice p
secretary and treasurer; T. W. Walsh, manager. Org
under laws of Utah, with $100,000, shar
were 7 claims, patented, e Copper Co.,
circa 1865, carrying mai dues, with so
Development was by sha danned to be
at Lucin, Box Elder Co.,

MINERAL MOUNTAI

Mine office: Steins
ores. Idle some years a

MINERAL POINT MIN

Letter returned uncl
Ariz. Max Wenzel, genera

tunnel. Is practically idle, except for annual asse
plans resumption when general copper conditions w

MINES FINANCE CO.

Dead. Formerly at Happy Camp, Siskiyou Co

MINESOTA MINING CO.

Dead. Lands are now owned by Michigan Co
at Rockland, Ontonagon Co., Mich. Very fully des
Copper Mining Co., Vol. II.

MINES VENTURE SYNDICATE. C

Dead. Formerly at Alturas, Modoc Co., Cal.

MINGINEW COPPER SYNDICATE, LTD.

Dead. Former office was 9 Ironmonger Lane, L
Clarkson was manager; preceding officer, H. J. Mon
directors. Organized Oct. 13, 1899, under laws of G
zation £5,000, shares £1 par; issued, £2,532, fully p
on copper claims near Minginew, on which very little
at Minginew, Western Australia.

MINGUS MOUNTAIN COPPER CO., LTD.

Office: 516 Grant Bldg., Los Angeles, Cal. M
pai Co., Ariz. W. W. Thomas, president; Thos.
W. W. Thomas, second vice-president; J. R. Thom
A. M. McDermott, assistant secretary; preceding o
W. B. Metcalf, directors. Organized March, 1900,
capitalization $3,000,000, shares $1 par; issued, $2,35

Lands, 38 claims, area 750 acres, fairly timbere
Hills district, 12 miles south of Jerome, the neares
fissure veins carrying oxide and sulphide ores, one vei
width of 40′ and said to be traceable 4,000′, givin
carbonate ores, assaying up to 16% copper. Develo
250′ and 370′, with several tunnels, giving a total of
pany estimates average tenor of ore at 8% copper,
values, which is considered excessive.

Equipment includes a 50-h. p. steam plant, wit
each, and several mine buildings. Out of cash and i

MINING EXPLORATION CO., LTD.

Office: 31 Budge Row, Cannon St., London
office, 1128 Agustinas, Santiago de Chile. Mine
Frederick W. Kerr, chairman; preceding officer, C. M
Elkington, J. P., directors; G. M. O'B. Horsford, s
29, 1900, under laws of Great Britain, with capitali
February, 1905, to £175,000, again increased, Octo
yet again increased, January, 1908, to £300,000, sh
£38,000 first-mortgage, at 1[illegible] £30,000 second

Lands include La Vi[illegible] Choicas and
apparently undeveloped, [illegible] of Men
Chilean border, and about [illegible] nguiririca
rail point, and, although t[illegible] Argentina,
effect, are in Chile.

Las Choicas mine, on [illegible] of the A
development has been secu[illegible]
in both silver and copper, a[illegible]
developed, and in 1909 was [illegible]
averaging 8% copper and [illegible]
averaged 9.25% copper and [illegible]
so admitted by the late Fra[illegible]
[illegible] Development is mai[illegible]

copper, 86 oz. silver and $4 gold per ton, from rich se
is by No. 1 incline shaft, of 176′ depth, and No. 2 verti
of workings. Stringers of rich ore have been encoun
from a depth of 30′ to the bottom, which shows stre
entire vein at the bottom is estimated to average abo
silver and 80 cents to $1.40 gold per ton. Company p
plant, to be operated by commercial electric current.

MINNEHAHA COPPER-GOLD MINING CO.

Dead. Was absorbed, 1906, by Mineral Hill Tu
Formerly at Danville, Ferry Co., Wash. Described

MINNESOTA-ARIZONA COPPER CO.

Office: Willmar, Minn. Mine office: Copper
Col. Frank J. Sibley, president; Martin E. Tew, vice
Hunt, secretary and treasurer; preceding officers, E. O
and J. Emil Nelson, directors; R. Roy Sibley, gener
superintendent. Organized Apr. 29, 1908, under laws
zation $3,000,000, shares $1 par, nonassessable; issued,
meeting, second Tuesday in April. Company is clo
ment and ownership, with the Copper Creek Mining
subsidiary of the Calumet & Copper Creek Mining Co.

Lands, 9 claims, area 190 acres, in the Bunker H
Copper Creek, in 2 groups, southern of 4 claims. Th
southern group, is claimed to show a very rich vein of c
a 40′ shaft. The Kimbro claim has a 100′ shaft, wit
and the Lead Carbonate claim has a 100′ tunnel, sho
phides. Company reports country rock as granodior
sions, ore being carried in the original magma, with 7 k
3, under development, are reported to show oxidized or
by bornite and chalcocite, with chalcopyrite below 20
bonate claim is said to carry a 10′ vein of auriferous
Company reports 2,000′ of workings, with 1 body of c
2′ width, and estimates ore to average 3.25% copper.
from the Copper Creek Mining Co.

MINA MINNIE.

Mine office: Higuera, La Serena, Coquimbo, Ch
Bade and J. Aldai, owners and managers. Lands, 1 pe
circa 13 miles north of Higuera, showing a vein of 10′
ing carbonate ore of about 10% average tenor. Mine
and ore is sold to Sociedad Minera San Juan.

MINNIE-BELLE MINING & DEVELOPMENT CO

Mine office: Bouse, Yuma Co., Ariz. G. W.
Swartz, superintendent. Lands are 2 groups, 20 and
The southernmost group, on the
Williams range, across the Bill W
100′ shaft, in a vein said to be 8″ w
claimed to average 8% copper and
high. Lands also include a smelt
way between the 2 groups, and a

MINNIE GULCH MINING & T

Mine office: Silverton, San
copper. Has steam power. Idle

MINNIE HEALY MINE.

Owned by Anaconda Copper

MINNIE HEALY MINING CO.

Property was sold, 190
at w Co., Mont. I

of copper. The property also carries some argentifero is by a 1,400′ upper tunnel, and a 2,800′ lower tunn workings. Ore was cut, 1910, in the lower tunnel, a was done, 1909.

Equipment includes a 100-h. p. electric plant, with The buildings were destroyed, early 1910, by a snow temporarily, and barely escaped the forest fires of 19

The management plans driving a third tunnel, o National Copper Co., installing an aërial tram and or production. Property considered promising.

MISSOURI & ARIZONA COPPER MINING CO.

Dead. Was a bad egg. Formerly at Mayer, scribed Vol. VIII.

MISSOURI CONSOLIDATED MINING CO.

Dead. Formerly at Idaho Springs, Clear Cree Vol. IX.

MISSOURI COPPER MOUNTAIN MINING CO.

Office: 323 West Seventh St., Sedalia, Mo. Crawford Co., Mo. W. D. Scoble, vice-president; Wm Organized under laws of Arizona, with capitalization $

Lands, 74 acres, freehold, and 690 acres leasehold have, under bond and lease, about 7,000 acres of mi Franklin and Washington counties, Missouri, this in The Copper Hill mine, area 32 acres, worked in a smal an ore body with a good gossan, in magnesian limest 4 shafts, and tunnels of 240′ and 1,000′, showing carb with values mainly in latter, having a hematite gangu claimed by the company to average about 10% cop assays of 5 to 7% copper, and probably averaging mat are also claimed to carry iron ore, lead, nickel, zinc and claimed to have 100,000 tons of ore blocked out, whic doubtful. The property has steam power.

The reduction plant includes a mill and smelter crusher, 18″ and 22″ rolls, 4 New Century jigs, a Card t fiers. The smelter has a 40-ton Allis-Chalmers blast- ville blower. The property has been idle some years, to be selling stock yet. Is not regarded favorably.

MISSOURI & MEXICAN MINING CO.

Dead. Formerly at Suaqui de Batuc, Ures, S Vol. VIII.

MISSOURI MINING CO.

Office: Provo, Utah. Mine office: Eureka, Roundy, president and gener ; Jos. Meilic Bird, secretary and treasurer; ficers, J. P. directors. Organized March successor with capitalization $100,000, par. La presumably held under bond vicinity property carries auriferous s lead or 1-compartment shaft, having air-compressor. Company v for sale, Oct. 29, 1910.

MITCHELL COPPER MINI

Dead. Formerly at Flor

MITCHELL DEVELOPMEN

Dead. Was liquidated, Fully described Vols. IV and V

Lands, circa 1,000 acres, also 200 acres of miscellaneou
are very ancient, having been opened in the Eighth C
for gold only, until circa 1650, when copper ores were
chalcopyrite, with occasional bornite and a little nati
pyrite and small quantities of sphalerite, galena and
native gold is found, mixed with the copper ores, and
values occurring mainly in the upper workings. The
ranging from 5″ to 30′ in width, with average width of
very persistent in strike, and hold workable to an aver
Tertiary shales and tuffs, with intrusive augite-andesi
ment is by 8 working shafts, deepest 470′, and 7 ma
the mines having upwards of 15 miles of workings.
1907, included installations aggregating 350 h. p. A
1,892 persons.

The Osaruzawa smelter has two 40-ton water-j
a 250-h. p. electric plant, turning out blister copper
1,200 years of operation, these mines have produced i
per, gold and silver. Production was 2,448,000 lbs. fi
lbs. copper, 142,492 grams silver and 6,161 grams gold
copper, 24,047 oz. silver and 299 oz. gold in 1907; 3,02
momme silver and 3,439 momme gold in 1908.

The Yoshioka mine is at Fukiya-mura, Kawad
M. Fujioka, general superintendent. The mine, open
tinuously, but never became a considerable produce
by present owners, and was very difficult of access unt
the company. Ore is chalcopyrite, associated wit
pyrrhotite, with quartz gangue, and averages, aft
occurring in veins in country rocks of clayslate, sa
traversed by porphyry dikes. Power plants, 1908,
average forces, 1907, were 1,423 persons. Productio
copper, 56,449 oz. silver and 175 oz. gold in 1907; 1,72
momme silver and 1,157 momme gold in 1908.

The Arakawa mine is at Arakawa-mura, Senhok
Ooye, general superintendent. This property, forme
mine was reopened 1871, and, after passing through v
1896, by the present owners. Country rocks, of Terti
include hornblende-andesite, liparite and propylite, c
veins in propylite, with strike approximately northe
carries no appreciable gold or silver values. Equipment
and forces averaged 753 persons, 1908. Production w
in 1900; 1,200,215 lbs. in 1906; 1,660,998 lbs. in 1907;

The Hisanichi mine is at Arakawa-mura, Senhok
Ooye, general superintendent. This
veins, the largest, known as the Uga
about 8′ of payable ore, and occasio
The 5 other workable veins range 5′
chalcopyrite, associated with pyrite,
and chrysocolla, associated with p
gangue. Equipment includes wate
gating 334 h. p. Average forces, 19
smelter. Production was 1,734,522 l
1,530,000 [illegible] 1908.

[illegible] are at Ikuno,
The[illegible]covered A. D.,
1620[illegible]on of the Tok
1868[illegible]ernment, an

and electric power, with installations aggregating ci
having an exceptionally good plant of modern
averaged 1,068 hands in 1907, and 1,238 in 1908.
fine copper, 3,098,265 grams silver and 374,899 gra
copper, 116,421 oz. silver and 13,209 oz. gold in 190
momme silver and 114,500 momme gold in 1908.

The Kanayama mine, in the vicinity of the Nish
installation, and employed an average of 195 hand
265,363 lbs. fine copper in 1903; 309,418 lbs. in 19
945,228 kin copper ore in 1907; 528,720 kwan iron
copper ore, estimated to have yielded circa 175,000

The Komaki mine is at Hanawa, Kazuno, Rik
is a very ancient mine, lying partly in the province
about 1,000,000 lbs. fine copper yearly, with consid
Latest individual production reported was 167,83
time the mine, employing 160 hands in 1907, has b
Osaruzawa, and production has been included in th

The Okuzu mine is at Okuzu-mura, Kita-Ak
property has numerous fissure veins, of about 1' aver
traversing Tertiary tuff and augite-andesite, carrying
associated with pyrite and occasional sphalerite.
discovered 1604, was worked for 2 centuries for silv
of copper as a by-product, but within the past de
increased. Forces averaged 262 hands in 1907.
fine copper in 1906; 132,412 lbs. copper, 6,404 mom
gold in 1907.

The Takara mine is at Takara-mura, Minami-t
property has only a 15-h. p. installation, and employ
in 1907, and 95 persons in 1908. The ore carries n
Production was 417,123 lbs. fine copper in 1903; 54
lbs. in 1907; 243,408 lbs. in 1908.

The Mitsu Bishi Goshi-Kwaisha is one of the fo
panics operating in Japan and, like the other three
tionally progressive and wide-awake management.
the company was 12,727,944 lbs. fine copper in 19
19,084 kgs. silver and 578 kgs. gold in 1907, and is
fine copper, 20,000 kgs. silver and 600 kgs. gold in 1

MITSUI & CO.

Mine office: Funatsu, Yos
intendent. This is an extensiv
sulphur, copper, pig-lead and re
and handled with technical ski

The Mozumi mine, near
Kwaisha, opened A. D. 1573, is
secured as a by-product. Pro
fine copper and 858,900 grams

MITTERBERG COPPER CO

Dead. Was a bad egg.
Salzburg, Austria. Very fully

MITTERBERGER KUPFER-A

Office: Schulhof 6, Vienna
, Salzburg, Austria. E
dwig Neurath, vice-pr
, Arthur von Escher,
, general manager;
, mine superintend

the positions with relatives of the directors, beco
throwing this company into bankruptcy also. Was
berger Kupfer-Aktiengesellschaft. Formerly at M
Salzburg, Austria.

COMPAÑÍA MINERA MIXTA MICHOACANA.

Mine office: Ario de Rosales, Ario, Michoacán
manager, at last accounts. Lands include a coal d
having auriferous and argentiferous copper ores. Pr
erty is the San Andrés, and other mines are El Palac
Dos Naciones, San Nicolás, Panamá and San Ma
shafts and tunnel, and the principal mine has steam
60 men, and was a small producer, at last accounts.

MIZPAH CONSOLIDATED COPPER & GOLD MINING CO.

Office: East Ely, Nev. Mine office: Mizpal
Cochran, president; Robt. T. Seagrave, vice-president
tary and general manager; H. P. Crist, treasurer; J
ent; preceding officers are the directors. Organized
South Dakota, with capitalization $1,000,000, shar
issued, $686,775. Annual meeting, third Monday in

Lands, 25 claims, unpatented, area 490 acres, 5 r
ing 7 ore bodies, occurring as fissure veins in granite,
tween granite and rhyolite, of which 2, under develop
management at 1,200′ width, carrying mainly born
mated by management to average 18.18% copper, 1
per ton, which figures are absolutely incredible, and
maximum assays, and not for an average of ore va
10 pits and shafts, of 10′ and upwards, deepest bei
shaft. There also is a 452′ tunnel, expected to cut
total of 900′ of workings, estimated by management
Property considered promising.

MIZPAH COPPER CO.

Dead. Was organized circa February, 1907,
by Ely National Copper Co. Formerly at Ely, Whi

MIZPAH COPPER KING MINING CO.

Mine office: Mizpah, Elko Co., Nev. J. H. Wi
Donaldson, vice-president; C. C. Shettles, secretary a
superintendent, at last accounts; preceding officers
Watson and A. E. Strong, dir[illegible]rganized 19
with capitalization $1,000,0[illegible] 6 claims,
the Nevada Northern railw[illegible]uartzite an
carrying a 3′ fissure vein ha[illegible] up to 32
$10 gold per ton, opened by[illegible]00′ tunn

MIZPAH COPPER MINI[illegible]

Office and operating [illegible] Was
Latah Co., Idaho. C. E. [illegible]; J.
and general manager; W. F. [illegible]y an
E. R. Northrup and H. C[illegible]rs;
Organized Sept. 4, 1906,
$1,500,000, shares $1 par, no
Lands, 18 claims, survey
th[illegible] mine, well water
H[illegible]r, in the Hoodoo
[illegible]d to Harvard,
[illegible]ers quartzite a
p[illegible], having a NE

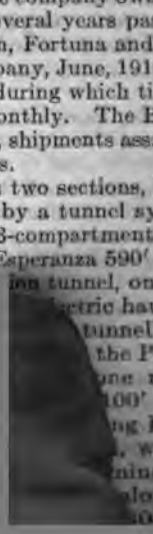
Organized circa 1896, under laws of West Vi
$3,000,000; issued, $2,600,000. Is controlled, throu
by Phelps, Dodge & Co., Inc., and holds direct title to
Copper Co., S. A., organized Feb. 4, 1896, under laws
tion 500,000 pesos. Net earnings were $456,525 i
$533,118 in 1905; $1,195,424 in 1906; $833,236 in
$1,104,454.44 in 1909. Dividends were 77%, or $2,2
dividend in 1908, and dividends were $988,000 in 190
after writing off $363,009.15 for depreciation, was $

Property is circa 2,000 acres of mineral land in t
districts of Sonora, including the Pilares de Nacoz
Nacozari, and the company also owns the Juárez an
35,000 acres, which carry considerable valuable timb

The Pilares mine lies in a hilly country, near th
Oposura rivers, carrying ore in a broad friction zone,
has been broken into sizes from gravel up to masses
porphyritic rock in this crushed zone, which is the
mainly auriferous chalcopyrite, with occasional borni
The deposit has no clearly defined footwall, and the h
about 80°. There is a small outcrop of rich carbon
mainly red-stained porphyry, carrying considerable
leached zone is about 20′ in depth only, with payable
circa 60′. The ore body apparently is about 800′ w
face, with increased area at depth. The matrix is a
lite, and ore averages about 2.7% in copper tenor, a
tion, though some high grade ore is found, and ore trea
in copper tenor. The property has been tested extens

In addition to the Pilares mine, the company own
erties, that have been operated, for several years pa
including the Churunibabi, Bella Unión, Fortuna and
Pedro mine was taken back by the company, June, 191
for 2 years to J. G. Alexander, et al., during which t
carload of high-grade silver-gold ore monthly. The
ore, including oxides and native copper, shipments ass
tenor, with small gold and silver values.

The Pilares de Nacozari mine has two sections,
Esperanza, both operated throughout by a tunnel sy
is drained also. Each section has a 3-compartment
Pilares shaft being 575′ deep, and the Esperanza 590′
depths, with the Porvenir or main
all workings are connected, and
depth, in the Esperanza shaft, a
shaft at the Pilares mine has bee
10th level, 300′. The Porveni
gauge railway track, with stor
milled down from the upper wo
being sent, in chutes, to the Po
porphyry core from the northwe
to the main shaft, cutting the c
hauled by 6-ton General Electr
dumping cars, in trains of 7, to th
e employs four syste
and-fill, and overh
ed stopes are fi
, making a cut
0′ square, and, a



Each unit of the mill is equipped with 6 coars
rolls, Swain classifiers, Callow screens, 44 Wilfley tab
Ore from the storage-bins is fed, by a portable ore
passing over an automatic weighing machine and sam
trommel, delivering oversize to bull jigs, and und
which feed oversize to coarse jigs and undersize to
oversize to intermediate jigs and undersize to 4-mm
goes to 2-mm. trommels, from which oversize goes
from the 2-mm. trommels goes to 22-mesh Callow sc
tables handling oversize and undersize. Slimes fr
vanner settling tanks, and middlings from the Wilf
elevators. Tailings from the bull jigs, coarse jigs
either of 3 sets of 42x16″ rolls, then by elevator to
of the trommels. Tailings from the fine jigs go to
overflow from dewatering machines goes to vanne
material going to the jig tailings bin, and thence t
pass a 2½-mm. screen, and thence to Callow screen
concentrate of about 12% copper tenor, and about
saved. Average assay of tailings, 1909, was 0.584

Two aërial tramways were under construction,
from the concentrator to a new storage pond, built
where tailings will be impounded for future treatme

Water is pumped from a well sunk at the side
and 3 Worthington pumps, of 500 gallons capacity p
tanks at the mill. Wash-water from the concentrate
ing to lack of water, it has been necessary to close d
during the dry season, but a large dam was under
miles east of Nacozari, to store water during the rai
in height, is planned to store water sufficient for 2 y
mill.

The old 600-ton concentrator, in 2 sections, ful
of commission, but is by no means antiquated or in
use on immediate notice, whenever required.

The smelter, described Vol. IX, was blown
which time all concentrates and rich ore have been s
smelter, at Douglas.

Equipment includes necessary shops and wareh
machine-shop, and the mine, mills and shops have a
lights. The company built and owns the entire to
Pilares mine, has built a considerable number of co
ports a school. At Nacozari the company maintain
schools, for the children of employés, a well-equippe
and an amusement hall. The company maintains
profitable mercantile business, both at Nacozari an
saloons are permitted, one for Mexicans and one f
Mexicans closing at 7 P. M., and the white man
promptly at 9 P. M., after which hours neither love
refreshments until 5 o'clock of the following mornin
and manages a good hotel, waterworks, an electric
plant.

Forces, February, 1911, were 1,300 men, at the
great majority were Mexicans, with a few Japanes
employed at the mine, aside from shift-bosses and
exclusively by Mexicans, is performed under contra
per foot, and the larger part of the tramming is don
employing about 200 miners, 80 carmen, and 75 co

MOGOLLON GOLD & COPPER CO.

Office: 516-290 Broadway, New York, N. Socorro Co., N. M. - Dr. Frederick W. Seward, p president; Frank P. Jones, secretary and treasurer; Carter and Ira L. Chase, directors. The entire ma 1910. Organized Sept. 12, 1901, under laws of Ne $1,250,000, increased, Aug. 29, 1910, to $3,000,($350,000 authorized; $105,000 issued. Paid divi 1906, which probably were not earned.

Lands, 29 claims, partly patented, area circa site, including the Cooney, Peacock, Little Charley groups, sometimes known as the Silver Bar mine, Mogollon Mountains, circa 85 miles northeast of point. The property shows porphyry and andesite to 10' average width, with a paystreak of circa maximum width, having numerous narrow feeders, s values. Ores include slightly auriferous and st pyrite, bornite, and chalcocite, claimed to carry depth, and the east vein has been said to show na The Cooney and Peacock mines are said to have p ore, in the past. The Cooney group of 9 claims main shaft. The Peacock mine, 1,500' from the C is connected with the Cooney by drifts on severa claim is said to show a 4' vein, and the Fluoride clai

Equipment includes a hoist, machine-shop and concentrator was variously rated at 40 to 100 ton incendiary, burned the mill and much of the othe agement was entirely changed, 1910, and work 1910, and was under way, with a small force, at las

MOGOLLON MINING CO.

Dead. Formerly at Cooney, Socorro Co., N

MOHAWK GOLD & COPPER CO.

Office: Albany, Wyo. Mine office: Cent G. W. Billmyer, president and manager; Frank Rh Billmyer, secretary and treasurer. Capitalization Lands, 80 acres, near the Topeka mine, in the Lake with a copper-stained gossan said to have been tra reported average width, carrying auriferous copper shaft, equipped with gasoline power.

MOHAWK MINING CO.

Office: 15 William St., New York, N. Y. weenaw Co., Mich. Mill office: Gay, Keweenaw 1,250 men. Jos. E. Gay, president; J. Wheeler Stanton, treasurer; Fred Smith, agent; preceding directors; Willard J. Smith, superintendent; Fra agent and chief clerk; John Trevarrow, mining capt neer.

Organized November, 1898, under laws of M $2,500,000, shares $25 par; paid in, $21. Dividend $2.50 in 1908; $3 in 1909; $2 in 1910, a total of $21. of 1910, and a $1 dividend was paid January, 19 Trust Co., registrar; American Trust Co., Bost meeting, last Tuesday in March.

Lands, 800 acres, in an irregular tract having Kearsarge amygdaloidal bed, in Sections 27, 28, 33 about 4 miles northeast of Calumet, with the Ahm

and 2, and a Fraser & Chalmers geared hoist, goo
2-ton skips in balance.

No. 4 shaft, 1,300′ southwest of No. 3, is 1
average ground from surface. Equipment include
3 crushers and a steam-hammer. The engine-ho
berg double-conical-drum hoist, good for 6,000′ de
plant, at No. 4, has a 60-drill Nordberg air-compr
Sergeant cross-compound 2-stage air-compressor,
and 46″ diameter, and air cylinders of 27¼″ and
of 48″, having a piston efficiency of 5,260 cubic
compressed to 70 lbs. pressure per square inch.
No. 4 has 5 locomotive firebox boilers, and a 160′ sc
smokestack.

No. 5 shaft, 1,800′ south of No. 4, is 1,100′
shafts, gave an excellent showing near surface, wi
but is again improving in the lower workings. Ec
shaft-rockhouse, and a Bullock hoist good for 2,0
shaft of the Wolverine.

No. 6 shaft, the southernmost and newest, is
and 2,600′ from the Ahmeek boundary, command
mile of the strike of the Kearsarge bed under an
approximately as much ground as the entire W
started May, 1909, located about 60′ in the foot, i
to a maximum of 4,000′. The shaft is concreted
collar, and the first level, opened at 213′, correspon
older workings of the mine, is known as the 4t
second or third levels in this shaft. The bed in No
about 17′, and, owing to the sharper pitch of the
apart. Equipment of No. 6 includes a 45x86′ steel
hoist and a 20-drill Ingersoll-Sergeant air-compres

Owing to the unusually large masses of nati
Nos. 4, 5 and 6, the management has planned the
26x44′ in size, just north of No. 4 shaft, to have
hammer, for treating masses.

Buildings include a 30x40′ office, machine-sh
penter-shop and warehouse, 2 changing-houses a
smaller structures, with numerous dwellings for
coal-trestles at No. 4, and between Nos. 2 and
phone system connects the principal underground
The company maintains a well equipped hospita
having a bank, newspaper and a number of busin
grown up around the mine.

The mine and mill are served by the Mineral
this line over which rock is transported having bee

The mill, near the mouth of the Tobacco R
Superior, opposite the mill of the Wolverine, is 17
sheathed with iron, on foundations of sandstone
own land. A steel trestle, 350′ long and 50′ high, l
being pulled up the incline by a winding engine.
compounded, giving a daily capacity of 2,800 to
Chilean mill and 3 sets of auxiliary crushing rolls,
oversize material from the mortar-boxes of the he
of rock stamped. Mineral from the wash disc
sluiced into the basement, where shoveled into 1½
mesh perforated steel bottoms that allow the drain
the cars are weighed, then lifted by a cage-elevato

Organized Apr. 29, 1865, under laws of France, v
shares f500 par. Has paid annual dividends of
and 10% in 1907. Is controlled by the Banque
in April.

Lands, a little north of Ouenza, and 25 kilon
clude the Bénisaf and several other iron mines, als
carries a large body of cupriferous and manganife
are veins of cupriferous barite. Production of iro
in 1906, and 497,063 metric tons in 1907. No cop
some years.

MOLINA & SANGINETTI MINING CO.

Office: Yuma, Ariz. Mine office: Wend
Lands, 5 claims, known as the Torres mine, about
dale, in the Harcúvar Mountains. The mine, fro
several small shipments, to the Humboldt smelte
125', and a 125' tunnel, all workings showing slig
good average assay tenor. The property has gas
ing with a force of about 15 men, at last accounts.

MOLLIE GIBSON MINING CO.

Letter returned unclaimed from former mine
N. M. Is controlled, through stock ownership,
solidated, and holds lands, 3 claims, under lea
Development is by a 135' shaft. Idle and presum

MOLLIE GROVES MINING & MILLING CO.

Office: 328 New York Life Bldg., Kansas
420 Ernest & Cranmer Bldg., Denver, Colo. Mine
Colo. L. F. Fue, president; Chas. F. Dehner, v
secretary; P. B. Austin, treasurer; O. M. Groves,
officers, John H. Escoe, R. Emmett Stewart and
V. L. Fulton, mine superintendent; E. H. Huber, en
1909, under laws of Colorado, with capitalizatio
nonassessable; issued, $1,300,000.

Lands, 11 claims, unpatented, area 114 acres
Parshall. Property shows granite and schist, carr
reported average width, of which the main vein, of
width, is reported to have a 6' central paystreak c
copper stains and copper sulphides on either side
some copper carbonates and gray copper, but mainl
averaging 12% copper and $7.50 gold per ton. D
shafts, of 10' to 55' depth, and 5 tunnels of 125',
703' of workings, on the strength of which workin
opened for a length of 4,500'. Two mill tests from
7.9% copper.

The property has no power equipment, but
company's circulars claimed 72,000,000 tons of ore
to the tunnel level, which probably was a typograp
which, dividing the company's claims by ten, for thi
be claiming a little over 10,000 tons for every runn
so ridiculous that it carries its own refutation. Th
smelter was expected to be installed, early 1909, b
future, and according to company's present plans, i
regarded favorably.

MOLLIE STARK COPPER MINING CO.

Dead. Fo[illegible] Encampment, Carbon Co

MOLOLOA M[illegible]

Letter ret[illegible]ner office,

MONARCH DEVELOPMENT CO.

Mine office: Paradise, Cochise Co., Ariz. W. K. Morrow, vice-president; F. S. Hayward, urer; preceding officers and J. C. Hancock, di under laws of Arizona, with capitalization $1, 8 claims, partly held under bond and lease. Th of 2 claims was sold, circa 1910, to Nebraska &

MONARCH GOLD & COPPER MINES, LT

Dead. Formerly at Nelson, Trail district,

MONARCH GOLD & COPPER MINING C

Dead. Was promoted by G. P. Morrill. Co., Ariz. Described Vol. VI.

MONARCH MINES & SMELTERS CORPO

Dead. Name was changed, Nov. 26, 1 Smelters Corporation. Formerly at Milford, Vol. V.

MONARCH MINING & SMELTING CO.

Office: P. O. Box 13, Macon, Ga. Mine Co., Ariz. Dr. Jas. T. Ross, president; John Dozier, secretary; preceding officers, John W. R Brown, Jos. H. Napier and M. B. Clason, dir urer; C. W. Platt, superintendent; Albert D. Al ized August, 1904, under laws of Arizona, with $1 par, nonassessable; issued, $570,000. Ann in December.

Lands, 6 claims, patented, area 100 acres, Black Buttes group, in the Black Rock or Whit east of Wickenburg, showing diorite and schist at and near surface, changing, at shallow depth bornite, assaying 2 to 20% copper, and estimate 3 oz. silver and $3 to $15 gold per ton. Dev shafts, and tunnels of 540′ and 100′, with circ workings, and several thousand feet of surface t agement to show 1,000,000 tons of ore, which f

Equipment includes a small gasoline plant pressor, with 3 buildings. A 50-ton experimen mill, burned April, 1907, has a Chilean mill and ment reports that the company has contracted at the mine, with a 100-ton MacDonald hot-bl

MONARCH-SMUGGLER MINING & REDU

Dead. Formerly at Eldora, Boulder Co.,

AGUIRRE MONCADA i HERMANOS.

Mine office: Higuera, La Serena, Coquim melita mine, at Yerbas Buenas, circa 13 league road point, with 10 pesos per ton transportati Mine, opened to depth of 115 meters in 1903, p ore, after discarding about 2,000 tons of 5% or Production, 1907, estimated at 125,000 lbs. fi

MOND NICKEL CO., LTD.

Office: 39 Victoria St., London, S. W. Mines, Algoma, Ont. Works office: Clydac Alfred Mond, M. P., chairman; Dr. Bernhard M officers, Sir Andrew Noble, Bart., K. C. B., F. K. C. M. G., Saxton W. A. Noble, Emile S. Carl Langer, directors; Robt. Mathias, secretar Oliver Hall, superintendent; A. Sharp, superint

4,500,000 lbs. nickel, 1909. The property is mana
financial success.

MONETT GOLD & COPPER MINING & MI

Office: Monett, Mo. Mine office: Ibapah
Shaffer, president; H. L. Eckert, vice-president;
Shaffer, treasurer. Organized under laws of Utah,
shares 10 cents par. Lands, 37 claims, area 740
copper and lead ores. Presumably idle.

MONEY METALS MINING CO.

Office: Prescott, Ariz. Mine office: Polan
Sweeney, vice-president; W. H. Reiterman, secr
manager; Fritz Vierthaler, superintendent. Orga
tion $1,200,000, shares $1 par.

Lands, 13 claims, including the Bordeaux m
near Poland, and timber lands giving total holding
and Black Hills districts, 6 miles from a railway.
shaft develops a 3′ vein, carrying a sulphide compl
per and zinc.

MONFARLAND COPPER EXPLORATION, LT

Office: 52 New Stock Exchange, Johannesbu
Berkenrode, Zoutpansberg, Transvaal. H. Marty
ized April, 1908, under laws of Transvaal, with c
show 2 practically parallel veins, one of circa 6′ ave
able chalcocite, and one of about 8′ width showi
manager terms carbonate of copper glance. Son
shaft was started, in the 6′ vein, July, 1908. Idle

MONIDA GOLD & COPPER MINING CO.

Dead. L. T. Nystrom was president; Hon.
Organized under laws of Idaho, with capitalizati
Lands were 6 claims, having the Carney on the so
north, in the Hunter district, southeast of Mullan.
cut tunnel, with back of 80′, on a 10′ vein, and the
lower tunnel. Formerly at Mullan, Shoshone Co

MONITOR CONSOLIDATED COPPER MINI

Office: 1325 Dean Ave., Spokane, Wash. M
Co., Mont. Otis Hill, president and manager;
H. M. Casey, H. F. Samuels and E. P. Spaulding
superintendent. Capitalization $1,000,000, share
1907, of $9,500. Supposedly is controlled, throug
issue, by Monitor Development Mining Co.

Lands, 12 claims, 10 patented, mainly in Mo
miles west of Saltese, being the first copper location
A fissure vein of 10′ to 30′ width, with NE. strike
a paystreak carrying mainly massive chalcopyri
disseminated chalcopyrite, mainly of concentrati
copper is found. Shipments, 1907, of selected ore
circa 7 oz. silver and $1.50 to $2 gold per ton, and s
up to $12 gold per ton. The bottom levels of t
show good ore. Development is by a 700′ two-com
survey has been made for a 5,000′ crosscut tun
Sound Railway track, to develop the Richmond a
a back of 2,200′ on the dip of the vein.

Equipment includes a steam plant with 50-h.
hoist and a 3-drill air-compressor. Fuel is wood.
fine copper, 1906, and a small production was mad

Emberson, secretary and treasurer; preceding o
ors. Organized Feb. 7, 1906, under laws of Arizo
shares $1 par.

Lands, 6 claims, area 120 acres, one mile w
miles north of Wellton, in the Ellsworth distri
claimed to show a vein of 8′ to 25′ width, with
ores to a depth of 100′ to 150′, succeeded by
show ore assaying 5 to 17% copper, and the prop
siderable free milling gold ore. Company's adve
misleading on many points, and the concern is
of recent operations. Idle and presumably mor

MONTANA-BINGHAM CONSOLIDATED MI

Office: 66 West Third South St., Salt Lak
unclaimed from former mine office, Bingham
W. E. Hubbard, president and general manage
Chandler, directors; M. T. Miller, superintende
as successor of Bingham-Butte Consolidated M
$1,500,000, shares $1 par; assessable.

Lands, 26 claims, 13 patented, including t
carrying the Quinn fissure, near the Starlus mine,
of these lands were under lease, from the old co
Leasing Co. Property is an old mine, having ab
to have produced about $1,500,000 worth of ore
and argentiferous lead and copper ores, develo
shaft, and several tunnels. The 450′ upper tunn
50′ vein of low grade ore, and a lower crosscut t
sect the same vein. A 400′ tunnel is said to sh
copper, 10.4 oz. silver and 80 cents gold per ton
begun early 1910, is planned to be driven 2,700′

Equipment includes a hoist and air-compr
mine buildings. Some small shipments were
at last accounts.

MONTANA-BOSTON MINING & MILLING

Office and mine: De Borgia, Missoula Co.,
intendent, at last accounts. Organized July,
with capitalization $100,000, shares 10 cents par

MONTANA CENTRAL MINING CO.

Dead. Formerly at Butte, Silver Bow Co.,

MONTANA-CLINTON COPPER CO.

Office: First National Bank Bldg., Laur
Helena, Mont. Mine office: Elliston, Powell
president; Jos. Strobel, vice-president; Chas. L.
and general manager; Jas. O'Brien, superintende
E. O'Brien and Thos. Bastian, directors. Organ
of Montana, with capitalization $1,500,000, sha
issued stock, 50,000 shares are $1.50 paid and
assessments of 40 cents having been levied, last,
capitalization, 42,000 shares were issued to the
Co., in consideration of the first payment on the
doned, and 9,829 shares were issued for promoti
of the Julia group, the present property, were giv
paid, and the company agreed to pay $20,000 ad
ments, after deducting operating expenses. Fi
registrar and transfer agent.

The company's first venture was a bond and
Clinton, Missoula County, Montana, taken from t

MONTANA COPPER & SILVER MINING CO

Letter returned unclaimed from former offic
Clancey, Jefferson Co., Mont. C. H. Lane, sup
Capitalization $2,000,000, shares $10 par. Land
miles from Clancey, opened by the 275' Clara B
shows tetrahedrite assaying 60 to 400 oz. silver per

MONTANA-CORBIN MINING CO.

Office: 42 Broadway, New York, N. Y.
Broadway, Butte, Mont. Mine office: Corbin,
H. Schultze, president; Wm. B. Arnold, vice-pres
ager; J. B. Patterson, secretary and treasurer; prec
Carl H. Richardson and Chas. W. Andrews, dire
1908, under laws of Montana, with capitalization
reorganized May 3, 1909, under laws of Maine,
shares $5 par.

Lands, 8 claims, about one mile from Corbin,
and Copper King claims, bought of the Corbin-W
6 lode claims, held under option. The 2 former cl
the Alta, and across Picnic Gulch from the Bertha
are supposed to carry the extension of the Bluebird
a 2" paystreak, near surface, reported to widen,
auriferous and argentiferous bornite and chalcopy
copper and $5 to $20 per ton in combined gold an
averaging about 4% copper, 8 oz. silver and 40 c
is a footwall paystreak. A shipment to the Pitts
14.1% copper, 19 oz. silver and 16 cents gold pe
245' shaft, having 340' of laterals, and 4 tunnels,
100' each.

Equipment includes two 60-h. p. boilers, a 15
tric air-compressor, taking current from the M
default judgment for $440.70 was taken against th
the Western Supply Co., and a petition for invol
early 1911. Idle and moribund.

MONTANA ELECTROLYTIC CO.

Works office: Wickes, Jefferson Co., Mont.
at last accounts. Idle.

MONTANA FURNACE CREEK COPPER CO.

Dead. Formerly at Greenwater, Inyo Co., C

MONTANA-HECLA MINING CO.

Office: 403 Riverside Ave., Spokane, Wash.
son Co., Mont. J. K. Riordan, president, tre
Morton F. Webster, vice-president; Richard Schae
superintendent. Organized Jan. 20, 1906, unde
capitalization $375,000, shares $2 par.

Lands, 28 claims, area 560 acres, on Old C
Norris, in the Lower Warm Springs unorganized d
small silver producer, has 5 fissure veins, in granite
ment, of about 6' average width, traceable 2 m
depth, sulphide ores with silicious gangue, giving a
lead, 50 to 75 oz. silver and $2 gold per ton, with
$4.12 gold per ton. Development is by numero
shafts of 95', 100' [illegible] and tunnel [illegible]
of workings.

Company re[illegible] area
installation. The [illegible]
Northern Pacific, [illegible]

MONTANA MINING & DEVELOPMENT CO.

Dead. Was a bad egg, having stock "gu
Formerly at Carter, Missoula Co., Mont. Fully

MONTANA-MORNING MINING CO.

Mine office: Libby, Flathead Co., Mont. L
a vein of about 8′ width, carrying a 5′ paystreak
apparently of smelting grade, with about 3′ of cop
grade. Presumably idle.

MONTANA-NEVADA COPPER CO.

Dead. Company was organized circa 1907,
shares $1 par. Lands were fairly located, though
little or no work was done thereon. Formerly at

MONTANA NICKEL & COPPER CO.

Office: Scarritt Bldg., Kansas City, Mo.
Co., Mont. Lands, in the vicinity of Nye, carry
company was said, 1910, to plan the immediate er

MONTANA ORE PURCHASING CO.

Office: 42 Broadway, New York, N. Y. M
Butte, Silver Bow Co., Mont. F. Augustus Hein
ager; John MacGinnis, vice-president; Arthur
Gifford, treasurer. Organized 1883, under laws of
$2,500,000; debentures, $1,000,000, first-mortgage
United Copper Co., which holds 76,791 shares ou
which formerly owned the entire bond issue. Th
pany was sold, 1906, to Butte Coalition Mining
pany now owns nothing but sundry share interes

MONTANA OREWAY MINING CO.

Mine office: Wisdom, Beaverhead Co., M
Tip group, in the Big Hole Basin, showing no ore
planned by a 1,500′ tunnel to give an 800′ back.

MONTANA REDUCTION CO.

Dead. Formerly at Cooke, Park Co., Mon

MONTANA SCOTCH BONNET COPPER & GOLD MINING CO.

Office: 908 Sprague Ave., Spokane, Was
Cooke, Park Co., Mont. S. A. Gibson, presiden
and general manager; J. T. Skarrett, secretary an
Mrs. Marie Gibson, Thos. Donnelly and Moritz
ized March, 1902, under laws of Washington,
shares 10 cents par, nonassessable; fully issued.
day in August.

Lands, 17 claims, partly fractional, area circa
district, 65 miles from a railway. Development i
of workings, developing auriferous and argentifer
of lead and copper, giving small copper assays, a
oz. silver and $3.10 gold per ton. The company
Management was changed, September, 1907, to th

MONTANA STANDARD MINING CO.

Office: Columbus, Ohio. Mine office: Th
M. J. Lisle, president; M. J. Maher, vice-preside
and treasurer; preceding officers, B. B. Baker,
directors; Frémont S. Re[illegible] manager; Maurice M
superintendents. Or[illegible]th capital [illegible]
$1,500,000, shares $[illegible] 9
veins, 2 of which ha[illegible]
centrating ore. De[illegible]

Production was copper precipitate yielding 1,2

The Fenice Massetana mine, also at Mas of 6′ to 65′ width, apparently lenticular, carryi pyrite, in a quartz gangue, with occasional sulph grade ore, averaging 10% in tenor, is heap-roas Leghorn, and second grade ore, averaging about leached at the mine. Equipment includes a co was 693 metric tons fine copper, in precipitate, secured by smelting first grade ore, a total of 1,73

The Val di Nievole mine carries low grade or only when copper prices are high, and this pr years.

The smelter, at Leghorn, has 4 reverbera plant. In connection with the smelter is a sulp tion of the sulphur fumes, the low grade ores about 40% sulphur contents.

Production of the company, from all mine in 1903; 5,892,895 lbs. in 1905, and circa 4,000, is well managed, with a magnificent market at i

MONTE CRISTO CONSERVATIVE MINING

Mine office: Paradise, Cochise Co., Ariz. Paradise, are slightly developed. Idle some y

MONTE CRISTO GOLD & COPPER CO.

Dead. Formerly at Milford, Beaver Co.,

MONTE CRISTO MINING CO.

Dead. Property was sold, 1904, at sheri Formerly at Metcalf, Graham Co., Ariz. Desc

MONTE CRISTO MINING & MILLING CO

Dead. Property was sold; circa December Co., for $20,000. Mine had a 90′ shaft. Form Co., Ariz.

MONTEREY GOLD MINING CO.

Dead. Formerly at Bolster, Okanogan Co

COMPAÑÍA MINERA, FUNDIDORA y AFIN DE MONTERREY, S. A.

Office and works: Monterey, Nuevo León de la Mula, Monclova, Coahuila, Mex., and Pár Rio, Durango, Mex. Arthur K. Brewster, mana ent Mineral de Mula mines; José M. Padilla, Organized under laws of México, with capitalizat pesos. Is controlled by American Smelting & R

Lands include the Ocampo and Santa Elen carrying auriferous copper and lead ores; La Cru Coronado, carrying argentiferous lead and copper at Lampazos, Nuevo León, producing iron flux Camargo, Chihuahua, Mex.

The smelter, at Monterey, is described unde Refining Co., and was the first modern smelter About 1,800 men are employed. Apparently present, last copper production reported havi Smelter production, 1908, was 17,417,148 kgs. le kgs. gold.

MONTEREY SMELTING & REFINING CO.

Works office: Monterey, Nuevo León, M Smelting & Refining Co. and is described und Minera Fundidora y Afinadora de Monterrey,

MONTREAL SMELTING & REDUCTION CO. OF CANADA, LTD.

Office: 26 St. James St., Montreal, Que. Nipissing, Ont. R. J. Forget, president; M. Turpi secretary; J. H. Brown, manager; preceding of Benjamin Burland, Hon. L. Payette and Pierre T ization $2,000,000, shares $5 par. Lands, 6 acr from North Bay, having a reduction plant know said to have cost $700,000, designed primarily to of the Cobalt district, but also planned to smelt co a concentrator with ore-bins and amalgamating departments, power-house, boiler-house, machine- tory and office, all principal buildings being of stee ized iron, on concrete foundations. The smelte but is idle, and company desires to sell the plant,

SUCESIÓN MONTT.

Office and mine: San Juan, Freirina, Atac erties are the Quebradita, 300 meters deep, open deep, opened 1864; Manto, 160 meters deep, ope meters deep, opened 1851. Properties were consi but for several years little or no production has b

MONUMENT COPPER MINING CO.

Mine office: Dillon, Beaverhead Co., Mon under laws of Montana, with capitalization $75,(Creek, are developed by a 165′ shaft, bottomed in 270′ tunnel, planned to be driven 500′, at which vein of high-grade auriferous copper ore. Presum

MOOIPLAATS (NO. 83) COPPER DEVELOPIN SYNDICATE, LTD.

Office: Newcastle, Natal. Mine office: E Chas. Earl, chairman, at last accounts. Organiz with capitalization £5,000, shares £1 par. Prop purchase for £8,000, of the Farm Mooiplaats No sumably idle.

MOON-ANCHOR COPPER MINING CO.

Office and mine: Encampment, Carbon Co., dent and general manager; W. J. Wernli, secreta 1901, under laws of Wyoming, with capitalizati Lands, 3 claims, area 60 acres, on Green Mountain said to show a 50′ fissure vein of sulphide ore, giv developed by a 200′ shaft. Has steam power. I

MOON CREEK MINING CO.

Office: Wallace, Idaho. Mine office: Osb J. Peeper, president and general manager. Lan about 2 miles up Moon Creek from Osburn, wit property has a 30″ vein, carrying ore assaying up with small gold values, developed by a 165′ shaft a includes a 4′ Pelton water wheel, working under boiler, hoist, 4-drill Ingersoll air-compressor, and There are necessary buildings.

MOON GOLD MINING CO.

Office: Valley Springs, Cal. Mine office: J. B. Lucas, vice-president and general manager, miles east of Richey, show an ore zone of circa 1,00 schist, having a vein, with a gossan of 8′ to 18′ w of auriferous copper sulphides, with country-rock

MORESBY ISLAND MINING CO.

Mine office: Jedway, Queen Charlotte I
Moresby Island of the Queen Charlotte group.

MORGAN-ARGENTINE MINING CO.

Office: 54 West Second South St., Salt Lak
unclaimed from former mine office, Peterson,
Pembroke, president and general manager; W. I
Pembroke, secretary and treasurer; Earle R. P
officers, John Croft and S. J. Pembroke, directors
of Utah, with capitalization $50,000, shares 1 cen
Tuesday in May.

Lands, 10 claims, area circa 175 acres, partl
Union Pacific line, in the Argentine district, havin
limestone, and contact deposits between limesto
of 2′ to 10′ width, with NW. strike, carries main
and gold values, opened by a 175′ shaft, with circa
supposedly is in the same limestone belt as Park Ci
Idle.

MORGAN-CRESCENT MINING CO.

Mine office: Morgan, Morgan Co., Utah.
and general manager; Wendell A. Slayton, vi
secretary and treasurer. Organized under laws
$500,000, shares $1 par, nonassessable.

Lands, 9 claims, opened by 2 shallow incline
veloping copper ores, said to include cuprite.
new air-compressor, early 1911, and continuing d

MORMON GIRL MINING CO.

Dead. Was a bad egg. Formerly at Cav
Described Vols. V and VI.

MORNING BELL COPPER MINING & SMELTING CO.

Letter returned unclaimed from former office,
Creston, Boundary district, B. C. Registered 1
lumbia, as a foreign corporation, with capitaliza
par. No trace of operations secured, and appar

MORNING GLORY MINE.

Office and mine: Patagonia, Santa Cruz
owner and manager. Lands, 10 claims, unpater
from a railway, in the Harshaw district of the Pa
5′ fissure vein in limestone and porphyry, traceabl
ous and argentiferous sulphides, estimated by o
40% zinc, 5 oz. silver and $2 gold per ton. De
with about 300′ of workings, estimated by own
blocked out for stoping, which estimate seem
Equipment includes a small hoist. Production w
3,788 oz. silver in 1907.

MORNING [illegible] MINE.

Mine[illegible] arkleeville, Alpine Co., Cal.
the Mog[illegible] orth [illegible]ville, showi
copper, [illegible]. Long

MORNIN[illegible]

Dead. [illegible] Co., A

MORRIS [illegible]

Dead. [illegible] in Cot
ing Co. For[illegible]re.

claims, area 140 acres, in the Copper Basin, 10 m
an ore body between limestone and porphyry, s
circa 12% copper and $6 gold per ton. Presums

MOTHER LODE COPPER MINES CO. OF A

Office: 902 Lowman Bldg., Seattle, Was
Creek, Copper River district, Alaska. Clarence
Menach, vice-president; Jas. J. Godfrey, secret
officers, Chas. G. Hubbard and John Miller, trust
Washington, with capitalization $5,000,000, share

Lands are 40 claims, area 800 acres, known as
which the company owns a third interest, controls
deed held by John Miller, and has an option on
Company also holds 38 claims, area 760 acres, fro
ration Co., under option at $150,000 cash and 25
groups have a total area of 1,580 acres, with 12 cl
necessary assessment work for 1911 performed on
pany formerly held the Valdez group, on Dryer Ba

The Copper River property adjoins the Bo
Mines Co., and is 13 miles from the Copper River
the Copper River group, the oldest exposed rock is
upon which is exposed a series of thick bedded sed
stone and shales, the bedded rocks dipping 30°
greenstone carries very much disseminated ores, b
portance occur in the form of chalcopyrite, bornite
between the underlying greenstone and the Chit
formably thereon, and also in the bedding plan
showing much fracturing. The outcrop show
limited quantities, but ore is mainly slightly ar
little bornite and chalcopyrite. The surface sh
Bonanza mine, but lacks the mammoth outcrop
on the Bonanza. Development is by 3 short t
Main and South tunnels.

Buildings, all of logs, include a 16x20′ office, 2
for 8 horses.

MOTHERLODE COPPER MINING CO.

Office: 623–18 Broadway, New York, N. Y.
fax Co., Va. Joseph H. Morong, president and
counts. Organized September, 1902, under laws
tion $1,500,000. Idle several years.

MOTHER LODE MINES.

Owned by British Columbia Copper Co., Ltd

MOTOYAMA MINE.

Mine office: Okayama, Kawakami, Bizen, J
53,319 lbs. fine copper, 1,499 oz. fine silver and
Presumably idle.

MOUNTAIN CHIEF MINE.

Owned by Anaconda Copper Mining Co., at B

MOUNTAIN CONSOLIDATED MINE.

Owned by Anacond Mining Co.,

MOUNTAIN COPPER D.

Office: 3 Lombard , E.
St., San Francisco, Cal.
Martinez, Contra Costa C
officer, Sir Andrew Noble
Wenham, directors; Alfred
ager; Wm. F. Kett, ass

The Martinez works also do a general custom
with steam, electric and pneumatic power.

Production of ore, January, 1911, was at
from the Iron Mountain mine, and 200 tons
time, only a decade ago, this company was am
of the world, but has since greatly declined in
29,727,040 lbs. fine copper in 1901; 19,116,16
1907; 3,638,619 lbs. in 1908; 2,775,197 lbs. in
Operations for 1909 gave a net operating pro
of $50,335 for exploratory and development wo
aged with great prudence, and marked success,
and, notwithstanding the depletion of an origi
make a successful change of base, by which lo
for the manufacture of acid.

MOUNTAIN DELL CONSOLIDATED MIN

Office: care of National Copper Bank, Sa
American Fork, Utah Co., Utah. John H.
tendent; Henry Lewis, vice-president; Benjami
bould, treasurer; preceding officers and H. W.
mine superintendent. Organized June, 1906,
ization $100,000, shares 25 cents par, assessable
of 1910; fully issued. Annual meeting, first Tues

Lands, 9 claims, patented, area 180 acres,
way, having a 4′ fissure vein, between limeston
traceable circa 3,000′, carrying argentiferous
ores, estimated by management to average 5%
and $1 gold per ton. Mine is developed by
tunnel, with 1,200′ of workings. There is a sm
buildings. The mine was a small shipper of g
reported, in the press, to have been taken und
by the United States Smelting, Mining & Ref

MOUNTAIN GEM MINING CO.

Office: Spokane, Wash. Letter returne
office, Saltese, Missoula Co., Mont. Wilbur D
ized 1907. Lands supposedly are in the vicinit
tain mines. No trace of operations secured, a

MOUNTAIN HOME COPPER CO.

Dead. Formerly at Cloncurry, Beaconsf
Described Vol. VIII.

MOUNTAIN KEY GOLD MINING CO.

Mine office: Pinos Altos, Grant Co., N
manager. Mine, having argentiferous and au
oped by a 700′ shaft, is one of the oldest in Gr
Idle.

MOUNTAIN LAKE MINING CO.

Office: Provo, Utah. Mine office: Brigh
Knight, president; Jas. H. Moyle, vice-presid
treasurer; preceding officers, J. Wm. Knight an
Wm. Witt, superintendent. Organized 1896, u
ization $50,000, shares 10 cents par, increased
par, assessable. Shares are listed on the Salt L

Lands, 5 [illegible] ted, in Wasatch, Sa
property has [illegible] ta, be
be 100′ wide [illegible] 2
assays up to [illegible]
values of 2.5% [illegible]

MOUNTAIN VIEW MINE.

Owned by Anaconda Copper Mining Co., at

MOUNTAIN VIEW MINING CO.

Dead. Property was sold, 1908, to Yankee C merly at Eureka, Juab Co., Utah.

MOUNT ANDREW MINING CO.

Office: 1105-105 Broadway, New York, N. Y. Bldg., Seattle, Wash. Letter returned from for Alaska. Samuel Lichtenstadter, general manager superintendent; Henry P. Banks, metallurgist. T 1905-1908, to the Britannia Smelting Co., Ltd., an Lichtenstadter.

Property, on Kasaan Bay, Prince of Wales Isl rite disseminated in magnetite, with hornblende g unaltered from surface, except for a few inches of of sulphide ore even showing glacial striations, the native copper are found. Ore averages circa 3.75 ton in combined gold and silver values. The ore about 2 acres, and is developed by tunnels of 300′ a from the lower tunnel, and 10 small glory-holes, from the tunnels.

A 4,600′ aërial tram of 40 tons hourly capacity bin at the mine to a shipping bunker 500′ from tid

Equipment includes two 50-h. p. boilers, with Sergeant air-compressors. Buildings include an house and smithy. About 125 men are employed

The mine has been one of the few steady co several years past, and about 55,000 tons of ore output to June 30, 1910. Production was 1,234,87 was circa 600,000 lbs. in 1910.

MOUNT AYLIFFE DEVELOPMENT SYNDICA

Office: Johannesburg, Transvaal. Mine of qualand, Cape Colony. Organized under laws of £10,000, increased, 1909, to £25,000. No trace

MOUNT BAKER GOLD, COPPER & TIN CO.

Dead. Formerly at Glacier, Whatcom Co.,

MOUNT BAKER & SHUKSAN MINING CO.

Office: 18 Post-Intelligencer Bldg., Seattle, claimed from former mine office, Maple Falls, Wh way, president; C. M. Welch, secretary; Geo. B. last accounts. Lands, 320 acres, said to carry 7,0 ber, with an available water-right. Property is sai to 100′ width, carrying ore claimed to assay $8 to is by 4 tunnels, longest 1,100′, with about 3,00 estimated to average circa 3.5% copper and $5 to includes an air-compressor. Idle.

MOUNT BALFOUR COPPER MINES, N. L.

Dead. Was merged, circa 1910, in Central M Formerly at Mount Balfour, Russell Co., Tasman

MOUNT BALFOUR COPPER PROSPECTING ASSOCIATION.

Mine office: Mount Balfour, Russell Co., capitalization £1,600, shares £40 par, increased, 1 Lands, in the vicinity of Mount Balfour, apparentl Presumably idle.

aggregate width, claimed to average 6% copper. M
shaft, having levels at 150', 250' and 350', develop
4' aggregate width. The mine is somewhat wet.
air-compressor. The property lacks adequate t

MOUNT DIAMOND COPPER CORPORATIO

Dead. Formerly at Wandie, Northern Ter
scribed Vol. VI.

MOUNT DIAMOND MINE.

Mine office: Wandie, Northern Territory,
acres, leasehold, 5 miles northeast of Wandie,
Diamond Corporation, Ltd., having a vein of ab
be traceable 900'. Mine is opened to a depth of
450', the 200' level south drift showing a 3' vein ca
with pyrite, in quartz gangue, estimated to ave
sumably idle.

MOUNT DONALDSON COPPER CO., LTD.

Dead. Was dissolved Feb. 26, 1909. Form
Tasmania. Described Vol. VI.

MOUNT EDDY MINING & DEVELOPMENT

Dead. Formerly at Sisson, Siskiyou Co., Ca

MOUNT ELLIOTT, LTD.

Office: Palmerston House, London, E. C.
Queen St., Melbourne, Australia. Mine office:
field Co., Queensland, Australia. Wm. Clark, ch
Becker, R. H. Henning and W. D. Reid, director
man; G. W. W. Mackinnon and W. S. Robinso
F. G. Hughes, secretary; Edwin Habben, Londo
general manager; H. P. Richards, mine superint
sulting engineer.

Organized 1906, under laws of Victoria, and re
laws of Great Britain, with capitalization £750,000,
fully paid. Owns 60,000 shares in the Cloncurry

Lands, 270 acres, including a 160-acre reward
south of Cloncurry, on the 2 upper branches of
the Cloncurry River. The company has a tow
mile north of the mine.

The property shows a big outcrop of good o
Devonian slates and schists, ore occurring in le
being of 50' to 60' width, and about 220' in length
diamond drill, to a vertical depth of 600'. The up
considerable chrysocolla, associated with limoni
chalcocite and chalcopyrite, associated with sa
Ore reserves were estimated by the management,
tons, averaging 25% copper, but after resampling
16.4% copper and 2 dwts. gold per ton, and, Dec.
mated ore reserves of 102,800 tons, averaging 14.3
12s. gold per long ton. As a matter of fact, first
per tenor, with an average lower than the lowest
though some ore shipped, 1907, assayed 37% copp
per ton.

The mine is developed by a 125' vertical sha
addition to which there are some opencast working
second at 185', with levels at 100' intervals there
ported to show 3 parallel lenses of sulphide ore,
grade. The mine made 1,310' of new openings, 19
of workings.

assay tenor, but ran out of funds, and suspend apparently moribund.

MOUNT GLINES GOLD & SILVER MINING

Mine office: Bryant Pond, Oxford Co., M tendent, at last accounts. Property shows aurif and lead ores. Has steam power and a small mill.

MOUNT GUNSON PROPRIETARY MINING

Office: Grenfell St., Adelaide, South Austr Lagoon, South Australia. Works office: Por Lands, 460 acres, 1 mile west of Pernatty Lagoo Gunson and circa 90 miles northwest of Port Au 1875, and worked in an exceedingly small way bef 2 practically parallel veins, with NE. strike, of 6′ t having 6″ to 3′ paystreaks carrying malachite, a average assays of about 26% copper, with interm The old mine shows carbonate impregnations, ap tions, in practically horizontal veins in quartzo planes and cracks that carry copper carbonates films. Considerable trenching and test-pitting ha half mile wide by 1½ miles long.

The smelter, built 1905, has 1 reverberatory fu mine, and the ore is highly silicious, while the ir silicious, causing much trouble in smelting. Pro

MOUNT HECTOR COPPER MINES, LTD.

Office: Brisbane, Queensland, Australia. Bowen Co., Queensland, Australia. Thos. Gib Welsby, secretary; Matthew Caldwell, mine m smelter superintendent. Company was organize shares £1 par, and reorganized, 1907, with capi par; issued, £12,500, 4s. 10d. paid.

Lands, 346 acres, including the Monument, miles north of Glassford Creek and 29 miles from field. Lands show rocks of Devonian age, car argentiferous copper ores, with fluxing material o is by opencast workings, the 270′ Monument sha hoist, and various tunnels, the Welch tunnel being Main tunnel 258′.

The smelter, connected with the mine by a gr having a crusher and one 20-ton reverberatory fu 55% copper tenor, but the reverberatory was dis jacket blast-furnace blown in, August, 1908. Pro ore, yielding 261,968 lbs. fine copper, 2,928 oz. sil average return of 4.5% copper, circa 1 oz. silver a

MOUNT HOPE COPPER MINES CO.

Mine office: Cloncurry, Beaconsfield Co., Q ized circa 1906, under laws of Queensland, with ca leasehold, include the Mount Hope, Mount Hop mines, having 2 veins, of which No. 1 vein is said in schist, carries chalcopyrite. Idle since 1908.

MOUNT HOPE COPPER PROPRIETARY.

Dead. Was succeeded, circa 1908, by Mount at Mount Hope, Blaxland Co., N. S. W., Australi

MOUNT HOPE MINES, N. L.

Office: 114 Pitt St., Sydney, N. S. W., A Hope, Blaxland Co., N. S. W., Australia. H. E Rees, legal manager. Organized circa 1908, as a

MOUNT LYELL BLOCKS MINING CO., N.

Office: 47 Queen St., Melbourne, Australia House, London, E. C., Eng. Mine office: Nor Tasmania. Colin Templeton, chairman; prece Thos. Harvey and Alex. Campbell, directors; Th Habben, London secretary; Robert Ferguson, March 20, 1908, under laws of Victoria, as a r Blocks Copper Corporation, Ltd., with capitaliz paid in, 19s. 9d. Half yearly meetings, Februar

Lands, 317 acres, including 17 acres held timber lands, 150 acres miscellaneous lands and company has the right to mine on adjoining lanc for 7 years, on a royalty of 40% of net profits.

The property has 2 ore bodies, consisting of ticles, disseminated quite evenly, but somewhat schists, locally termed clays, as the schists are These ore bodies formerly were estimated to carry 1906, gave an estimate of 2.15% copper, while, a probably is about 1½% copper. The property a assays up to 6% copper, in a 30' bed of conglomer done for some years.

Development is by the 450' Main shaft, 24 Office tunnel and the 2,255' Consols tunnel, latter on the 450' level. The mine, formerly estimate ore, had reserves, at the end of 1907, estimated ground is very soft, turning to clay when weathere ous, requiring heavy timbering and constant wat

The company formerly held options on lands Tasmania, on which some prospecting work was

Equipment includes steam power and an air- sawmill, with a framing mill for mine timbers. cord. Nearest railway is the Mount Lyell & N distant.

A 350-ton steel frame concentrator, complete stamps, 20 Wilfley and Phœnix-Weir tables, canv The mill gave very unsatisfactory results at first, fair work, the ore being concentrated easily, but lean.

Production was 70,790 long tons of ore, yield in 1906, showing an average extraction of about formerly employed about 250 men, but has secu owing to the low price of copper, and was develop the end of 1910.

MOUNT LYELL COMSTOCK COPPER CO.,

Offices: Alderman's House, Bishopsgate, Lo Hill Chambers, 31 Queen St., Melbourne, Australia Montagu Co., Tasmania. Works office: Pilling mania. Thos. J. Ive, chairman; Chas. Alfred Sa manager, Chas. E. Coote, mine manager; Alex. H ing engineers. Organized June 1, 1907, under la italization £150,000, shares 4s. par; issued, £109,0 ized as a reconstruction of the Lyell Comstock C which was a reconstru[illegible] Mount Lyell thus changing back to [illegible]le. Compan to Oonoh Mines, Ltd.

Lands, 300 acres

MOUNT LYELL CONSOLS EXTENDED M

Dead. Formerly at Gormanston, Monta

MOUNT LYELL CONSOLS MINING CORP

Dead. Was succeeded Dec. 21, 1908, b Mines, N. L. Formerly at Gormanston, described Vol. VIII.

MOUNT LYELL CONSOLS, N. L.

Dead. Was succeeded, July, 1906, by M poration, N. L. Formerly at Gormanston, Mo Vol. VI.

MOUNT LYELL CONSOLS REGISTERED,

Dead. Formerly at Gormanston, Montag

MOUNT LYELL COPPER ESTATES, LTD.

Dead. Was dissolved Feb. 25, 1910. Fo Co., Tasmania. Described Vol. VIII.

MOUNT LYELL EXTENDED CO., N. L.

Dead. Was succeeded, circa 1908, by L merly at Gormanston, Montagu Co., Tasmani

MOUNT LYELL EXTENDED MINING ASS

Dead. Was succeeded by Mount Lyell E Gormanston, Montagu Co,, Tasmania.

MOUNT LYELL MINING & RAILWAY C

Office: 39 Queen St., Melbourne, Austr House, Old Broad St., London, E. C., En Queenstown, Tasmania. Mine office: Gorm Bowes Kelly, chairman; preceding officer, W Lindsay Tulloch and E. Neale Wigg, directo John A. Cockburn, K. C. M. G., John Ball a British board; Alfred Mellor, secretary; Ed Robt. C. Sticht, general manager; Hon. B. A. G. S. Wiggins and Thos. Woodward, aud gist; R. M. Murray, mine superintendent; E. tendent; G. W. Wright, mechanical engineer chemical works; Dr. F. J. Howell, agricultura intendent Chester mine.

Organized Aug. 11, 1903, under laws of company, of the same name, with the Mount talization £1,300,000, shares £1 par; issued, former North Mount Lyell, £140,000, at 5% company without bonded debt. Profit for f was £205,000. Balance of liquid assets was £ £405,420 Sept. 30, 1910. Dividends have bee £195,000 in 1905; £345,000 in 1906; £330,0 £210,000 in 1909; £180,000 in 1910. The pre end of 1910, aggregating £1,620,000, and for £996,574, giving total dividends, to end of 1 meeting, May, annual meeting, November.

The operations of the company are very ex smelting of copper ore in Tasmania, the minin manufacture of acid and superphosphates i Australia and Western Australia, and the mi coke in New South Wales, the activities of th state, but Queensland, in the Australian con ployed in the various works of the company are

Lands are 1,785 acres, inclusive of 3 conso periods, and 565 acres of mill and smelter-site

traction being feasible. A vertical blind shaft c
levels below, and all are accessible from surfac
which also serves the quarry. Underground
were begun actively, early 1909, giving a product
tons of ore daily, from opencast and undergrou
underground workings ore is stoped in large sec
with waste rock from the capping, previously re
crane, and is electric-lighted. The removal of th
burden is nearing completion, and the finished
cubic yards of capping removed, to render availa
A little cement copper is secured from the mine
30, 1910, that the Mt. Lyell proper had ore rese
able for opencast extraction, and 2,275,220 tons
ing, this ore having an estimated average assay
and 0.028 oz. gold per ton. For the half year
Lyell mine shipped 125,927 long tons of ore, aver
ver and 0.042 oz. gold per ton.

The South Mt. Lyell ore body is a lens of th
body of the Mt. Lyell, though much smaller, a
being opened from the Mt. Lyell mine, and prac

The incline shaft at the Mt. Lyell, which rai
200-h. p. Ilgner electric hoist, taking current fr
plant by a 1½-mile special line. Hoisting is i
shaft there are 2 Australian-built Corliss cross-c
capacity to reduce 3,100 cu. ft. of free air per minu
inch, and the air supply is diverted, when require
by means of a 6,000′ pipeline.

The North Mt. Lyell mine carries ore as diss
schist, in the vicinity of a conglomerate contact,
ring as pipes, or columns, of irregular cross-sectio
contorted contact surface of the conglomerate.
bornite, but there are limited quantities of cha
ciated with small amounts of pyrite, and the
The North Lyell ore averages, as broken, about 6
long ton, with a trace of gold, the gangue averag
and 7.5 to 11% alumina. The North Mt. Lyell
ciated, but distinct, orebodies, the 2 largest bein
ment orebodies. The Main orebody outcropped
dip, with depth proven to 1,000′. The New Deve
the Main orebody on the 400′ level, descending at
disseminated bornite, of good average grade, on
deepest working of the mine. The character
down to the lowest level opened, except that p
with depth. The North Mt. Lyell is opened b
and 2 shafts, the Main, of 1,080′, and the Auxili
from the 300′ level. The lower levels are opene
in progress on all levels from the 400′ to 1,100′, i
850′ level, where the New Development and var
a striking enlargement in area. Filling for de
surface by means of a main mullock-pass, and
passes. For 6 months ending Sept. 30, 1910, th
tons of ore, with average assay of 5.63% copper,
gold per ton, and at this date reserves were esti
the same average assay value. The North Ly
well, and it is evident that the property has
considerable ore bodies, while the ore is persis

with cast-iron water-jackets of solid construct
The capacity is in excess of requirements, be
furnaces have special mechanical feeders, and
raised to 18′ from the tuyeres to the edge of th
employed. The 9 No. 8 and 3 No. 7 Connersvil
replaced by two 1,025-h. p. Parsons turbo-blow
and one 460-h. p. Parsons turbo-blower, of 18,
by steam turbines, giving a 64-oz. blast-press

The first successful pyritic smelting eve
plant, in 1896, under the direction of Mr. S
greatly improved since then. Formerly 2
giving a 15% matte, with a concentration of 6
per, the first-fusion matte being brought to 4
calcining, in a small hot-blast furnace usin
practice was improved, 1903, since when only
pyritic ore from the Mount Lyell, and the sil
Lyell, form an ideal smelting charge, which h
small amount of limestone for fluxing, and thi
per tenor, is brought to matte of 40 to 50%
Slags average about 0.33% copper, 32 to 38%
and about 4% calcium oxide.

The furnaces have a very large stationar
mented by a number of smaller rectangular fo
the slag skims into a stream of water, for gra
furnace. Granulated slags are lifted and di
three 90-h. p. centrifugal pumps. Matte tap
allowed to cool, before conversion, the convers
furnaces being subject to local difficulties that

The 75-ton converter plant has 2 remelti
shells of the Stahlmann type, each 60x96″. C
16x24x30″ Riedler steam-driven compound
compressing 3,000 cu. ft. of free air per minu
copper averaging 98.83% copper, circa 80 oz. s
the silver contents having declined about 20%
in recent years. For many years, until the e
sent to Baltimore, for electrolytic refining, but
Port Kembla works.

The smelter power plant includes 16 Babc
tube boilers, supplemented by superheaters, su
Green and 1 Lowcock fuel economizer, with in
sidiary paraphernalia. The steaming capacity
are three 600-h. p. Parsons-Brown-Boveri turb
fit for the distribution of electric current to nu
including the power required about the smelt
mines, and electric lighting. The matter of d
garet, by a hydro-electric installation, was bei
early 1911.

Fuel is mainly local firewood, costing 11s.
coal is burned, this being secured from Newca
miles distant. Annual consumption is about 6
to 10,000 tons of coal, for power purposes, and
the smelter and foundry. To conserve the py
furnace charges has been reduced, with consequ

There is a large modern machine-shop at
motor-driven machine tools, and a well fitted
brass cupolas. There also is a boiler-shop,

creased cost of production of Mount Lyell ore, of ore won underground.

Since the organization of the present comp remarkably uniform, the average of ore smelted long tons yearly, while the production of blister at an average figure of 8,550 long tons. Inclu company, from 1896 to Aug. 11, 1903, the total 30, 1910, was 4,714,669 long tons of ore, yieldin 9,252,176 oz. silver and 293,743 oz. gold. Of long tons were supplied by the Mount Lyell m Mount Lyell mine, 166,749 tons were purchased of metalliferous fluxes. Recent production has fine copper, 703,945 oz. silver and 23,087 oz. gol 700,087 oz. silver and 19,449 oz. gold in 1907; 19 silver and 19,532 oz. gold in 1908; 19,746,719 lb 13,345 oz. gold in 1909; 18,237,268 lbs. copper, gold in 1910.

The Mount Lyell enterprise has been by might be inferred from a cursory reading of the having presented a series of grave financial, mi all of which have been solved with great skill more serious handicaps is the heavy rainfall, ave disturbs all outdoor operations, and is especially worked opencast. Furthermore, two-thirds of lower in copper contents than the leanest of th of the Lake Superior district, which, for two ge lowest grade copper ore in the world, until this distinction, passed to the Mount Lyell. The ch by which the company has increased the scop extensive manufacture of sulphuric acid and with the thoroughly sound British policy of u The management is excellent, in all department the company has come, not through good fortu of an effective combination of financial ability by rugged persistence.

MOUNT LYELL NORTH CO.

Dead. Formerly at Gormanston, Montag

MOUNT LYELL PEAKS MINING CO., N.

Office: 90 Queen St., Melbourne, Austral Montagu Co., Tasmania. W. D. McWhae, m italization £40,000, shares 10s. par. Lands, years, and moribund.

MOUNT LYELL PROPRIETARY MINES, L

Dead. Was wound up, voluntarily, June ton, Montagu Co., Tasmania.

MOUNT LYELL SOUTH CO.

Dead. Formerly at Gormanston, Montag

MOUNT LYELL TASMAN COMSTOCK GO LEAD & COPPER MINING CO., LTD.

Office: Launceston, Tasmania. Mine of Tasmania. Bernard Bradley, manager, at la agent. Lands, 113 acres, leasehold. Idle some

MOUNT LYELL WEST CO.

Dead. Formerly at Gormanston, Montag

MOUNT MOLLOY, LTD.

Office: Macdonnell St., Irvinebank, Q

ized 1907, as successor of Sugar Loaf Gold Min
Mount Morgan Gold Mining Co., Ltd., have b
mond drill borings to considerable depth, proper
agement, to carry the extension of the copper
Morgan. Development is by a 651′ incline sha
quartzite, that was 450′ deep, September, 191
power and a hoist, and the company was develo
end of 1910.

MOUNT MORGAN GOLD MINING CO., LT

Office: 215 Quay St., Rockhampton, Q
offices: 118 Pitt St., Sydney, Australia, and 9 G
Eng. Mine office: Mount Morgan, Raglan
Robt. Stubbs Archer, chairman; Walter Russell
Wm. Knox D'Arcy, chairman London board;
Jas. Callan, Kelso King, Henry Perier, Dr. W
Casey and E. V. Reid, directors; Holyoake W
London secretary; Jas. S. Spark, Sydney se
Richard, general manager; C. H. Humphrey
J. White, mine manager; J. Bowie Wilson, min
superintendent Marmor mine; N. F. White, chie
smelter superintendent.

Organized Oct. 1, 1886, under laws of Q
£1,000,000, shares £1 par; fully issued, 17s. 6d. ac
paid. Profits, for fiscal year ending May 31,
for half-year ending Nov. 30, 1910, were £76,30
dividends, surplus was £88,032, 7s. 5d. Dividen
from a minimum of 8d., at the beginning, 188
1889. To end of 1910 the company had paid al
were 6s. yearly, 1892–1897; 6s. 6d. in 1898; 7s.
1901; 5s. 9d. in 1902; 3s. yearly 1903–1906; 4s. 3
1909–1910. Company is second only to the
the dividend paying mines of Australia. Accou
year, May 31st, and submitted at Rockhampton
ment, to Nov. 30th, is submitted in Decembe
stock ownership, the Electrolytic Refining & Sm

The company holds the Many Peaks mine u
owners, but which may be terminated, on 6 mon
gan, under a royalty of 6s. 2d. per long ton of o
described under title of its owner, the Many Pe

Lands, 90 acres perpetual leasehold, 80 acre
hold. The company exchanged its freehold g
leases, circa 1894, and pays a royalty of 1s. per
ently this exchange was made partially to secur
government, and partially because the governm
in the gold. The property is about 25 miles w
mine has been, since 1890, one of the greatest
though showing declining values, and decreasing
past, due mainly to the increase in depth, and p
formerly followed, of extracting the richest ore,

The Mount Morgan gold mine apparently i
moth copper deposit. The ore showing increas
company wisely begun extensive diamond drill
mense tonnage of copper ore. While the Moun
mine, and now is a copper mine also, the two n
ores coming mainly from the 750′ level, or belo
carries copper, and the copper ore carries gold, t

The district being arid, extensive dams
there being 7 dams, of which 5, in commis
of 387,000,000 gallons, No. 7 having a capa

The reduction works include mills for g
values are secured, and a smelter for copper
gold values are saved. Gold is secured in the
ores, by chlorination, and the gold mill furni
copper precipitate, of circa 60% copper tenor.

The copper smelter, built at a cost of ne
the first furnace blown in, January, 1906, wit
and a fourth furnace installed late 1910, giv
about 900 long tons. The blast-furnaces ar
smelter has extensive storage-bins for ore, fu
large stationary circular forehearths, replaci
forehearths formerly used. Matte is made
jackets, from bad water, a system of launders
tion of water has been installed. Blast for
trically driven Connersville blowers. The
single reverberatory furnace, reducing flue-d
tenor, which is sent to the blast-furnaces for

A new building has been erected for the
the blast-furnace building, this covering the fo
equipped with an electric traveling crane.
1910, presumably to 4 stands, and there is a
for linings. The converter blast is furnished b
of the converters is blister copper averaging
gold per ton, formerly shipped to the De Lan
but sent, since 1909, to the Port Kembla ref

The gold refinery, built 1907, is 78x142′
equipped with a 12x38′ 6″ furnace for burnin
is fluxed and melted in two 5x8′ reverberato
building are 4 pot-furnaces, 8′ in diameter a
refinery has an 8x12″ Dodge crusher, and 1
strong-room for refined gold bullion is built
12′ high and 19′ 6″ thick.

Forces have averaged 2,500 men for mar
in February, 1910. Ore is broken mainly on
satisfactory to both employer and employé.
the treatment of its workmen, giving libera
purposes, and, in consequence, has a force of
mum of friction.

Recent production has been as follows,
257,600 lbs. fine copper and 122,280 oz. gold
120,606 oz. gold in 1906; 9,154,880 lbs. cop
12,456,640 lbs. copper and 153,092 oz. gold i
138,342 oz. gold in 1909; 15,818,880 lbs. cop
the production of 1910 being the largest ever
For the half-year ending Nov. 30, 1910, the
of ore, yielding 3,343 long tons fine copper
January, 1911, the works treated 28,662 long
fine copper and 11,077 oz. gold, or at the
17,250,000 lbs. copper and 133,000 oz. gold.
very best gold mines of the world, and also is
and highly profitable.

MOUNT MORGAN PROSPECTING CO.,

Office: East St., Rockhampton, Que

MOUNT ROYAL MINE.

Mine office: Dandaloo, Narramine Co., 20 miles west of Dandaloo, in the Orange Plai with about 500′ of workings, showing a consi chalcocite assaying up to 40% in copper te reverberatory furnace, and November, 1907, l shipment. Idle since June, 1908.

MOUNT ROYAL MINING & REDUCTIO

Mine office: Philipsburg, Granite Co., Lands, 4 claims, a tunnelsite and water-rig from Philipsburg, opened by tunnel, with showing auriferous and argentiferous coppe

MOUNT ST. HELENS CONSOLIDATED

Office: 606 Marquam Bldg., Portland, Skamania Co., Wash. Thos. Prince, preside dent; E. L. Harmon, secretary; Dr. Henry W director; Andrew Olson, superintendent; Ge 1902, under laws of Oregon, with capitalizati

Lands, 101 claims, 65 patented, area 100,000,000′, of standing timber, on the north shores of Spirit Lake, circa 50 miles from P holdings of the Sweden Copper Co., Calumet arch Mining Co., Chicago Mining Co., Yello Co. and Cascade Copper Mining Co. The co the United mines, holdings being practically by 4 miles length. In addition to copper ore ochre bed, a granite quarry, and a deposit of

The property shows syenite, diorite a contact deposits between diorite and syenite less developed, these ranging from 5′ to 100 phide ores, including chalcocite, bornite and 25% copper, occasional lead, 2 to 50 oz. silve

Development is by a 50′ shaft, and tun with circa 5,500′ of workings, estimated by tons of medium and high grade ores, with a

The Sweden-Norway-Denmark group h tween diorite and syenite, with mineralizati sional shoots of rich ore assaying 3 to 20% gold per ton. There is said to be circa 10,0 tunnel.

The Earl group shows a strong gossan occasional bunches of high grade copper ore,

The Bronze Monarch group, adjoining th has produced circa 1,000 tons of auriferous s

The Index mine, about 2½ miles from t estimated average width, carrying ore said t and $4 gold per ton.

Equipment includes an 80-h. p. Pelton air-compressor. There is a sawmill, with a various camps.

Lands are owned outright, and the com a small amount of cash on hand, but the pro some years, though the management plans a s for 1911.

MOUNT SHASTA GOLD MINES CORPO

Dead. Was an unsavory stockjobbing

directors; Capt. John Walters, general mana
laws of Great Britain, with capitalizatio
£110,007. Accounts to July 31, 1908, show
£1,020, and mine expenses £175.

Lands, 202 acres, including 3 leases of
covering 37 acres. Property is said to sho
associated with pyrite, in quartz gangue, av
of galena. Mine has shafts of 60′ and 17
Is not regarded favorably.

MOUNT WARMINSTER LEAD & COP

Office: 166 Bolsover St., Rockhamp
office: Mount Chalmers, Rockhampton
Eustace King, chairman; Wm. Thompson,
Lands, 100 acres, 80 acres freehold, 1 mile
and 10 miles from Rockhampton. The m
tunnel, latter showing a 12′ vein carrying
2% copper tenor, from which 23 tons of 2
to the Waratah smelter. The Mt. Warmi
mond drilling, 1910. The company also
mine, on the Canoona goldfield, said to carr
ton.

MOUNT WASHINGTON COPPER CO.

Dead. Property was sold, under fore
Mount Washington, Baltimore Co., Md.

MOUNT WHIPPLE MINING CO.

Letter returned unclaimed from forme
dino Co., Cal. Capt. J. L. Curtis, manager
trict, near Empire Flats, on the Colorado
Williams Fork River, developed by a 1,500
of ore have been made, assaying up to 15%
values. Idle.

MOUNT ZIRKEL COPPER MINING C

Dead. Was a bad egg. Formerly at
Vol. VIII.

MOURAMBA COPPER MINES, LTD.

Office: Winchester House, Old Bros
office: Canbelego, Canbelego Co., N. S.
Aaron and C. J. McMahon, directors. O
Great Britain, with capitalization £20,000,

MOURGOUL RIVER COPPER CO., LT

Dead. Formerly at Dzansulski, Kut

SOCIÉTÉ ANONYME DE MOUZAÏA.

Office: 5 Rue St. Vincent-de Paul,
Camp des Chenes, par Blida, Alger, Alger
secretary; M. Duvialard, general manage
laws of France, with capitalization f350,00
in April.

Lands, 5,362 hectares, having 6 fissu
pyrite, and 10 contact veins carrying antim
2cm. to 1m. in width and averaging 4 to 5
silver per ton. Mine is opened by a 17m.
length, in chalcopyrite, and by 12 tunnel
255m., and 265m., in gray copper ore. Pr
railroad, 2 kilometers distant. Copper pro
the company has developed large bodies o
mated to contain 4,200,000 metric tons of

ance of £36,780, after writing off £20,000 f
are listed on the London, Melbourne, Sydney

Lands, 6 leases, area 293 acres, held for
annual rental of £1 per acre, circa 10 miles w
Tinaroo district.

The Girofla mine has a good surface show
continuous by diamond drill borings. Dev
stripped to depth of 50', and 3 shafts, No. 3
considerable ore assaying up to 8% in copper
mine, values in order named being in silver, c
square sets, and the mine is very wet, giving
times.

The Lady Jane mine has met with a series
shaft through drawing, this being replaced by
old Lady Jane No. 3 shaft, of 4' 6" by 15' 9"
compartments, sunk to depth of 426'. A fi
burning 1910, and the mine also suffered, 191
being only 653 long tons of ore for fiscal year

Minor properties, apparently all idle, are
cut, the Calumet, having an 80' shaft, the Ma
opencut, and the Dorothy, having a 100' sha

Buildings include a general workshop,
mine structures. There are tanks holding
mine, with waterworks for the town, giving
The property is served by the Chillagoe to Ma
Ore production is shipped to the Chillagoe sm

Production was 30,275 long tons of ore,
6,657,360 lbs. lead and 298,505 oz. silver, in 1
ing 2,925,440 lbs. copper, 3,178,560 lbs. lead

SUCESIÓN JUAN MUÑOZ.

Office and mine: Higuera, La Serena,
general manager. Property includes mines
Las Casas and El Aji, having fissure veins
tunnel, to depth of 220 meters, with hor
length. Equipment includes a Siemens &
offer good working conditions.

A smelter, near the mine, known as the
beratory furnaces, with modern equipment,
intercommunicating telephone system. Ores
treated. Production was 3,770 metric tons o
copper, yielding 775,680 kgs. of matte of 46.3
lbs. fine copper, in 1903. Presumably idle.

MUNROE-THOMPSON ORE REDUCTIO

Dead. Was a bad egg. Formerly at W
N. S. Fully described Vol. IV.

MÜNSTER'SCHE GEWERKSCHAFT.

Office: Mozartstr. 16, Düsseldorf, Ger
from former mine office, Steinbach, Elsass-
nütter, general manager; Fr. Wilh. Lührma
cludes the Nassau mine, near Steinbach, and
carrying iron and copper ores, both in a dev

MURCHISON COPPER MINING SYNDI

Mine office: Barr[illegible] Darling Co., N. S
leasehold, 3 miles nor[illegible] Gulf Creek, slightl

MUR[illegible] PER[illegible] CO.

[illegible] Lake C[illegible]

COMPAÑÍA MINERA LA NACIONAL.

Mine office: El Salado, Catorce, San L
president; José M. Parga, manager, at las
Saltillito mines, producing silver, gold, copp

NACKARA PROPRIETARY COPPER MI

Mine office: Nackara, Herbert Co.,
company had received subsidies of £100 fro
and had repaid nothing. Lands, formerly
from Nackara, have a fissure vein traversin
and sandstone, of 2′ to 4′ width, with a 6″ t
assays of 7 to 25% copper, from a trace to 3
long ton. Mine is developed by a 220′ mai
distance of circa 400′. Presumably idle.

NACO CONSOLIDATED COPPER CO.

Office: 428–228 West Fourth St., Los
claimed from former mine office, Turkey, Ya
dent; Wm. Theising, vice-president; Chas.
preceding officers, J. Ross Campbell and J.
Oct. 26, 1906, under laws of Arizona, with
par. Lands, 20 claims, area 400 acres, incl
groups, in the Black Cañon district, 3 miles
shafts, with about 700′ of workings, showi
tised, 1909, that it had one of the "biggest
and quickest money-makers ever offered to
and the company is regarded as a mere bit
ably moribund.

NACO SMELTING & REFINING CO.

Office: 522 Bradbury Bldg., Los Angel
from former works office, Naco, Cochise
scribed Vol. VIII.

NACOZARA MINING & REDUCTION C

Dead. Formerly at Moctezuma, Sono

NACOZARI CONSOLIDATED COPPER

Office: Douglas, Ariz. Mine office:
Sonora, Mex. John G. Alexander, presiden
León, vice-president; John Gaughran, secret
N. Cohen and W. J. Funkhouser, directors.
of Arizona, with capitalization $3,000,000, s
$300,000. Annual meeting, second Monday

Lands, 60 hectares, and a 6-hectare m
on either side of the Tharsis-York. The Pi
area 35 acres, lie between the Pilares and S
Copper Co., three-fourths of a mile from the
trict. The Galera, El Rey or Lower group i
shows 9 ore bodies, reported by the company
brecciated rhyolite on the Galera group.
brecciated rhyolite, similar to that at the Pil
Co., carrying chalcocite, changing at dept
pyrite.

to development being exclusively by tunne
are two 3-drill Ingersoll-Rand air-compres
h. p. hydro-electric installation on the Rio M
fuel on the Naltagua ranch.

The old Cloruradora de Cobre leaching
process, was not successful, under the ma
is idle.

Transportation includes an aërial tram
Bleichert aërial tram, from El Monte to Sa
is located, is 5,600 meters in length, with
height, on concrete foundations, having gre
rope of 35-mm. and movable rope of 15-m
San Antonio, connecting with the lower sta
long, at an incline of 30°, having a double
way connects the incline tram with the pr
length of 14 kilometers, with maximum gr
Equipment includes 3 Arturo Koppel elec
ore-cars, a train consisting of 12 cars.

The 300-ton smelter, 2½ miles from
Maipó, adjacent to the Rio Mapocho, takin
eters from the coast, and 225 kilometers f
of 6 pesos per ton to the latter point.
Chalmers, is modern throughout. Work
furnace was blown in Apr. 4, 1909. Equip
Chalmers water-jacket blast-furnaces. Sla
granulated, and sluiced to the dump by wa
Fuel consumption, 1909, included 1,400 me
costing 75 pesos per ton.

The 15-ton converter department has
Queen barrel type, and has an electric trave
lator for rotating the shells. The lining d
cylindrical pug-mill. Total smelting and
pesos per metric ton of ore.

The power plant at the smelter includes
compound engine, two Connersville blowe
Fraser & Chalmers compound air-compress
at 1.2 kgs. per cc. The boiler plant has five
and a 30-meter steel smokestack.

Forces are about 70 men at the mines
4.5 pesos at the mines, and 4 pesos at the s

Production was 337,694 lbs. fine copp
metric tons of 3.6% copper ore, yielding 4
and 220 metric tons of 52% matte, with sla
tion is estimated at 1,135,000 lbs. fine coppe
985,125 lbs.

NAMAQUA COPPER CO., LTD.

Office: 3 Fenchurch St., London, E.
Little Namaqualand, Cape Colony. Th
Mirrielees, managing director; preceding of
ick J. King, Wm. Rich and C. L. H. Loeffler,
S. F. Phillips, superintendent; J. Garland,

Organized Apr. 23, 1888, under laws
Namaqua United Copper Co., Ltd., with ca
issued, £188,662. The company has a su
invested in British consols, and has returned
zation. Largest dividends were 40% in 18

NANCOT COPPER CO.

Dead. Formerly at Belen, Valencia Co

NANTLLE VALE COPPER MINING CO.,

Dead. Lands sold, 1907, to Talysarn C
Llanllyfin, Carnarvon, Wales. Described Vol

NAPA COUNTY COPPER MINING CO.

Dead. Formerly at Middletown, Lak

NAPOLEON & MAGHERA COPPER MININ

Office: Lock Box 537, Cedar Rapids, Ia.
Mine office: Utah Hot Springs, Box Elder Co
and general manager; John H. Kincaid, vice-p
tary; Lee Kincaid, treasurer; John E. Dalbey,
Wm. Zaff and Thos. Holmes, directors. Org
of Utah, with capitalization $1,000,000, share
Tuesday in June.

Lands, 12 claims, area 240 acres, and a 10
district, showing gneiss carrying 4 fissure vein
are practically parallel, estimated by company
5,000′. Veins show malachite, bornite and c
cocite and copper silicates, estimated to avera
gold per ton. Development is by a 120′ sha
300′ and 50′, with about one mile of workings
of ore, with 75,000 tons blocked out for stopin

A 2,632′ Broderick & Bascom aërial tram,
hourly capacity, has ore-bins at both terminals

The mine has a 20-h. p. steam plant, and b
shop and 30x36′ carpenter-shop, both of wo
Management plans a concentrator at the bas
electric installation, to take water under a 75

NAPOLEON MINE.

Letter returned unclaimed from former m
Co., Cal. Josephine H. Sullivan, owner; Lew
last accounts. This is the oldest copper mine
able producer, in early days, circa 1865. The
ranging from diabase to talcose schist, havin
in width, carrying mainly copper sulphides, w
carbonates. Development is by a 430′ new
to the eastward. A little cement copper was p
the century, by leaching the old dumps, and a
ton Chemical works. Idle.

NAPOLEON MINE.

Owned by British Columbia Copper Co., L

NARLARLA SILVER-LEAD MINING CO.,

Mine office: Mount Marmion, Wester
manager, at last accounts. Lands, 240 acres
and 90 miles from Derby, on the Barker Rive
ledge of 30′ to 50′, giving assays of 2.4 to 16.4
to 70 oz. silver, estimated by company to ave
oz. silver, which is an overestimate. Comp
dooma, 30 miles from Narlarla, said to show a
outcrops of or [illegible] be h[illegible] to 30′

NASSAU C[illegible]

Letter r[illegible]
Cal. Mine o[illegible]
last accounts. [illegible]
vein of 15′ to [illegible]

15% and 20% copper. Equipment include compressor. Presumably idle.

NATIONAL COPPER & GOLD MINING

Letter returned unclaimed from forr office: Wellton, Yuma Co., Ariz. Gates M. ized 1904, under laws of Arizona. Lands w under a $60,000 bond and lease from W. E forfeited. Idle and presumably moribund.

NATIONAL COPPER MINES CO.

Dead. Formerly at Cuprum, Washingto

NATIONAL COPPER MINING CO.

Letter returned unclaimed from former Wash. Mine office: Mullan, Shoshone Co Andrew McCrea, secretary; Chas. McKinnis ing Moore, consulting engineer. Organized ington, with capitalization $1,250,000, share

Lands, 6 claims, between the east and w 4 miles northeast of Mullan, near the Imperi west of the Lucky Calumet. Suit was brou Featherstone over titles.

Development is by a 2-compartment ma width, with a 30" paystreak said to give ave lead and 10 oz. silver per ton, ores includi copyrite, with lead values mainly in carbonat being argentiferous. The shaft is flooded. A the Æolian property, is planned to be driven 4,

Equipment includes a 15-drill electric being taken from the Washington Water Pov

NATIONAL COPPER MINING CO.

Dead. Formerly at Castleton, Grand

NATIONAL COPPER MINING CO.

Office and mine: Douglas, Converse C dent; G. W. Johnson, secretary; H. C. Paul, Organized July, 1906, with capitalization $2

NATIONAL COPPER ORE CO.

Dead. Former office was 11 Broadway, company disappeared mysteriously. Officer Robt. Hueber, vice-president; A. M. Lowry, Lands carried cupriferous pyrite, and appar secured. Formerly at Garrisonville, Stafford

NATIONAL COPPER TEMPERING CO.

Office: 808 Continental Bldg., Denver, Henry Stewart, vice-president; Theo. H. Tho ganized under laws of Colorado, with capi This concern claims to have a process for t tensile strength by more than 500%, which i claimed to have been tempered by this proce in the metal, and Mr. Lamon excuses himself that successful tests can be made only on a Notwithstanding a nonsensical article, laudat ing in a journal of such excellent standing as t fake, the promised dividends are impossible o swindle.

NATIONAL DEVELOPMENT & MINING

Dead. Was succeeded [illegible] Co. Formerly at Kelvin, [illegible]

including the right to bring water, through a
Matehuala, and the old management planned
Production was 2,295,270 lbs. fine copper, in
in 1906. The company was promoted as a wil
new management, and finally has fallen into r

NATIONAL MINE & SMELTER CO.

Office; 1514 Park Bldg., Pittsburg, Pa.
Oro, El Oro, Durango, Mex. S. H. McKee,
president; C. H. Tebbetts, secretary; Robt.
circa January, 1911, with capitalization $2,50
have authorized a $400,000 issue of collate
beginning life with $125,000 cash, having been
tre Mining & Smelting Co., the sole property
the Lustre Mining Co., although the Lustre M
tically a reorganization of the Lustre Mining C
encing much tribulation.

Lands, reported as 521 hectares, formerl
lands, 372 hectares of mill and smelter sites, a
ous lands, including 6,000 acres of leasehold tim

The mine, known as the Magistral, deve
has a large body of auriferous, argentiferous
with quartz and limestone gangue, carrying 0
aging under 1% copper, circa 1 oz. silver and 15

The machinery equipment is very complet
having two 360-h. p. Koerting and two 350-h.
h. p. and three 400-h. p. gas producers, a 2,30
drill Ingersoll-Rand air-compressors, and 10 h
are 25 four-ton wagons for hauling coke and m

The company owns 110 buildings, includi
adobe carpenter-shop, with a large number of

The 70x100′ stampmill, of wood, covered
Colorado Iron Works 750-lb. stamps, Huntingt
vanners, has been idle for some time.

The 60x100′ concentrator, of wood, sheat
Huntington mills, a chlorination plant and a
idle for some time.

The smelter, remodeled 1910, has 6 blast
MacDonald hot-blast furnaces and three 200-t
being heated by waste-gases in a specially
heater. Fuel is West Virginia coke. The sm
was claimed to be putting 15 tons of ore into 1 t
ientes smelter for conversion.

This company and its predecessors, flour
tury through a bog of difficulties, caused by re
management and numerous experiments, a
Experiments with chlorination and cyanide pl
pyritic smelting also was a failure. The prop
was sold December, 1909, to S. H. McKee, repr
ently the shareholders also. It was said that

NATIONAL MINING CO. **BRITISH**

Dead. Was a bad egg. Formerly at W
scribed Vol

NATION

Office
Co., Mich.
preceding

NATIONAL MINING & SMELTING CO.
Dead. Title was changed, 1906, to N
Co. Formerly at Saltese, Missoula Co., M
NATIONAL MINING & SMELTING CO.
Office: 200 Fifth Ave., New York, N.
ing, Luna Co., N. M. Robt. E. Powell, p
intendent. Company succeeded the Luna
mine, carrying silver-lead ores, with small g
having a 50-ton lead stack, that was close
intention of adding a 100-ton copper stack.
NATIONAL NATIVIDAD COPPER CO.
Office: 251 Main St., Dallas, Tex. M
Isaac B. Walker, president; D. Head, vice-p
D. Upthegrove, treasurer; F. Wiebens, m
directors; H. J. Hazzard, superintendent. L
Natividad, Dallas, Banco, Santiago and Du
argentiferous copper and lead ores. Princip
mine, which has a 120′ two-compartment shaf
copper values, with a hanging-wall paystrea
pany to average $50 to $100 in combined valu
to have 4 parallel veins, carrying outcrops c
per ton, planned to be opened by a 400′ tunn
said to show gold and silver values. The D
and the Durant mine apparently is undevel
power.
NATIONAL RADIUM & COPPER CO.
Dead. Formerly at Denver, Denver C
NATIONAL SMELTING CO.
Office: 2030 Land Title Bldg., Phila
chihuites, Sombrerete, Zacatecas, Mex. L.
G. Park, vice-president; Paul W. Meyers, s
preceding officers, Wm. C. Haddock and Jo
ized March 27, 1906, under laws of Maine, wi
$5 par; issued, $389,375, in 1908. A forme
converted into stock, at par. Dividends
holds property through the Compañía Ben
organized under laws of México. Annual me
Lands, 178 hectares, also 38 acres of mill
rights. Mineral lands, in 8 groups, showing l
of eruptive rocks, carry fissure veins in the
limestone, with values mainly in silver-lead.
lead mine, La Anaconda mine of iron fluxing
Manto and El Tigre silver-gold mines, La Es
mines, La Santa Rita de Los Bobos mine, a
mine, which has argentiferous lead and copp
openings, but were not developed systemat
Seventeenth Century, and, previous to present
way, by local owners, from circa 1850, exclu
cates, and ore was reduced in adobe smelters.
Th[illegible] shows a 36′ vein, n
averag[illegible] The Núngano
develo[illegible] 160′ in dep
tenor, o[illegible] and 160′,
being s[illegible] of
mines ca[illegible]
45% lead,

Quintana, superintendent. Organized 1895, u
jointly, through stock ownership, by the Bac
de Pasco Mining Co.

Lands, 4 pertenencias, having a vein wit
meter tunnel. The upper workings are pr
showing a very evenly mineralized vein, carry
associated with pyrite. For the first 9 years
aged 21.65% copper and 530 grams silver per
2,988,300 kgs. fine copper and 7,304 kgs. fin
250 men, at average wages of 1.2 pesos daily.

Production was circa 2,400 metric tons o
fine copper in 1904; 1,265 metric tons of or
grams silver per ton, yielding 446,710 lbs. co
241,271 lbs. copper and 519 kgs. silver in 1906
silver in 1907.

NATIVIDAD COPPER CO.

Dead. Lands passed to National Nati
Ocotlán, Oaxaca, Mex. Described Vol. VII

NAUMKEAG MINING CO.

Dead. Was organized 1859, under laws
1899, when property was sold to Thos. L. Ch
$20,000 to Dec. 31, 1871. Lands were 400 a
the SE. ¼ of Sec. 3, T. 54 N., R. 34 W. The
1870, and a little diamond drilling was done,

NAVERSBERG FALUN COPPER MINES

Office: 19 Coleman St., London, E. C.
larne, Kopparbergslän, Sweden. Col. F. Sor
B. Lucas, secretary. Organized July 5, 1907,
capitalization £100,000, shares £1 par, in 20,
shares, increased, August, 1909, to £250,000,
under old ownership, was 361,800 kgs. of low
idle.

NEBRASKA & ARIZONA COPPER CO.

Dead. Former office was Vinton, Ia. O
dent; Mrs. Frank S. Hayward, secretary; W.
organized circa January, 1910, and was merged
& Paradise Mining Co., in the California & I
Lands were 13 claims, known as the Morrow
by a shaft on the Malachite claim. Formerly

NEDRE MIDDAVARRE KOBBERGRUBER

Office: Bodö, Norway. Mine office:
Norway. Property was working, on a small

NEEDLES EYE COPPER CO.

Dead. Former office was Los Angeles,
Gordon, Alfred W. Allen, W. A. Smith and
Was organized circa October, 1909, as success
Co [illegible] prom[illegible] mainly to sell stoc
L[illegible] clai[illegible] from Needles, I
lit[illegible] Needles, San I

NE[illegible]NING CO.

[illegible] succeed
Form[illegible] Co., C

NEE[illegible] CO.

Of[illegible]
Mohave [illegible]
Sharp, pr[illegible]

Lands, formerly held by Arenillas Coppe
May, 1904, include the Chaparrita group, i
Ratera or María Concepción group, 3 kilo
and 8 miles from a railway station. The com
erous pyrite, averaging 3.5% copper, and the
ore body, carrying cupriferous pyrite, with q
in sight. Mining equipment includes a 250-
reports that the mine is served by its own

The works, 2 miles from the mine, cove
and 48′ in height, are in 3 sections, one for
for the smelter. The smelter has two 36x84′
settler, making matte of about 45% copper
electric traveling crane, and hydraulic accu
blister copper of 98% copper tenor. The sm
ment at 200 tons. The smelter power pla
& Wilcox boilers.

The prospectus issued by this company,
in pushing its shares, was most misleading.
question secured, scarcely by accident, a pho
of the Compañía del Castillo de las Guardas,
a reproduction of this photograph in the p
Guardas mines are 150 kilometers from La R
of prospectii also secured a photograph sho
Sotiel Coronada mine, a long distance from
in the prospectus. The company claimed, 1
daily, which statement may or may not hav
sive capitalization, and the falsehoods told in
company is viewed with suspicion, notwithst
a senator of the Spanish córtes, and its vice-
grandezza.

NESPELEM CENTRAL MINING CO.

Mine office: Nespelem, Okanogan Co.,
Nespelem, in the Moses district, adjoin ho
Milling Co. and Apache Mining Co. Presu

NEST EGG GOLD & COPPER MINING

Office: 402 Majestic Bldg., Denver, C
from former mine office, Ely, White Pine Co
E. B. Henderson, vice-president; Albert L. I
ceding officers, Dr. C. S. Roberts and Geo.
Feb. 9, 1907, under laws of Arizona, with capi

Lands are said to be 440 acres, includir
and the company is said also to have claim
group of 6 claims, 1 fractional, south of the
pany apparently was promoted to sell share
ably moribund.

GRUBE NEU-GLÜCK.

Mine office: Volperhausen, Rheinpr
Jüngst, general manager. Property carries
production of circa 3,000 metric tons, mainl
age force of 15 men. Mine is opened by t
second tunnel, of 700 meters length, 45 meter
direct rail connection.

C. NEUMANN & CO.

Dead. This firm had some slightly d
vicinity of the mines of the Cape Copper C
done, circa 1903. Formerly at O'okiep, Litt

Brigham, secretary and treasurer; preceding officers, Arnold Schaer, J. Kazar, Geo. W. Dryden, William E. Blanchard, Chas. E. Hayes, Everett wood, Thaddeus B. Beecher and Francis E. Higgins, directors; Philip J. superintendent. Organized May 4, 1907, under laws of Arizona, with cap tion $2,000,000, shares $5 par.

Lands are 17 claims, patented, area 340 acres, 5 claims having been de 6 miles northeast of Buckskin, circa 10 miles northwest of Yerington, miles from Wabuska, showing diorite, porphyry and silicious limestone, c 3 contact deposits, with gossans estimated at 12′, 30′ and 40′ average traceable 500′ to 1,200′, carrying cuprite, malachite, azurite, chalcocite chalcopyrite, giving assays of from a trace to 18% copper, and up to $1 though with low average gold values. Development is by a number of pits, with 2 main shafts, 1,200′ apart, one 500′ deep, planned to be connec the 500′ level, with about 225′ of laterals, on the 500′ level, showing bunches and stringers of ore, in a leached zone, with fair indications of able values at greater depth. Equipment includes two 25-h. p. Witte ga hoists, and there is a 20-room boarding-house, with 4 other buildings.

NEVADA CARBONATE COPPER MINING CO. NEVA

Dead. Formerly at Siegel, White Pine Co., Nev. Described Vol.

NEVADA CENTRAL COPPER CO. NEVA

Office: 1012–122 Michigan Blvd., Chicago, Ills. Mine office: Pal Eureka Co., Nev. Col. Chas. Lay, president; Geo. Leighton, vice-president superintendent; Robt. L. Benson, secretary and treasurer; preceding o Jos. D. Wright, E. L. Wilson, S. E. Oberlin and Wm. R. Andrews, dire Organized under laws of District of Columbia, with capitalization $1,000 shares $10 par, in $250,000 noncumulative 7% preferred stock and $750 common stock.

Lands, 32 claims, area 600 acres, in the Antelope district, on the western of the Sulphur Mountains. Litigation over titles was settled, in the fe court of appeals, San Francisco, the Nevada Central securing clear title to former property of the Whalen Consolidated Copper Co. Wm. Whalen, presi of the Whalen Consolidated, was sentenced to 10 years imprisonment, at Quentin, California, for swindling women of Sacramento and Minneapolis ou $8,000, on alleged gold mines at Alpha, this being Whalen's second sentence, he served 5 years in a Missouri penitentiary. Development is by a 400′ inc shaft, cutting an 8′ vein on the 100′ level, showing copper of good average tenor. Two carloads of ore gave returns of 11% copper. Company rep having spent about $6,000 on development work, 1910.

NEVADA CENTRAL GOLD & COPPER CO. NEVA

Mine office: Pioche, Lincoln Co., Nev. R. D. Montgomery, secretary treasurer; L. F. Peer, manager, at last accounts. Lands adjoin the Nevada Si Silver Mining Co., in the Bristol district. Presumably idle.

NEVADA CHAMPION COPPER CO. NEVA

Letter returned unclaimed from former office, Goldfield, Nev. Mine off Mina, Esmeralda Co., Nev. Wilson H. Scott, president; W. F. Miller, v president; C. M. Miller, secretary and treasurer; preceding officers, H. H. D sey and E. J. Amann, directors; Geo. Oswell, superintendent, at last acco Organized circa February, 1907, under laws of Arizona, with capitali $7,500,000, shares $5 par.

Lands, 7 claims, in process of patenting, area 130 acres, 3 miles from Lu and 9 miles northwest of Mina, having a contact deposit between limeston quartzite, of 6′ to 25′ reported width. The mine was opened circa 1865, wh 400′ three-compartment shaft was sunk, and about a mile of openings m there being about 15 other shallow shafts, pits and tunnels. Property show phides at d as ore assaying 3.7 to 11.2% copper and 6 oz. silve to have produced a little copper, circa 1

October, 1909, and dividends, 1910, were $1.50 per share. Old Colony Tru
Boston, and Guaranty Trust Co., New York, registrars; Boston Safe Dep
Trust Co., Boston, transfer agent. Shares are listed on the New Yo
Boston stock exchanges. Annual meeting, formerly first Tuesday in Nov
has been changed to third Friday in April.

Company absorbed the Cumberland-Ely Copper Co., paying $7.5
cash therefor, and took possession Aug. 30, 1910. Shareholders of the C
berland-Ely were given the opportunity of exchanging stock on the basis
shares for 1 share of Nevada Consolidated. The Nevada Consolidated is
trolled, through stock ownership, amounting to 950,476 shares, March
by the Utah Copper Co., which in turn is controlled by the American Sm
Securities Co., which is dominated by the Guggenheim interests. The
pany controls, through stock ownership, the Nevada Northern Railway
having a line of circa 90 miles length, running from Ely to Cobre Station, o
Southern Pacific railway, and controls, through stock ownership, the Su
Valley Smelting & Mining Co. The company had 6,586 shareholders, Febr
1910, and ended the year with upwards of 7,200 shareholders.

Lands, 111 claims, partly patented, area 1,379 acres, including the fo
holdings of the Cumberland-Ely, 48 claims, of 523 acres area. Property in
the Copper Flat or Eureka group of 355 acres; the Ruth group of 455 acres
Lane group of 46 acres; the Veteran group of 14 claims; the Jupiter gro
22 claims, and a group of 12 claims near the Giroux Consolidated. Mineral ri
include properties formerly held by the White Pine Copper Co., Cumberl
Ely Copper Co., and sundry other corporations and individuals. The comp
also owns the Georgetown ranch, area circa 320 acres, including valuable wa
rights on Murray Creek, which carries a flow of circa 4,000,000 gallons dai

The property shows general characteristics markedly similar to tho
Bingham, and to some of the Arizona camps, notably at Clifton and Mor
Extensive beds of limestone are intruded by porphyry, and there is an extra
rhyolitic flow, with a great mass of monzonite porphyry intruding, tilting t
lime and forcing its way into it, in dikes and sills, and heaving it up in a gr
irregular laccolith. The monzonite-porphyry, which is the principal ore-bear
rock, is stained on surface, carrying small quantities of copper carbonates a
oxides, not exceeding 0.5% in copper tenor, and 25 cents gold per ton, but
is worthless, but below a thoroughly leached zone, varying from 20′ to 16
thickness, with an average of 72′, commercial ores are carried, these including
little chalcopyrite, associated with pyrite, and occasional native copper, b
mainly disseminated chalcocite, occurring in fine seams on partially brecciat
material, and as crusts, also as speiss, disseminated through the rock-mas
The zone of payable ore extends 200′ to 300′ below surface, and at depth th
chalcocite impregnations become too lean for commercial use, the bottom lim
of payable ore depending somewhat upon commercial factors, mainly the mark
price of the metal, as there is a gradual shading out of ore values with dep
The monzonite ore body, below the capping of waste material, in the Copp
Flat mine, carries about 3.5% iron, 0.5% lime and 80% silica. The altered lime
stone also carries occasional impregnations of chalcocite, of commercial val
One portion of the property shows an extreme width of about 2,000′ of ore
The mine water is strongly impregnated with copper sulphate, causing trouble
with pumps and pump columns.

Extensive churn drill borings on the Copper Flat, Liberty, Veteran, Ruth
and other properties, have proven an enormous tonnage of ore, estimated, No
vember, 1907, at 14,432,962 tons of ore averaging 2% copper, with combined go
and silver values of about 15 cents per ton; estimated, Dec. 31, 1908, at over
20,000,000 tons; estimated, Dec. 31, 1909, at 30,073,000 tons, averaging 1.9%
copper, and estimated, Sept. 30, 1910, at 40,360,823 tons of ore, averaging 1.7
copper, of which the major portion is in the Copper Flat and Liberty groups.

a 5x6′ ladderway, for pipes also, and 7x9′ timberway, handling loaded ca cages. The shaft has a 140′ steel headgear on concrete foundations. The hoist is geared to a 300-h. p. General Electric induction motor, and has with 72″ face, running independently or in balance, raising 5-ton square working in guides, and there is a 75-h. p. 11x16″ duplex hoist for the timber This shaft has a small crushing plant.

The Veteran or Veteran-Ely mine, taken over from the Cumberland was tested extensively by churn drilling, and has an ore body of about 500 in section, apparently of circa 200′ average depth, with indications that it isolated bunch of sulphide ore, lying on a shelf of limestone, in a trough th protected the sulphide ores from oxidation and leaching. This mine has 4,000,000 tons of ore developed, of excellent tenor, averaging nearly 3% co Development includes a tunnel, but is mainly by the 475′ Veteran-Ely shaft, in limestone. This has outside dimensions of 7′ 6″ by 27′ 6″, being practica duplicate of the Star Pointer shaft. The mine has its bottom level at 400′, is worked by top-slicing and caving, to which the blanket formation is e lently adapted. Equipment includes a 300-h. p. Denver Engineering W electric hoist, with 6′ drums, raising two 5-ton Kimberley skips, singly balance, good for 600′ depth, and is operated by a 550-volt 3-phase cu with a steam hoisting plant in reserve, for emergencies. The Veteran mine shut down July, 1909, on account of labor troubles.

The Puritan group of the Cumberland-Ely formerly was thought to tain a good body of ore, available for opencast working, but this has been pr not thick enough for profitable steam-shovel mining, though it may be ava for underground extraction later.

Miscellaneous properties include a number of small mines and groups which more or less work has been done. The Kimberley group shows a pro ing area of mineralised porphyry, but is not extensively developed, and capping is too thick for opencast work. The Wedge mine has a shaft sho some ore of about 3.5% copper average assay tenor. The Jupiter mine h shallow shafts, showing ore assaying up to 9% copper, but with an averag probably about 3%. The Turkey shows a comparatively thin bed of cuprife porphyry, apparently of no particular promise, and the August and Bos Nevada groups have not given indications of much value.

Electric power is used throughout, current being brought from the Ste smelter, at 40,000 volts, and stepped down to 550 volts by two 200-kw. tra formers, in a concrete station.

Buildings include a machine-shop and a warehouse at the Copper Flat an engine-houses at the various shafts, and an office, boarding-house and numer dwellings for employés at the Ruth mine.

Ore is shipped to the Steptoe smelter, at McGill, separately described un title of the Steptoe Mining & Smelting Co., over a 27-mile standard gauge ra way, with an adverse grade of 3.5%, equipment including 100 sixty-ton and fifty-ton Ingoldsby self-dumping ore cars. This line is a part of the Nev Northern railway, having a standard gauge line of circa 90 miles length, run from Ely to a junction with the Southern Pacific railway, at Cobre Station miles east of Toano. The Nevada Northern Railway Co., controlled thro stock ownership by the Nevada Consolidated, is capitalized at $3,000,000, wi a $1,000,000 bond issue, at 5%, the line doing a large general business, in ad tion to handling the traffic of the Nevada Consolidated Copper Co. and Step Mining & Smelting Co.

The cost of stripping overburden was given at 43.5 cents per cu. yd. for fiscal year ending Sept. 30, 1909, with actual mining costs for ore of 15.5 per ton, with an additional charge of 15 cents per ton made to cover str redemption. Ore mined and treated during the fiscal year 1909 averaged 2. copper, by assay, with an average extraction of 70.73%. The cost of p

J. H. Whiteman, vice-president; C. A. Higbe, secretary and treasurer. L... include the Dunlap property, near the Blue Light mine. Apparently ... no work has been done. Idle several years.

NEVADA COPPER CO. NEVA...

Dead. Was merged, 1902, in Nevada Bell Copper Mining & Reduction ... Formerly at Lovelock, Humboldt Co., Nev. Described Vol. II.

NEVADA COPPER CO. NEVA...

Mine office: Sandy, Lincoln Co., Nev. N. M. McFatridge, pres... Lands, 13 claims, showing an auriferous copper vein, assaying up to 32% co... and $20 gold per ton, paralleled by a silver-lead vein, showing gross assay v... up to $150 per ton, opened by a 90′ shaft. A small smelter shipment, ... 1906, to El Paso, gave returns of 50% copper, with gold and silver values. ... several years and apparently moribund.

NEVADA COPPER CO. NEVA...

Mine office: Yerington, Lyon Co., Nev. Lands are claimed to sh... vein of 60′ to 100′ width, opened by a 330′ main shaft. Company is said to h... the old Boston & Nevada smelter, across the river from Yerington. Idle ... years and apparently moribund.

NEVADA COPPER CO. NEVA...

Dead. Formerly at Ely, White Pine Co., Nev. Described Vol. VIII

NEVADA COPPER CO. UT...

Office: 222 D. F. Walker Bldg., Salt Lake City, Utah. Mine office: Fr... Beaver Co., Utah. A. J. Bettles, vice-president; A. J. McMullen, second v... president; A. D. McMullen, secretary and treasurer. Organized April ... under laws of Utah, with capitalization $1,000,000, shares $1 par, assess... issued, $650,000. Lands, 14 claims, 4 patented, 6 miles from a railway, in ... Beaver Lake district, having several pits and shafts, deepest 175′, with abou... of laterals, said to show a vein assaying 8.5% copper and 111 oz. silver per ...

NEVADA COPPER HILLS MINING CO. NEVA...

Office: 18 South Mulberry St., Mansfield, Ohio. Mine office: L... Esmeralda Co., Nev. Dr. A. H. McCullough, president; F. W. Lehl... vice-president; Dr. T. J. Foster, secretary; Chas. Ritter, treasurer; Rowland L... mine manager; preceding officers, Chas. Fish and Bernard Eastman, dir... Organized Oct. 24, 1907, under laws of Nevada, with capitalization $1,50... shares $1 par, nonassessable; issued, $725,000. Farmers' Saving & Trust C... Mansfield, registrar. Annual meeting, second Monday in August.

Lands, 6 claims, area 116 acres, in the Fitting district, circa 9 miles nort... Luning. The property, formerly claimed by the company to have 65 ... ore, of 6″ to 14′ width, is reported, by Mr. Lea, to have numerous ore bod... the bedding planes of limestone, forming a series of parallel veins over a wid... about 600′, these having a generally NS. strike, with dip of 60°, carrying ... dized ores, with occasional native copper, and some bornite, with small q... ties of chalcopyrite showing in the bottom workings. Ore formerly wa... mated by the company to average 6.5% copper, 1 to 2 oz. silver and $1 gold ... ton, and is stated by Mr. Lea to assay 1 to 70% copper, from a trace to ... silver and from a trace to $3 gold per ton. Development is by a 215′ shaft ... a 270′ tunnel.

Equipment includes a 25-h. p. hoist, and there are 6 buildings. M... ment plans extending the tunnel, deepening the shaft to 500′, and cross... Company's prospectus contained much misleading information, but appa... ently the management is endeavoring to develop the property legitimately.

NEVADA COPPER MINING & SMELTING CO. NEVA...

Dead. Was a stockjobbing scheme. Was liquidated early 1911, pa... a dividend, in liquidation, of 6 cents per share, on stock sold to the publ... $4 to $6 per share. Formerly at Cuprite, Esmeralda Co., Nev. Fully descri... Vol. VIII.

impregnations in limestone. There also is one claim carrying fluxing ore at Buckskin, 7 miles distant.

The property as a whole has about 3 miles of workings, and is estimated by the management to show 10,000,000 to 15,000,000 tons of ore, with 600,000 tons fully blocked out on three sides, for stoping. The estimate of tonnage in sight seems high.

The Douglas mine shows granite-porphyry and wollastonite, carrying fissure veins and contact deposits, and is said to have 3 different intersecting ore systems. The principal ore bodies consist of contact metamorphic deposits, with fissures carrying oxidized ores and cupriferous pyrite, mainly in wollastonite, walls carrying copper impregnations. The property shows strong gossans, the surface carrying low grade oxidized ores of about 2% copper tenor, followed by low grade garnetiferous sulphide ores, of circa 3% tenor, and, at depth, by sulphide ores up to 6% in copper tenor. At surface, and to depth of circa 10′, the property shows oxidized ores and chrysocolla, succeeded by a secondary zone carrying oxidized ores and secondary sulphides. The zone of oxidation and secondary enrichment apparently extends to a depth of 500′, giving an ore zone of 100′ to 400′ thickness, in wollastonite, with claimed superficial area of 1,800,000 square feet, or approximately 42 acres, in addition to strong gossans showing elsewhere on the property. The principal ore is chalcopyrite, associated with pyrite, in granules, in wollastonite. The vein system has a generally NS. strike, with average dip of circa 60°, and the 3 principal veins, of about 20′ average width, were estimated formerly, by the company, to average 6.5% copper. The company now claims to have 600,000 tons of ore, fully blocked out on 3 sides, averaging 5.4% copper, but it is doubtful whether these figures will hold good under the test of actual extraction, and Mr. Jennings' estimate of 3.5% average copper tenor seems a safer figure. The ore is garnetiferous, and not readily amenable to concentration.

The Douglas mine is developed by the 2,500′ Douglas tunnel, with other shorter tunnels, and has 3 shafts, known as the Sunlight, Double Ess and Amalgamated, latter vertical. Ore has been proven to a depth of 700′ below the base of the mountain, and the lower levels show an ore body claimed to be 300′ in length, and up to 80′ in width.

The Ludwig mine, 6 claims, about 1 mile northwest of the Douglas, bought for a price formerly reported to have been $1,000,000, includes 2 claims, on which the mine is opened, and a 40-acre tract, in Smith Valley, having a well and pumping station. The Ludwig was opened 1865, and work by the former owners was badly planned, but the property was a shipper, for some years, of small quantities of high grade auriferous and argentiferous ore, production including some very handsome malachite and azurite, a portion of which was sold to lapidaries, and considerable bluestone was produced also, for the mines of the Comstock Lode. The mine has oxidized ores, including some carbonate ore assaying up to 25% in copper tenor, and a fair showing of chalcopyrite. Development is by a 700′ two-compartment incline shaft, 6x12′ in size. The Ludwig mine formerly was claimed to have blocked out 650,000 tons of ore, below 5% copper tenor, but is now claimed, by the management, to have 250,000 tons of ore partially blocked out, averaging 3.69% copper. The mine water from the Ludwig was claimed, formerly, to carry 1.6% copper, which figure is considered excessive.

In addition to copper ore, the Ludwig has a very large deposit of gypsum on the footwall, claimed by the company, 1909, to be 3,000′ long, 500′ wide and 400′ deep, which figures seem high. This deposit of gypsum may be of commercial value, eventually, but should not be included, as it was, in the company's balance sheet of Jan. 1, 1911, where 30,000 tons of gypsum were listed as an asset of $750,000. The balance sheet shows resources of $4,661,000, of which only $25,000 is cash and quick assets. The company is said to plan a tramway between the Ludwig and Douglas shafts.

W. T. Watson, secretary and general superintendent; T. H. Windsor, treasurer; preceding officers, John E. Harper and Frank L. Wiles, directors. Capitalization $5,000,000, shares $5 par. Lands, 50 claims, area 995 acres. Company's "conservative" figures claimed millions of tons of ore in sight, with at least 1,000,000 tons of ore in the Home Bee mine, said to assay 6 to 31% copper, but the information must have been obtained by a clairvoyant, as developments do not show the ore. Was a bit of stockjobbery. Idle several years, and moribund.

NEVADA GREENWATER MINING CO. CALIFORNIA

Dead. Formerly at Greenwater, Inyo Co., Cal. Described Vol. VIII.

NEVADA GREENWATER MINING, MILLING & SMELTING CO. CALIFORNIA & NEVADA

Office: 1118–67 Exchange Place, New York, N. Y. Letter returned unclaimed from former office, Greenwater, Inyo Co., Cal. Wallace H. Hopkins president; T. H. McInnerney, vice-president; Thos. J. Delahunt, secretary; Maj. L. H. French, managing director. Capitalization $5,000,000, shares $5 par. Lands, 15 claims, at Greenwater, 5 at Lida, 2 at Tonopah and 2 at Goldfield, with sundry alleged Goldfield leases. The president is a convicted felon, and the company a bit of stockjobbery. Idle and moribund.

NEVADA MINING CO. CALIFORNIA

Mine office: Auburn, Placer Co., Cal. L. G. Schuster, manager, at last accounts. Lands, 150 acres, in Placer County and 30 acres in Nevada County; former 8 miles from nearest railroad, at Auburn, with a good wagon-road connecting. Development is by 2 shallow 2-compartment incline shafts, in a vein reported as diorite in slate, carrying malachite and chalcopyrite, associated with pyrite and hematite, all apparently auriferous. Buildings include a smith and boarding-house. Presumably idle.

NEVADA NICKEL & COPPER CO. NEVADA

Office: Bunkerville, Lincoln Co., Nev. Lands, 4 miles from a railway known as the Key West group, have about a mile of workings left from a former ownership, showing ore claimed to give average assays of 5 to 6% copper, 2% nickel and 0.3 to 0.5 oz. platinum per ton, with gold and silver values. Idle and presumably moribund.

NEVADA NORTHERN COPPER CO. NEVADA

Dead. Was reorganized, circa Decem er, 1906, as Ely Northern Copper Co. Formerly at Ely, White Pine Co., Nev.

NEVADA NORTHERN COPPER MINING & MILLING CO. NEVADA

Office: 51 Sherman St., Deadwood, S. D. Letter returned unclaimed from former mine office, Winnemucca, Humboldt Co., Nev. Dr. Jas. A. Ogle president; C. H. Miller, vice-president; G. S. Harper, secretary; S. T. Arnold treasurer; J. C. Fuller, general manager; F. W. Barbee, mine superintendent. Organized May, 1907, under laws of South Dakota, with capitalization $1,500,000, shares $1 par; issued, $115,000.

Lands, 17 claims, unpatented, area 340 acres, and a 20-acre millsite, in the Sonora range, 12 miles southeast of Winnemucca, showing 8 contact deposits of which 4, slightly developed, are reported as of 18′ average width, traced circa one mile, carrying native copper, copper oxides, bornite and chalcopyrite with slate gangue, estimated by the company to average 15% copper, 3 oz. silver and $1.50 gold per ton, which figures are excessive. Development is 10′ and 20′ pits, a 50′ shaft and a 330′ tunnel. Idle.

NEVADA-PACIFIC COPPER CO. NEVADA

Dead. Was a bad egg. Formerly at Luning, Esmeralda Co., Nev. Described Vol. IX.

NEVADA-PHŒNIX MINING CO. NEVADA

Mine office: Beowawe, Eureka Co., Nev. P. V. Locker, manager, at last accounts. Lands, 22 claims, south of Beowawe, having a shallow 2-comp

no bond issue, though one was authorized. Is said to have circa 12,000 shareholders. Annual meeting, second Wednesday in February. Stock is listed on the New York curb.

On June 10, 1907, the company took over the Imperial Gold & Copper Mining Co. of Beaver county, Utah, and the Manhattan Copper & Gold Mining Co. and Pioche Consolidated Mining Co., of Pioche, Lincoln county, Nevada. The Imperial and Manhattan companies, which were promoted by Hon. A. R. Lewis, were supposed to be dead, but according to statement of the Nevada-Utah, dated June 30, 1909, the company had advanced $11,544 to the Imperial Gold & Copper Mining Co., and $15,013 to the Manhattan Copper & Gold Mining Co. It is obvious that these companies are still alive, but, to all practical intents and purposes are merged in the Nevada-Utah. The Pioche Consolidated property was said to have been bought for $425,000, less 7½% cash discount, but apparently the Nevada-Utah owns only a half interest in the Pioche Consolidated, also a control of Raymond-Ely Mining Co. and other properties, with miscellaneous mineral lands, at and near Pioche, and possibly elsewhere.

The company controls the New England-Utah Mining Co., owning the Last Chance mine, at Bingham Canyon, Salt Lake Co., Utah, which is described under its own title.

Landed holdings are extensive and valuable, but it has been found impossible to secure definite statements regarding same, despite repeated efforts, and the company studiously refrains from explaining its exact financial relations with the various subsidiary and collateral corporations, through which lands are held.

The Pioche Consolidated group is 38 claims, 33 patented, also 51 town lots and 1,528 acres miscellaneous lands.

The Pioche mines, formerly held by the Pioche Consolidated, include silver-lead properties that were large producers, 1870–1876, and suspended 1893, being popularly credited with a past production of $20,000,000 gross, which probably is an overestimate. It was stated, in the press, 1910, that the company's engineers had certified to ores of $20,000,000 gross value in the Pioche properties, which may or may not be correct. The May Day mine of this group has an 1,100′ shaft, and there are 2 shafts on the Yuba mine adjoining. The Meadow Valley claim has a 400′ three-compartment incline shaft. The old Independence shaft is said to show a 40′ body of sulphide ore, between the third and fourth levels. Equipment at this group includes a 700′ Leschen aërial tramway, from the May Day shaft to orebins on the company's railway, running from the mine to Pioche. The Pioche group has steam power, and a 4-drill air-compressor.

The Half Moon group of 6 claims, area 42 acres, lies circa one and one-half miles west of Pioche.

The Manhattan mine, in the Pioche district, is supposed to be owned by this company, but apparently is idle.

Holdings in the Jack Rabbit district, 15 miles west of Pioche, are 5 patented claims, area 115 acres, including the Day and Onondaga mines. The Day mine has a tunnel, completed 1908, with a back of 1,300′, showing ore said to assay up to 2.5% copper, 217 oz. silver and 0.06% gold.

The Imperial group, area 400 acres, including the Comet mine of 18 acres, adjoining the Cactus mine of the South Utah Mines & Smelters Corporation, in Beaver County, Utah, is mainly virgin ground, some of which also adjoins the Horn Silver and Majestic mines.

The Imperial group, developed by tunnels, has carbonate ores above and sulphides at little depth, ore being claimed to average circa 3% copper, 15% lead, 18 oz. silver and $9 gold. Ore is mainly of concentrating grade, but considerable ore has been shipped to smelters, from time to time. The Comet [illegible] single claim, adjoining the Cactus, undoubtedly carries a continuation of the Cactus ore bodies of the Newhouse Mines & Smelters. The [illegible] shaft of circa 300′ depth, in a gossan carrying about 1[illegible]

NEVILL, DRUCE & CO. WALES.

Office: 4 Corbet Court, Gracechurch St., London, E. C., Eng. Works office: Llanelly, Caermarthenshire, Wales. Property is the Llanelly copper works, built 1805.

NEW ALFRED MINES, LTD. ENGLAND.

Office and mine: Bolingey, Perranporth, Cornwall, Eng. A. J. Sw... and B. Reed, directors; F. Marshall, secretary. Organized March 31, 190... under laws of Great Britain, with capitalization £35,000, shares £1 par, as a reconstruction of Alfred Mines, Ltd. Property is the New Wheal Leisure mine, carrying copper and zinc ores. Presumably idle.

NEW AMERICAN MINING & MILLING CO. UTAH.

Dead. Formerly at Brigham, Box Elder Co., Utah.

NEW ANNIVERSARY COPPER PROSPECTING SYNDICATE, LTD. AUSTRALIA.

Dead. Was succeeded, August, 1909, by Anniversary Copper Mines, Ltd. Formerly at Herberton, Cardwell Co., Queensland, Australia. Described Vol. VIII.

NEW ANNIVERSARY MINE. AUSTRALIA.

Owned by Anniversary Copper Mines, Ltd., at Herberton, Cardwell Co., Queensland, Australia.

NEW ARCADIAN COPPER CO. MICHIGAN.

Office and mine: Houghton, Houghton Co., Mich. Robt. H. Shields, president and general manager; Col. Sylvester T. Everett, vice-president; Wm. F. Miller, secretary and treasurer; preceding officers, Wm. B. Anderson, John Merton, John C. Shields, L. W. Killmar, Jas. W. Shields and Allen F. Ree... directors; Herman W. Fesing, engineer; Otto Sieber, superintendent. Organized Apr. 27, 1909, under laws of Michigan, with capitalization $3,750,000, shares $25 par, assessable; paid in, $11. This company succeeded the Arcadian Copper Co., a corporation organized under the laws of New Jersey that had non-assessable stock, and exchanged shares, pari passu, levying an assessment of $... per share, payable 50 cents Sept. 1, 1909, and 50 cents March 1, 1910. Property was transferred, by deed, from the old company to the new, May 30, 190... Company had $86,707 cash on hand, Dec. 1, 1909, and was entirely free of debt. Company owns 10,000 shares of stock of the New Baltic Copper Co. Boston Safe Deposit & Trust Co., registrar. American Trust Co., Boston, transfer agent. Annual meeting, first Tuesday in May.

Lands, 3,500 acres, including 3,200 acres of mineral lands, all freehold. Property includes 5 old mines, worked, in a small way, at various periods in the past. The Arcadian Copper Co., predecessor of present company, operated the property with great vigor, 1898–1901, and equipped it with magnificent buildings and machinery, including a 3-stamp mill at Grosse Point. Operations on the Isle Royale bed proving unsatisfactory, all work was suspended June 15, 190... the hoist, machinery and shafthouses were sold to the Trimountain Mining Co., the stamp-mill was sold to the Centennial Copper Mining Co., and the mine buildings disposed of to various purchasers, the property being almost completely dismantled. The floating debt of the old company was liquidated by the sale of 800 acres of land, for $750,000, to the Quincy Mining Co. The old mine and equipment were fully described Vols. I and II.

Exploratory work was resumed October, 1905, by the old company, on an amygdaloidal bed about one-fourth mile east of the Isle Royale amygdaloid previously worked, and crosscutting from the 200' level of the exploratory shaft disclosed 5 cupriferous beds in a distance of 110'. Work was suspended March, 1908, until organization, and was resumed August, 1909, by diamond drill borings from the bottom of the 200' exploratory shaft, which is in the SW. ¼ of Sec. ... Exploratory work, 1910, included considerable trenching and test pitting, ... was devoted mainly to securing 2 cross-sections, nearly 1 mile apart, by ...

NEW BALTIC EXPLORATION. MICHIGA

Dead. Was succeeded, 1909, by New Baltic Copper Co. Formerly Houghton, Houghton Co., Mich. Fully described Vol. IX.

NEW BINGHAM CONSOLIDATED MINING CO. UTA

Letter returned unclaimed from former office, Provo, Utah. Mine offi Bingham Canyon, Salt Lake Co., Utah. Jesse Knight, president; Wm. Mathews, vice-president; W. Lester Mangum, secretary and treasurer; prece ing officers, Wm. Christopherson and J. Wm. Knight, directors; J. Knox, ma ager. Organized circa January, 1907, under laws of Utah, with capitalizati $100,000, shares $1 par. Lands, 6 claims, in the northern part of the Bingha district. Idle and apparently moribund.

NEW BOSTON MINING CO. MONTAN

Office: Eden Valley, Minn. Operating office: 117 North Montana S Butte, Mont. Mine office: Corbin, Jefferson Co., Mont. Jas. A. Davids president and general manager; Hugo Traylor, secretary and treasurer. Lan 8 claims, 2 fractional, adjoining the Boston & Corbin, said to carry upwards 20 different veins. The Daphne claim carries a 5′ vein, with a 16″ paystre assaying 10.5% copper, 42 oz. silver and $3 gold per ton, balance of vein bei claimed to assay about 3% copper. Company's fiscal agent advertised th this stock was "fully guaranteed by 10-year gold bonds, bearing 3% interest 50% to agents—why not become a mining king?" Is not regarded fav ably. Idle.

NEW BULL DOMINGO MINING & MILLING CO. WYOMIN

Office: Silver Cliff, Colo. Letter returned unclaimed from former mi office, Hecla, Laramie Co., Wyo. John L. Morgan, superintendent. Orga ized circa June, 1907, under laws of Colorado, as successor of Bull Domi Mining Co., with capitalization $100,000, by S. D. Everett, Henry Link, C. Sipes, J. R. Johnston and A. R. Brooks. Mine, carrying auriferous and argen iferous copper ore, was idle several years, when owned by the old company, wi no trace of operations by present company. Idle and presumably moribun

NEWBURY MINING CO. ARIZON

Office: 49 Federal St., Boston, Mass. Mine office: Florence, Pinal C Ariz. W. V. Lander, vice-president and general manager; C. M. Schofie superintendent. Organized circa 1901, with capitalization $2,000,000, shares par. Lands, 49 acres, and a smelter-site, on the Gila River. Mine, formerl known as the Mt. Lander, near the old Silver King mine, in Box Cañon, forme was worked for silver, and has 4 practically parallel veins, with silver val changing to copper at depth. Development includes a 300′ tunnel, and 4 sha of 285′ to 350′, the mine being said to have several miles of workings, wi reserves estimated at 175,000 tons, claimed to average about 4% copper and gold per ton, with silver values, which figures are considered excessive. Equ ment includes steam and electric power, and a 15-drill air-compressor. Proper considered promising, though the advertising by F. W. McAleer & Co., fis agents, was bad. Idle.

NEW CALEDONIA COPPER CO., LTD. NEW CALEDONI

Dead. Was reorganized, 1899, as Caledonia Copper Co., Ltd. Forme at Noumea, Diahot district, New Caledonia.

NEW CENTRAL SIBERIA, LTD. SIBERI

Office: 155 Dashwood House, London, E. C., Eng. Mine office: Ver neoodinsk, Transbaikalia, Siberia. Marquis of Winchester, chairman; E. Maund, managing director; Wm. Owen, secretary. Organized Dec. 6, 19 under laws of Great Britain, with capitalization £100,000, shares £1 par; issu £90,000. Property consists of sundry options on mineral lands, including o per deposits circa 40 miles from Verchneoodinsk, on the Siberian railway, b tween the Selenga and Chilok rivers, showing quarts veins carrying s copper and carbonate ores.

NEW COLUMBIA MINING CO. IDAH

Mine office: Salmon, Lehmi Co., Idaho. H. Armstead, superintend at last accounts. Ores carry copper and gold. Has steam power and a stamp mill. Idle several years.

NEW CONSOLIDATED MINING CO., LTD. MEXIC

Dead. Was reconstructed, June 10, 1909, as Consolidated Copper C Ltd. Formerly at Charcas, Moctezuma, San Luis Potosí, Mex.

NEW CORNELIA COPPER CO. ARIZON

Office: 611 Wright Bldg., St. Louis, Mo. Operating office: Gila Ba Maricopa Co., Ariz. Mine office: Ajo, Pima Co., Ariz. C. E. Nedey, pre dent; Geo. H. Augustine, vice-president; John R. Boddie, secretary; C. A. B man, treasurer; preceding officers, C. W. Chamberlain, T. C. Ratcliffe, Herm Diel and H. W. Mann, directors; H. C. Chamberlain, superintendent. Org ized Sept. 28, 1909, under laws of Delaware, as a reconstruction of the Cor Copper Co., with capitalization $6,000,000, shares $5 par, nonassessable; b $2,650,000. Debentures, $50,000, at 8%, due June 21, 1914. Bankers Tr Co., St. Louis, registrar and transfer agent. Annual meeting, second Tues in December.

Lands, 14 claims, 4 patented and balance in process, area 250 acres, 45 m from the Southern Pacific railway. The property shows monzonite, rhy and hornblende-granite, carrying disseminations of ore in monzonite and rh lite; between a limestone foot and granite hanging. The company reports 3 bodies, with 2 under development, estimated, by the former company, to a age 10% copper, with 25,000,000 tons in sight, which was a very serious ov estimate, all around, and now estimated, by the management, to average ab 4% copper, 2 oz. silver and $2 gold per ton, in the main ore bodies. They is a vein of circa 15′ width carrying sulphide ore assaying 3 to 15% copper, s small gold and silver values. Ores include cuprite, malachite, chalcocite, bor and chalcopyrite. The mine has about 1,100′ of workings.

Equipment includes a 115-h. p. steam plant, with 3 hoists and a one-d air-compressor. There are 5 buildings, including a 20x50′ machine-shop 12x14′ smithy, of adobe. The 60x60′ stampmill, of wood, has 10 gravity stamp a 75-ton Gates crusher, 4 Wilfley tables and 3 sizers. The former com claimed to be able to deliver ore to the crusher for 25 cents per ton, but co 1910, were 70 cents per ton for mining, and 60 cents for concentrating.

In 1906 the company contracted with one "Prof." Fred L. McGahan fo so-called vacuum smelter, planned to operate on principles diametrically o posed to all the laws that govern the physical universe. This most remarka process, fully described Vol. VI, cost the company $30,000, and proved inglorious failure, leading to some shooting, suing and indicting. Nothi daunted, the management tried another short-cut process, invented by electrician named Anderson, which process, fully described Vol. VIII, proved equally inglorious failure, though apparently an honest one.

The General Development Co. bought 20,000 shares of stock for $20,0 expending the money in exploratory work, under an option on a stock own putting down 5 diamond drill holes, deepest 188′, which showed the ground t oxidized to a depth of about 30′, followed by sulphides, estimated by the pany to average 2 to 2.75% copper. The option was forfeited, 1910, and p erty was leased, temporarily, to H. C. Chamberlain, the former manager, reports a production of 800 tons of 4% ore, 1910, concentrates having shipped to the Copper Queen smelter. The property carries a large dep low-grade disseminated copper sulphides, and is by no means devoid of m The owners are residents of St. Louis and vicinity, of excellent local st and perfectly sincere in their operations, but totally lacking in practical edge of the copper business, and prone to overreach experimentally tried processes of reduction.

The Sunset mine, with shafts of 200′ and 412′, and large opencast workings, has a large ore body, valuable chiefly for flux, as it carries excess of iron, silica and lime, with only small copper, silver and gold values. A trestle from the Sunset mine runs to a 2,000-ton ore-bin on the railroad siding. Equipment includes a 14x20″ Jenckes duplex link-motion hoist, 14x20″ Lidgerwood double-cylinder hoist, and a 10-drill Ingersoll-Sergeant duplex air-compressor. Production of the Sunset mine, 1907, was 31,258 tons of ore.

The Crown Silver mine adjoins and is practically a part of the Sunset. Development is by a 265′ shaft and an 880′ tunnel.

The Morrison mine has a 364′ shaft, with 4,300′ of tunnels, showing ore averaging about 0.6% copper, 1.5 oz. silver and up to $4 gold per ton. Equipment includes a 110-h. p. steam plant, with a 7x9″ hoist and 5-drill Canadian Rand air-compressor.

The Wellington group includes the Athelstan and Jackpot mines, with combined area of 34 acres. These show a large outcrop of oxidized ore, carrying very low values in copper, about 1 oz. silver and up to $7.50 gold per ton, but expected to carry somewhat better copper values below the oxidized zone. The Jackpot was a considerable producer, 1910, and the Athelstan mine was being prepared for production, November, 1910, with a force of 15 men.

The Summit group includes a one-half interest in the Lancashire mine, having a vein carrying silver ore, and a three-fourths interest in the Mountain Rose mine, a quarter interest being owned by the Hall Mining & Smelting Co., Ltd., now in liquidation. The Mountain Rose, developed by 2 tunnels, has a vein of about 15′ width, carrying strongly pyritic ore, low in silica, with small gold and silver values, and is valuable for fluxing purposes, yielding 3,999 tons of fluxing ore, 1907.

Equipment at the Phœnix group includes electric hoists and a 25-drill Canadian Rand air-compressor, driven by a 450-h. p. Canadian Westinghouse electric motor. The largest crusher is a Jenckes-Farrel-Bacon machine, with 42x30″ jaw openings, weighing circa 125,000 lbs., with an hourly capacity of 150 tons of ore reduced to 6″ size, being one of the largest ever built.

Electric power is taken from the Bonnington Falls plant of the West Kootenay Power & Light Co., transmitted 87 miles at 60,000 volts, entering the works at 2,000 volts, and then being stepped down again to 550 volts for use.

Ore is transported, 4 to 25 miles, by rail, from the various mines to the smelter, at a freight rate of 17 cents for Deadwood ore and 30 cents per ton on ore from the mines of the Phœnix and Summit camps.

The 1,500-ton smelter, 4 miles from Greenwood, was built by the Standard Pyritic Co., passing later to the Montreal & Boston Consolidated Mining & Smelting Co., Ltd., thence to the Dominion Copper Co., Ltd. The smelter was poorly equipped and poorly located, but was overhauled and modernized by the Dominion Copper Co., Ltd., and lands were added for slag storage. A small sampling mill is equipped with crushers, rolls, belt-conveyors, and Vezin and Bridgeman automatic samplers.

The 120x182′ blast-furnace building has sixteen 10x25′ ore-bins, and there are 3 large ore and coke-bins outside, with railroad tracks running above. There are two 325-ton water-jacket blast-furnaces, 40x176″ at the tuyeres, and one 600-ton 44x255″ furnace, all with automatic feed. The 200′ dust-flue has a 30x50′ brick dust-chamber, and leads to a brick stack 112′ high and 9′ 6″ in diameter, and a self-supporting steel stack 100′ high and 8′ in diameter. Slag is handled by a 7x12″ locomotive, on a 40″ gauge railroad track. Product when the smelter was in blast, was matte, averaging about 45% copper, 11 oz. silver and 3 oz. gold per ton, shipped to the Greenwood smelter of the British Columbia Copper Co., Ltd., for conversion.

The former smelter power plant, burned 1908, was rebuilt, and now includes a 275-kw. motor-generator set, which furnishes direct current for electric

ores carry a trace of silver, but no gold. The mine is opened under the Em leigh River, with a 40′ roof of ore remaining for safety. Development is by th Daintrees shaft of 30′, South shaft of 120′, and Main shaft of 390′, with levels 120′, 170′, 270′ and 370′, the lowest level showing a 23′ vein. Mine is timbere on the "pigstye" system, using coarse waste and river sand for filling. So diamond drilling has been done. Ore reserves were estimated, 1910, at 141,5 long tons, half of 4% and half of 8% tenor, giving an average of 6%.

Equipment at the mine includes a 200-h p. steam plant, with a 4x6″ sing drum hoist, and a 14x30′ first-motion duplex hoist with two 6′ drums. There a 6-drill Riedler air-compressor, and a 15-kw. direct-connected engine and p erator. There are 14 buildings, including an office, laboratory, store, sawmill a dwellings.

A mill, under construction late 1910, has crushers and rolls, with a sing unit Elmore vacuum oil flotation plant.

The smelter, at the mine, burning wood, has a 50-ton 32x75″ water-ja blast-furnace. Production, 1901, was 1,009 long tons of ore smelted, yield 232,960 lbs. fine copper and 1,330 oz. silver, but work was suspended 19 pending construction of the Etheridge railway, and was resumed 190 smelting contract was made with the Chillagoe smelter, for 3 years, ending 19 for a minimum of 300 tons and maximum of 600 long tons weekly. For the half of August, 1910, ore shipped was 990 tons, of 6.6% tenor, and for last half August, 1910, shipments were 631 tons of 7.75% ore, and February, 1911, mine was said to be making daily shipments averaging 100 long tons, emplo a force of 117 men. Production, for 9 months ending January, 1910, was long tons shipped, yielding 592 long tons fine copper, and 1910 produc estimated at 1,200,000 lbs. fine copper. Property considered promising.

NEW ENGLAND-ARIZONA COPPER CO. ARIZ

Dead. Was merged, 1907, in Verde River Copper Co. Form Cherry, Yavapai Co., Ariz.

NEW ENGLAND-ARIZONA COPPER-GOLD MINING CO. ARIZ

Letter returned unclaimed from former office, Douglas, Ariz. Mine Paradise, Cochise Co., Ariz., and Dudleyville, Pinal Co., Ariz. J. W. house, manager at last accounts. Organized 1905, with capital $3,000,000. No trace of operations secured. Idle and presumably

NEW ENGLAND & ARIZONA GOLD & COPPER MINING CO. ARIZ

Office: 250 Devonshire St., Boston, Mass. Mine office: H Yavapai Co., Ariz. Geo. A. Wooden, president; Louis Harlow, tr John H. Farrell, superintendent. Organized Jan. 19, 1901, under laws of zona, with capitalization $750,000, shares $1 par.

Lands, 6 claims, 3 patented, area 120 acres, including the Red Star of 3 claims, and the Calumet group of 2 claims, circa 2 miles from H The property is said to show 2 practically parallel veins, about 30′ apart, paystreaks of 2′ width, carrying ore assaying about 10% copper, with and silver values. The mine has a number of short tunnels and sha and a 600′ two-compartment main shaft. Equipment includes a p with a 70-h. p. boiler, 35-h. p. hoist and a small air-compressor, and several other buildings. Presumably idle.

NEW ENGLAND & CLIFTON COPPER CO. ARIZ

Office: 43 State St., Boston, Mass. Mine office: Clifton, G Ariz. Edmund Bristol, vice-president and managing director; Alex eral manager; C. E. Phippen, secretary and treasurer; Roy Armstrong, tendent. Organized 1903, under laws of Maine, with capitalization shares $5 par, in $2,000,000 preferred 8% stock, cumulative after payment 8% dividend, and $3,000,000 common stock, changed 1907, to capital $2,500,000, shares $1 par. Company authorized, 1908, an issue of first-mortgage 7% [illegible]

stock dividend, October, 19
Bradstreet & Co., transfer a

Lands, 13 claims, 9 pa
fractional claims, area circa
and claims near Goldfield, E

The Bingham group sh
fissure veins, of 30″ average
400′, opened by the 1,600′ N.
and 2 shafts, one of 159′, wit
to w'den at depth, and ores
zinc, 15 oz. silver and $4.50
copper, some of the monzo
prove workable in part, at s

Equipment includes a s
depth.

The 50-ton concentrat
jigs and 1 Wilfley table, op
was 2,108 tons of lead concen
was closed down, late 1907,
securing 936 tons of ore, gi
$30.98 per ton. In Febru
corporation for $700,000 da

NEW ENGLAND MININ

Office: 35 School St
Franklin Co., Mass. Othe
Capt. Geo. H. Davenport,
Organized 1902, with capita
acres, 2 miles west of the D
mately vertical, conforming
which it occurs, and appar
occurring scattered through
mineralized, on the south w
2′ wide, on the north wall.
across. Idle some years.

NEW ENGLAND-UTAH

Letter returned unclai
N. Y. Mine office: Bingh
controlled, through stock o
poration.

Lands, 13 claims, area
between the Highland Boy a
and contact deposits of 3′ to
and gold, in about the order
about $1,250,000 in ore valu
with a back of 900′, tunnels
miles of workings.

The mill, of 125 tons r
October, 1907. The proper
perintendent, who planned

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...carrying a 15' paystreak, claimed to a...
...per ton, balance of vein carrying ...
...extraction and concentration. The old...
...The 570' No. 2 tunnel shows chrysocol...
...copper tenor, and No. 3 tunnel, of circa 600'...
...of the old mine there are surface deposits of ...
...copper, and a bed of Gila conglomerate, of 4 ...
...to 0½% copper.
...the present company is along somewhat different lines...
...drilling and underground workings. About 14,000 ...
...No. 5 Keystone drills. The 330' New Keystone shaft...
...the 100' and 250' levels has blocked out, in 200' square...
...ore-body, under an area of 11 acres, about 2,000,000 tons...
...assays, from 501 samples, of 2.6% copper. Ore is disseminated...
...chief, similar to the ore of the Miami but of somewhat...
...The mine as a whole had 13,555' of underground workings...

...includes a 25 h. p. gasoline hoist and a 3-drill air-compressor...
...is said to plan installing a new electric hoist and ...
...running an aerial tram to the Miami mill.
...experimental mill, built, 1905, by the old company used ...
...Hepburn sulphide process for leaching ... described...
...recently proved unsuccessful.
...under the old ownership was a small ... since 1899...
...smelter returns of 22 to 2[illegible]...
...used at Old Dominion smelter...
...sold his mine copper, 1907. ...
...was giving consideration to ...
...consulting, though not up to ...

KING SOLOMON'S MINES, LTD.

...incorporated under laws of ... to acquire, develop, ... Mayo, discovered ... capitalization £[illegible] ... which is apparently little or no ... reasonably marketed.

LINCOLN COPPER CO.

...Dead. ... incorporated ... Hamilton ... Yorks ... nearly at Holmes, Albany Co., Wyo. ...

NEW LYMNI, LTD.

Office: 32 Great St. Helens, London, E. C. ... Chrysokhow, Cyprus. J. G. Garnett, ... Ashworth, mine manager. Organized ... per Mining Syndicate, Ltd., under ... 250,000 shares £1 par, in 250,000 ... fully paid.

Lands, 30 square miles, in the ... Cyprus. Ore occurs as lenses, ... and 1,400' long, which was a ... and chalcopyrite averaging ... was a deliberate fabrication. ... miles, which is doubtful. ... a tunnel of 2,100'. As last ... is not regarded favorably.

NEW MAMMOTH MINING & MILLING CO.

Dead. J. E. Bevers, ... veloped, circa 1903, by ...

body of the old mine was a 12′ vein, carrying a 15″ paystreak, claimed to aver circa 22% copper and 2 to 5 oz. silver per ton, balance of vein carrying ore 3 to 5% copper tenor, left for later extraction and concentration. The old mi has a 330′ shaft, and 3 tunnels. The 570′ No. 2 tunnel shows chrysocolla a carbonate ores of 4 to 24% copper tenor, and No. 3 tunnel, of circa 600′, sho somewhat similar ore. East of the old mine there are surface deposits of chry colla, said to assay 3 to 7% copper, and a bed of Gila conglomerate, of 4′ to thickness, said to carry 3 to 6% copper.

Development by the present company is along somewhat different lines, a includes both churn drilling and underground workings. About 14,000′ of h have been bored by 2 No. 5 Keystone drills. The 330′ New Keystone shaft, w 7,200′ of laterals on the 150′ and 250′ levels has blocked out, in 200′ squares, wit levels at 100′ intervals, under an area of 11 acres, about 2,000,000 tons of o giving an average assay, from 591 samples, of 2.6% copper. Ore is disseminat sulphides, in Pinal schist, similar to the ore of the Miami, but of somewhat lo average grade. The mine as a whole had 13,555′ of underground workings, De 31, 1910.

Equipment includes a 25-h. p. gasoline hoist and a 3-drill air-compress and the management is said to plan installing a new electric hoist, and also credited with planning an aërial tram to the Miami mill.

A 25-ton experimental mill, built, 1905, by the old company, used a mod fication of the Hoepfner sulphide process for leaching chrysocolla, described Vo VIII, which apparently proved unsuccessful.

The mine, under the old ownership, was a small producer since 1899, shi ping ores giving smelter returns of 22 to 27% copper, also low-grade silicious ore of 3 to 5% tenor, used at Old Dominion smelter for converter linings. Produ tion was 208,801 lbs. fine copper, 1907. Work was suspended, 1910, but th management was giving consideration to resumption, April, 1911. Property considered promising, though not up to Miami grade, and management good.

NEW KING SOLOMON'S MINES, LTD. TRANSVAAL.

Letter returned unclaimed from former office, Johannesburg, Transvaal. Mine office, Zeerust, Marico district, Transvaal. Organized under laws o Transvaal, with capitalization £5,000. Property is the Farm Aniater's Kop No. 152, on which apparently little or no work has been done. Idle several years, and presumably moribund.

NEW LINCOLN COPPER CO. WYOMING.

Dead. Was merged, circa 1907, in Rambler Copper & Platinum Co. Formerly at Holmes, Albany Co., Wyo. Described Vol. VI.

NEW LYMNI, LTD. CYPRUS.

Office: 32 Great St. Helens, London, E. C., Eng. Mine office: Limasso Chrysokhow, Cyprus. J. G. Gordon, chairman; A. C. Gibbons, secretary; J. W Ashworth, mine manager. Organized Oct. 28, 1909, as successor of Lymni Copper Mining Syndicate, Ltd., under laws of Great Britain, with capitalizatio £20,000, shares £1 par, in £10,000 "A" shares, 10s. paid, and £10,000 "B" share fully paid.

Lands, 30 square miles, in the Bellathousa district of Colis, Chrysokhow, Cyprus. Ore occurs as lenses, largest claimed by former owners to be 400′ wid and 1,400′ long, which was a gross exaggeration, and also claimed to carry borni and chalcopyrite averaging 9 to 10% copper and 3 dwts. gold per long ton, which was a deliberate fabrication. Ore formation was claimed to be continuous for 3 miles, which is doubted. Development is by shafts of 150′ to 300′ depth, and by a tunnel of 2,100′. At last accounts the mine was not permanently equipped Is not regarded favorably.

NEW MAMMOTH MINING & MILLING CO. UTAH.

Dead. J. E. Beveridge was superintendent. Property was slightly developed, circa 1903, by shallow shafts and a tunnel, showing auriferous and ar

property shows about 500,000 tons of 60% iron ore. The main ore zone, ranging up to 300′ in width, with an estimated average of 30′, traceable about 2,700′, with about 50 ore exposures, carries oxidized and silicious ores, estimated by the former company to average 7 to 8% copper, and 50 cents gold per ton, with traces of silver, but apparently the workable part of the vein, which is very flat, dipping at about 15°, is only about 3′ to 20′ in width.

The old workings include 8 tunnels, longest 225′, 12 vertical pits and shafts, of 25′ to 325′ depth, 3 old incline shafts, deepest 738′, and a new 600′ vertical shaft. The mine was said, by the former company, to have about 6,000′ of workings, and is now reported to have 8,880′ of openings. Former owners estimated 100,000 tons of ore in sight, with 75,000 tons blocked out for stoping. About $150,000 was expended under the management of the General Development Co., in sinking the vertical shaft, and putting down a number of churn drill holes, 3 holes showing low-grade sulphide ore, below the old workings.

The Planet mine opened circa 1864, was worked in a small way until 1874, and was reopened 1884 when a 36″ circular blast-furnace was erected. The property was taken over, 1902, by the predecessor of the present company. The mine produced, 1864-1874, upwards of $500,000 worth of high-grade ore, ranging from 15 to 40% in copper tenor, which was shipped by water to a port on the Gulf of California, presumably Guaymas, and transshipped thence to Swansea for reduction. A little ore was shipped to San Francisco also, and was said to have given fair profits, notwithstanding the heavy cost of freight and smelting and harassments from various Indian uprisings.

Equipment includes a 75-h. p. gasoline plant, with two 15x25″ hoists and a 5-drill air-compressor. Buildings include a 15x40′ frame carpenter-shop, 10x10′ smithy, 2 shafthouses and 3 dwellings. Property considered promising and management good.

NEW QUEENSLAND COPPER CO., LTD. AUSTRALIA.

Office: 6 Princes St., London, E. C., Eng. Mine and works office: Mount Perry, Bowen Co., Queensland, Australia. Geo. Grinnell-Milne, chairman; preceding officer and J. Noël Sparks, directors; J. G. Tait, secretary; S. H. Pulbrook, general manager; J. D. Audley Smith, consulting engineer. Organized Sept. 27, 1910, under laws of Great Britain as a reconstruction of the Queensland Copper Co., Ltd., with capitalization £125,000, shares 10s. par; issued, £36,017 10s. The old company paid dividends of £32,296, but came to grief through lack of funds.

Lands, 1,650 acres, bought of the Mount Perry Copper Co., also the Normanby mine, and the New Moonta, Reed's Creek and Great Freehold mines, and other properties bought of the Burnett (Queensland) Exploration Co., Ltd. The company also owns the Mount Jacobs gold mine, at Many Peaks, in the Gladstone district, a mine of fluxing ore, and the Daylsford limestone quarry.

The Mount Perry mine has fissure veins traversing granite, the main vein of circa 12′ average width, carrying a 6″ to 8″ paystreak in the upper levels, increasing to about 10″ width in the lower levels, of ore averaging circa 16% copper, balance of the ground apparently being unpayable, with copper at a low price. The mine formerly was opened by 3 shafts, poorly located and inadequate, replaced by new shafts, the vertical Milne or main shaft being 1,130′ deep. Stoping latterly has been mainly from the 8th, 9th and 10th levels, and the mine is opened for a distance of circa 1,400′, the ground growing harder with depth. The Kennedy shaft is 1,020′ deep, with bottom level at 1,000′, and is the principal producer of the mine. The Southern shaft is practically abandoned, ground tributary thereto being developed by the Milne shaft. Ore reserves of the Mount Perry were estimated, 1909, at 12,323 long tons. The richer ores near surface apparently are nearly exhausted, and if production is to be maintained, it will be necessary to concentrate and smelt the low grade

NEWSBOY COPPER MINING CO. WYOMING.

Dead. Formerly at Encampment, Carbon Co., Wyo. Described Vol. VI.

NEWS COPPER MINING CO. ARIZONA.

Mine office: Jerome, Yavapai Co., Ariz. Lands are 1½ miles southeast of Jerome. Shaft was unwatered and retimbered, 1905, after several years idleness, and property was investigated by F. Augustus Heinze, but not taken by him, failing to prove as represented. Idle since 1905.

NEW SOUTH WALES MINES & SMELTERS, LTD. AUSTRALIA.

Dead. Succeeded Blayney Copper Mines & Smelters, Ltd., and was succeeded, Jan. 31, 1907, by Blayney Copper Mines & Smelting Co., N. L. Formerly at Blayney, Bathurst Co., N. S. W., Australia. Described Vol. VIII.

NEW STATE COPPER MINING CO. ARIZONA.

Office and mine: Tucson, Pima Co., Ariz. James W. Bogan, president; Chas. Bent, vice-president; Lyman W. Wakefield, treasurer; Ralph K. Shelton, secretary. Capitalization, $2,000,000, shares $1 par. Lands, 9 claims, in the Tucson Mountains, 14 miles west of Tucson, showing a prominent gossan, carrying oxidized ores and a little chalcocite, with small gold and silver values, suitable for fluxing ore, and presumably underlaid by copper ores of better tenor. Has 40′ shaft, showing a little chalcopyrite, and a short tunnel, with circa 400′ of workings. Has shipped about 300 tons of ore. Idle several years.

NEW STRATAN COPPERS, LTD. TRANSVAAL.

Office: P. O. Box 1276, Johannesburg, Transvaal. Letter returned unclaimed from former mine office, Rustenburg, Transvaal. J. M. Calderwood, consulting engineer. Organized under laws of Transvaal, with capitalization £11,000, shares £1 par, fully issued. Lands include 96 claims on the Limpopo River, also 360 base metal claims on government Farm Stratan No. 1386, in the Zoutpansberg district, latter slightly prospected, giving, 1907, average assays of 17.72% copper, with traces of silver and gold. Idle and presumably moribund.

NEW SUPERIOR MINING CO. UTAH.

Dead. Formerly at Bingham Canyon, Salt Lake Co., Utah. Described Vol. IX.

NEWTON COPPER CO. CALIFORNIA.

Letter returned unclaimed from former office, 420 Montgomery St., San Francisco, Cal. Mine office: Ranlett, Amador Co., Cal. Col. Horace Ranlett, president and general manager. Organized 1887, under laws of California, with capitalization $200,000, shares $5 par.

Lands, 100 acres, patented, showing a gossan of 4′ to 8′ width, with 3 fissure veins in slate, carrying sulphide copper ores of about 7% copper tenor, with small gold values, and the country rock carries 3 to 6% copper impregnations for a distance of 15′ to 20′ from the main vein. The mine, opened 1861, has shafts of 200′ and 430′, and has been estimated to have about 20,000 tons of ore in sight.

Equipment includes steam power, with a hoist good for 1,000′, and there is a smelter having an 80-ton water-jacket blast-furnace. The mine has 750′ of sluices, for precipitation, the ore, which is excellently adapted to leaching, yielding cement copper of 75 to 80% tenor. Production was circa 450,000 lbs. fine copper in 1900, and the property seems worthy of further development. Idle since circa 1903.

NEWTON COPPER MINING CO. WYOMING.

Dead. Formerly at Encampment, Carbon Co., Wyo. Described Vol. VII.

NEWTON, KEATES & BOLTON. ENGLAND.

Office: 13 Charles St., Princess St., Manchester, Eng. Works office St. Helens, Lancashire, Eng. Property is copper smelting and refining works.

NEW UTAH MINING CO. UTAH.

Letter returned unclaimed from former office, Salt Lake City, Utah. Mine office: Ibapah, Tooele Co., Utah. Hugh Heffernan, president; W. W. [illegible] son, vice-president; Geo. A. Udall, secretary; James Norman, treasurer; [illegible]

lferous copper sulphides, said to assay about 15% copper, 10 oz. silver and $10 gold per ton, which must be from carefully selected ores.

There are 3 tunnels, formerly reported as of 100′, 450′ and 600′ length, and the Lillian tunnel, of circa 1,400′, latter claimed to show a 50′ ore body carrying average values of $12 gold per ton, which was a serious overestimate. There are 5 shafts, including the 260′ Argentine shaft, showing copper sulphides; the 80′ Louise shaft, cutting an 8″ vein showing ore assaying up to 15% copper, 180 oz. silver and $20 gold per ton, and the 72′ Jensen shaft, near the Louise. The Buzzard Shadow group, at the eastern end of the property, shows a 2′ to 4′ vein carrying auriferous and argentiferous copper ore. Values, as developed in the mine as a whole, are mainly in gold. The mine is wet.

Equipment includes a 15-h. p. Fairbanks-Morse gasoline hoist at the Louise shaft. The company, at various times, has planned various mills and cyanide plants, but none of these have materialized.

NEW YORK BONANZA MINING CO. UTAH.

Office: Salt Lake City, Utah. Mine office: Park City, Summit Co., Utah. M. J. McGill, manager. Mine, in Ontario Cañon, 3 miles from Park City, has a 1,000′ two-compartment shaft, sunk in limestone, showing auriferous and argentiferous lead and copper sulphides all silicious, and has stoped considerable ore from the 600′ and 800′ levels, ore shipped averaging about 2% copper, 10% lead, 100 oz. silver and $2.50 gold per ton.

NEW YORK & BROOKLYN COPPER CO. MONTANA.

Dead. Former office was Missoula, Mont. Lands, next east of the Bonton-Colby Mining Co., were said, 1908, to have considerable development, showing some good copper ore. Formerly at Saltese, Missoula Co., Mont.

NEW YORK-CANADIAN COPPER CO., LTD. ONTARIO.

Dead. Formerly at Kashaboiwe, Rainy River district, Ont. Fully described Vol. IV.

NEW YORK CONSOLIDATED MINING CO. MICHIGAN.

Office: Leopold Bldg., Houghton, Mich. Mine office: Phœnix, Keweenaw Co., Mich. Frederick W. Nichols, resident manager. Lands, 720 acres, being the S. ½ of the S. ½, Sec. 3, N. ½ of Sec. 10, SE. ¼ of Sec. 10, E. ½ of the NE. ¼ of Sec. 15, T. 57 N., R. 32 W., adjoining the holdings of the Ojibway, and just east of the old Manhattan mine. Idle many years.

NEW YORK COPPER MINING & SMELTING CO. ARIZONA.

Office: 46 North Stone Ave., Tucson, Ariz. Letter returned unclaimed from former mine office, Helvetia, Pima Co., Ariz. Frank H. Lee, president; Samuel Seinsheimer, vice-president; H. E. Heighton, secretary; Harry A. Drachman, treasurer; Henry Buchman, general manager. Organized Nov. 4, 1907, under laws of Arizona, with capitalization $500,000, shares $1 par.

Lands, 8 claims, area 110 acres, about 8 miles from Vail station, on the Southern Pacific railway, in the foothills of the Santa Rita Mountains, southeast of Tucson. Property has contact deposits between limestone and porphyry, developed by several hundred feet of trenching and stripping, showing carbonate and sulphide ores at surface, with 3 shafts, aggregating 175′ depth, and 3 tunnels, of 550′ aggregate length, showing copper carbonates and sulphides, giving average assays of about 4% copper, with gold and silver values. Idle.

NEW YORK & CORBIN COPPER & SILVER MINING CO. MONTANA.

Dead. Property was sold, January, 1909, to Corbin Copper Co. Formerly at Corbin, Jefferson Co., Mont. Described Vol. IX.

NEW YORK & ELY CONSOLIDATED COPPER CO. NEVADA.

Dead. Formerly at Ely, White Pine Co., Nev.

NEW YORK & GREENWATER COPPER CO. CALIFORNIA.

Dead. Was organized October, 1906, under laws of Arizona, with capitalization $1,000,000. Apparently no work ever was done on the property and entire camp is deserted. Formerly at Greenwater, Inyo Co., Cal.

NEW YORK & VIRGINIA COPPER CO. VIRGINIA.

Office: 50 Broadway, New York, N. Y. Mine office: Copper Hill, Floyd Co., Va. Col. Ambrose C. Dunn, president and general manager; Wm. D Boggs, secretary and treasurer; Capt. John W. Hancock and Geo. W. Welk, receivers. Organized 1901, under laws of West Virginia, with capitalization $2,500,000, shares $1 par.

The company was organized on a lease of mineral lands, in Carroll county, Virginia, which were abandoned, 1903. This property, 740 acres, was claimed to show 7 cupriferous fissure veins, and 2 gold-bearing veins, the main copper vein being claimed, by the company, to average 96′ in width, carrying argentiferous melaconite, chalcopyrite and bornite, averaging 10% copper, 25 oz. silver and 1 oz. gold per ton, which claims were deliberate falsehoods, and also claimed to have 40,000 tons of smelting ore on the dumps, with a larger amount blocked out for stoping, which also was untrue. On loss of the lands in Carroll county, some property was bought in Floyd county, Virginia, presumably in the vicinity of Copper Hill, but apparently title to the property in Floyd county is defective also. A small smelter was built, by Louis Strauss, who sold bogus bills of lading for several carloads of ore, and committed suicide on discovery of his crime. Receivers were appointed by the circuit court of Kanawha county, West Virginia, Apr. 27, 1909. Various charges of fraud are made against Col. Dunn, and presumably are well founded, considering the flagrant nature of the company's shortcomings.

NIAGARA COPPER CO. ARIZONA.

Office: Prescott, Ariz. Mine office: Bagdad, Yavapai Co., Ariz. Herman Voge, president; Geo. H. Schuerman, vice-president; J. P. Bauder, secretary and general manager; preceding officers, J. K. Miller, F. L. Wright, W. H. Bauder and D. Levy, directors. Capitalization $1,000,000, shares $1 par, nonassessable.

Lands, 8 claims, unpatented, area 160 acres, and a 5-acre millsite, adjoining the Arizona-Nevada Copper Co., in the Copper Creek district, circa 25 miles southwest of Prescott. The property formerly was claimed to show a vein of 50′ to 150′ width, with footwall and hanging-wall paystreaks giving assays up to 50% copper, 9 oz. silver and $1.55 gold per ton, from native copper, melaconite, malachite, azurite, chalcopyrite and chalcocite. The mine has 3 shafts and 6 tunnels, with about 2,500′ of workings, showing ore estimated to average 3 to 6% copper, 2 to 7 oz. silver and $1 to $10 gold per ton, and the property apparently also carries a continuation of the low-grade disseminated ore body that is under test by the Arizona-Nevada Copper Co.

NIAGARA MINING & SMELTING CO. UTAH.

Letters returned unclaimed from former mine office, Bingham Canyon, Salt Lake Co., Utah. Is controlled, through ownership of a majority of its stock, by the United States Smelting, Refining & Mining Co., and, to all practical intents and purposes, is a part of that company, and the property is described under title of the latter named company.

NIBLACK COPPER CO. ALASKA.

Dead. Surrendered lease of lands, circa 1909, to the Geo. M. Wakefield Mineral Land Co., and went into bankruptcy. Formerly at Niblack, Prince of Wales Island, Alaska. Fully described Vol. VIII.

NIBLACK COPPER DEVELOPMENT CO. ALASKA.

Dead. Was succeeded, Oct. 12, 1904, by Niblack Copper Co. Formerly at Niblack, Prince of Wales Island, Alaska.

NIBLACK MINE. ALASKA.

Owned by Geo. M. Wakefield Mineral Land Co., at Niblack, Prince of Wales Island, Alaska.

NICHOLS CHEMICAL CO. QUEBEC & NEW YORK.

Dead. Was succeeded May, 1905, by Nichols Copper Co. Formerly at Capelton, Sherbrooke Co., Que. Fully described Vol. VI.

change, Leeds, Eng. Mine office: Hunslet, Yorkshire, Eng. Property in cludes copper reduction works using the wet process for extracting values fro cupriferous cinders remaining from the burning of iron pyrites for making sul phuric acid. The company also manufactures acids and ammonia.

NICKEL-COPPER CO. ONTARI

Office and mine: Worthington, Algoma, Ont. Company experiment with a new process of reducing nickel-copper ores, scoring a failure. Finance are badly involved. Idle some years and moribund.

NIGHT HAWK MINING CO. WASHINGTO

Office: 201 Uihlein Bldg., Milwaukee, Wis. Mine office: Loom Okanogan Co., Wash. Edw. Kolb, president; A. W. Schroeder, vice-presid H. D. James, secretary and general manager; preceding officers, John W. Cr Jas. Meehan and John Meehan, directors; John P. Gormley, superintende Organized 1901, under laws of Montana, with capitalization $5,000,000, shar $1 par.

Lands, 65 claims, 10 fractional, area circa 1,250 acres, including the Gra View group, and 150 acres miscellaneous lands, including a millsite and townsi on Mount Ellemeham, in the Wannicut Lake district, east of the Similkam River. Development is by 3 shallow shafts and 4 tunnels, longest circa 1,2 Property shows numerous fissure veins, of which 5 have been partly develop these ranging 6′ to 10′ in width, carrying ore estimated by the management average 8% copper, and 1 oz. gold per ton, which estimate is excessive.

Equipment includes electric power, a 75-ton concentrator, and a mill havi 20 gravity stamps, bought, 1908, from the Grand View Mining Co. Employ 15 men, on development, at last accounts, which is a rather small force for company claiming to have developed, some years ago, large bodies of ore ave aging 8% copper and 1 oz. gold per ton.

NIJNI-TAGILSK MINES & WORKS. RUSS

Office: Italianski 3, St. Petersburg, Russia. Mine and works of Bogoslovsk, Nijni-Tagilsk, Perm, Russia. P. T. Zamiatnin, manager. owned by Estate of P. P. Demidoff, Prince San Donato. Property includes Rudianski or Miednoroudiansk mine, and various other old properties, w smelters known as the Vijski and Verchoturski works.

The house of Demidoff was granted, by Peter the Great, 2,150 square m of land, on the eastern slope of the Urals. This property, in addition to copp mines and works, includes 11 iron works, the largest platinum mine in the wo and gold placers that employ about 25,000 workmen during the summer month

The copper mines are at Bogoslovsk, on the outskirts of Nijni-Tagil Country rocks are beds of the Permian series, ore occurring as local enrichme of good average tenor, in Permian red beds, and in limestone near diorite co tacts, oxidized ores predominating. The Rudianski mine carries a great va of copper minerals, including oxides, carbonates, silicates, phosphates, sulph and occasional native copper, and is especially notable for its production of m sive malachite, a single mass weighing 330 tons having been found in 18 Ores average 3 to 3.5% in copper tenor, without appreciable gold or silver va The northern part of the mine has disseminated chalcopyrite, associated w large bodies of magnetite, the central part of the mine carries oxidized cop ores, with gangue of hematite and red clay, and the southern part carries s nodules of oxidized copper ores, and occasional sulphides, with talcose gang The mine is developed by 3 working shafts.

Equipment at the Rudianski group includes 8 steam engines, aggre 520 h. p. Ore is taken to the smelter over 1½ miles of standard gauge railw in side-dumping cars.

The Vijski works do smelting partly in brick shaft-furnaces, of a type u since the Eighteenth Century, and partly in a patented reverberatory fur The works have coal and coke pockets, and flux is mainly limestone, use

tion plant, with an electrolytic refinery of 70 tanks, having multiple arrangement of electrodes, with a daily capacity of 1 metric ton of electrolytic copper.

NILPENA COPPER MINING CO., LTD. SOUTH AUSTRALIA.

Mine office: Blinman, Taunton Co., South Australia. Company had a subsidy of £290 5s. 3d. from the South Australian government. Lands, near Parachilna Gap, about 10 miles from Blinman, show 4 veins, of 4′ to 10′ width, carrying pockets of low grade malachite, with quartz, calcite and iron gangue. Mine is developed by 2 short tunnels, one, of 200′ being connected with a 130′ shaft.

NINETY-NINE COPPER CO. NEVADA.

Office: 315 McCornick Bldg., Salt Lake City, Utah. Mine office: Goodsprings, Lincoln Co., Nev. Jas. T. Hammond, president; J. B. Jenson, vice-president; L. N. Stohle, secretary and treasurer; preceding officers, P. M. Hanson and Alma Nelson, directors. Organized May 20, 1908, under laws of Arizona, with capitalization $1,000,000, shares $1 par, nonassessable.

Lands, 14 claims, unpatented, 16 miles from a railway. The mine has a 250′ shaft, planned to be sunk to 500′, with levels at 50′ intervals, and about a quarter-mile of workings, showing, on the bottom level, at 250′, a vein of more than 50′ claimed width. The mine carries high grade oxidized ore, said to assay 11 to 25% copper and 4 to 5 oz. silver per ton, and has considerable quantities of ore of good average grade. A number of small shipments, to the Salt Lake and Needles smelters, have returned 20 to 30% copper.

Equipment includes a 15-h. p. gasoline hoist, and a 3-drill air-compressor. Property considered promising.

NIPISSING COPPER & SILVER CO., LTD. ONTARIO.

Office: 609 Temple Bldg., Toronto, Ont. Letter returned unclaimed from former mine office, Cobalt, Nipissing, Ont. A. Aubin, president; Duncan Donald, vice-president; F. Asa Hall, secretary; T. Baycroft, mine manager. Organized under laws of Ontario, with capitalization $3,500,000, shares $1 par. Lands, are claimed to be 2,200 acres, said to show a 19′ vein of sulphide ore assaying 11% copper and 41 oz. silver per ton, which figures are their own refutation. Company is regarded with suspicion, because of the extravagant nature of its advertising. Idle and presumably moribund.

NIPPER CONSOLIDATED COPPER CO. MONTANA.

Letter returned unclaimed from former office, 42 Broadway, New York, N. Y. Mine office: Butte, Silver Bow Co., Mont. F. Augustus Heinze, general manager; Stanley Gifford, secretary and treasurer. Capitalization $3,750,000. Bonded debt, $2,500,000. Is a subsidiary of the United Copper Co. Property at Butte, Silver Bow Co., Mont., was sold, 1906, to Butte Coalition Mining Co., and it cannot be learned that the company now possesses any assets.

NIPPER MINE. MONTANA.

Owned by Anaconda Copper Mining Co., at Butte, Silver Bow Co., Mont.

NISHINOKAWA MINE. JAPAN.

Owned by Sumitomo Copper Co.

NIZINA GOLD & COPPER CO. OF ALASKA. ALASKA.

Dead. Formerly at McCarthy Creek, Copper River district, Alaska. To be described Vol. VII.

N'KANDHLA SYNDICATE, LTD. NATAL.

Office: 1 Great Winchester St., London, E. C., Eng. Mine office: Umhlatuzi, Zululand, Natal. A. Lee, secretary. Organized March 13, 1902, under laws of Great Britain, with capitalization £2,000, shares £1 par; issued, [illegible]. Property was prospecting rights over 4 blocks, each 600 yards square, on Umhlatuzi River, N'Kandhla district, Zululand. Idle some years and moribund.

NOBLE GOLD MINES, LTD. MONTANA.

Dead. Formerly at Sheridan, Madison Co., Mont. [illegible]

ing to the exceedingly flaky nature of its copper. Idle since September, 19
Property considered promising.

SOCIEDAD FRANCESCA DE MINAS y FUNDICIÓN DE NONOGASTA. ARGENTIN

Mine and works office: Nonogasta, Rioja, Argentina. Lands include th
Andueza, Atacama, Muerto and San Toribio copper mines, also various silv
mines, in the Tigre district. Ores of the Andueza are claimed to averag
to 20% copper, 3 oz. silver and 2 oz. gold per ton, which either is an excess
estimate, or veins are very narrow. Equipment includes steam power and
small smelter, built 1887, to treat dry silver ores, but altered to smelt copp
Presumably idle.

NONPAREIL CONSOLIDATED COPPER CO. WASHINGTO

Office: Mansfield, Ohio. Mine office: Index, Snohomish Co., Wa
Dr. S. P. Ecki, president; Monroe Harmon, vice-president; F. G. Mall
secretary; R. S. McCreery, treasurer. Lands, adjoining the Sunset, said to b
extensive, are well watered and timbered, and show 3 veins. Developmen
by a tunnel, cutting a vein, of 20′ estimated width, carrying a 7′ paystreak
chalcopyrite, of good average assay tenor.

NONPAREIL CONSOLIDATED MINING & MILLING CO. UTA

Office and mine: Grouse Creek, Box Elder Co., Utah. Clayton
Herrington, president; Thomas Sherry, secretary and treasurer. Organ
June, 1905, under laws of Utah, with capitalization $400,000, shares $1 p
assessable, and has levied assessments of $12,000. Lands, 25 claims, unpatente
20 miles from railroad, having a 100′ shaft and about 1,300′ of tunnels, show
auriferous and argentiferous copper ore.

NONPAREIL COPPER MINING CO. IDAH

Office: Wallace, Idaho. Letter returned unclaimed from former m
office, Mullan, Shoshone Co., Idaho. Amos M. Stroud, president and ge
manager; Jas. A. Wayne, secretary. Lands, 8 claims, patented, on the w
fork of Willow Creek, across from the Carney mine, 3 miles southeast of Mull
Development is by 4 tunnels, No. 1 being 74′, and No. 4, the lowest, being 11
Surface ores have given assays up to 1.5% copper, and 8 to 19 oz. silver per
Idle several years and apparently moribund.

NORDDEUTSCHE AFFINERIE. GERMAN

Office and works: Hamburg, Germany. Property is an electrolytic pl
having 600 tanks, with multiple arrangement of electrodes, yearly capac
being about 3,000 metric tons of cathodes.

NORDISKA GRUFAKTIEBOLAGET. NORWA

Office: Trondhjem, Norway. Mine office: Ripperfjord, Finmark
Tromsö, Norway. Exploratory work was done, 1907. Presumably idle.

NORFOLK SMELTER. VIRGINI

Owned by Virginia Smelting Co., at West Norfolk, Norfolk Co., Va.

NORMANBY SYNDICATE, LTD. AUSTRALI

Office: 16 O'Connell St., Sydney, N. S. W., Australia. Mine offi
Mount Perry, Bowen Co., Queensland, Australia. David Logan, secretary;
O'Brien, manager.

Lands, 240 acres, including the Gibb mine, on which some prospecting w
done, 1908, and the Harpur's Hill mine, circa 8 miles northwest of Mount Per
in the Tenningering district. The Harpur's Hill mine has a tunnel and 5 sha
including the 343′ three-compartment White shaft, the 296′ Northern shaft, t
Lady Jane shaft with 4 levels opened, and the Manning, Virgin No. 1 and Virg
No. 2 shafts. The mine has a vein of about 12′ average width, carrying
estimated to average 18% copper and 15 oz. silver per ton, with a trace of g
Selected ore has been sent to the Aldershot smelter, and latterly to the Mo
Perry smelter. Equipment includes new hoists at the principal shafts.

NORTH AMERICAN EXPLOITATION CO. **ARIZONA & MONTANA**

Office: 327 New York Life Bldg., Chicago, Ills. Wm. R. Everett, president; Chas. W. Cheney, vice-president; Davis Ewing, secretary; "Western Trust & Guaranty Co.," treasurer; Frank F. Day, managing director; Frank A. Sumerill, assistant general manager. Capitalization $10,000,000, shares $1 par.

This company was a swindle, selling stock on a "special repayment contract," under the pretence that "investments" would be repaid in full, plus interest, with "a certainty that the stock would advance upon the installation of smelters." No interest has been paid on the fake bonds since 1906, and a receiver was asked, 1909. The entire outfit should be jailed. Formerly at Rambler, Carbon Co., Wyo. Fully described Vol. VIII.

NORTH AMERICAN EXPLORATION CO. **ARIZONA**

Dead. Formerly at Gilbert, Yavapai Co., Ariz. Described Vol. VII.

NORTH AMERICAN LEAD CO. **MISSOURI**

Dead. Property was sold, under foreclosure by bondholders, Nov. 3, 1910, and bid in by M. J. O'Brien, of Ottawa, Ont. Formerly at Fredericktown, Madison Co., Mo. Fully described Vol. VIII.

NORTH AMERICAN MINES CO. **COLORADO**

Mine office: Frisco, Summit Co., Colo. H. T. McAllister, general manager, at last accounts. Property shows auriferous and argentiferous copper and lead ores. Equipment includes steam power and a small air-compressor.

NORTH AMERICAN MINING CO. **NEW MEXICO**

Dead. Was succeeded, 1906, by North American Copper Co. Formerly at Lordsburg, Grant Co., N. M. Fully described Vol. VI.

NORTH AMERICAN MINING CO. **OREGON**

Dead. Was succeeded, circa 1907, by North American Copper Co. Formerly at Burkemont, Baker Co., Ore. Fully described Vol. VI.

NORTH AMERICAN MINING & MILLING CO. **COLORADO**

Mine office: Liberty, Saguache Co., Colo. Jos. A. Powell, superintendent, at last accounts. Property, showing copper ore, is slightly developed.

NORTH AMERICAN PROSPECTING & MINING ASSOCIATION. **COLORADO**

Office: 405 Temple Court Bldg., Denver, Colo. Mine office: White Pine, Gunnison Co., Colo. Chris. C. Sierk, president and general manager; J. T. Chase, secretary. Lands, 60 acres, showing 7 contact veins, between limestone and shale, said to give average assays of 2% copper, 25% lead and 20% zinc from carbonate and sulphide ores. Has water power and a small concentrator making 55% zinc concentrates and 55% lead concentrates, carrying copper and gold values, when working. Idle several years.

NORTH AMERICAN SMELTER & MINES CO. **COLORADO**

Office: Boston Bldg., Denver, Colo. Mine office: Idaho Springs, Clear Creek Co., Colo. Works office: Golden, Jefferson Co., Colo. H. A. Riehl, president; C. M. Miller, secretary; J. H. Robeson, consulting engineer; Geo. C. Vivian, smelter manager; Fred H. Nye, mine superintendent; Jas. W. Myers, smelter superintendent. Organized circa 1909, under laws of Colorado, with capitalization $2,000,000, shares $1 par. Has authorized a $500,000 issue of 5% convertible bonds.

Lands, circa 400 acres, patented, including former holdings of the Banner Consolidated Mines Co., International Gold Mining Co., Centurion Mining Co., Donaldson Mines Co., Champion Comstock Mining Co. and Prosperity Mining Co. The mines, carrying 2 main veins, for a length of circa 6,000', have also 12,000' of workings, deepest circa 1,600', ore being extracted through the Rockford tunnel. Equipment includes steam power, but properties are now operated by commercial electric current.

The reduction plant is the old Golden furnace, remodeled, at a cost of about $35,000, having a 20-ton Vivian sintering furnace and 2 blast-furnaces of

maining from the old regime, and the former directors got off very c
indeed by returning about 100,000 shares of stock.

Lands of the old company originally were 4 claims and 2 millsites
55 acres, lying north of the Butte & London, and supposed to carry the
sion of the Black Rock vein. In March, 1908, the old company adde
Michigander and Third Sphinx claims, north of the Berlin mine of the
Butte, on which options were extended, October, 1908, but these claims rev
April, 1909, to the owner, Alexander Leggatt, through inability of the co
to take up a bond for $5,000, although Mr. Leggatt offered to take $1,00
and the company's notes for the balance. In 1908, the old company le
Occidental and Free Trade claims, after payments of $90,000 on the b
Apparently the company's only present property is the Overman claim,
owned outright, the Black Crow fractional claim, of circa 2½ acres, a
eleven-sixteenths interest in the Free Trade claim, with the Clipper and
millsites. Development is by a 700′ shaft, planned to be deepened to 1

NORTH BUTTE EXTENSION MINING CO. MONT

Dead. Was organized October, 1906, under laws of Arizona, with ca
zation $5,000,000, by Geoffrey A. Lauzier, Thos. Lavell, C. S. Passmore
Fayette Harrington, and title was changed, January, 1907, to North
Extension Copper Mining Co., which ran a most disgraceful course, and
succeeded, 1909, by North Butte Extension Development Co., which
more or less disreputable, until a new board was elected, circa 1910. F
at Butte, Silver Bow Co., Mont.

NORTH BUTTE MINING CO. MONT

Office: 1400 Alworth Bldg., Duluth, Minn. Mine office: Butte,
Bow Co., Mont. Employs 950 men. Capt. Jas. Hoatson, president; Ch
Duncan, vice-president and treasurer; Jos. B. Cotton, second vice-president
general solicitor; preceding officers, Jas. Gayley, Thos. F. Cole, Daniel F.
son, Wm. J. Olcott, John Uno Sebenius and Chester A. Congdon, dir
Frederic R. Kennedy, secretary; Daniel R. Smith, assistant secretary;
Hegardt, assistant treasurer; Henry B. Paull, auditor; John D. Pope,
manager.

Organized Apr. 5, 1905, under laws of Minnesota, with capital
$9,000,000, shares $15 par; issued, $6,150,000. Company began busi
$6,000,000 stock outstanding, and issued 15,000 shares, early 1910, to a
an outstanding fractional interest in the Crœsus claim. Net earnings
official statements, filed for purposes of taxation, with the auth
tana, were $1,839,442 for the year ending June 1, 1909, and $754,
ending June 1, 1910. Old Colony Trust Co., Boston, registrar; Ameri
Co., Boston, transfer agent. Has about 5,000 shareholders. Share
on the Boston stock exchange.

Dividends are paid quarterly, and have been as follows: $1.
$7.25 in 1906; $6 in 1907; $3 in 1908; $4 in 1909; $1.10 in 1910. A
terly dividend of 30 cents was declared March, 1911, on payment of
dends aggregated $9,292,000.

Lands, according to assessment records of Silver Bow County,
were 20 fractional claims, area 161 acres, and now are 22 fra
The company owns its lands mainly outright, but there are some
interests outstanding, in the case of several properties, and it is p
company owns interests in other properties than those standing
A two-thirds interest was bought, August, 1909, in the Paul,
claim adjoining the Gem and Crœsus claims of the North Butte and
the Badger State mine of the Anaconda. Holdings include the
Edith May, Jessie, Adirondack, John Emmett, Berlin, Ground
East Gem, West Gem, Copper Dream, Crœsus, Miners' Union,
Snow Ball, Margaretha, Hancock, Lynchburg, Mill View, Paul and

The Berlin group, to the north of the Speculator, Edith May, Gem and Jessie properties, consists of the Berlin, Gustavus, Leaf, Eva and Margaretha claims, but full title was secured only in 1909, after 4 years of litigation, and further suits were brought against the company by Mr. Levi N. Strong, the vendor who wishes to return the money paid him for the property, and take the land back. There seems little likelihood that Mr. Strong will succeed in his efforts. The Berlin has an old 350′ two-compartment shaft, long out of commission, and of no present practical value, and a new shaft of larger capacity was planned circa 1908, but has not been sunk.

The Granite Mountain mine had a 500′ shaft when taken over, and was 1,800′ deep, April, 1911, connected with the main workings on the 700′, 1,000′, 1,200′, 1,600′ and 1,800′ levels.

The different veins of the extensive system possessed by the North Butte are opened mainly from the Speculator shaft, regardless of old shafts and boundary lines of the claims, the work having been done as seemed most advantageous.

The Speculator vein, on which the main shaft was opened, has been practically well worked out to the depth of 2,000′, having produced about $6,000,000 worth of copper, silver and gold, but shows a little copper ore on the 2,000′ and 2,200′ levels.

The Edith May vein has been the principal ore producer of the North Butte from the inception of the company. This vein is worked from the Speculator shaft, and, as developed, is 18′ to 42′ in width, opened, at 200′ intervals from the 800′ level downward. The vein was of only ordinary value until the 1,200′ level was reached, after which there was a marked improvement, culminating in the 1,800′ level, which developed a vein up to 42′ in width, carrying phenomenally high grade ore, many of its stopes producing about 90% of first class ore, for a distance of about 1,000′ along the horizontal workings. The 2,000′ level showed a decrease in average value of ore, and also in the length of the ore shoot, while the 2,200′ level showed a truly alarming falling off, the ore being of much lower average grade than above, and payable for only about 300′ in length, as against a length of 1,000′ on the 1,800′ level only 400′ above, where the ore was mainly chalcocite and bornite, with considerable enargite. The Edith May vein divides, east of the shaft, showing no commercial ore in the south branch, but these branches may unite some distance west of the shaft. On the lower levels there are 2 fault-planes, defining the limits of the better grade of ore, these faults diverging in their downward course. The Edith May vein was opened in ore for 186′ on the 2,300′ sub-level, between the eastern and western faults, the vein averaging about 8′ in width, and carrying about 4.5% copper. Apparently the faults diverge with depth, giving a pyramid apexing above the 2,200′ level, which offers encouragement for further development at great depth.

The Jessie vein, opened by crosscuts from the Speculator shaft, ranks next to the Edith May in production and promise. Where opened on the 700′ level, in the Gem crosscut, the Jessie shows a vein of about 10′ width, ranging up to 15% in copper tenor. The best ore was found from the 1,200′ to the 1,800′ level, inclusive, becoming low in grade on the 2,000′ and 2,200′ levels, changing in character at this depth, showing more marcasite, with considerable sphalerite in drifts to the west. On the 2,000′ level the vein is about 8′ wide, showing up to 6% in copper tenor, and a good amount of ore has been developed on this level. On the 2,200′ level the vein is about 12′ wide, showing some ore up to 5% in copper tenor, but averaging materially below the average value of the mine above. The 1,600′ level has a high grade paystreak of chalcocite. The west drift on the 2,000′ level has opened a 150′ ore shoot, of 6′ width, carrying 5% copper and 7.5% silver. The west drift on the 2,200′ level shows low grade only.

The Berlin vein, opened through the Speculator shaft by crosscuts at

and silver values, was 9.78 cents per pound, delivered, and for 1910 cost probably was circa 10.5 cents per pound for finished copper.

Production has been as follows: 30,954,788 lbs. fine copper in 1905; 32,895,907 lbs. in 1906; 16,479,062 lbs. in 1907; 36,929,028 lbs. copper, 1,283,76[illegible] oz. silver and 1,593 oz. gold in 1908; 33,102,153 lbs. copper, 1,048,272 oz. silver and 1,302 oz. gold in 1909; 25,267,092 lbs. copper, 998,190 oz. silver and 1,19[illegible] oz. gold in 1910.

The North Butte had a spectacular rise as a heavy copper producer and a dividend-paying mine of the first rank, and had an almost equally spectacular drop, due partially to the blighting effects of the 1907 panic, felt alike by all copper mines, and partially to the decrease in values in the Edith May vein that came shortly after the panic.

It is obvious that the Edith May has seen its best days as a producer, but taking into consideration the history of the other mines of the camp, which have encountered a zone of impoverishment at an average depth of about 1,600' to 1,800', corresponding with the zone of impoverishment in the North Butte, after allowance for the higher ground on which the shaft is sunk, and making due allowance for the improvement noted in the Edith May vein at depth, it is reasonable to anticipate better ore in the Edith May below the 2,200' level, though it is not likely that any values approaching the spectacular stopes on the 1,800' level will be found in the deeper workings of the mine. The property also carries a considerable number of other cupriferous veins, of greater or less promise, some of which are likely to prove important producers of ore that will be profitable, though not up to the wonderful average of the Edith May stopes of 1907-1908, which were among the very largest and richest ever opened in any copper mine.

NORTH BUTTE MOUNTAIN COPPER CO. MONTANA

Dead. Formerly at Butte, Silver Bow Co., Mont. Fully described Vol. VIII.

NORTH BUTTE SUMMIT COPPER CO. MONTANA

Letter returned unclaimed from former office and mine, Butte, Silver Bow Co., Mont. G. W. Mickel, president. Organized January, 1907, with capitalization $1,000,000. Lands, 7 claims, in the Lost Child district, circa 5 miles northeast of Butte, showing ore giving assays of 1.3% copper. Idle since organization, but is not dead, though company cannot be reached through the mails.

NORTH BUTTE SUMMIT COPPER MINING CO. MONTANA

Dead. Apparently was succeeded by North Butte Summit Copper Co. Formerly at Butte, Silver Bow Co., Mont. Described Vol. VIII.

NORTH CAROLINA MINING CO. NORTH CAROLINA

Operating office: Webster, N. C. Mine office: Medlin, Swain Co., N. C. Winfield Scott Adams, general manager. Lands, 200 acres, known as the Everett mine, including a good smelter-site, and lands available for water power development, on Hazel Creek, in the Smoky Mountains. The mine, developed by tunnel, shows mainly chalcopyrite, with some melaconite, and a little native copper, ores being said to average about 6% copper. Equipment includes steam plant and a 4-drill Rand air-compressor. There are a number of buildings. Company has been in litigation over titles since 1899.

NORTH CAROLINA & VIRGINIA DEVELOPMENT CO. NORTH CAROLINA & VIRGINIA

Dead. Formerly at Virgilina, Halifax Co., Va.

NORTH CERRO MURIANO COPPER MINES, LTD. SPAIN

Dead. Was merged, Aug. 5, 1908, in Córdoba Copper Co., Ltd. Formerly at Estación de Cerro Muriano, Córdoba, Spain. Described Vol. VIII.

NORTH CERRO MURIANO COPPER MINING CO., LTD. SPAIN

Dead. Was succeeded, March 8, 1906, by North Cerro Muriano Copper Mines, Ltd. Formerly at Cerro Muriano, Córdoba, Spain. Described [illegible]

NORTHERN CALIFORNIA INVESTMENT CO. CALIFORNIA

Letter returned unclaimed from former office and mine, Copley, Shasta Co., Cal. Geo. Bayha, vice-president and manager. Lands, 18 claims, area [illegible] acres, known as the Black Diamond group, in the Stillwater district, on which little exploratory work is said to have shown considerable bodies of low-grade ore giving assays up to 8% copper. The company also was said to hold between 4,000 and 5,000 acres of patented lands, southeast of the Bully Hill mine. Life and presumably moribund.

NORTHERN COPPER (B. S. A.) CO., LTD. RHODESIA

Office: 365 Salisbury House, London, E. C., Eng. Operating office Bulawayo, Rhodesia. Lord Gifford, chairman; preceding officer, Edmund Davis, Dr. F. Rutherford Harris and P. Coventry Tarbutt, directors; Tom Dennis, secretary; Bechuanaland Exploration Co., Ltd., manager; Thos. D. Davies, resident engineer.

Organized Feb. 16, 1895, under laws of Great Britain, as Northern Territories (B. S. A.) Exploring Co., Ltd., changing name, June, 1899, to present title, with capitalization £100,000, increased, May, 1899, to £250,000, shares £1 par; issued, £224,630, fully paid. A former convertible bond issue has been retired. First dividend, paid Aug. 20, 1910, was 5% cash and 5% in fully paid shares of the Bwana M'Kubwa Copper Mining Co., Ltd. Stock holdings of the company include 33,334 shares in the Bwana M'Kubwa Copper Mining Co., Ltd.; circa 125,000 shares of the Rhodesia Copper Co., Ltd.; circa 180,000 shares of Kafue Copper Development Co., Ltd., and a stock interest in the Rhodesia Broken Hill Development Co., Ltd.

Owing to interchanging of share interests between this corporation and various subsidiary and collateral companies, and the bad habit, common to many English holding companies, of giving reports on mining properties, in which merely share interests are owned, as though they were owned outright, it is difficult to arrive at the true status of this company, or its exact holdings. The descriptions of the Silver King, North Star, Maurice Gifford, Crystal Jacket, True Blue, Blue Jacket and Sable Antelope mines, formerly given under this title, are listed, in this volume, under the name of the Kafue Copper Development Co., Ltd., which is the real owner. Lands originally were 500 square miles near the Zambesi River, with 12,000 acres of coal lands, and 220 gold claims in the Umniati and Guay districts, but 500 square miles were sold to the Rhodesia Copper Co., Ltd., leaving 5 blocks, of 10 square miles each, on either side of the northern reach of the Kafue River, scattered over an area of 160 miles east and west by 100 miles north and south. Jan. 1, 1910, property consisted of 3 blocks of 10 square miles each, carrying both surface and mineral rights; mineral rights over 10 square miles, at Chanobi; 2 tracts of 10 square miles each, at the N'Kana Sulphur Springs; the Lukali farm of 15,000 acres, on the Lukali River; the Alice farm of 500 acres, between the Lusensfwa and Lukashashi rivers; a 10% undivided interest in certain holdings of the Rhodesia Copper Co., Ltd., and the right to peg 600 reef claims and 300 alluvial claims in northern Rhodesia, under which right 160 claims had been located.

The Chanobi mine, 45 miles from the Silver King, has 5 shafts, on 4 separate outcrops. No. 1 shaft is 100'; No. 2 outcrop has a North shaft of 92' and a South shaft of 98', latter showing favorable copper values at bottom; No. 3 outcrop has a 78' shaft showing chalcopyrite and occasional chalcocite; No. 4 outcrop shows copper carbonates on surface. Apparently the various outcrops are of the same small sulphide vein. Improvements at the Chanobi include a store house, and a compound for native workmen. Transportation is by traction engines to the nearest railway, which is planned to reach the Kafue River and probably to touch the mines.

NORTHERN EXPLORATION CO. BRITISH COLUMBIA

Office: 655 New York Blk., Seattle, Wash. Mine office: Cobbled [illegible]

officers, D. E. Alexander, Fred Trevarrow and E. C. Curtis, directors; F. R. Luckhardt, general manager. Organized Aug. 2, 1901, under laws of California, with capitalization $300,000, shares $1 par.

Lands, 167 acres, in 4 groups, including La Reina de Cobre and Providencia copper mines, and El Colosus silver-lead mine, circa 25 miles west of Susqui & Batuc. Property shows diabase, shale and limestone, reported by the management to have 5 ore bodies, with 3 under development, of 2′ average width carrying argentiferous and auriferous oxidized and sulphide ores, with quartz gangue, estimated to average 15.5% copper, 20% lead, a trace of zinc, 73 oz. silver and $8 gold per ton. Development is by a 37′ crosscut tunnel, and by drift-tunnels of 100′, 418′ and 115′, with 633′ of workings, and management estimates 4,854 tons of ore in sight, with 3,214 tons blocked out for stoping. Idle on account of the Mexican revolution, March, 1911.

NORTHERN TERRITORIES MINES OF AUSTRALIA, LTD. AUSTRALIA

Dead. Was wound up voluntarily, 1910. Formerly at Palmerston, Northern Territory, South Australia. Fully described Vol. IX.

NORTHERN TERRITORIES MINING & SMELTING CO., LTD. AUSTRALIA

Dead. Was succeeded, Jan. 25, 1905, by Northern Territories Mines of Australia, Ltd. Formerly at Palmerston, Northern Territory, South Australia. Fully described Vol. VI.

NORTHERN TEXADA MINES, LTD. BRITISH COLUMBIA

Dead. Formerly at Van Anda, Texada Island, B. C. Described Vol. IX.

NORTH FORK COPPER MINING CO. WYOMING

Dead. Formerly at Battle, Carbon Co., Wyo.

NORTH FORK COPPER MINING & MILLING CO. IDAHO

Dead. Formerly at Mullan, Shoshone Co., Idaho. Described Vol. VII.

NORTH FORK GOLD & COPPER MINING CO. IDAHO

Office: 520 Cedar St., Wallace, Shoshone Co., Idaho. Mine office Enaville, Shoshone Co., Idaho. Curtis Lightner, president; Victor E. Waltman, vice-president; John Dolan, secretary and treasurer; preceding officers, Jos. Freeman, Wm. Sites and J. E. Lightner, directors; Myron Lightner, superintendent. Organized December, 1908, under laws of Idaho, with capitalization $1,000,000, shares $1 par, assessable; issued, $50,000. Annual meeting, third Saturday in April.

Lands, 9 claims, unpatented, and a 7-acre millsite, on the North fork of the Cœur d'Alene River, 13 miles from Enaville. The forestry department of the federal government caused considerable trouble, 1909, by cutting timber from mining claims owned by this company, thus exemplifying the practical benefit of a bureaucratic form of government. Property shows two 4′ fissure veins in Revette quartzite, carrying argentiferous and slightly auriferous lead and copper ores, latter being in the form of chalcocite, estimated to average 7% per, 10 oz. silver and $4 gold per ton. Development is by a 40′ upper tunnel, 65′ middle tunnel and 200′ lower tunnel, estimated by management to show 25,000 tons of ore. Equipment includes a hoist and 3 mine buildings.

NORTH FRANKLIN MINING CO. IDAHO

Office: Wallace, Idaho. Letter returned unclaimed from former mine office, Mullan, Shoshone Co., Idaho. W. H. Nichols, president; Norman Ebb, vice-president and general manager; Gary C. Burke, secretary and treasurer; preceding officers, Geo. F. Stoney and Thos. E. Booth, directors. Organized under laws of Idaho, with capitalization $1,000,000, shares $1 par, assessable; with 5 assessments levied, to end of 1910. Lands, 6 claims, area 120 acres, the Morning mine, in the Hunter Creek district, circa 2 miles north of Mullan. Development is by an 80′ shaft, and tunnels of 60′, 40′ and circa 1,700′, [illegible]

P. A. Tucker, secretary, treasurer and general manager. Organized March 1908, under laws of Washington, with capitalization $100,000, shares $1 pa nonassessable.

Lands, 11 claims, in the Ketchikan district, showing 3 contact deposits tween limestone and greenstone, of which one, under development, of 4' estimat average width, traceable 3,000', carries chalcopyrite, with schistose gang estimated by the management to average 10% copper, 3 oz. silver and $1 to gold per ton. Development is by two 70' shafts and 3 drift tunnels, with 2,000' of workings.

Equipment includes steam power and an air-compressor, and the manag ment planned a 1,800' ground-tram to tidewater. A test shipment of 3 to sampled 10% copper. Presumably idle.

NORTH LYELL MINE. TASMANIA.

Owned by Mt. Lyell Mining & Railway Co., Ltd., at Gormanston, Mont Co., Tasmania.

NORTH MOUNT BALFOUR COPPER MINES, N. L. TASMANIA.

Office: 31 Queen St., Melbourne, Australia. Mine office: Mou Balfour, Russell Co., Tasmania. P. J. Deely, chairman. Mine, opened by 510' tunnel, was being developed, with a small force, at last accounts, July, 191

NORTH MOUNT LYELL CONSOLIDATED MINING CO., N. L. TASMANIA.

Dead. Formerly at Gormanston, Montagu Co., Tasmania. Descri Vol. VIII.

NORTH MOUNT LYELL COPPER CO., LTD. TASMANIA.

Dead. Was absorbed, 1903, by Mt. Lyell Mining & Railway Co., Ltd Formerly at Gormanston, Montagu Co., Tasmania. Fully described Vol. III

NORTH MOUNT LYELL MINING CO., N. L. TASMANIA.

Dead. Was succeeded, Sept. 20, 1907, by North Mount Lyell Copper Co., Ltd. Formerly at Gormanston, Montagu Co., Tasmania.

NORTH MOWRY MINES CO. ARIZONA.

Dead. Formerly at Patagonia, Santa Cruz Co., Ariz. Described Vol. VIII

NORTH NYMAGEE COPPER MINING CO., N. L. AUSTRALIA.

Office: Sydney, N. S. W., Australia. Mine office: Nymagee, Mourama Co., N. S. W., Australia. John Waugh, chairman, at last accounts. Idle several years and apparently moribund.

NORTH ONTARIO REDUCTION & REFINING CO., LTD. ONTARIO.

Office: 88 Yonge St., Toronto, Ont. Works office: Sturgeon Falls Nipissing, Ont. Lieut.-Col. J. I. Davidson, president; A. Ansley, vice-president; J. J. Wright, secretary; O. L. Young, superintendent, at last accounts. Organized 1906, under laws of Ontario, with capitalization $500,000. Property is a smelter, between Sudbury and North Bay, built to treat the silver-cobalt ores of the Cobalt district, and the copper ores of the Nipissing and Algoma districts. Presumably idle.

NORTH PARK (U. S. A.) COPPER SYNDICATE, LTD. WYOMING.

Dead. Was wound up, voluntarily, 1909. Formerly at Keystone, Albany Co., Wyo. Described Vol. VIII.

NORTH PLATTE COPPER MINING & SMELTING CO. WYOMING.

Dead. Was a swindle, perpetrated by F. S. Pusey, of Philadelphia. Formerly at Douglas, Converse Co., Wyo. Described Vol. VI.

NORTH POLE MINING CO. COLORADO.

Office: Aspen, Colo. Letter returned unclaimed from former mine office Crystal, Gunnison Co., Colo. Jas. T. Stewart, chairman and general manager; Geo. N. Smalley, vice-president; W. Porter Nelson, secretary; Frank Meyer, treasurer; preceding officers, James R. O'Hara, Geo. H. Poor and A. T. Ferris, directors; C. Casagrande, superintendent, at last accounts. Organized 190 under laws of Colorado, with capitalization $500,000, shares $5 par.

retary. Apparently the company is not possessed of any lands, and is regarded with suspicion.

NORTH SHANGO COPPER MINING CO., N. L. AUSTRALIA

Mine office: Cobar, Robinson Co., N. S. W., Australia. Organized circa January, 1907, under laws of New South Wales, with capitalization £2,64[illegible] shares £1 par. Has a shallow shaft showing gold, with indications of copper at greater depth. Presumably idle.

NORTH SHORE COPPER & SMELTING CO. ONTARIO

Dead. Was a stockjobbing scheme. Formerly at Aberdeen, Algoma, Ont.

NORTH STAR MINING CO. MICHIGAN

Dead. Formerly at Ironwood, Gogebic Co., Mich. Described Vol. VII[illegible]

NORTH STAR MINING CO. WASHINGTON

Office: 502 Mutual Life Bldg., Seattle, Wash. Letters returned unclaimed from former mine offices, Index, Snohomish Co., Wash., and Chelan, Chelan Co., Wash. J. T. Ronald, president; Hon. John S. Jurey, vice-president; J. [illegible] Chase, secretary; John A. Soderberg, treasurer; preceding officers and E. L. McAllister, directors. Organized 1901, under laws of Washington with capitalization $1,500,000, shares $1 par. Is controlled, through stock ownership, by the Chelan Consolidated Copper Co.

Lands, 70 claims, area circa 1,200 acres, in 3 groups.

The Index group of 11 claims, lying between the Ethel and Bunker Hill & Sullivan mines, has a 4′ vein, with a 6″ paystreak carrying high grade bornite, balance of vein carrying some chalcopyrite, and the mine is claimed to have given average assays of 10% copper, which claim is excessive. Development by a 220′ shaft, and crosscut tunnels of 200′ and 600′, with circa 2,000′ of workings. This property has been idle several years.

The second group, of 6 claims, area 120 acres, lies on the western slope of the Cascade Mountains, and apparently is without development.

The third group, of 53 claims, adjoins the holdings of the Chelan Copper Co. and practically is a part thereof. This group on Red Mountain, on the eastern slope of the Cascade Mountains, in the Leavenworth district, is claimed to show gold ore, developed by several shallow shafts and opencuts and tunnels of 20′ and 100′.

The various properties are said to have several mine buildings, with water power, and an air-compressor. Idle and presumably moribund.

NORTH STAR MINING & MILLING CO. COLORADO

Dead. Property was sold to Silverton Mining Co. Formerly at Silverton, San Juan Co., Colo.

NORTH STATE GOLD & COPPER MINING CO. NORTH CAROLINA

Dead. Formerly at Jamestown, Guilford Co., N. C. Described Vol. VII[illegible]

NORTH UTAH MINING CO. OF BINGHAM. UTAH

Office: 1 Broad Street Place, London, E. C., Eng. Operating office 221 Herald Bldg., Salt Lake City, Utah. Mine office: Bingham Canyon, Salt Lake Co., Utah. A. L. Pearse, managing director; R. H. Munro, treasurer; preceding officer, C. Lambert, J. P., A. Dugdale, I. W. Dyer and D. L. [illegible] directors; W. H. Stentiford, secretary; W. D. Bohn, general manager. Organized Feb. 23, 1906, under laws of Maine, with capitalization $3,250,000, shares $5 par. Debentures, £45,900 at 6%. Company owns a half interest in the Markham Gulch Mining & Milling Co., and absorbed the Utah Extension Copper Mining Co., September, 1908, and the Utah Development Co. circa Nov. 1908, and also has taken over the property formerly owned by the New Red Mining Co., these various merged companies having had interlocking relations.

Lands, circa 300 acres, in Markham Gulch, including the Red Wing and Butler-Liberal mines. Property carries the Florence and Erie fissures, having been a good producer in the upper levels. The mines on a shaft [illegible]

Clark Co., Mont. Marcus L. Hewitt, president; J. H. Henry, vice-presid P. F. Wood, secretary; C. B. Waterman, treasurer; preceding officers, C. Weidinger, O. J. Merkel, W. M. Gorham, C. B. Waterman, A. E. Spriggs, J. Ketterlinus and A. W. Burwell, directors; C. C. Titus, manager. Organi under laws of Montana, with capitalization $3,000,000, shares $10 par, nonass able.

Property includes a two-thirds interest in the Bullion group of 6 clai carrying copper ore, and 150 acres of placer ground, with water-rights, in J ferson county, Montana. Improvements at the Bullion mine include a boa ing-house, bunkhouse, warehouse, smithy, office, laboratory and stables. T Bullion also has a 125-ton concentrator.

The smelter plant, located on the site of the old Peck concentrator, mi between Helena and East Helena, includes 3 stone buildings, and the mana planned putting the first unit of 100 tons in commission, 1911. Comm electric current is to be used. The company controls the patent rights fo northwestern states of the Baker-Burwell method of treating zinc ores. I regarded favorably.

NORTHWESTERN MINING CO. IDA

Letter returned unclaimed from former office, Baltimore, Md. Mine Lucile, Idaho Co., Idaho. Wm. B. Clark, president; Francis T. Homer, president; Chas. G. Helm, secretary and treasurer; Frank E. Johnesse, manager. Organized May, 1905, under laws of New Jersey, with capitali $200,000, shares $1 par.

Lands, 10 claims, area 200 acres, surveyed for patent, and a 5-acre m Property, including the Blue Jacket mine, of 4 claims, area 75 acres, diabase, diorite and altered schist, with 2 contact deposits estimated at 40 width, carrying oxidized ores to depth of circa 200', followed by native chalcocite and chalcopyrite, estimated to average 4 to 5% copper, 5.5 to silver and $2.80 to $4 gold per ton. Development is by shafts of 100' and and an 868' tunnel, with circa 4,100' of workings, estimated by the ma to show 60,000 tons of ore, with 25,000 tons blocked out for stoping. ment includes gasoline power.

NORTHWESTERN SMELTING & REFINING CO. BRITISH COLUM

Dead. Property was sold, 1905, to Britannia Smelting Co., Ltd merly at Crofton, Vancouver Island, B. C. Described Vol. IV.

NORTHWEST GOLD & COPPER CO. ORE

Dead. Formerly at Sumpter, Baker Co., Ore.

NORTHWEST MINING CO. WASHING

Dead. Formerly at Kettle Falls, Stevens Co., Wash. Described Vo

NORTHWEST SMELTING & REFINING CO. ORE

Office: 786 Broad St., Newark, N. J. Works office: Sumpter, Bak Ore. Scott German, president; G. F. Holmes, vice-president; G. N. W secretary; J. T. Donnelly, treasurer; preceding officers, Walter A. W Robt. Weir and Henry Hartgerink, directors; F. W. Scofield, general Organized Jan. 26, 1910, under laws of New Jersey, with capitalization shares $10 par, nonassessable, in $350,000 preferred and $350,000 comm issued, $400,000. Is operated as a close corporation.

Property is the Sumpter smelter, formerly owned by the Oregon Sm Refining Co., bought, under execution, December, 1909, for $17,050. T pany also owns 40 acres of mining claims, a limestone quarry, 640 ac ber land, and the 200-acre smelter-site.

The reduction plant includes a 33x37' sampling-mill, with 16x

The smelter, of circa 150 tons daily capacity, has a 46x88' furn with a 38x144" Allis-Chalmers water-jacket blast-furnace, making mated by management to average about 45% copper, 500 oz. silver gold per ton, sent to the United States smelter, at Salt Lake City

Lands, 54 claims, in 5 groups, in 4 districts, formation being much the same at the various properties. Country rock is micaceous schists, of lower Silurian age, with eruptive greenstone conformable with the schists, ore bodies occurring as extended lenses, very persistent in strike and depth, on the contact of the schists with metamorphosed olivine gabbro. Ore is cupriferous pyrite, carrying 3 to 10% copper and 10 to 30% sulphur, with small gold and silver values.

The Fines mine, which has the principal development and equipment, is about 1 mile south of the head of the Värranfjord, which is a branch of the great Trondhjemsfjord, mine being about 60 miles from Trondhjem. All property is owned outright, except the Fines and Tingstad mines, which are held under contract, by which they can be bought for $42,500 cash, or the same price in yearly installments, or can be operated for 90 years on a royalty basis. The Fines, which is an old mine, operated in a small way, many years ago, has a channel carrying lenses of 3′ to 10′ width, with an average of about 6′, ore being proven for about 1,200′ in length. Development includes several thousand feet of shafts, tunnels, crosscuts and drifts, and about 10,000 tons of ore have been extracted. The ore carries 0.15 to 5% copper, and about 45% sulphur, and Dr. J. H. L. Vogt estimates that the concentrating ore will average about 1.6% copper.

The equipment at the Fines mine includes quarters for upwards of 100 men, an office, store, bakery and mine buildings.

The 80-ton mill has 1 crusher, 2 Chilean mills, and two 80-ton Elmore vacuum oil flotation units, of which only one is installed, the other being on the ground. The company reports an extraction of 85% of the assay values, producing concentrates averaging 11.8% copper from ore averaging 1.6% in copper tenor. The mill has a 100-h. p. Tangye suction gas producer, burning anthracite coal. A 3,000′ aërial tram leads to shipping bins upon a wharf at tidewater.

The Tingstad mine is in a valley near the Fines, and is held under the same contract as the Fines, on the basis, alone, of a cash price of $10,000, or a royalty of 35 cents per metric ton on production.

The Skardahl mines include the Bratfjeld and Skarfjeld mines, in the Skardahl, at the head of the Kaafjord, a branch of the Lyngenfjord, lands being extensive, extending for 10 miles up both sides of the valley. This property apparently is of more promise than the Fines and Tingstad mines. The Skardahl group shows 3 veins, 1 apparently being an extension of the ore body of the Birtavara mine, and 2 parallel veins, about 16′ apart, are developed by 3 tunnels of about 3,000′ aggregate length. The upper vein ranges up to 3 meters in width, and the lower up to 2 meters, and there is a possibility that the veins will join at depth. Development work gave about 1,000 tons of ore, which 200 tons assayed 6.7%, 400 tons assayed 4%, and 600 tons assayed 2% copper, an average of circa 4.3%. Prof. Vogt classes ore of 5% or better as smelting ore, and ore under that tenor as concentrating ore. The Skardahl group has produced 4,500 tons of ore, shipped to smelters, under this company's ownership. This group also includes the Kobber Liens mine, 2 miles up the valley from the Bratfjeld.

Improvements at the Skardahl group include an office, accommodations for 50 workmen, and several other mine buildings. There is a 2,300′ aërial tram. A small river near by has a 300′ waterfall, which should give several hundred horsepower. The Lyngenfjord does not freeze over in winter.

Miscellaneous holdings include claims on the Island of Tromsö, and the company also holds mining lands in the Signalskarn district of Lyngenfjord. The Os or Faadals mine, formerly owned by King Oscar Frederick of Denmark, is near the Meraker mines, in the Rörös district, Trondhjem. The various properties include water-rights to a number of available waterfalls.

Some radical differences of opinion between the directors and the

engineer. Organized Dec. 10, 1906, under laws of Great Britain, with capitalization £150,000, shares £1 par, fully paid.

Lands, 1,028 acres, in 2 groups, including the Nymagee mine, bought, 1907, of the Great Cobar Mining Syndicate, and the Crowl Creek and Shuttleton mines.

The Crowl Creek and Shuttleton mines, area 260 acres, are at Shuttleton, Mouramba county, 16 miles west of Nymagee. The Shuttleton mine is 453′ deep, and the Crowl Creek mine is 730′ deep. These properties have been idle since 1909.

The Nymagee mine, area 768 acres, freehold, 50 miles from Cobar, lacking rail connection, which is badly needed, was opened 1880. The main vein, of 15′ to 20′ width, traversing slate and sandstone, carries ore of about 2% average copper tenor, and a rich shoot, of circa 250′ length and unknown depth, carries ore assaying up to 10% copper. Development is by 3 shafts, deepest 720′, said to block out 100,000 long tons of ore, with 150,000 tons additional reasonably inferred. Developments at depth are said to be promising.

The old mining plant of the Nymagee was replaced, 1907, by a modern equipment.

The Nymagee smelter has 3 small water-jacket blast-furnaces, and 4 small reverberatory furnaces for refining matte to blister copper of about 99.5% copper tenor. Largest production of the Nymagee was 2,388,320 lbs. fine copper, 1886. Production was 1,630,720 lbs. fine copper in 1898, and was 26,649 long tons of ore smelted, averaging circa 2.5% copper, yielding 1,491,840 lbs. fine copper in 1906. Although the average grade of Nymagee ore is dangerously low, the property is considered of promise, if given the railway transportation facilities absolutely essential to its successful operation.

NYMAGEE COPPER MINING SYNDICATE. **AUSTRALIA.**

Dead. Lands were sold to Great Cobar Copper Mining Syndicate. Formerly at Nymagee, Mouramba Co., N. S. W., Australia.

OAK CONSOLIDATED MINING & MILLING CO. **OREGON.**

Office: 226 Failing Bldg., Portland, Ore. Mine office: Grants Pass, Josephine Co., Ore. Chas. W. Birum, manager. Property includes the Oak and Hidden Fortune mines, carrying gold-copper ores, in Josephine and Jackson counties, Oregon. Has gasoline power.

OAKESDALE COPPER CO. **MONTANA.**

Office: Oakesdale, Wash. Mine office: Java, Dawson Co., Mont. R. H. Hutchinson, president and general manager; Jos. MacEachern, vice-president; E. L. Scott, secretary; T. S. Hutchinson, treasurer; preceding officers, T. H. Howard, J. H. McCoy, S. J. McCoy and John N. Morgan, directors; B. W. Bailor, superintendent. Organized August, 1907, under laws of Washington, with capitalization $100,000, shares 10 cents par, nonassessable; issued, circa $80,000.

Lands, 19 claims, 1 fractional, unpatented, area circa 375 acres, in the unorganized Java district. Property shows Revett quartzite and limestone, having an ore body, reported by company to carry native copper, malachite, bornite and chalcopyrite, averaging 12% copper, 7 to 8 oz. silver and circa $6 gold per ton, developed by tunnels of 106′, 475′ and 560′.

Equipment includes a 25-h. p. gasoline engine, and there are 7 buildings. Management plans steady development.

OAKS MINING & MILLING CO. **UTAH.**

Office: Eagle Block, Salt Lake City, Utah. Letter returned unclaimed from former mine office, Alta, Salt Lake Co., Utah. A. H. Cutright, secretary and treasurer. Capitalization, presumably $2,500,000. Lands include claims said to be surrounded by the Flagstaff, Old Emma, and Columbus Consolidated mines, and the company was claimed also to have lands at Mercur. No trace of operations secured, further than stock sales in 1907. Idle and presumably moribund.

OCALA COPPER CO. NEW MEXICO.

Mine office: Silver City, Grant Co., N. M. R. P. Thompson, superintendent, at last accounts. Lands, 160 acres, known as Thompson group, adjoining the main group of the Azure Mining Co., developed by a 400' shaft, showing low-grade copper sulphides. Property is under option to the Mangus Development Co.

OCAMPO MINING CO. MÉXICO.

Mine office: Cuatro Ciénegas, Monclova, Coahuila, Mex. José Marco, manager, at last accounts. Lands include El Barrio mine, carrying auriferous and argentiferous copper ores, equipped with steam power.

CAMILO OCAÑA. CHILE.

Office and mine: Taltal, Antofagasta, Chile. Ramón A. Heredia and David B. Contreras, superintendent, at last accounts. La Estrella de Venus mine, opened to depth of 125 meters, but hampered in operation by excess of water, produces ore that is brought, by hand selection, to 24.1% average copper tenor. La Ligua and La Gyacolda mines carry auriferous and argentiferous copper ores. Equipment includes steam power, and there is a concentrator with 4 Chilean mills. Mine and works employed 75 men, at last accounts, in 1907. Presumably idle.

OCCIDENTAL COPPER CO. MÉXICO.

Dead. Formerly at Palomas, Bravos, Chihuahua, Mex. Fully described Vol. VIII.

OCCIDENTAL MINING CO. CALIFORNIA.

Dead. Was a bad egg. Formerly at Keswick, Shasta Co., Cal. Described Vol. VIII.

OCEAN MINING CO. UTAH.

Office: 411 Auerbach Bldg., Salt Lake City, Utah. Mine office: Ibapah, Tooele Co., Utah. R. A. Kimball, president; Robert Palmer, vice-president; Brigham Clegg, secretary, C. C. Crapo, treasurer. Organized 1907, under laws of Utah, with capitalization $60,000, shares 10 cents par, assessable. Land: 6 claims, unpatented, circa 60 miles from a railroad, with a very rugged country intervening, and in an arid district. Property shows fissure veins carrying mainly copper, with some silver-lead, opened by shafts of 50', 90' and [illegible]. Made a test shipment returning 23% copper. Presumably idle.

MINERAL DE COBRE LOS OCOTES, S. A. MÉXICO.

Dead. Lands were sold, 1906, to Teziutlán Copper Mining & Smelting Co. for $565,000. Formerly at Ejutla, Oaxaca, Mex. Described Vol. VI.

OCTAVIA MINING CO. WYOMING.

Mine office: Cambria, Weston Co., Wyo. David Jones, president. Lands, 54 claims, including the Straight Up group, near the head of Jack Creek, slightly developed by a 60' tunnel. Idle since circa 1904.

ODIN MINING CO. UTAH.

Mine office: Park City, Summit Co., Utah. The 740' main tunnel cuts the Odin and Columbus veins, former, of about 2' width, showing an ore [illegible] about 3% copper, with some ore assaying up to 4% copper, 40 [illegible] oz. silver per ton. First smelter shipment returned 2.7% copper, 49 oz. silver and $2 gold per ton. Presumably idle.

O'DONNELL COPPER CO.

Dead. Formerly at Clifton, Graham Co., Ariz.

OE MINE.

Mine office: Mitsukuye-mura, Nishi-Uwa-gori, Iyo, Japan. Output was 160,696 lbs. fine copper in 1903, with no later production.

OEST & ENRIQUEZ.

Office: Apartado 65, Oaxaca, Oax., Mex. Letter reads from former mine office, Ocotlán, Oaxaca, Mex. Alfredo Oest, [illegible]

and handles mainly silver-lead ores, the only copper treated being that bought in connection with lead ores, which is concentrated to about 40% tenor, and sold in the east, whenever the copper becomes high enough in the matte to trouble the lead work.

OHIO COPPER CO. UTAH.

Office: 74 Broadway, New York, N. Y. Operating office: Salt Lake City, Utah. Mine and works office: Lark, Salt Lake Co., Utah. Stanley Gifford, president; Carlos Warfield, vice-president; preceding officers, P. Chester Thompson, Geo. Baglin, F. Augustus Heinze, H. H. Smith, J. P. Hutchinson and N. J. Catrow, directors; Frederick Eckstein, secretary and treasurer; Alfred Frank, general manager; W. A. Kidney, mill superintendent.

Organized Nov. 1, 1903, under laws of Nebraska, with capitalization $1,000,000, and reorganized Aug. 8, 1907, under laws of Maine, with capitalization $10,000,000, increased February, 1908, to $15,000,000, shares $10 par; issued, $12,292,700. Has authorized $2,000,000 ten-year 6% gold bonds convertible into stock at par, at any time prior to Sept. 1, 1917; outstanding $1,326,000. Borrowed $600,000 on notes, April, 1910, reduced, April, 1911, to circa $500,000. Company planned a sinking fund, calling for $100,000 beginning Sept. 1, 1910, but date for beginning the sinking fund has been postponed to Aug. 1, 1911. Had circa 2,500 shareholders, April, 1910. Company formerly was said to be controlled, through ownership of about two-thirds of issued stock, by United Copper Co. Empire Trust Co., New York, registrar; Carnegie Trust Co., New York, transfer agent. Annual meeting, first Wednesday in June.

Lands, 14 claims, patented, area 120 acres, with a 1,480-acre millsite. The mineral tract is bounded on the north and west by holdings of the Utah Copper Co., on the east by the Fortuna Mining & Milling Co., on the south by United States Mining Co., and on the southwest by the Boston Consolidated. The Mascotte tunnel, said to be controlled by Mr. F. Augustus Heinze, through the Bingham Central railway, exacts a toll of 15 cents per ton on all ore extracted through that avenue, yielding a very considerable revenue to the owners. The mineral property was bought of the Columbia Copper Mining Co., for $245,000.

The property carries ore in veins, and also disseminated in country rock. The mineralized zone has an EW. strike, and dip of about 45° N., consisting of a belt of quartzite of more than 500′ width, lying south of porphyry, carrying 2 parallel veins, known as the What Cheer and All's Well, the former on the southern border, near the contact of quartzite and porphyry, and the latter on the northern border, apparently having a porphyry hanging-wall. These veins are more than 500′ apart, separated by mineralized quartzite, carrying copper and iron sulphides, said to average 1.6 to 1.8% copper, but probably averaging under 1.5%. The quartzite, which merges into the laccolithic mass of monzonite porphyry of the Utah Copper and Boston Consolidated properties adjoining, is much shattered and broken, with ore disseminations and impregnations along shatter and cleavage planes, in the brecciated material, ore being chiefly chalcocite and chalcopyrite, associated with pyrite, readily amenable to concentration, and lying above the level of the Mascotte tunnel.

The fissure veins carry ores of higher average grade, with oxidized ores in the upper workings, but values are mainly in chalcocite and chalcopyrite, with quartzose gangue. The main fissure veins hows a width of 30′ on the 400 level.

The mine is developed by 2 tunnels, and one shaft, with a number of shallow shafts of no present importance, one being said to show a 3′ vein carrying a paystreak of malachite, averaging circa 25% copper, balance of vein carrying disseminated cuprite, estimated to average 5.12% copper. The main shaft, 6x12′, is sunk at an angle of 45°, to depth of 1,100′, where it connects with the

and tables, with a few buddles that treat the very finest feed, there being no vanners. Equipment of the 2 units in full commission includes 2 coarse and 4 fine Blake crushers, elevators, trommels, conveyors, 4 roughing and 8 finishing rolls, of Allis-Chalmers make, 16 Monadnock Chilean mills, 144 jigs, 288 Wilfley and James tables, and Callow classifying tanks. The installation includes 51 motors, ranging from 15 to 150 h. p.

The slime plant is to one side of the mill, and slightly lower, receiving feed by gravity. This building is 342′ long and 115′ deep, of the same construction as the concentrator, and is designed to treat 2,250 tons of material daily. Feed consists of the headwaters of the tables in the main mill, and overflow of the table feed tanks, which, after entering the slime plant, is distributed to 24 Callow tanks, arranged in two rows, on the table floor, which feed to 18 Wilfley tables in two rows.

Water is secured from a system of wells in the valley and from the Mascot tunnel, which has a minimum flow of 800 gallons per minute. The pumphouse has four 12x12″ thousand-gallon Aldrich triplex pumps, each geared to a 100 h. p. Westinghouse motor, raising water to the mill through a 24″ wooden pipe against a static and frictional head of 250′.

Production, under the old management, was circa 850,000 lbs. fine copper in 1904, and 3,000,000 lbs. in 1905, and production is estimated as approximately 6,000,000 lbs. in 1910. The company was milling about 1,500 tons of ore daily April, 1911. Mining costs are said to have averaged about 31 cents per ton 1910, and were reported as only 27.7 cents in August, 31.8 cents in September, and 31.3 cents per ton in October, 1910, with milling costs reported as 31 to 32 cents per ton, and total mining and milling costs were said to be about 84 cents per ton in February, 1911. The ratio of concentration is very high, being about 25 into 1, with a consequent heavy loss in tailings, of probably 35%, or upwards. The ore was running about 1.4% copper in April, 1910. Concentrates are sent to the Garfield smelter, 27 miles, at a freight rate of less than $1 per ton. Profit on operations, first quarter of 1910, was reported as $21,670.47, and the management stated, April, 1911, that the floating debt had been reduced approximately $100,000, by the profits from 1910 operations, and that the property was earning about $20,000 per month, from which about $6,000 per month was required for bond interest. It is obvious that the average grade of the porphyry ore of the Ohio is exceedingly low, even dangerously so, but the mine is well developed with very large bodies of ore that can be mined and milled at low average cost. The stock has suffered, marketwise, through its domination by Mr. Heinze, whose devious methods of management have wrecked various other companies.

OHIO-KEATING GOLD MINING CO. MONTANA

Office: Butte, Mont. Mine office: Radersburg, Broadwater Co., Mont. R. M. Calkins, president. Capitalization $500,000, which it was planned, in December, 1910, to increase to $1,000,000. Is controlled, through stock ownership, by Radersburg Consolidated Mining Co.

Lands, 8 claims, area 125 acres, carrying a vein traceable circa one-half mile. Mine, opened to depth of 225′, is said to show a 3′ vein of good ore on the first level, with considerable ore blocked out. Commercial electric current is taken from the Missouri River Power Co. The company became financially involved, and was idle at end of 1910, but early 1911 planned leasing the mine for balance of the year.

OHIO LEAD MINING & SMELTING CO. NEVADA

Letter returned unclaimed from former office, Salt Lake City, Utah. Mine office: Sprucemont, Elko Co., Nev. Lands, 8 claims, area 160 acres, showing 7 fissure veins, said to give average assay values of 7% copper and 7 oz. silver per ton, also a silver-lead vein opened by a 400′ shaft and tunnels of 700′ and 100′ with circa 3,000′ of workings. Has a 50-ton concentrator, and a smelter with 3 small water-jacket blast-furnaces. Idle.

are said to include the Carlotta mine, having a 5′ vein carrying up to 60 oz. silver; said to have some ore developed for stoping.

OHIO & TENNESSEE MINING CO. ARIZONA

Office: Delaware, Ohio. Mine office: Wickenburg, Maricopa Co., Ariz. W. D. Clymer, president and superintendent, at last accounts. Lands, 10 miles south of Wickenburg, have a 115′ shaft, showing a 2′ vein. Presumably idle.

OHIO-YAQUI MINING CO. MÉXICO

Office: 506 Harrison Bldg., Columbus, Ohio. Mine office: San Javier, Hermosillo, Sonora, Mex. John J. Joyce, president and manager; Lovett W. Jones, vice-president; John J. Joyce, Jr., secretary and assistant manager; Wm. M. Maize, treasurer; Jas. S. Lawrence, superintendent. Company apparently is very closely connected in management with the Ohio Mining & Smelting Co.

Property is La Sierra mine, said to be an antigua, carrying argentiferous copper ore, with excess of iron. Development is by a 1,400′ tunnel, cutting a 2′ vein carrying ore assaying up to 2% copper and 75 oz. silver per ton, and an ore zone of 150′ estimated width is said to give assays of 2.5% copper and 50 oz. silver per ton, presumably from selected ores. The mine is said to have considerable ore blocked out for stoping, in the upper workings.

Equipment includes a steam plant with an 80-h. p. boiler and hoist, and there is a 10-stamp mill.

OJANCOS MINING CO. CHILE

Dead. Lands were sold to Copiapó Mining Co., Ltd. Formerly at Copiapó, Atacama, Chile.

COMPAÑÍA MINERA DE OJANCOS NUEVOS. CHILE

Letter returned unclaimed from former office, Valparaiso, Chile. Mine office: Tierra Amarilla, Antofagasta, Chile. Thos. C. Peddar, manager, at last accounts. Organized Apr. 30, 1903, under laws of Chile, with capitalization £150,000, shares £1 par. Property is El Transito mine. Presumably idle.

OJIBWAY MINING CO. MICHIGAN

Office: 14 Alworth Bldg., Duluth, Minn. Operating office: Houghton, Mich. Mine office: Ojibway, Keweenaw Co., Mich. Dr. Lucius L. Hubbard, president; Chas. A. Duncan, vice-president and treasurer; preceding officers, Thos. F. Cole, Chester A. Congdon, Chas. d'Autremont, Jr., Oscar J. Larson, Capt. Jas. Hoatson, Capt. Thos. Hoatson and John D. Ryan, directors; Frederic R. Kennedy, secretary; Daniel R. Smith, assistant secretary; Wm. G. Hegardt, assistant treasurer; Henry B. Paull, auditor; Andre Formis, superintendent; Capt. Wm. Bryant, chief mining captain; Wm. H. Charlton, clerk; Jas. Stephens, master mechanic.

Organized June 8, 1907, under laws of Michigan, with capitalization $2,500,000, shares $25 par, assessable; issued, $2,100,000, $11 paid. Levied a $2 assessment January, 1910, payable $1 March and $1 October, 1910. Company began business with circa $500,000 cash, and, on Apr. 30, 1910, had cash and accounts receivable of $62,736.99, with $10,247.13 accounts payable. Property was bought for $459,919.29. Boston Safe Deposit & Trust Co., registrar; American Trust Co., Boston, transfer agent. Shares are listed on the Boston stock exchange. Annual meeting, first Tuesday in June.

Lands, circa 1,600 acres, bounded on the north by the Cliff and on the south by the Seneca. Property includes the old Manhattan tract, Bacon & Jacobs lands, property bought of the Union Copper Land & Mining Co., and the Miskwabik tract of 1,224 acres, in Section 5, Town 57, and Sections 33 and 34, Town 58 North, Range 31 West.

The Kearsarge bed was located, circa 1904, on the Miskawabik tract, about 4 miles northeast of No. 1 shaft of the Mohawk, and was proven by 5 diamond drill holes, crossing the formation at intervals of 1,200′, of which 4 holes gave good cores, predicating the making of a rich mine, the cores being especially rich in

OJO VERDE COPPER CO. MÉXICO

Letter returned unclaimed from former office, Chicago, Ills. Mine office Autlán, Jalisco, Mex. Thos. Kelly, president; Stanislaus F. Ossolinski, manager at last accounts. Lands include El Refugio mine, showing an outcrop for nearly a mile. Property is said to have an extensive ore body, carrying mainly copper values. The management planned building a wagon-road to Chamela, on the Pacific, and erecting a mill. Presumably idle.

OKANE MINE. JAPAN

Mine office: Tsumo-mura, Mino-gori, Iwami, Japan. Production, 1907, was 38,489 lbs. fine copper.

O. K. BLOCKS, LTD. AUSTRALIA

Dead. Was liquidated 1908. Former office was Cairns, Queensland, Australia. A. J. Draper was secretary; A. F. Martyn, mine manager. Lands three-fourths mile southeast of the main workings of the O. K. mine, carried a 7' vein of sulphide copper ore, slightly developed. Production, 1907, was 478 long tons of 10% average copper tenor, sold to the O. K. Copper Mines Development Syndicate, N. L., returning circa 100,000 lbs. fine copper. Was liquidated 1908. Formerly at Mungana, Lynd Co., Queensland, Australia.

O. K. COPPER CO., N. L. AUSTRALIA

Office: Abbott St., Cairns, Queensland, Australia. British office: Palmerston House, London, E. C., Eng. Mine and works office: Chillagoe, Lynd Co., Queensland, Australia. John Newell, chairman; preceding officers, W. R. Munro, E. B. Torpy, A. Overend and Sydney Beach, directors; Thos. Welsby, secretary; Henry Twynam, mine manager; A. P. Selby Davidson, smelter superintendent. Organized June 23, 1909, under laws of Queensland, as a reconstruction of the O. K. Copper Mines Development Syndicate, N. L., with capitalization £90,000, shares 4s. par; issued, 337,450 shares. Company voted Oct. 13, 1910, an authorization of the issue of part or all of the 112,685 ordinary shares remaining in the treasury, as preferred shares, to be issued at 4s. each payable 1s. on application, and balance in calls not to exceed 3d. per month, the management deciding to resume work when £3,000 was in hand. The old company paid total dividends of £92,798, which money could have been expended better on development work. The old company had protracted litigation with Aron Hirsch & Sohn, of Halberstadt, Germany, resulting in an adverse verdict for £19,570 and costs, which was compromised by a cash payment of £16,5[illegible] which, strangely enough, took exactly all the money that the company had, and necessitated reconstruction.

Lands, 4 mineral leases, area 90 acres, and a 60-acre smelter-site. Property includes the North O. K. mine, which is quite wet, and the lower levels of the main mine make considerable water. The property shows altered siliceous argillaceous and hornblendic shales, carrying irregular lenses of ore, capped by practically barren gossan. Two ore bodies under development range 12' to [illegible] in width, carrying oxidized ores to depth of about 40' only, succeeded by about 120' of high-grade chalcocite, said to be associated with pyrite. Diamond drill boring, 1907, showed the main vein to carry ore up to 12% in copper to at depth of 480', and proved the continuation of the ore bodies to good depth though in decreasing quantity and quality. The principal ore bodies are known as the Main, at the south, and the Eastern, with an intermediate ore body, termed the Kaolin. The management of the old company estimated ore reserves Dec. 31, 1908, at 40,000 long tons, and the state mines department estimated reserves at the same date, as 30,000 long tons of 8% average copper tenor. The ore carries traces of lead and zinc, and 0.025 oz. gold per ton, and as smelted has ranged 9 to 10% in copper tenor.

The main shaft, of 300' depth, has levels at 80', 115', 150' and 200', the latter being much too close together. Very little development work was done in 1907, during the era of high prices, though after the break, sinking and [illegible]

O. K. GOLD & COPPER MINING CO. ARIZONA.

Dead. Formerly at Florence, Pinal Co., Ariz. Described Vol. VIII.

OKLAHOMA COPPER CO. ARIZONA.

Dead. The company went out of business, and was reorganized under laws of Arizona, as Amalgamated Gold, Copper & Silver Co., ostensibly because of the unfavorable laws of Oklahoma, with its high corporation tax, but possibly to avoid payment of a note for $1,100. It transpires that Mr. H. G. Beard, the president and general manager, never transferred legal title of the lands to the company. Formerly at Florence, Pinal Co., Ariz. Described Vol. VIII.

OKLAHOMA MINING CO. NEVADA.

Dead. Formerly at Yerington, Lyon Co., Nev. Described Vol. IX.

OKLAHOMA MINING & SMELTING CO. ARIZONA.

Dead. Formerly at Price, Pinal Co., Ariz. Described Vol. VI.

O. K. SOUTH BLOCK CO. AUSTRALIA.

Mine office: Mungana, Lynd Co., Queensland, Australia. Lands, adjoining the O. K. Copper Mines Development Syndicate, N. L., have a 100′ shaft with steam power. Presumably idle.

OKUZU MINE. JAPAN.

Owned by Mitsu Bishi Goshi-Kwaisha.

OLALLA COPPER MINING & SMELTING CO. BRITISH COLUMBIA.

Office: Second National Bank Bldg., Paterson, N. J. Mine office: Olalla, East Yale district, B. C. Robt. Gaede, president; Jos. Barnford, Jr., vice-president; John E. Tylee, secretary and treasurer; preceding officers, Fred A. Blauvelt, Warren N. Conant, Robt. Swinley, F. C. McLane, H. Chas. Roy and Frank E. Morrison, directors; Fletcher H. Parsons, general manager. Organized Oct. 19, 1901, under laws of Maine, with capitalization $8,000,000 shares $25 par. Annual meeting, first Monday in August.

Lands, 32 claims, crown-granted, area 1,183 acres, and a 92-acre mill smelter and town site, in the lower Similkameen and Keremeos camps, Osoyoos division, East Yale district, 4 miles from a railway, property including the town site of Olalla. Lands show contact deposits between diorite and felsite, with ore bodies in both, but mainly in the felsite. Twelve claims adjoin the town site of Olalla, and the Dividend group, of 7 claims, is 17 miles distant. Veins, about a dozen in number, were claimed by the former management to range to 500′ in width, estimated to carry ore averaging 5% copper, 2 to 5 oz. silver and $1 to $40 gold per ton, but this ridiculously inflated estimate has been reduced to reasonable dimensions by the present management, which claims 1 vein, under development, to carry bunchy replacement deposits of chalcopyrite, with garnetite and magnetite gangue, in limestone, near intrusive contacts, assaying 1 to 5% copper, a little silver and $1 to $7 gold per ton. Development is by a 7 shaft, and tunnels of 642′, 600′, 150′ and 112′, with 1,504′ of workings. There is no power equipment. Property is leased, for 25 years, to the Yale Development & Construction Co., organized among the stockholders of this company.

OLANCHO COPPER CO. HONDURAS.

Dead. Former office was 42 Broadway, New York, N. Y. This company was a nearly perfect example of a mining fake. Officers were F. H. Allen, president; Henry A. Spears, engineer. The company was floated circa January 1910, and was capitalized at $1,000,000, shares $1 par. Lands were claimed to be about 80 miles from the Caribbean sea, some distance from a railway, and the property, claimed to be opened by shafts and trenches, was claimed to show 5,680′ of the strike of a copper vein of 8′ to 14′ width, one-half of which was modestly claimed as a paystreak averaging 22% copper and $20 gold per ton, and the balance of the vein was claimed to carry merely 10% copper and $8 gold per ton. The United States consul at Tegucigalpa was quoted, probably falsely, as reporting that in the department of Olancho there was ore reported to run 80% copper and 20% silver, which would constitute a decidedly valuable alloy—if it were

ized Jan. 15, 1904, under laws of Maine, with capitalization $8,750,000, sha
$25 par. First dividend, 50 cents per share, was paid Dec. 15, 1905, and div
dends have been as follows: 50 cents in 1905; 50 cents in 1906; $1 in 19
50 cents in 1908; $1.50 in 1909; $1.25 in 1910, a total of $5.25 per share, to e
of 1910.

The company is a securities holding corporation only, organized to promo
the operation of the mines of the Old Dominion Copper Mining & Smelting C
and United Globe Mines under a joint management, while technically complyi
with injunctions restraining the merging of these two corporations. Prope
of the Old Dominion Co. is exclusively shares in the two subsidiary corporati
named, and the Old Dominion Co. is controlled by the United Globe Min
owned by Phelps, Dodge & Co., the United Globe having given 138,000 sha
of its stock, and $250,000 cash, for 138,000 shares of the Old Dominion C
The Old Dominion Co. has exchanged its stock for shares of the Old Domin
Copper Mining & Smelting Co., and owns 150,245 shares, or about 93%
the issued stock of 162,000 shares of the Old Dominion Copper Mining & Sm
ing Co. The balance sheet of Dec. 31, 1908, showed holdings, unchanged fr
the preceding year, of $6,981,125 in subsidiary corporations, with special ite
accounts aggregating $589,696, and profit and loss surplus of $29,215.

The Old Dominion and United Globe mines are operated by the Old D
minion Co. as entities, but with a free interchange, upon an equitable basis,
ores for smelting and fluxing. The Old Dominion Co. financed the form
floating indebtedness of the Old Dominion Mining & Smelting Co., by means
a loan. The subsidiary properties are described under their respective titles.

OLD DOMINION COPPER MINING CO. ARIZON

Dead. Was succeeded, circa 1895, by Old Dominion Copper Mining
Smelting Co. Formerly at Globe, Gila Co., Ariz.

OLD DOMINION COPPER MINING & SMELTING CO. ARIZON

Office: 852–50 Congress St., Boston, Mass. Mine and works offi
Globe, Gila Co., Ariz. Employed, 1910, an average of 812 men. Chas. Sum
ner Smith, president; preceding officer, Geo. Napier Towle and Dr. Jos. T. Ri
rick, executive committee; preceding officers, Chas. T. Lund, E. F. Newton an
G. Waldo Smith, directors; Chas. H. Altmiller, secretary and treasurer; G. E
Dowell, general superintendent; Geo. Hegardt, superintendent; L. O. How
smelter superintendent; Dr. L. D. Ricketts, consulting engineer. Organize
July, 1895, under laws of New Jersey, with capitalization $5,000,000, shares $
par; issued, $4,050,000. Is controlled, through ownership of 155,245 shares
the 162,000 shares of issued stock, by the Old Dominion Co. Resumed di
dends July, 1907, after an intermission of 12 years, and paid dividends of $1
per share, or $202,500, in 1907; $1 per share, or $162,000, in 1908; $3 per sh
or $486,000, in 1909; $2.75 per share, or $435,500, in 1910. The company fo
merly had a large floating debt, which was cared for by the Old Dominion C
and the last of this debt, amounting to $100,000, was paid October, 1908. F
years ending 1907, improvements cost $1,875,647. Annual meeting
Wednesday in April.

The company has been engaged, for some years, in extensive litigation w
A. S. Bigelow and the Estate of Leonard Lewisohn, suing for recovery of pr
tion profits. The litigation is extremely involved, being in the state co
New Jersey and Massachusetts, and also in the federal courts, and was fu
complicated by efforts of the New Jersey courts to restrain the company f
prosecuting suit against the promoters in the Massachusetts courts. On De
1907, the company secured, in the Massachusetts court, a verdict of $1,70
for damages, but there is no record of the judgment having been paid, and a
ently the litigation may drag along for years.

Lands, 9 claims, 3 fractional, and a 10-acre millsite, at Globe, also th
Dominion and Keystone claims, circa 3½ miles north of Globe, the Co

and 1 with a 2-deck cage. Equipment includes a steel engine-house, built 191[illegible] having a 17x31x48″ Nordberg compound hoist, good for 2,000′ depth.

"B" shaft, on the eastern side of Pinal Creek, is bottomed on the 14th lev[illegible] and has 4 compartments.

"C" shaft is bottomed on the 12th level.

"D" shaft, 1,000′ deep, at the 14th level, is located o[illegible] the western side [illegible] Pinal Creek, about 2,000′ west of the most westerly previous workings.

The Transit shaft, about one-half mile east of "A," was crosscutting [illegible] both directions, at approximately the 2d level of the main mine, at the end [illegible] 1910.

A new shaft, known as the Kingdon, was 150′ deep, April, 1911.

The old Buckeye shaft, at the intersection of the Buckeye and Carr[illegible] claims, was enlarged, 1910, from 2 to 3 compartments, and is to be deepened [illegible] develop a large body of silicious ore. Equipment at the Buckeye includes [illegible] 75-h. p. Wellman-Seaver-Morgan electric hoist, driven by a General Electr[illegible] motor.

The Grey mine has a 75-h. p. Wellman-Seaver-Morgan electric hoist, and [illegible] to be developed. The upper workings of the Grey mine, east of the shaft [illegible] above the 5th level, are under lease to W. E. Carter.

The Continental mine shows some high grade sulphide ore, and has [illegible] siderable bodies of ore assaying about 3% copper.

In addition to the shafts previously named, the property has a nun[illegible] of smaller shafts, mainly of the prospect class, and several tunnels, not in pre[illegible] use.

The mine, mill and smelter are connected by a private railway, equip[illegible] with a 14x20″ Porter locomotive, and 50-ton ore-cars.

Ores are graded and furnace charges prepared at the millsite, a short d[illegible] tance from the mine. The grading plant has six 85-ton steel coarse-ore b[illegible] Ore is drawn from the various pockets to manganese steel trommels, under[illegible] dropping to an 18″ conveying-belt, which carries it to railroad storage bins, wh[illegible] oversize goes to a 10x20″ crusher, and thence to a 36″ picking-belt, from wh[illegible] smelting ore is hand-picked, and residual ore reduced to 2″ size in a 10x20″ [illegible] crusher, going thence, on an 18″ belt, to the conveyor storage-bins, of 200 [illegible] tons capacity each. From the storage-bins ore is drawn automatically [illegible] conveying-belt that takes it to the top of the mill, where ore is discharged [illegible] mixing-box, and passed to revolving screens for classification.

The 300-ton mill is of structural steel, on concrete foundations, with [illegible] siding and roof. Equipment includes 18 Frue vanners and 9 Wilfley [illegible] The plant is entirely automatic, and of excellent design and practice. The [illegible] age of all ores treated in the concentrator is about 3.6% copper, and, owing [illegible] large amount of iron, the ratio of concentration is very low. In connection [illegible] the mill is a sampler of about 125 tons daily capacity, for custom ores. [illegible] matter of enlarging the mill was under consideration, early 1911.

The smelter does some custom work, and formerly was an extensive [illegible] chaser of sulphide ores, needed for fluxing the oxidized ores of the Old Do[illegible] and United Globe mines, but latterly these mines have developed consi[illegible] quantities of sulphides, in the lower workings, hence the amount of [illegible] ore handled has been re[illegible] materially.

The smelter includes [illegible] buildings, of structural steel, on stone [illegible] tions. There are 8 doub[illegible] [illegible], holding 1,000 tons of coke, [illegible] and ore. Mixing, weighin[illegible] [illegible] are done automatically, [illegible] force of only 4 men. Equi[illegible] [illegible] blast-furnaces, each [illegible] tuyeres, set tandem, with [illegible] between, charged [illegible] from side-dumping cars. The [illegible] smelter a nominal [illegible] about 2,400 tons daily, but one [illegible] [illegible] ber is 20x20x250′, connecting wi[illegible] [illegible]

OLD EMMA MINES CO. UTAH

Office: 401 Herald Bldg., Salt Lake City, Utah. Letter returned un claimed from former mine office, Alta, Salt Lake Co., Utah. L. R. Martineau president; Jesse Knight, vice-president; W. Lester Mangum, secretary and treasurer; preceding officers, Wm. Groesbeck and O. P. Miller, directors. Or ganized circa July, 1908, under laws of Utah, as successor of Old Emma Mining Co., with capitalization $600,000, shares $1 par.

Lands, 5 claims, patented, known as the Old Emma mine, adjoining the Emma Copper Co. The Old Emma mine was discovered 1870, and became an important producer of bonanza ore, which is said to have returned a profit of $120 per ton, from shipments to Swansea. The property passed into the hands of an English company promoted by Gen. Robt. Schenck, then American minister to England, who also introduced the American game of poker to polite British circles. The mine was a considerable shipper, until circa 1874, but never was a producer of importance thereafter, and the English lost heavily on the property, said to have been bought for $5,000,000.

The Old Emma bonanza was a pear-shaped body of rich ore, which came to an end suddenly, after producing ore values variously reported as $1,000,000 to $7,000,000. Some of the ore returned 22,000 oz. silver per ton, and during 6 months of 1872 the Emma mine shipped 4,200 tons of ore that gave average returns of about 35% lead and $182 silver per ton. A little work was done in 1908, when some of the old workings were cleaned out, the mine showing a large body of low-grade carbonate ore. Buildings include a bunkhouse and smelter. Idle, and property for sale at the price of $100,000.

OLD EMMA MINING CO. UTAH

Dead. Was succeeded by Old Emma Mines Co. Formerly at Alta, Salt Lake Co., Utah. Described Vol. VIII.

OLD GLORY COPPER CO. MONTANA

Dead. Property was sold, November, 1910, to Anaconda Copper Mining Co. Formerly at Butte, Silver Bow Co., Mont. Described Vol. VIII.

OLD GOVERNORS COPPER MINING & SMELTING CO. NEW MEXICO

Dead. Formerly at San Marcial, Socorro Co., N. M. Fully described Vol. VIII.

OLD HICKORY COPPER MINING CO. NEW MEXICO

Dead. Was absorbed, circa 1901, by Copper Chief Mining Co., later Santa Fe Copper Co., later Ft. Pitt Copper Co. Formerly at Clayton, Union Co., N. M.

OLD HUNDRED MINING CO. COLORADO

Office: 43 Wall St., New York, N. Y. Mine office: Silverton, San Juan Co., Mont. Howell Hinds, president; Thos. A. Nevins, vice-president; W. H. Briggs, secretary and treasurer; preceding officers, Wm. C. Eakins and John Werkheiser, directors; J. M. Elmer, superintendent. Robt. W. Davis, Jr., former general manager, resigned, early 1907, when the management began "ballooning" the stock, and sending out doctored reports over his signature. Organized, June, 1906, under laws of Maine, with capitalization $5,000,000, shares $5 par.

The company has authorized $400,000 of series "A" first mortgage 6% bonds, and it transpired, 1910, that the $400,000 for which bonds were issued was owed to Neigold & Rodell, the vendors, on the purchase price. The company had a floating indebtedness, May, 1910, of $150,000, and is said to be heavily in debt to President Hinds. The stock was floated by Thos. Sr. & Son, of New York, and advanced, by rank manipulation, to $5 per share, which was above any possible actual value.

Lands, 26 claims, patented, area circa 500 acres, in Cunningham Gulch on Galena Mountain, near the Silverton & Northern railway. The property shows a quartz vein of 5' to 12' claimed width, carrying values in gold, lead and copper, with increasing copper at depth, ore being [illegible]

includes a 35-h. p. gasoline engine, 12-h. p. gasoline hoist, and a 30-h. p. Ingersoll-Rand air-compressor. Management planned, April, 1909, a 100-ton new process copper smelter, to cost $20,000, but apparently failed to build same.

OLGA COPPER CO. NEVADA.

Dead. Former office was Tonopah, Nev. Geo. Davidovich was general manager. Property, near Luning, carried a vein said to have been proven for 2,200′ along its strike by shafts of 20′ to 60′, showing ore claimed to average 8% copper, with some assays up to 50%. Formerly at Luning, Esmeralda Co., Nev.

OLIVE CAMP MINING CO. ARIZONA.

Dead. Formerly at Tucson, Pima Co., Ariz. Described Vol. VIII.

JOSEPH OLIVER. NEW MEXICO.

Office and mine: Chloride, Sierra Co., N. M. Lands, 120 acres, in the Apache district, showing 6 contact deposits, between limestone and porphyry, of which 2, under development, of 40′ reported average width, are said to be traceable 7 miles, carrying oxide, carbonate and sulphide ores of copper, claimed to average 18% copper and 25 oz. silver per ton, which estimates are too high. Mine is opened by shafts of 30′, 50′, 75′, 100′ and 110′, and by a 200′ tunnel. Presumably idle.

OLIVER MINING CO. COLORADO.

Dead. Was merged, 1903, in San Juan Smelting & Refining Co. Formerly at Silverton, San Juan Co., Colo.

OLYMPIA MINING CO. OF WYOMING. WYOMING.

Dead. Formerly at Encampment, Carbon Co., Wyo. Described Vol. VIII.

OLYMPIC MINING CO. ALASKA & WASHINGTON.

Office: 322 Globe Bldg., Seattle, Wash. E. R. Butterworth, president; Alfred Jeffery, secretary. The company advertised stock on the installment plan, claiming that its lands carried gold, copper and coal, but the management stated that its copper property was not under development, and now states that its copper claims were disposed of, long ago, but does not explain where these alleged copper claims were. The management claims to have gold and silver claims, in southeastern Alaska, but does not give the name of its mine office, and the management claims that the company is about to be reorganized, but gives neither the name of the new company, nor any particulars regarding same. Is regarded with suspicion.

OMAHA COPPER MINING CO. WYOMING.

Office: 1017 New York Life Bldg., Omaha, Neb. Letter returned unclaimed from former mine office, Encampment, Carbon Co., Wyo. Jas. H. Kyner, secretary. Is a twin of the Blanche Copper Mining Co. Idle some years and apparently moribund.

OMAHA GOLD & COPPER MINING & SMELTING CO. MONTANA.

Dead. Formerly at Bigtimber, Sweetgrass Co., Mont.

OMAKI MINE. JAPAN.

Mine office: Nishitate-mura, Kita-Akita-gori. Ugo, Japan. Mine was opened circa A. D. 1750, and reopened 1885. Ore bodies are lenses in Tertiary tuffs and andesite, largest lens being 70′ deep and 130′ long. Ores are argentite, chalcopyrite, sphalerite and galena. Latest reported production, 1896, was 242,690 lbs. fine copper and 858,316 momme fine silver. Idle some years.

OMAR MINING CO. ALASKA.

Office: 224 Stark St., Portland, Ore. Mine office: Kiam, Prince of Wales Island, Alaska. Chas. E. Ladd, president; W. A. Howe, vice-president; C. E. S. Wood, secretary and treasurer; W. W. Catlin, general manager; H. W. Turner, superintendent, at last accounts. Organized 1904, under laws of Oregon.

Lands, 6 claims, unpatented, area circa 80 acres, showing Kasaan greenstone and amphibolite schist, latter in part dioritic, showing 4 parallel ore zones, having lenses in schist of 4′ to 40′ estimated width, carrying chalcopyrite, associated

Work was suspended 1900, and the property was idle, except for a [illegible] work, 1906–1907, until resumption August, 1909, when a campaign of diam[ond] drilling was begun, and continued 1910, ten drill-holes being bored, cutting [the] Oneco bed, on which the shaft is sunk, and an unidentified amygdaloidal [lode] called the Torch Lake or Tomahawk lode, lying about 1,200′ west of the On[eco] both beds giving cores showing more or less copper. Drill-holes were bored [to a] depth of 1,000′ to 1,700′, locating the eastern sandstone, and giving two compl[ete] cross-sections, 2,700′ apart.

The old shaft was reopened November, 1910, and drifting resumed on [the] 4th level.

ONEIDA GOLD & COPPER CO. ARIZONA

Dead. Formerly at Nogales, Santa Cruz Co., Ariz.

ONN COPPER MINING CO. CALIFORNIA

Office and mine: Coram, Shasta Co., Cal. Alfred Onn, president; W. [H.] Onn, secretary and treasurer; preceding officers, Arthur E. Onn, Frederick [A.] Lanyon and J. C. Isaacs, directors. Organized 1909, under laws of Arizona, with capitalization $2,000,000, shares $2 par. Lands, 22 claims, area 440 acres, known as the Spread Eagle group, showing a gossan giving assays of $3 to [$]5 per ton in gold, with some silver and copper. Mine is claimed to have 4,0[00] of workings, showing ore assaying 8 to 10% copper and $5 to $6 gold per [ton] with some silver, which figures are considered excessive. Company has [per]mission to use the Balakala wagon-road, and prospectus announced that [the] corporation will be conducted on "strictly Puritan principles." The prospectus also claims that the Mammoth mine, in the same district, has $450,000,000 worth of ore in sight, which, of course, is untrue. Presumably under lease to the Shasta County Exploration Co.

ONOKO MINES CO. COLORADO

Dead. Formerly at Central City, Gilpin Co., Colo. Described Vol. VIII.

ONO MINING CO. JAPAN

Mine office: Hatasa-mura, Gujo-gori, Mino, Japan. Property is the Hatasa mine, opened in the Sixteenth Century, and once highly productive. The mine has 4 principal veins, of 2″ to 2′ width, carrying argentiferous chalcopyrite, galena, sphalerite and pyrite. Forces averaged 212 hands in 1907, and 182 hands in 1908, and the mine has an 86-h. p. steam installation. Production was 38,651 lbs. fine copper and 165,416 momme fine silver in 1900; $2,123 [in] copper and 189,838 momme silver in 1907; 99,219 lbs. copper and 211,0[00] momme silver in 1908.

ONTARIO & CŒUR D'ALENE MINING CO. IDAHO

Dead. Formerly at Mullan, Shoshone Co., Idaho. Described Vol. VIII.

ONTARIO & COLORADO GOLD & COPPER MINING CO. COLORADO, ONTARIO & YUKON

Dead. Formerly at Central City, Gilpin Co., Colo. Described Vol. VI[II].

ONTARIO-COLORADO MINING CO. COLORADO

Office: 926 Equitable Bldg., Denver, Colo. Mine office: Central City, Gilpin Co., Colo. Herbert Eastman, manager. Lands include the O'Neil mine near Central City, carrying auriferous and argentiferous copper and lead sulphides. Equipment includes steam power, and the mine was developing with small force, at last accounts.

ONTARIO COPPER CO. ONTARIO

Dead. Was a bad egg. Formerly at El Dorado, Hastings Co., Ont. Fully described Vol. VIII.

ONTARIO DEVELOPMENT CO. ONTARIO

Office: care of Frank Howard, Munising, Mich. Mine office [at] Bay, Algoma, Ont. M. J. Morrisey, secretary and treasurer. [Or]laws of Ontario, with capitalization $150,000. Lands, 330 [acres] of Goulais Bay, opened by 14 shallow pits, deepest 24′, showing [illegible]

order noted, copper being merely a by-product. Has hydro-electric power, a
a 50-stamp mill.

OPHIR COPPER MINING CO. MONTANA

Dead. Lands were sold, 1906, to Butte Central & Boston Copper Corpo
tion. Formerly at Butte, Silver Bow Co., Mont. Fully described Vol. VI

OPHIR GOLD & COPPER MINING CO. AUSTRALI

Mine office: Lewis Ponds, Bathurst Co., N. S. W., Australia. The m
southeast of Lewis Ponds, opened 1852, was reopened, 1906, by this compan
which cleaned out an old 600′ tunnel, retimbered an old 120′ shaft and sunk
new 85′ shaft. Property is said to show a vein of 2′ to 12′ width, in the tunn
with large bodies of low grade ore in the deeper shaft. The mine produc
considerable ore, in early days, from the oxidized zone, which carried auriferou
copper ore with quartz gangue, 200 tons yielding 30 tons fine copper, but th
sulphide ores give assays of 1% or under in copper tenor, and apparently ar
unworkable. Presumably idle.

OPHIR GOLD & COPPER MINING CO. MONTANA

Office: 5 South Howard St., Spokane, Wash. Mine office: Ophir, Pow
Co., Mont. M. A. Mitchell, president and general manager; W. Y. Clark, vice
president; W. F. McCarthy, secretary; F. E. Elmendorf, treasurer; preceding
officers, and M. B. Bozarth, directors. Capitalization $1,000,000. Lands
claims, patented, near Ophir, having a fissure vein carrying copper ore of fai
assay tenor. Idle, early 1911, but hoped to secure funds to permit resumption

OPHIR HILL CONSOLIDATED MINING CO. UTAH

Office: Miner Bldg., Butte, Mont. Mine office: Ophir, Tooele Co.,
Utah. Hon. Wm. A. Clark, president; W. C. Siderfin, secretary; E. W. Clark,
treasurer and general manager; preceding officers and Chas. W. Clark, director;
A. G. Swanson, mine superintendent; John Franks, mill superintendent; Haines
Gridley, engineer. Company is managed as a close corporation.

Lands are about one-half mile north of Ophir, and litigation thereover wa
settled in company's favor, February, 1908. The property carries 5 veins,
these being the Tot vein averaging about 5′, the Big vein about 20′, the Middle
vein about 10′, the Copper vein about 8′, and the Blue vein about 6′ in width.
Ore is mainly argentiferous galena, associated with pyrite, averaging about 8%
lead and 10 oz. silver per ton, but also includes some copper and zinc ores, with
occasional gold values, a little copper being produced as a by-product. Ores
occur as replacements in argillaceous limestone and shale, in 3 clearly defined
shoots, known as the Delirium, Miner's Delight and Western Stope. The mine is
opened by an 1,800′ incline shaft, stopes standing well without timbering, but is
somewhat wet on the bottom levels, and has a 250-gallon electric pump.

Equipment includes a steam plant, with hoist, and there is a gravity tram-
way from the mine to the mill, of 150 tons daily capacity. Production has
averaged about 50,000 tons of ore yearly, for some years past, and the property
is supposed to be profitable.

OPHIR KING GOLD MINING CO. UTAH

Office: 60 East South Temple St., Salt Lake City, Utah. Mine office:
Ophir, Tooele Co., Utah. Martin S. Lindsay, president, secretary and treas-
urer; Joseph S. Appleby, vice-president. Organized November, 1907, under
laws of Utah, with capitalization $10,000, shares 2 cents par, assessable. Lands
4 claims, in process of patenting, 9 miles from railroad and adjoining the
property of the Cliff Mining Co., carrying auriferous and argentiferous copper
and lead ores. Mine has 400′ tunnel, with some crosscutting, and several
shallow shafts.

OPHIR MINING CO. ARIZONA

Dead. Was a bad egg. Formerly at Jerome, Yavapai Co., Ariz. De-
scribed Vol. IX.

lens, of 40′ extreme width, but not mineralized for the full width, traceable circa 4,000′ on the property, carries chalcopyrite, disseminated in pyrrhotite with average assays above 3% copper. The mine has a 110′ incline shaft with about 70′ of laterals on the 100′ level. Equipment includes steam power and a 3-drill air-compressor, and there are several mine buildings.

ORANGE PLAINS COPPER MINING CO. AUSTRALIA.

Mine office: Dandaloo, Nariamine Co., N. S. W., Australia. Property in the vicinity of the Bogan River mine, shows ore of good assay tenor. Presumably idle.

ORANGE RIVER SYNDICATE. ORANGE RIVER.

Mine office: Upington, Gordonia, Orange River Colony. Arthur C. Shore, secretary. The company was said to have developed copper ore, early 1908, and part of the property was sold, circa 1908, to the Commonage Copper Syndicate, Ltd. Presumably idle.

ORDENAURA MINING CO. MEXICO.

Mine office: Valardeña, Cuencamé, Durango, Mex. Mine has auriferous and argentiferous copper ores, with steam power and a 25-ton mill.

ORE CHIMNEY MINING CO., LTD. ONTARIO.

Office: Fort Erie, Ont. Mine office: Northbrook, Frontenac Co., Ont. Anson Ellsworth Fletcher, president; J. J. Foster, vice-president; W. P. Matthews, secretary and treasurer; preceding officers, Richard Haggerty and John M. Fletcher, directors. Organized Oct. 11, 1909, under laws of Ontario, with capitalization $600,000, shares 40 cents par, nonassessable. The property was bought of the president for 850,000 shares of stock.

Lands, circa 300 acres, about 15 miles from Kaladar, the nearest railway station. Property shows limestone, conglomerate and schist, and is reported by the management to have immense bodies of rich ore, but figures of size are lacking. Development is by 4 pits, of 12′ to 50′ depth, No. 2 shaft, of 18′ depth being said to show small flakes of native copper. Apparently the ore is in a quartz vein carrying a sulphide complex of galena, sphalerite, chalcopyrite and pyrite, somewhat argentiferous and auriferous. Ore has been secured giving assays of 3.22% copper, 23.07% lead and 54 oz. silver per ton, and other assays have given 0.17% copper, 18.77% lead, 10.6% zinc, 5.5 oz. silver and 0.5 oz. gold per ton.

The property apparently has no machinery plant, but there are 4 buildings. The company's prospectus is filled with entirely wrong figures regarding mines, mining developments, mining operations and mining profits.

OREGON-ARIZONA COPPER CO. ARIZONA.

Mine office: Superior, Pinal Co., Ariz. Lands are 2 miles south of Superior. Has steam power. Presumably idle.

OREGON & ARIZONA MINING CO. ARIZONA.

Dead. Formerly at Old Glory, Santa Cruz Co., Ariz. Described Vol. VIII.

OREGON & BRITISH COLUMBIA MINING & DEVELOPING CO., LTD. BRITISH COLUMBIA.

Office: 304 Lewis Bldg., Portland, Ore. Letter returned unclaimed from former mine office, Princeton, Boundary district, B. C. W. J. Peddicord, president; John Mock, vice-president; G. Evert Baker, secretary, treasurer and general manager; preceding officers and J. C. Proebstel, directors. Organized Jan. 6, 1906, under laws of Oregon, with capitalization $150,000, shares 10 cents par, nonassessable; issued, $99,926.70.

Lands, 8 claims, crown-granted, area 379 acres, well timbered, in the Similkameen camp, carrying 2 veins, of which one, developed by a 176′ tunnel, is reported by the management to show 40′ of mineralized ground, with 2′ [illegible] 6″ to 20″ stringers, carrying auriferous and argentiferous chalcopyrite and bornite, and the last 8′ of the tunnel is said to show an 8′ vein of [illegible] 18″ to 2′ of talc gangue. Property also has shafts of 33′ and 26′. [illegible]

ant superintendent; E. Franki, chief engineer. Is controlled, through stock ownership, by the International Nickel Co.

Property includes the main plant at Bayonne, also works at New Brighton, Richmond Co., N. Y., for the treatment of Canadian nickel and copper; a plant at Camden, Camden Co., N. J., and a 25-ton smelter at Copper Cliff, Algoma, Ont., for treating silver-cobalt ores of the Cobalt camp.

The main plant, on Constable Hook, at Bayonne, refines nickel mattes and ores from New Caledonia, and nickel-copper matte from Canada, in addition to treating a limited quantity of copper ores and mattes from the United States, Canada, México and elsewhere. The capacity of the plant is about 1,000,000 lbs. fine copper and 2,500,000 lbs. metallic nickel monthly. The works are well equipped, and the company enjoys a practical monopoly in the refining of nickel, which it has brought to a point of perfection previously unknown.

ORIENTAL COPPER CO. ARIZONA.

Office: 303 Security Bldg., St. Louis, Mo. Mine office: Cave Creek, Maricopa Co., Ariz. W. F. McDonald, president; John B. Cabanne, vice-president; F. W. Irland, secretary and treasurer; preceding officers, H. C. Townsend, W. C. Stith, S. B. Schuyler, C. A. Deane, E. B. Lane and H. F. Bering, directors; A. S. Mills, superintendent, at last accounts. Organized, 1904, under laws of Arizona, with capitalization $2,000,000, shares $1 par.

Lands, 19 claims and a 5-acre millsite, area 385 acres, having a 475' tunnel, said to croscut a number of veins showing ores that have given assays of 8.9% copper and 6.8 oz. silver per ton, with occasional small gold values. Management claims many carloads could be shipped, but that such shipments would be inadvisable. Tunnel is in schist, and ore found must have been from small stringers. Property is poorly developed. Idle, and is not regarded favorably.

ORIENTAL MINING & MILLING CO. ARIZONA.

Office: Jamestown, N. Y. Mine office: Providence, Yavapai Co., Ariz. A. F. Kent, president; W. A. Keeler, secretary; Wm. A. Kent, assistant treasurer; L. B. Kent, superintendent. Lands include the Lottie and Postmaster claims, and the mine is said to be developed by a 4,500' tunnel, showing auriferous and argentiferous copper ores, with values mainly in gold and silver. Equipment includes a 20-stamp mill. Presumably idle.

MINAS ORIENTE DE THARSIS. SPAIN.

Office and mine: Alosno, Huelva, Spain. Wm. Guthrie Bowie, manager. Property includes the Oriente de Tharsis mine, area 16 hectares, owned by Wm. Guthrie Bowie & Sons, and the Mina Hueca, area 12 hectares, owned by Sr. D. Eduardo Díaz. Property, adjoining the Tharsis mine on the east, lies about Kilometers Nos. 2 and 3 of the Tharsis railway, which passes through the tract.

The mines show old Roman shafts, with deepest workings of circa 90 meters, and cupriferous schist is shown to the north of the old workings. The property has a broken gossan, and the ores of the Hueca mine dip into the Oriente de Tharsis.

The Hueca mine, adjoining the Prado Vicoso and Oriente de Tharsis, shows a strong gossan, with copper impregnations, at the crest of a hill, near which are remains of numerous old shafts, and some old scoria. The modern shafts of the Hueca have just reached the pyritic zone with 3 levels opened, and have workings of about 400 meters, showing several ore bodies, one, of 12 meters width, carrying ore assaying up to 5% copper; one, of 7 meters width, assaying up to 4% copper, and a third, of 5 meters width, assaying up to 3.5% copper. The second level shows a mammoth ore body, of 135 meters width, carrying ore averaging about 1.25% copper. Property considered promising.

ORIENT GOLD MINES, LTD. WASHINGTON.

Mine office: Bossburg, Stevens Co., Wash. Frank A[illegible]. Property was a reconstruction of Orient Gold Mining Co. [illegible] tunnel, carries auriferous copper ore. Equipment includes [illegible] with an air-compressor.

Wash Mountains, have several short tunnels and an incline shaft cutting seven veins, and management planned sinking a vertical shaft. Idle and presumably moribund.

COMPAÑÍA DE MINAS EL ORITO. CHILE

Office: Valparaiso, Chile. Mine office: El Orito, Vallenar, Atacama, Chile. Organized July 19, 1904, under laws of Chile, with capitalization £550,000, shares £5 par. Property includes Las Breas mines, opened 18[illegible] from which the former owner is said to have made upwards of 1,000,000 lbs. fine copper yearly.

The smelter, known as the Fundición El Orito, or Fundición Las Breas, [illegible] leagues from Vallenar, has 2 reverberatory furnaces, turning out matte of about 60% average copper tenor. Fuel is both coal and wood. Production was 847,009 lbs. fine copper in 1907, and 698,564 lbs. in 1908, but the smelter was idle in 1909.

SOCIEDAD MINERA EL ORITO. CHILE

Dead. Was succeeded, July 19, 1904, by Compañía de Minas El Orito. Formerly at El Orito, Vallenar, Atacama, Chile. Described Vol. V.

ORIZABA CONSOLIDATED MINING & SMELTING CO. UTAH

Office: 304 Judge Bldg., Salt Lake City, Utah. Mine office: Modena, Iron Co., Utah. J. P. Olympius, president; L. F. Rutter, vice-president; H. Robinson, secretary. Organized Aug. 12, 1907, under laws of Utah, with capitalization $1,000,000, shares $1 par, nonassessable.

Lands, 56 claims, area circa 1,100 acres, in the unsurveyed Washington district of Beaver county, 38 miles north of Modena, the nearest rail point, by wagon-road, and 30 miles west of Lund. Lands, well watered and timbered, include the Blue Jay Consolidated group, patented, and the Colorado Dividend group of 5 claims, patented, which are held under bond and lease, [illegible] claims, which are owned outright, including the Tonopah group of 3 claims, the Mask group of 6 claims, Alpha group of 8 claims, Lucero group of 10 claims, Copper Queen group of 8 claims, Alta Vista group of 3 claims, Algonquin group of 8 claims, and Omega group of 5 claims.

The property carries a number of veins, of which the Mono apparently is the more important. This vein, apparently a contact deposit, traceable [illegible] mile on the company's land, with SW. strike and average dip of 22° from vertical, is opened at 7 points, averaging 3′ in width, and is said to be 50′ wide to depth of 200′. The Mono has a limestone foot and diorite hanging, carrying copper oxides and carbonates in the upper workings, with lead and copper sulphides at comparatively slight depth, all auriferous and argentiferous, [illegible] an 8″ paystreak giving assays up to 460 oz. silver per ton. There also are several other veins, reported as fissures, parallel with the Mono, the principal being the Copper Queen vein, traceable 4,500′, opened by a 50′ shaft, developing copper oxides and carbonates. There are said also to be 6 cross-fissures, carrying surface ores assaying well in copper. The mine has about 30 pits and shafts up to 200′ depth, with about 3,000′ of workings, and is said to have shipped about $25,000 worth of ore, by wagon. There is no machinery equipment. The company was promoted just in time to be caught by the 1907 panic, but is [illegible] ering to arrange for active development, 1911.

ORKLA GRUBE-AKTIEBOLAG. NORWAY

Office and mine: Lökkens Værk, Meldalen, Sondre Trondhjem, Norway. Dr. F. Esser, general manager; F. Brocha, secretary. Organized Dec. 7, [illegible] under laws of Norway, with capitalization 4,140,000 kroner, shares 180 kr. par, increased later to 7,000,000 kroner. The company formerly was [illegible] by the Orkla Mining Co., Ltd., a British corporation that went out of [illegible] suddenly.

Lands, [illegible] 2,500 hectares in the Meldal and Orkdal [illegible] of Sondre Trondhjem [illegible]

shafts, of 10′ to 40′ depth, with 720′ of laterals. The main shaft is said to show a 30″ vein carrying chalcopyrite, assaying up to 20% copper, with gangue of limestone and calcite.

Equipment includes a steam hoist, said to be good for 1,000′ depth, and formerly included an air-compressor, bought of the Calumet & Globe Development Co. Buildings include a 20x22′ machine-shop, carpenter-shop, smithy, laboratory and foreman's dwelling.

The career of this company on the New York curb was marked by a succession of scandals. Frank Rockefeller was given stock, for the use of the Rockefeller name, but foxily dumped considerable stock, in violation of an alleged agreement, and there was talk of a suit against him, but this was purely a bluff. The stock was boomed in Boston, on the most approved lines of shady finance, by Cardenio F. King, now in prison for various mining stock swindles, and the stock rose, September, 1908, to 8⅜ on Monday, but closed Thursday at 1½ bid. The property is not devoid of promise, but the past record of the company is so unsavory that it is not regarded favorably.

ORVILLE GOLD & COPPER MINING CO. BRITISH COLUMBIA.

Mine office: Golden, Kootenay district, B. C. Idle some years and apparently moribund.

OSAKA MINING CO. JAPAN.

Office: Settsu, Osaka, Japan. Mine office: Ichihara-mura, Gamo-gori, Omi, Japan. Property is the Takamasa mine, carrying argentiferous copper ore, having only a 5-h. p. plant, and employing an average of 101 hands in 1907. Production was 66,091 lbs. fine copper and 21,830 momme silver in 1907, and 22,043 lbs. copper in 1908.

OSARUZAWA MINE. JAPAN.

Owned by Mitsu Bishi Goshi-Kwaisha.

OSBORN CONSOLIDATED MINING & MILLING CO. UTAH.

Office and mine: American Fork, Utah Co., Utah. S. Osborn, president and general manager; W. D. Loveless, vice-president; Alfred J. Osborn, secretary and treasurer; preceding officers, J. L. Dunkley and J. W. Storrs, directors. Organized July 17, 1907, under laws of Utah, with capitalization $125,000, shares 25 cents par.

Lands, 9 claims, well watered, carrying 20 acres of good timber, in American Fork Cañon, about 4 miles from Park City and 21 miles from American Fork. Property shows veins of 5′ to 8′ width, carrying lead values near surface, developed by a number of shallow shafts and short tunnels. The Chicago claim has a 50′ shaft, showing a wide vein, and the Osborn No. 2 claim has shafts of 60′ and 70′, and a 70′ tunnel. The 200′ main shaft is sunk at an incline of 45°. There is a 90′ upper tunnel, a 150′ middle tunnel, and a 300′ lower tunnel, with a crosscut for 200′, and thereafter a drift tunnel.

OSCEOLA CONSOLIDATED MINING CO. MICHIGAN.

Office: 12 Ashburton Place, Boston, Mass. Mine office: Osceola, Houghton Co., Mich. Rodolphe L. Agassiz, president; Quincy A. Shaw, vice-president; Jas. MacNaughton, general manager; preceding officers, Francis W. Bonnewell, Thos. N. Perkins, Wm. H. Dwelly, Jr., and Guy W. Currier, directors; Geo. A. Flagg, secretary and treasurer; Frank H. Haller, superintendent; Lincoln Burgan, mill superintendent; Chas. D. Hohl, chief engineer; Jas. Richards, chief mining captain; Hugh James, mining captain Osceola branch; Jos. Biscombe, mining captain North Kearsarge branch; Frank Landers, mining captain South Kearsarge branch; John T. Reeder, purchasing agent; Wm. Yeo, chief clerk; Thos. Burgan, assistant clerk. Organized 1873, under laws of Michigan, and reincorporated, 1903, for a term of 30 years, with capitalization $2,500,000, shares $25 par; issued, $2,403,750. State Street Trust Co., Boston, transfer agent; American Trust Co., Boston, transfer agent. Shares are listed on Boston stock exchange. Annual meeting, second Thursday in March.

The shops of the Osceola, formerly scattered along the line of shafts, have been centered between shafts Nos. 5 and 6. The boiler plant at No. 6 has Burt locomotive firebox boilers, with a coal-trestle and bin, and a 125′ brick-lined self-supporting steel smokestack, of 7′ inside diameter, standing on a sand-stone base. The old boiler-house at No. 6, with stone walls and steel roof, has been lengthened 30′, and made into a compressor-house, equipped with a 30-drill Nordberg 2-stage cross-compound air-compressor having 26″ and 40″ air cylinders, and steam cylinders of 22″ and 42″, with 48″ stroke. A new boiler-house has been built to the north of the old structure.

An electric plant, in the compressor-house, has a 100-kw. 220-volt d. c. generator, furnishing electric light for the Osceola mine and location, using enclosed arc lamps.

A 60x144′ combination smithy and machine-shop, between shafts Nos. 5 and 6, has brick walls and a steel truss roof, covered with corrugated steel. All machinery is actuated by electric power.

The Osceola mine proper has a local telephone system, connecting all surface departments and underground pump-stations, with an exchange in No. 6 engine-house.

The company owns, at the Osceola location, a large number of dwellings for workmen. Water is secured from Lake Superior through a 1½-mile line of 6-pipe, connecting with a stand-pipe at the Tamarack mine, leading to a 130,000-gallon concrete reservoir between Osceola shafts Nos. 5 and 6.

The Kearsarge or North Kearsarge mine, area 1,120 acres, lies north of the Wolverine, with which it has underground connections, and with which has was exchanged, to the extent of 13½ acres, permitting both mines to square their boundaries with the strike and dip of the bed. Extensive diamond drilling, 1905–1907, showed considerable good stamprock in the foot and hanging walls, at points where the main bed was impoverished. Diamond drill bor-costs were $2 to $3 per foot, as against $6 to $8 per foot for drifting. The Kearsarge amygdaloidal bed ranges 16′ to 20′ in width, in this mine, and has proved very bunchy, though with very good average values. The southern workings, approaching the Wolverine, have shown improvement, but the mine is richer near the Ahmeek, to the north. The mine is being deepened at the rate of about 400′ yearly. About 60 power drills are used in this branch. Shafts are numbered from south to north.

No. 1 North Kearsarge shaft is 3,873′ deep, and has not been deepened for several years. Cavities under the shaft, resulting from old workings, were filled with waste-rock, and capped with cement, and the skipway has concrete stringers. No. 1 shaft has a Nordberg hoist good for 6,500′ depth, operating two 7-ton skips in balance.

No. 2 North Kearsarge shaft was abandoned at depth of 2,400′, some years ago.

No. 3 North Kearsarge shaft, 1,825′ northeast of No. 1, is 3,192′ in depth and has not been deepened for several years. This shaft develops a large area of good ground, especially in the northern drifts. The shaft has a concrete collar and the hoist is a duplicate of the Nordberg engine at No. 6 Osceola shaft.

No. 4 North Kearsarge shaft, begun 1907, sunk 75′ in the footwall, is 1,[illegible] deep, not having been deepened since 1909. The shaft is lined with concrete to depth of 185′ from surface, and has large loading-bins just below the 10[illegible] and 13th levels, to which rock is milled through chutes, from the levels above. No. 4 North Kearsarge shafthouse is of steel, 22x40′ on the ground and [illegible] high, connected with the steel rockhouse, which is 127′ high, built on a [illegible] concrete foundation, divided in the center by a single railway track. [illegible] on the concrete foundation is a cylindrical steel rock-bin of 40′ diameter [illegible] high. Equipment of the rockhouse includes two 40-ton crushers, driven by special Nordberg rockhouse engine.

ther efforts toward simplicity, and he conceived the idea of lifting the stamp with the high-pressure steam, and using a constant vacuum under the low-pressure piston, thereby eliminating, as much as possible, all resistance during the downward stroke of the stamp, rendering it possible for the entire energy of the downward stroke to be applied in the actual crushing of rock. The compound stamps have circular mortars, with 5/8" screens, and hydraulic separators, about 20% of the copper secured in milling coming from the mortar discharge and separators.

The wash departments of the 2 mills are equipped with 110 Hodge jigs with 6 round tables and 1 Wilfley table for each stamp, the Wilfleys taking headings from the round tables. An Allis-Chalmers Chilean mill reduces oversize material from the stamp mortars, and there are crushing rolls, with fixed bearings, introduced by Mr. Burgan. The mills were extensively remodeled in 1910, with the addition of Woodbury jigs and other machinery. Stamping costs were 16.95 cents per short ton in 1905, and only 11.71 cents in 1907, the latter figure being the lowest ever reported by any mill, for this work, and milling costs were 13.36 cents per ton in 1908. No figures of stamping costs have been made public since the change in management.

The 43x150' steel boiler-house, adjoining the mills and furnishing power for both, has three 250-h. p. 72" boilers, delivering steam at 150 lbs. pressure, and nine 250-h. p. 84" boilers operated under 105 lbs. pressure, all of the locomotive firebox type. Coal is brought to a 500-ton bin, over a trestle, in railway cars. An automatic ash-discharge washes the ashes through a launder by water flushed from a stand-pipe at 3-minute intervals. The boiler-house has a 150' brick-lined self-supporting steel smokestack. The power plant has an Allis-Chalmers Corliss engine, operating a 100-kw. Morgan-Gardner d. c. generator furnishing current for 220-volt incandescent enclosed arc lamps.

The joint pump-house of the Osceola and Tamarack mines, is of steel 35x70' in size, housing two 40,000,000-gallon triple-expansion Nordberg pumps having 22", 40" and 60" cylinders, with three 30" horizontal plungers of 7' stroke and 42" discharge. Water is taken through an 8' tunnel, running 1,2[illegible] under Torch Lake, with 3" intake holes, guarding against clogging by ice.

Production has been as follows: 924,400 tons rock stamped, yielding 16,059,638 lbs. fine copper, in 1903; 1,095,520 tons rock stamped, yielding 20,472,429 lbs. fine copper, in 1904; 1,007,200 tons rock stamped, yielding 18,938,965 lbs. fine copper, in 1905; 1,016,240 tons rock stamped, yielding 18,588,451 lbs. fine copper, in 1906; 811,603 tons rock stamped, yielding 14,134,753 lbs. fine copper in 1907; 1,241,400 tons rock stamped, yielding 21,250,794 lbs. fine copper in 1908; 1,494,845 tons rock stamped, yielding 25,296,657 lbs. fine copper in 1909; 1,217,720 tons rock stamped, yielding 19,346,566 lbs. fine copper in 1910. Rock stamped yielding 17.4 lbs. copper per ton in 1907; 17.1 lbs. in 1908; 16.9 lbs. in 1909; 15.9 lbs. in [illegible]. Cost of finished copper delivered was 10.29 cents in 1903; 9.96 cents in [illegible], 10.68 cents in 1905; 10.89 cents in 1906; 12.44 cents in 1907; 10.25 cents in [illegible], 9.47 cents in 1909; 9.37 cents in 1910. Net earnings were $677,105.39 in [illegible], $1,070,645.14 in 1909; $758,585.87 in 1910. The company ended 1910 with a balance of assets of $1,840,605.61.

The history of the Osceola, since the beginning of the century, has been marked by a series of struggles for control, starting in 1901, and still going on. In 1901-1902, shareholders became greatly incensed at Mr. A. S. Bigelow, president, and, as a result of a vigorous campaign, secured sufficient proxies to have carried the annual election of 1902, but satisfied themselves with a minority of the directors. In 1906 the Calumet & Hecla Mining Co. bought in the open market, 22,061 shares of Osceola stock, and secured proxies for 50,000 shares additional, for the annual meeting of March, 1907. The latter joined from voting either its own stock or proxies, and no annual [illegible]

Misterio mine, which produced, 1903, circa 300 metric tons of 22% ore from a vein of about 40" average width, opened to about 50 meters depth, and La Purisima mine, which produced 1903, about 400 tons of 18% ore, equal to an output of circa 300,000 lbs. fine copper for both properties. Presumably idle.

OTA MINE. JAPAN.

Mine office: Ota-muri, Mine-gori, Nagato, Japan. Kunizo Ikuta & Co., owners. Equipment includes a 71-h. p. installation, and forces, 1908, averaged 133 persons. Production was 73,145 lbs. fine copper in 1906; 195,666 lbs. copper, 3,648 oz. silver and 17 oz. gold in 1907; 142,271 lbs. copper, 19,912 mommc silver and 15 oz. gold in 1908.

OTATE COPPER CO. MÉXICO.

Mine office: Llano, Magdalena, Sonora, Mex. L. H. Jansen, president; W. P. Ross, superintendent, at last accounts. Lands, east of Llano, near the Cobre Grande mine of the Sonora Copper Co., are well watered and fairly timbered, and are said to show promising indications of ore. Idle several years.

OTAVI EXPLORING SYNDICATE, LTD. GERMAN SOUTHWEST AFRICA.

Office: .1 London Wall Bldg., London, E. C., Eng. Mine office: Tsumeb, Otavi, Ovamboland, German Southwest Africa. E. Davis, J. B. Schroeder, H. Strakosch and E. Labowsky, directors; C. Launspach, secretary. Organized Dec. 15, 1909, under laws of Great Britain, with capitalization £63,000, in £60,000 ordinary shares of £1 par, and £60,000 deferred shares of 1s. par. Property consists of a concession from the Otavi Minen- und Eisenbahn-Gesellschaft to prospect any or all of the company's mining lands, of circa 1,000 square miles, with the exception of property already located by the owner, in consideration of 35% of the net profits.

OTAVI MINEN- UND EISENBAHN-GESELLSCHAFT. GERMAN SOUTHWEST AFRICA.

Office: 31 Unter den Linden, Berlin W. 8, Germany. Mine office: Tsumeb, Otavi, Ovamboland, German Southwest Africa. Railway office: Usakos, German Southwest Africa. Alex. Schoeller, chairman; Dr. Paul D. Fischer, vice-chairman; preceding officers, Paul Boettger, Edmund Davis, Dr. Paul von Schwabach, Max Steinthal and E. Zintgraff, directors; Dr. Paul Heinmann, chairman local board and acting mine manager; Baurat A. Morgenstern, chairman railway board and acting railway manager; E. Labowsky, Kaiserlicher Bergrat Gustav Duft, Baurat E. Klobe and Dr. Paul Gloner, managers.

Organized Apr. 6, 1900, under laws of Germany, with capitalization 1,000,000 marks, and reconstructed 1903, with capitalization 20,000,000 marks, shares 100 marks par, in 20 series of 10,000 shares each, which were fully issued, but the company's railway was sold to the German government, for 22,330,875 marks, payable in 5 annual installments, and the company was reconstructed, 1910, paying back 16,000,000 marks of its capitalization, leaving the fully paid capital at 4,000,000 marks. Is controlled, through ownership of about 55% of the stock issue by South West Africa, Ltd. Annual meeting, in December.

The company's plan of finance calls for carrying a 5 to 15% reserve, followed by dividends of 5% on ordinary shares, after which 10% will be allowed by the board as a bonus, out of surplus, and balance divided equally between the ordinary and deferred shares. Profits for fiscal years ending March 31st were 350,145 marks, practically all from the railway, in 1907; 4,339,057 marks, of which 2,443,620 marks came from the railway, and 1,824,696 from mining operations, in 1909; 3,629,364 marks in 1910, with net profits of 1,687,168 marks from the railway, and 2,071,942 marks from the mine. Dividends were 11% on ordinary shares and 6 marks on deferred shares in the fiscal year 1909; 10% on ordinary shares and 5 marks on deferred shares in the fiscal year 1910.

Lands, 500 square miles, freehold; 500 additional square miles of mining rights, and 814 square miles, in strips of 10 kilometers width, along the right-of-

The smelter, at the Tsumeb mine, of 50 tons rated daily capacity, having 2 small blast-furnaces, was blown in Sept. 10, 1907. Iron ore for fluxing is obtained from Kalkfeld, near Kilometer 308 of the railway. Fuel is charcoal and coke, latter formerly costing 130 marks, and now costing 90 marks per metric ton delivered, which is an almost prohibitive price. The smelter is more of an experimental nature than a serious attempt at reduction, as the excessive cost of coke, the high cost of skilled labor, and the refractory nature of the ores have combined to render smelting so costly that much of the work has been done at an actual loss. The limited production of the smelter is in the form of silver-lead bullion and copper matte, the latter, of 40 to 50% copper tenor, carrying circa 15 oz. silver per ton, being shipped to Europe for conversion.

The Otavi railway, 400 miles long, of 600-mm. gauge, runs from Swakopmund, on the coast, to the interior terminus at Tsumeb, and was opened for general traffic Nov. 16, 1906, and a branch, from Otavi to Grootfontein, was completed 1908. This railway was built by the company, and has been highly profitable, but was sold to the Colonial government, 1910, and has been leased by the company, for 10 years, from Apr. 1, 1910, at a rental beginning at 4.6% annually, on the purchase price, and rising gradually to 6.5%, with the option of a 20-year renewal of the lease, this arrangement leaving the railway a highly profitable asset. Equipment includes 35 locomotives and 328 cars.

Forces average about 1,000 men, of whom circa 10% are whites, and the balance native workmen, mainly Ovambos. Forces range up to 1,300 men during the dry season, and as low as 600 men in the rainy season, the heavy rains interfering greatly with opencast operations, this being one of the reasons for the change to underground workings. Regular production was begun July 1907, but considerable quantities of ore were shipped previously, for test purposes. Apparently about 75% of the ore produced is shipped, and only 25% smelted in Africa. For several years the company has shipped copper matte and ores to the American Smelting & Refining Co., which has treated them successfully at the Perth Amboy works, and there was some talk, late 1910, of establishing a regular monthly steamer service between Swakopmund and New York.

Production, for fiscal years ending March 31st, has been as follows: 2,333 tons of ore, averaging circa 20% copper and 25% lead, with large silver values, estimated to have yielded 1,000,000 lbs. fine copper and 1,250,000 lbs. lead, in 1907; 25,700 tons of ore, of which circa 15,000 tons exported averaged 19% copper, 23% lead and 0.035% silver, and 1,000 tons exported averaged 38% copper, 17% lead and .04% silver, and 700 metric tons of 96% lead bullion, carrying 0.09% silver, also exported, production being estimated at 6,500,000 lbs. fine copper and 9,000,000 lbs. lead, in 1908; 44,250 metric tons of ore raised, of which circa 27,000 tons, averaging 17% copper, 30% lead and 12 oz. silver per ton, were shipped, and 17,250 tons were smelted at the mine, yielding circa 3,000 metric tons of lead bullion, carrying 24 oz. silver, and 3,150 metric tons of copper-lead matte averaging 42% copper, 23% lead and 16 oz. silver per ton, estimated as equivalent to a production of 13,500,000 lbs. fine copper, 25,000,000 lbs. lead and 450,000 oz. silver, in 1909; circa 49,500 metric tons of ore, of which 27,000 tons of ore shipped was estimated by the company to average 17% copper and 30% lead, and production is estimated at 14,000,000 lbs. fine copper, 25,000,000 lbs. lead and 425,000 oz. silver, in 1910. Shipments for first half of the fiscal year 1911 were 15,460 tons of ore, as compared with 9,700 tons for the corresponding 6 months of the preceding fiscal year, also 930 metric tons of lead bullion, comparing with 1,290 tons in corresponding period of the preceding year, and 360 tons of copper matte, as against 870 tons in the corresponding period of the preceding year.

Average costs of mining and milling are estimated by the company at 11.6 marks per metric ton. The management is composed of very solid men, of high

last accounts. Ores carry gold, silver and copper. Has gasoline power. Presumably idle.

OURAY CONSOLIDATED MINING CO. COLORADO.

Office: Lafayette Bank Bldg., St. Louis, Mo. Mine office: Ouray, Ouray Co., Colo. Jos. H. Tumbach, resident manager, at last accounts. Company succeeded the Colorado Gold-Copper Mining & Tunnel Co. Lands, reported to be circa 60 claims, but more probably 60 acres, formerly were developed by a tunnel of about 5,000′ claimed length, which has now shrunk to 1,200′ length only, presumably owing to the hard winters in that part of Colorado. Property, known as the Blowout group, has auriferous copper ore, and the mine has gasoline power. Was developing, with a small force, at last accounts.

OVERFLOW MINES, N. L. AUSTRALIA.

Office: 18 Bridge St., Sydney, N. S. W., Australia. Mine office: Bobadah, N. S. W., Australia. T. H. Palmer, manager, at last accounts. Ores carry gold, silver, lead and copper, latter being produced merely as a by-product. Has a Ball mill, 40-ton cyanide plant and 50-ton smelter. Presumably idle.

OVERLAND COPPER CO. ARIZONA.

Mine office: Winkelman, Pinal Co., Ariz. P. F. Walsh, superintendent. Lands, adjoining the London Range group of the London-Arizona Copper Co. on the south and west, carry an extension of the main dike system of the London Range, showing metamorphic contact ore bodies. Presumably idle.

OVERLAND GOLD MINING CO. OREGON.

Mine office: Cableville, Baker Co., Ore. Has auriferous and argentiferous copper, lead and zinc sulphides. Idle several years.

OVERLOCK COPPER CO. MEXICO.

Dead. Former office was Douglas, Ariz. Chas. A. Overlock was manager. Lands, known as the Los Anjeles mine, in the vicinity of Moctezuma, apparently were but slightly developed. Mr. J. J. Benton brought suit against the company, May, 1908, to set aside a judgment, alleging that Mr. Overlock confessed same, on the company's behalf, without authority. Formerly at Nacozar, Moctezuma, Sonora, Mex.

OVERSIGHT MINING & MILLING CO. WASHINGTON.

Letter returned unclaimed from former office, Seattle, Wash. Mine office: Republic, Ferry Co., Wash. Harold Preston, president; Chas. E. Murphy, vice-president; S. E. Dewsnap, secretary; C. A. Wallace, treasurer; E. J. Delbridge, general manager, at last accounts. Capitalization, $1,500,000, shares $1 par.

Lands, 11 claims, adjoining the Copper Key, in the Lambert Creek or Eureka district, north and west of the Turtle River, circa 10 miles northeast of Republic, showing 4 veins. Mine has about a quarter-mile of workings, with a 60′ shaft, but principal development is by the Pinmoney tunnel. The wide Pinmoney vein is mainly auriferous mispickel, carrying small silver and copper values. Has gasoline power, an air-compressor and 300-ton shipping bins, and planned an aërial tram. Presumably idle.

OVOCA COPPER SYNDICATE, LTD. IRELAND.

Office: 10 Austin Friars, London, E. C., Eng. Mine office: Ovoca, County Wicklow, Ireland. Maj. Ralph P. Cobbold, chairman; preceding officer, C. F. Tainton and F. S. E. Drury, directors; W. Smith, secretary. Organized Nov. 27, 1901, under laws of Great Britain, with capitalization £12,000, shares £1 par; fully issued and fully paid.

Property is the old Cronnebane mines, in the Vale of Ovoca, which were making about 1,250,000 lbs. refined copper yearly, at the end of the Eighteenth Century. Mines were closed, circa 1875, and reopened, 1902, on the advice of Mr. Philip Argall. High grade oxidized ores were mined out in past operations, but the vein, about 50′ in average width, shows immense bodies of low grade disseminated chalcopyrite, with quartz gangue, estimated to average a scant

plant, with a 20-h. p. hoist, and there are several mine buildings. Company plans deepening the main shaft 100′ and drifting.

OXIDE COPPER CO. ARIZONA.

Office: 85 Ames Bldg., Boston, Mass. Mine office: Red Rock, Pinal Co., Ariz. Frank H. Higgins, superintendent. Company is controlled, through stock ownership, by the Arimex Consolidated Copper Co.

Lands, 31 claims, 2 patented, known as the Copper Prince group, in the Silver Bell district, circa 7 miles south of the Imperial mine. Property shows contact veins carrying argentiferous copper sulphides, with limestone gangue. Development is by a 500′ shaft and a 350′ tunnel, with about one-half mile of workings. Equipment includes gasoline power and an air-compressor. Some churn drilling was done, 1910, in the effort to locate disseminated ores, but apparently results were not especially encouraging. Production was 319,591 lbs. fine copper and 3,338 oz. silver in 1907; 49,676 lbs. copper and 103 oz. silver in 1908.

OZARK SMELTING & MINING CO. KANSAS & NEW MEXICO.

Office: 601 Canal Road, Cleveland, Ohio. Mine office: Magdalena, Socorro Co., N. M. Works office: Coffeyville, Montgomery Co., Kans. Geo. A. Martin, general manager; Jos. C. Brown, superintendent; C. H. Brown, mill superintendent; R. V. Brown, smelter superintendent; R. P. Preuss, engineer.

Lands, 30 claims, area 227 acres, with total holdings of 800 acres, in the Magdalena district, showing limestone, shale and quartz, carrying contact ore deposits between limestone and schist, of about 50′ proven width, circa 500′ length, and known depth of 500′, said to give average assays of 1.6% copper, 4% lead and 23% zinc, with small gold and silver values. The upper workings show large quantities of lead and zinc carbonates, ores being mainly smithsonite and sphalerite, with some cerrusite and argentiferous galena, and occasional copper and native copper. Ores are mainly low in grade, with principal values in zinc. The ore shoot, of about 500′ length on the 7th, 8th and 9th levels, is circa 100′ wide on the 9th level. Development is by a 300′ shaft, and two 1,500′ cross-cut tunnels, with about 8 miles of workings, the lower levels showing a slightly argentiferous sulphide complex of zinc, lead and copper.

Equipment includes electric power and an air-compressor. A 50-ton mill, completed 1910, does dry concentration on ores above 20-mesh, and wet concentration on ores below that size. Production, mainly zinc ore, is shipped to the works at Coffeyville, for the manufacture of lead and zinc oxides, as the base for pigments, of which the Sherwin-Williams Co., in control of this corporation, is one of the largest American manufacturers.

PACIFIC COAST COPPER CO. ALASKA.

Dead. Was reorganized as Pacific Coast Mining, Milling & Developing Co., also dead. Formerly at Ketchikan, Alaska.

PACIFIC COAST MINING, MILLING & DEVELOPING CO. ALASKA.

Dead. Formerly at Ketchikan, Alaska. Described Vol. VI.

PACIFIC COAST SMELTING & REFINING WORKS. CALIFORNIA.

Works office: Bay Point, Contra Costa Co., Cal. Was built by the Copper King, Ltd. Plant includes a 100-ton furnace, with steam and electric power. Idle.

PACIFIC CONSOLIDATED MINING CO. NEVADA.

Dead. Formerly at Reno, Washoe Co., Nev. Fully described Vol. VI.

PACIFIC COPPER CO. MICHIGAN.

Office: 705–199 Washington St., Boston, Mass. Mine office: Tamarack Bldg., Houghton, Houghton Co., Mich. Nathaniel Thayer, president; Charles Paine, Jr., secretary and treasurer; preceding officers, Samuel N. Brown, [illegible] Stone, J. Henry Brooks, Geo. P. Gardner, Walter Hunnewell and R. R. Cole, directors; Frederick W. Nichols, agent. Organized August, 1899, under [illegible]

PACIFIC COPPER EXPLORATION CO. **ARIZONA.**

Mine office: Prescott, Yavapai Co., Ariz. Geo. Roper, general manager, at last accounts. Lands, 15 claims, including a water-right, in Spruce Cañon, circa 10 miles west of Prescott, opened by a 220′ tunnel. Presumably idle.

PACIFIC COPPER MINING CO. **ARIZONA.**

Office: 415 Board of Trade, Kansas City, Mo. Mine office: Crown King, Yavapai Co., Ariz. John Kelley, president; C. W. Mitchell, first vice-president and consulting engineer; W. A. Moses, second vice-president and treasurer; W. J. Morse, secretary; preceding officers, Howard Vanderslice, G. B. Gray and A. L. Harroun, directors; W. V. DeCamp, general manager. Organized Feb. 8, 1907, under laws of Arizona, with capitalization $3,000,000, shares $1 par, non-assessable; issued, $2,397,616.67. Annual meeting, second Monday in January.

Lands, 30 claims, 10 patented, area 600 acres, including a mill and smelter-site, 4 miles from Harrington, and 9 miles from a railway, in the Silver Mountain district of the Bradshaw Mountains. The property shows a hornblendic phase of Yavapai schist, with an intrusive porphyry dike of 50′ to 150′ width, carrying 3 contact deposits, No. 1 of 9′, No. 2 of 14′ and No. 3 of 25′ estimated average width, traceable circa 3,000′, with NE. strike. Gossans, of 100′ to 500′ estimated width, are much leached, carrying honeycombed hematite and limonite, with occasional copper carbonates. Ores are malachite and azurite at and near surface, succeeded, at depth of circa 50′, by a secondary sulphide zone carrying chalcocite, bornite and chalcopyrite. The management estimates ore to range 3 to 15%, and occasionally up to 30%, in copper tenor, up to 240 oz. silver, and 0.2 to 2 oz. gold per ton. Development is by shafts of 310′, 40′, 60′ and 40′, and tunnels of 25′ and 100′, with circa 1,500′ of workings, estimated by the management to show 5,000 tons of ore, with 3,500 tons blocked out for stoping. The first carload of ore, shipped November, 1910, gave net smelter returns of $31.23 per ton for copper, gold and silver, with an allowance of $1.20 additional for excess of iron.

Equipment includes a 120-h. p. plant, with an 80-h. p. 3-cycle vertical engine, connected to a 4-drill Sullivan air-compressor, a 20-kw. triplex pump, and a 40-h. p. gasoline hoist. Buildings include a 28x46′ machine-shop, 20x20′ smithy and 12x12′ carpenter-shop, with boarding-house and bunkhouse for 60 men. Management plans deepening No. 1 shaft to 600′, and doing about 4,000′ of drifting on the 460′ and 600′ levels, 1911.

PACIFIC COPPER MINING CO. **WASHINGTON.**

Mine office: Chewelah, Stevens Co., Wash. J. Hosea, superintendent. Property was being developed by tunnel, with a small force, August, 1910. Equipment includes a 25-h. p. gasoline engine and a 2-drill air-compressor.

PACIFIC DEVELOPMENT CO. **OREGON.**

Dead. Formerly at Riddle, Douglas Co., Ore. Described Vol. IX.

PACIFIC GOLD & COPPER MINING CO. **MÉXICO.**

Dead. Formerly at Ocotlán, Oaxaca, Mex. Described Vol. VIII.

PACIFIC GOLD MINING & MILLING CO. **UTAH.**

Office and mine: American Fork, Utah Co., Utah. J. L. Craig, president; C. M. Beck, vice-president; H. C. Johnson, secretary, treasurer and general manager; preceding officers, J. F. Crompton and A. B. Stevenson, directors; Fred Wingenfield, superintendent. Organized Feb. 24, 1900, under laws of Utah, with capitalization $20,000, increased, 1909, to $100,000, shares 10 cents par, assessable; issued, $40,000, with about $26,000 assessments levied to end of 1910. Annual meeting, first Monday in February.

Lands, 9 claims, 5 patented and 2 in process, area 180 acres, with a 10-acre millsite, 22 miles from a railway. Property shows granite, quartzite and [illegible] stone, carrying 3 veins, of which one, under development, with NE. strike, dip of 32°, of 2′ to 6′ width, carries an auriferous and argentiferous [illegible] complex of copper, lead and zinc, estimated by management to average low

Pacific Smelting & Refining Co., Ltd., the only property of which was the entire capital stock of the Compañía Metalurgica y Refinadora del Pacifico, S. A., organized under the laws of México, the property of which consisted of a smelter at Fundición, Alamos, Sonora, México, built to treat the Anita ores. The Douglas Copper Co. also had intimate relations with the Yaqui Mining Co., Ltd., owning properties in the Ryall and Mix concessions. The president of the Pacific Smelting & Mining Co. states that the Douglas Copper Co. is to be dissolved, and that upon such dissolution stock to the extent of 98% in the Pacific Smelting & Refining Co., Ltd., and Anita Copper Mines Co., Ltd., will pass to the treasury of the Pacific Smelting & Mining Co.

The president of the Pacific Smelting & Mining Co. stated, Nov. 4, 1910, that the property of the company consisted of the entire capital stocks of the following named Mexican corporations: Anita Copper Mines Co., Ltd., owning property in the state of Sonora; Yaqui Mining Co., Ltd., owning properties in the Ryall and Mix concessions; Pacific Smelting & Refining Co., Ltd., owning a copper smelting plant at Fundición, Sonora, Mex.; Mexican-American Smelting & Refining Co., Ltd., owning a silver-lead smelter at Guaymas; Sinaloa Smelting & Refining Co., Ltd., owning a concession for a smelter at Mazatlán, in the state of Sinaloa. The president stated, Sept. 14, 1910, that the Mexican Exploration & Mining Co., organized under the laws of Arizona, owned the stock of the Yaqui Mining Co., S. A., organized under the laws of México, and that all stock of the Mexican Exploration & Mining Co. is owned by the Pacific Smelting & Mining Co. The general manager stated, Jan. 31, 1911, that the people controlling the Pacific Smelting & Refining Co., Ltd. had bought the stock of the Mexican-American Smelting & Refining Co., S. A., which is affiliated with the Compañía Metalurgica y Refinadora del Pacifico, S. A., but that there was no direct financial connection, though the 2 corporations were under operation by the same staff. The Pacific Smelting & Mining Co. exchanged its preferred stock, on the basis of $1.25 of stock, for bonds, at par, with the bondholders of the Douglas Copper Co. and Mexican Exploration & Development Co., and exchanged share for share of its stock for stock of the Douglas Copper Co., and gave 1 share of its stock for 3 shares of stock of the Mexican Mining & Exploration Co. Theodore Douglas, the former president of the Douglas Copper Co. stated, Feb. 2, 1910, that the Pacific Smelting & Mining Co. owned practically 95% of the entire outstanding stock and bond issues of the Douglas Copper Co. and Mexican Exploration & Mining Co.

The lands and other property of the different companies controlled by the corporation are described hereinafter as a unit, with no attempt at segregation by nominal ownerships.

Lands, 1907, were 494 acres of mineral property, a 115-acre smelter-site at Fundición, and 19,760 acres of ranch, timber and coal lands, in the Baroyeca division of the Alamos district, including the Anita, Baroyeca, Consolidada, London, Juanita and María mines. The company was said, early 1911, to have bought the Morismenia copper-gold mine, near Navajoa, Alamos, Sonora, and also the Southern Pacific silver-lead mine, reported to be at Tesia, Sonora, but there is no such postoffice as Tesia in Sonora. The company also holds a property known as the Rosamond, apparently but little developed, and is said to have taken options on a number of other mines.

El Cobre mines of the Anita group, area 494 acres, have a shear-zone of 115′ claimed average width, between igneous rocks of different periods, with a diorite foot and trachyte or rhyolite hanging. The shear-zone, traceable for several thousand feet, with NS. strike and dip of about 45° W., carries ore in shoots, or chimneys, of somewhat lenticular form, there being 5 known ore bodies, the principal extending from surface to the 8th level, but branching into 3 parts at the 6th level. Faulting, cross-faulting and brecciation are noted, there being throws up to 200′. Ore, occurring mainly as replacements in diorite, and to

them to a stiff sludge, which is fed direct to the furnaces, without drying or briquetting. The former management planned installing a converter.

The smelter power plant has three 150-h. p. Morrison boilers. Machinery includes a 13x20x12″ Bates high-speed compound vertical engine, direct-connected to a 75-kw. Westinghouse generator, and there is a 25-kw. Western Electric generator direct-connected to a 9x12″ engine. Blast is furnished by a Connersville blower direct-connected to a 12x24x36″ Bates-Corliss tandem-compound engine. There are 3 electric pumps, and a small electric light plant.

The smelter plant includes a smithy, machine-shop, and an iron foundry with a 30″ cupola. The works have a 36″ gauge railway, equipped with 2 Davenport engines. Water is secured from an artesian well.

The smelter was blown in May 19, 1908, but was in commission only a short time, securing a very small production, after a great flourish of trumpets. The old management claimed costs of $3.99 per ton for mining, $2.21 for transportation, and $2.48 per ton for smelting, with indirect costs of $2.88 per ton, giving a total of $9.65 per ton, while miscellaneous charges, including refining, marketing and taxes, brought the alleged total cost to $15.73 per ton. The old management figured on an average extraction of $5.65 copper and $9.63 gold and silver per ton, and estimated that it could make copper at a net cost of 5.64 cents per lb., for electrolytic copper laid down, which figure was absolutely unwarranted, and it is probable that the limited production secured in 1908 cost the company closer to 25 cents than to 5 cents per pound, after deduction of included gold and silver values. On May 1, 1905, Theo. Douglas, then president of the company, claimed that it could make copper at 2.8 cents per lb. and estimated that the profits of the first operating year would be $700,000, figured on a production of 9,000,000 lbs. fine copper, from 6% ore, and finally estimated the insane cost of 1.83 cents per lb., a figure absolutely indefensible. The old management gave out estimates of net earnings as high as $1,500,000 yearly.

The property was under option for a time to the General Development Co., but the option was relinquished.

The company plans controlling the smelting business of the western coast of México, through the operation of 3 smelters, one at La Fundición, and one at Guaymas, both already built, but neither ever in blast for any great length of time, with a third to be built in Sinaloa, probably at Mazatlán, the plans calling for treatment of copper ores at La Fundición, lead ores at Guaymas, and probably both copper and lead ores at Mazatlán. The management hopes by operating this chain of smelters to be able to give lower rates, and hence be able to treat lower grade ores than has been possible previously, on the west coast.

Announcements have been made, from time to time, of the proposed blowing in of the smelter at La Fundición, but it remains idle, and the date of its actually going into commission is problematical. Mr. DeKalb stated, Jan. 31, 1911, that he would ship about 5,000 tons of silicious fluxing ores to a Pacific coast smelter, by the steamer Sark, in March, 1911, and that he had signed a number of contracts with shippers. He also stated that sufficient funds were being supplied, steadily, for carrying out the plans, and stated that the present management was endeavoring to redeem the investments of shareholders made under a previous management.

The stock of the Douglas Copper Co. was systematically foisted on credulous investors by Cardenio F. King, one of the smoothest and most plausible rascals ever engaged in the business of exchanging poor stocks for good money. The past record of the Douglas Copper Co. is so shady, in many respects, that the management cannot be blamed for desiring to do business under a new title, but necessarily some of the odium clings to the property, even with change of name. Mr. Theo. Douglas, generally blamed for past financial aberrations, wrote, Feb. 2, 1910, that he lived in México, while the financial affairs were left in the hands of the company's vice-president, Mr. Meiber

The property, though low in grade, has an ore body of large size, and is by no means devoid of promise, but will require large capital and careful handling if it is to be made a successful mine.

PALACE GOLD & COPPER CO. ARIZONA

Dead. Was a swindle. Formerly at Wickenburg, Maricopa Co., Ariz. Described Vol. VIII.

PALLANT & STOFFEL. MEXICO

Dead. Formerly at Charcas, Moctezuma, San Luis Potosí, Mex. Described Vol. VIII.

PALM DEVELOPMENT CO. CALIFORNIA

Dead. Formerly at Acton, Los Angeles Co., Cal. Described Vol. VI

PALMER MOUNTAIN COPPER MINING & MILLING CO. WASHINGTON

Dead. Formerly at Loomis, Okanogan Co., Wash. Described Vol. VIII

PALMER MOUNTAIN GOLD & COPPER CO. WASHINGTON

Dead. Formerly at Loomis, Okanogan Co., Wash.

PALMER MOUNTAIN GOLD MINING & TUNNEL CO. WASHINGTON

Dead. Was reorganized, 1903, as Palmer Mountain Tunnel & Power Co. Formerly at Loomis, Okanogan Co., Wash.

PALMER MOUNTAIN TUNNEL CO. WASHINGTON

Office: Holyoke, Mass. Mine office: Loomis, Okanogan Co., Wash. John H. Bell, president; F. G. Burnham, treasurer; E. C. Limbach, general manager and receiver. Organized circa 1910, under laws of Maine, with capitalization $5,000,000, shares $1 par, reported as nonassessable, with a 2¢ assessment levied. On March 1, 1911, the company had $52,000 notes outstanding, and nothing to meet them with.

Lands, 70 claims, unpatented, area circa 1,200 acres, and 2 millsites, on the southwestern slope of Palmer Mountain.

One John Boyd organized the Palmer Mountain Gold Mining & Milling Co. circa 1896, which company was reconstructed, by him, in 1903, as the Palmer Mountain Tunnel & Power Co. In 1908, after 12 years of cheerful contributions, the eastern shareholders began an investigation, which led to the resignation of Mr. Boyd, and a reorganization under the present title. The mine has a 4,000′ tunnel, originally planned to be driven 8,600′ to secure a depth of 4,000′. This tunnel was claimed, by Mr. Boyd, with deliberate untruthfulness, to have cut 28 veins, but, unfortunately, only one of these veins can be located in the tunnel, and, even more unfortunately, the sole survivor of the veins proves to be barren of ore, although it was claimed that the tunnel had cut a copper vein giving ore assaying up to 28.8% copper. The tunnel has electric lights and an electric haulage system, but, unfortunately, there is no ore to haul.

Equipment includes a power plant, on Touts Coulee Creek, 2 miles west of the mine, having a 5,500′ flume, with a 24″ penstock, delivering water, under 370′ head, to a 750-h. p. turbine, direct-connected to a 450-kw. 3-phase 60-cycle 6,600-volt a. c. generator, with an aluminum transmission line to a distributing station near the mine, where there is a Connersville pressure blower, driven by a 25-h. p. motor, and Temple-Ingersoll electric drills. Buildings include a machine-shop, smithy, warehouse, and a sawmill with electric power.

There is a very fine 100-stamp mill, which is a sin and a shame, as the mine has no ore worth mentioning. It is said that upwards of $1,500,000 has been spent on this property, but how much of this amount actually went into the ground is a question, as the project should have been completed for considerably less money. Mr. Limbach was said, April, 1911, to propose forming a new company. The Palmer Mountain is a fine example of how easily [illegible] are induced to squander enormous amounts of money on an absolutely worthless enterprise. A very ordinary mining engineer, of average honesty, would have told the shareholders of this concern, at a cost of a few hundred dollars,

This company was promoted by the notorious Dr. R. C. Flower, who wa successful in swindling many unsuspecting American investors, and who, a last accounts, was supposed to be traveling in México, in various disguises, an hitting the high spots only. The company was also assisted in securing th Quebradillas mine, of Parral, by Grant G. Gillett, the cattle plunger, who le Kansas City—and many creditors—between two suns. That preëminen firm of mining swindlers, L. E. Pike & Co., of Boston, also aided in the promo tion. The company succeeded the Lone Pine Mining Co., alias the Arizona Eastern & Montana Smelting & Ore Purchasing Co., of most unsavory memory succeeding the Buenos Aires Mining Co., Urique Gold Mining Co., Sunset Min ing Co. and La Paz Mining Co., all something more than dubious propositions Several mines were abandoned, without taking final titles. The Quebradilla mine, of Parral, was optioned, but bond was allowed to lapse. The various Mexican holdings of the Pan-American company, some of which may or may no still be held, included the Recompensa group, at Maguarachic, the Hernand group at Miñaca, and La Liga and Santa Camilla mines, at Concepción, al Chihuahua, México, also the Ambidexter group, in Arizona, located circa 19 on which no ore was found. Idle some years, moribund and should be buri

PANAMINT GREENWATER GOLD & COPPER MINING CO. CALIFORNIA

Dead. Was a Denver swindle. Formerly at Greenwater, Inyo Co., Ca Described Vol. VIII.

PANDORA COPPER MINING CO., LTD. IDAHO

Office: Wallace, Idaho. Mine office: Larson, Shoshone Co., Idah Walter H. Hanson, president; Martin Dunn, vice-president; John C. Weath head, secretary, treasurer and general manager; preceding officers, John Gray and C. M. Baillie, directors. Organized October, 1906, under laws o Idaho, with capitalization $1,000,000, shares $1 par, fully paid; issued, $737,0 with 3 mills in assessments levied, to end of 1910. Annual meeting, fourt Wednesday in October

Lands, 10 claims, area 150 acres, adjoining the Illinois claim of the Sno storm mine on the east, and supposed to carry about 3,000′ of the Snowstor ore zone. Property shows St. Regis and Revett quartzites, with copper in pregnations in the latter. Development is by a 1,075′ tunnel, with 1,15 of workings, and the management hopes to cut a vein, 1911, at 300′ furth distance.

PANHANDLE MINING & SMELTING CO. IDAHO

Mine office: Coolin, Bonner Co., Idaho. Lands are 2 groups, known a the Wood Rat and Idaho Panhandle. The Wood Rat claim has a 150′ shaft on a 3′ vein, carrying values mainly in lead and silver. The Idaho Panhandle pro erty, 2½ miles below the outlet, on the western side of Priest River, has a 2 shaft, showing a vein of 50′ claimed width, with NW. strike and vertical d carrying massive pyrrhotite with copper and gold values. Presumably bi

PANHANDLE SMELTER. IDAHO

Owned by Idaho Smelting & Refining Co., at Ponderay, Bonner Co., Ida

PANHANDLE SMELTING CO., LTD. IDAHO

Dead. Formerly at Ponderay, Bonner Co., Idaho. Described Vol.

PANTEIDAL COPPER CO., LTD. WALES

Dead. Was wound up, voluntarily, 1908. Formerly at Dolgelly, Me ionethshire, Wales. Described Vol. VIII.

PAN[illegible] COPPER CO., LTD. MÉXICO

[illegible]nds were sold, circa 1905, to Continental Copper Co. Pie [illegible]dova, Coahuila, Mex. Described Vol. V.

[illegible] CE

[illegible]nder laws of Great Britain, and supp [illegible]mine as a bad job. Was reorganized

$50,000, shares 5 cents par. Lands, 23 claims, 6 miles west of Paris, develop[illegible] by a shaft showing argentiferous lead and copper ores, giving assays up to 55[illegible] in copper and up to 80% in lead.

PARK CITY MAJESTIC MINING CO. UTAH

Dead. The promoter, S. T. Rolph, disappeared. Formerly at Park C[illegible] Summit Co., Utah. Described Vol. IV.

PARK CITY MINING CO. WASHINGTON

Mine office: Keller, Ferry Co., Wash. W. T. Connell, manager, at [illegible] accounts. Lands include the Mountain Boy and Hercules mines, latter havi[illegible] a 331′ tunnel showing ore assaying up to 6.5% copper and 140 oz. silver per [illegible] with small gold values and traces of lead. Presumably idle.

PARK COPPER CO. MONTANA

Dead. Former office was 33 West Granite St., Butte, Mont. Wm. [illegible] Climo was president; John H. Judge, vice-president; R. M. Cobban, treas[illegible] and manager; preceding officers, E. B. Howell and W. M. Bickford, direc[illegible] Forbes F. Irvine, secretary. Organized Oct. 6, 1906, under laws of Mont[illegible] with capitalization $1,000,000, shares $1 par. Lands were 6 claims, adj[illegible] ing the Pittsburg-New York Copper Mining Co., on the Wise River, [illegible] 50 miles from a railway. Mine had 2 shafts, known as the Park and Will[illegible] latter of 200′ depth, with 2 compartments, with about 1,000′ of workings, sh[illegible] ing argentiferous copper ore, assaying up to 12% copper tenor, the vein [illegible] wide, but badly broken, with no ore of value at the bottom, though the sho[illegible] at and near surface was very good. Property was worked during 1907. T[illegible] company also held deeds to interests in several claims, but these were mortg[illegible] for part of the purchase price, and also held claims under bond and lease, [illegible] other claims by location. Formerly at Elkhorn, Jefferson Co., Mont.

PARK COPPER & GOLD MINING CO., LTD. IDAHO

Office: 616 Cedar St., Wallace, Idaho. Mine office: Mullan, Sh[illegible] Co., Idaho. T. N. Barnard, president and manager; Nellie J. Stockb[illegible] secretary. Capitalization $1,500,000, shares $1 par. Lands, 7 claims, on [illegible] southern side of Stevens Peak, 5 miles from a railway. The property is [illegible] have a fissure vein in quartzite, of about 60′ in average width, capped by a [illegible] gossan of mixed hematite and siderite, carrying kidneys of high grade copper [illegible] bonates and chalcopyrite, with occasional native copper. Development [illegible] two 25′ shafts, and 3 tunnels, the two upper tunnels showing ore, while [illegible] the lower tunnel, of 1,680′ length, with a back of circa 1,000′, shows no ore. [illegible] mine has about one-half mile of workings. Idle.

PARKER GOLD & COPPER MINING CO. ARIZONA

Mine office: Parker, Yuma Co., Ariz. Lands, 6 claims, about 4 mi[illegible] of Copper Basin, said to show veins of 6′ to 25′ width in limestone, gra[illegible] schist, carrying ores giving assay values in copper and gold. Presumably [illegible]

PARKS MINING CO. MONTANA

Mine office: Polaris, Beaverhead Co., Mont. Has copper-gold ores. [illegible]

COMPAÑÍA ESPLOTADORA DE PARRAL. MÉXICO

Mine office: San Bartolo, San Juan de Guadalupe, Durango, Mex. P[illegible] includes El Lentisco mine, carrying auriferous copper ores. Idle several [illegible]

PARRAL CONSOLIDATED MINES CO. MÉXICO

Office: Philadelphia, Pa. Mine office: Ap. 155, Parral, Hidalgo, [illegible] hua, Mex. H. C. Gosch, president; D. H. Bradley, Jr., manager, [illegible] counts. Organized 1906, under laws of Maine, with capitalization [illegible] shares $1 par. Lands, 36 hectares, including La Prieta, Buena [illegible] mines, carrying mainly silver-lead ore, with gold and copper values [illegible] by a 420′ main shaft and a 220′ main tunnel, with about one-half mile [illegible] ings. The mine has rail connection and a 200-h. p. electric plant.

PARRAL SMELTING CO. MÉXICO

Dead. Formerly at Parral, [illegible] Mex. Dr[illegible]

Equipment includes a 10-stamp mill, hoisting machinery and several buildings. A force of 10 men was employed, for a short time, 1910. Idle at end of year, but management plans further work.

PAR VALUE CONSOLIDATED GOLD & COPPER CO. COLORADO.

Dead. Formerly at Turret, Chaffee Co., Colo. Described Vol. VIII.

PAR VALUE GOLD MINING CO. COLORADO.

Dead. Was succeeded, 1900, by Par Value Consolidated Gold & Copper Co., also dead. Formerly at Turret, Chaffee Co., Colo.

GEWERKSCHAFT PASCHA. GERMANY.

Office: Düsseldorf, Germany. Letter returned unclaimed from former mine office, Morsbach, Rheinprovinz, Prussia, Germany. Paul Müller, president; preceding officer, Ludwig Walter and Rh. Mühlemeyer, executive committee; Julius Jung, superintendent, at last accounts. Lands, 19 claims, in the Eitorg district, near Morsbach, carrying a sulphide complex of copper, zinc, lead and iron. Company formerly employed about 25 men. Idle.

PASO GOLDCOPPER & PRODUCING CO. UTAH.

Dead. Former office was Salt Lake City, Utah. A. H. Meredith, was president; Leonard Hilpert, treasurer. Organized, 1907, with capitalization $500,000, shares $1 par. Lands were 12 claims. Formerly at Brighton, Salt Lake Co., Utah.

PASS CITY COPPER CO. MÉXICO.

Dead. Formerly at Ahumada, Bravos, Chihuahua, Mex. Described Vol. VIII.

C. PASS & SON, LTD. ENGLAND.

Office and works: Bristol, Somersetshire, Eng. Property is the Bedminster Smelting Works, treating ores imported from a great variety of sources.

PATAGONIA MINING CO. ARIZONA.

Office: care of Francis J. Heney, San Francisco, Cal. Mine office, Patagonia, Santa Cruz Co., Ariz. Benj. Heney, president; R. R. Richardson, secretary and treasurer; Fredk. John Siebert, consulting engineer. Capitalization $200,000, shares $1 par. Lands, 31 claims, unpatented, area 620 acres, in 2 groups, known as the Hardshell and Flux, in the Patagonia Mountains, having a 505′ incline shaft with circa 2,000′ of workings. The Hardshell group shows auriferous silver-lead ore, slightly zinciferous in the bottom workings, with copper ores on the Flux group. Presumably idle.

PATHFINDER CONSOLIDATED MINES, LTD. BRITISH COLUMBIA.

Dead. Formerly at Grand Forks, Boundary district, B. C. Described Vol. VIII.

PATHFINDER GOLD & COPPER CO. IDAHO.

Dead. Formerly at Atlanta, Elmore Co., Idaho. Described Vol. VIII.

PAUDORNE COPPER MINING CO. VIRGINIA.

Dead. Wm. Leigh was general manager. Organized Dec. 23, 1902, under laws of South Dakota. Apparently no mining work ever was done by the company. Formerly at Houston, Halifax Co., Va.

PAULL'S CONSOLIDATED COPPER PROPRIETARY, N. L. AUSTRALIA.

Office: Grenfell St., Adelaide, South Australia. Mine office: Leigh Creek, South Australia. John S. Scott, manager. To end of 1909 the company had received subsidies of £525 from the South Australian government, of which no part had been repaid.

Property, formerly known as the Friend mine, on Burr Creek, 1½ miles north of Burr Well, in the Mount Lyndhurst district, has a vein of 2′ to 4′ width, carrying copper carbonates and gray ore, and is said also to have sodium ore, at shallow depth. Development is by numerous pits and shafts of 15′ to 100′ depth, and a 300′ incline shaft, with levels at 90′, 150′, 200′ and 250′, having about one-half mile of workings, in ore reported to show some values. The vein carries rich seams and stringers, of 1″ to 4″ width, with low-grade

from former mine office, Milford, Beaver Co., Utah. L. F. Block, president, treasurer and general manager; Allen T. Sanford, vice-president; J. Block, secretary. Organized 1906, under laws of Utah, with capitalization $60,000, shares 10 cents par, assessable.

Lands, 4 claims, patented, adjoining the King David and Cupric mines on the west, in the San Francisco district. Property has a good surface showing of argentiferous galena, disseminated in limestone. Mine, opened by a 130' shaft, with circa 500' of workings, developed a 2' to 5' fissure vein carrying argentiferous lead and copper ores, assaying up to 42% lead, 23 oz. silver, and $1.60 gold per ton. Some high grade silver-lead ore was shipped, late 1908, to Salt Lake smelters.

PEACOCK COPPER CO. CALIFORNIA.

Dead. Formerly at Lavic, San Bernardino Co., Cal. Described Vol. V.

PEACOCK COPPER MINING CO. ARIZONA.

Office: 1 Buckler Bldg., El Paso, Tex. Mine office: Johnson, Cochise Co., Ariz. J. A. Bennett, president and general manager; F. M. Miller, vice-president; A. H. Anderson, secretary and treasurer; preceding officers, C. E. Holmboe, J. I. Hewitt, J. D. Hughes and R. L. Nichols, directors; Ellis Mac Dougall, superintendent. Organized Sept. 4, 1908, under laws of Arizona, with capitalization $1,500,000, shares $1 par, nonassessable; issued, $808,000. Annual meeting, first Tuesday after first Monday in October.

Lands, 17 claims, unpatented, area 333 acres, adjoining the Arizona United Mines Co., showing limestone and porphyry, with an ore zone of NW. strike of 40' to 200' width on the outcrop, carrying 2 ore bodies, opened by a 120' shaft developing oxidized ores at surface, with sulphides at shallow depth, the shaft being in ore throughout, giving assays up to 20% copper and 20 oz. silver per ton, with small gold values. Buildings include an office, smithy and boarding house. Mine made small ore shipments to El Paso, 1910. Management plans continuous development.

PEACOCK COPPER MINING CO., LTD. IDAHO.

Office: Wallace, Idaho. Letter returned unclaimed from former mine office, Logan, Idaho Co., Idaho. John H. Nordquist, president. Organized 1907, under laws of Idaho. Lands, 5 claims, near the Eagle Mining Co., in the St. Joe district. Idle.

PEACOCK MINE. IDAHO.

Owned by American Mining Co., Ltd., S. T. Hauser and A. M. Esler. Described under title American Mining Co., Ltd.

PEAK COPPER CO. MICHIGAN.

Dead. Formerly at Bessemer, Gogebic Co., Mich. Described Vol. V.

PEAK DOWNS COPPER CO. AUSTRALIA.

Dead. Was succeeded by Peak Downs Freehold Copper & Coal Co. Formerly at Copperfield, Clermont Co., Queensland, Australia. Described Vol. VIII.

PEAK DOWNS FREEHOLD COPPER & COAL CO., LTD. AUSTRALIA.

Dead. Was succeeded, circa May, 1908, by United Peak Downs Copper & Coal Co., Ltd. Formerly at Copperfield, Clermont Co., Queensland, Australia. Described Vol. VIII.

PEARL COPPER MINING CO. COLORADO.

Dead. Formerly at Pearl, Larimer Co., Colo.

PEARL COPPER MINING & SMELTING CO. COLORADO.

Dead. Formerly at Pearl, Larimer Co., Colo. Described Vol. VII.

PEARL SMELTING CO. COLORADO.

Dead. Formerly at Pearl, Larimer Co., Colo. Fully described [illegible]

PECK MINING CO. ARIZONA.

Dead. Lands passed to Great Peak Mining Co. Formerly at [illegible] Yavapai Co., Ariz.

from former mine office, Milford, Beaver C[illegible] Salida, showing several fis[illegible] treasurer and general manager; Allen T. S[illegible]ferous lead and copper sulph[illegible] tary. Organized 1906, under laws o[illegible] has an 800′ crosscut tunnel, w[illegible] 10 cents par, assessable. [illegible] and a 12x14′ stampmill, presum[illegible]

Lands, 4 claims, patented, a[illegible], extending the tunnel 150′ to [illegible] the west, in the San Francisco d[illegible] argentiferous galena, dissemi[illegible] CHIL[illegible] shaft, with circa 500′ of w[illegible] argentiferous lead and co[illegible] SPAI[illegible] $1.60 gold per ton. So[illegible] Cannon St., London, E. C., Eng. M[illegible] Salt Lake smelters. [illegible] Brown, chairman; Dr. N. Brück[illegible]

PEACOCK COPPE[illegible] Count M. Pisani Jourdan, Albert Stra[illegible]

Dead. For[illegible] Harter and C. A. Massaouti, directors[illegible]

PEACOCK COP[illegible] Schreck, mine manager. Organized S[illegible]

Office: 1[illegible] and capitalization increased, Janu[illegible] Co., Ariz. J[illegible] issued, £537,600. Debentures, origin[illegible] president; [illegible] issued, at 5%, have been reduced to £63 [illegible] Holmboe, [illegible] fund for bond redemption, amounting [illegible] Dougall, [illegible] profits for fiscal years were £17,293 in 1[illegible] capital[illegible] £29,792 in 1909. Dividends were 5[illegible] nual [illegible] and 7½% in 1906, since when no divide[illegible] [illegible] reserving its profits to meet future finan[illegible]

Mi[illegible] of [illegible] northeast of the Rio Tinto mine, known as [illegible] s[illegible] of 17 old mines, taken over from the Socie[illegible] [illegible] is mainly opencast, and large quantit[illegible] [illegible] having amounted to 195,430 cubic meters [illegible] [illegible]; 174,324 cubic meters in 1907; 185,435 cu[illegible] [illegible] capping is to be removed almost complet[illegible] [illegible] down to the 9th level. There is a limited amou[illegible] [illegible] the mine being opened to the 11th level. [illegible] [illegible] were estimated, December, 1908, at [illegible]

[illegible] central power plant, built 1909. Buildings [illegible] [illegible] and a number of dwellings. A 2½-mile priva[illegible] [illegible] locomotive and 14 cars, connects the mines and wor[illegible]

[illegible] into cupriferous pyrite, pyrite and washed s[illegible] [illegible] previously leached for copper, and sold for sulph[illegible]

[illegible] settling tanks, boilers and pumps. The cupriferou[illegible] [illegible] end themselves with special facility to copper [illegible] [illegible] natural weathering and artificial leaching, and [illegible] [illegible] gives cheap costs, but entails heavy investments [illegible] [illegible] returned, a term of 8 to 10 years being required [illegible] [illegible] copper values. Occasional dry seasons cau[illegible] [illegible] production, as in 1907, and again in 1909. [illegible] lbs. fine copper in 1902; 2,199,680 lbs. in 190[illegible] [illegible] 110,000 long tons of leached ore, sold for sulph[illegible] [illegible] in 1906; 2,036,160 lbs. in 1907; 2,636,480 lbs. [illegible] [illegible] Property considered valuable and manag[illegible]

[illegible] MINERA DE PEÑAFLOR. SPAI[illegible]

[illegible] Spain. Mine office: Peñaflor, Sevill[illegible] [illegible] Don P. Alzaga, manager; Don Angel [illegible] [illegible] Organized Jan. 1, 1901, [illegible]

tain, in the Monarch district, 16 miles west of Salida, showing several fissure veins in granite, carrying auriferous and argentiferous lead and copper sulphides with lead values predominating. The mine has an 800′ crosscut tunnel, with 1,350′ of workings. There is a bunkhouse, and a 12x14′ stampmill, presumably with one stamp. Company works summers, extending the tunnel 150′ to 300′ yearly.

FUNDICIÓN DE PEÑA BLANCA. CHILE.

Owned by Otto Harnecker.

PEÑA COPPER MINES, LTD. SPAIN.

Office 3 Laurence Pountney Hill, Cannon St., London, E. C., Eng. Mine office: Nerva, Huelva, Spain. Nicol Brown, chairman; Dr. N. Brückner, deputy chairman; preceding officers, Count M. Pisani Jourdan, Albert Straube, H. Schmitz, C. Cahen d'Anvers, A. Harter and C. A. Massaouti, directors; T. Stevenson Dick, secretary; Enrique Schreck, mine manager. Organized Sept. 19, 1900, under laws of Great Britain, and capitalization increased, January, 1905, to £600,000, shares £1 par; issued, £537,600. Debentures, original £200,000 authorized and £193,800 issued, at 5%, have been reduced to £62,5[illegible] outstanding, and there is a sinking fund for bond redemption, amounting to £51,500, at last accounts. Net profits for fiscal years were £17,293 in 190[illegible] £45,697 in 1906; £19,522 in 1907; £29,792 in 1909. Dividends were 5% [illegible] 1903; 5% in 1904; 4% in 1905, and 7½% in 1906, since when no dividends have been paid, the company wisely reserving its profits to meet future financial requirements.

Lands, 183 hectares, 2 miles northeast of the Rio Tinto mine, known as the Peña del Hierro group, consisting of 17 old mines, taken over from the Sociedad Peninsular de Brussels. Extraction is mainly opencast, and large quantities of overburden are removed, stripping having amounted to 195,430 cubic meters in 1905; 220,869 cubic meters in 1906; 174,324 cubic meters in 1907; 185,435 cubic meters in 1909. Eventually the capping is to be removed almost completely and the mine worked opencast, down to the 9th level. There is a limited amount of underground work in progress, the mine being opened to the 11th level, and proving very wet. Ore reserves were estimated, December, 1908, at over 4,500,000 long tons.

Equipment includes a new central power plant, built 1909. Buildings include a crushing plant, shops and a number of dwellings. A 2½-mile private railway, equipped with one locomotive and 14 cars, connects the mines and works with the nearest public line.

Ores produced are divided into cupriferous pyrite, pyrite and washed sulphur ore, latter being ore previously leached for copper, and sold for sulphur contents.

The leaching plant has settling tanks, boilers and pumps. The cupriferous pyrites of the Sierra Morena lend themselves with special facility to copper extraction by a combination of natural weathering and artificial leaching, and the process, in use by the Peña, gives cheap costs, but entails heavy investments, long waits before profits are returned, a term of 8 to 10 years being required for the complete extraction of copper values. Occasional dry seasons cause scarcity of water, restricting production, as in 1907, and again in 1909.

Production was 1,397,760 lbs. fine copper in 1902; 2,199,680 lbs. in 1903; 1,724,800 lbs. copper and circa 110,000 long tons of leached ore, sold for [illegible] in 1905; 2,421,440 lbs. copper in 1906; 2,036,160 lbs. in 1907; 2,636,480 [illegible] 1908; 2,358,720 lbs. in 1909. Property considered valuable and [illegible] good.

SOCIEDAD ANONIMA MINERA DE PEÑAFLOR.

Office: Bilbao, Vizcaya, Spain. Mine office [illegible] Don Luis de Salazar, president; Don P. Alzaga, ma[illegible] Alzate, superintendent, at last accounts. Organi[illegible]

The mines are developed by 5 tunnels and 5 shafts, there being 3 shafts on the East vein, at the Campo Seco and Hecla mines, and 2 shafts on the West vein, at the Satellite mine, but there are only 2 hoisting shafts. The Hecla and Satellite mines were opened to 550′ depth, in early days. No. 1 shaft, 400′ deep, is useful only for ventilation; No. 2 shaft, 750′ deep, at the Campo Seco mine, is the main working shaft, with a steam hoist; No. 3 shaft, at the Satellite mine, about 1,300′ from No. 2, is 1,150′ deep, with levels at 100′ intervals, and has a steam hoist; No. 4 shaft, at the Satellite mine, 400′ deep, is used as an air-shaft and manway; No. 5 shaft, at the Hecla mine, is 400′ deep.

Equipment includes a 150-h. p. steam plant at the mine, with 44-h. p. and 100-h. p. hoists, good for 1,000′ and 2,000′ respectively, and there is a 14-drill Ingersoll-Sergeant air-compressor, and an electric light plant. The smelter has a 400-h. p. steam and electric plant, and fuel is crude petroleum, which is also is burned in the locomotives. The Southern Pacific railway is distant 7 miles, at Valley Springs, and transportation between that point and the mine is by wagons, making one round trip daily. A short private railway connects the mines and works, locomotives burning crude petroleum.

The smelter, a quarter-mile from the mine, has a 100-ton 36x72″ blast-furnace, and reverberatory furnaces of 50 and 100 tons, latter burning petroleum, and the smaller reverberatory is used to agglomerate partially desulphurized fines. There are eight 16-ton McDougal calciners. The blast-furnace, using semi-pyritic smelting, makes mattes of 20%, 40% and 60% copper tenor, in three successive fusions, and matte of about the same tenor is made in one fusion in the large reverberatory furnace. Matte goes to the American Metal Co., Ltd., for conversion and refining. The smelter railway, for charging and slag, has electric locomotives. A considerable percentage of the pyritic ore is used for the manufacture of sulphuric acid, and a little cement copper is produced by leaching old waste-dumps. The smelter has had considerable trouble with farmers over fumes, these difficulties having been adjusted, 1908, by the payment of damages, but complaints were again filed, late 1910, of smoke damage to the agricultural interests. The company employs about 200 men, and production is estimated at circa 1,000,000 lbs. fine copper, 1910.

PENN MINING CO. MICHIGAN

Dead. Sold part of lands, Nov. 28, 1905, to Lake Copper Co., and balance 1910, to Cherokee Copper Co. Formerly at Lake Mine Ontonagon Co., Mich. Fully described Vol. II.

PENN MINING CO. NEW MEXICO

Mine office: Lordsburg, Grant Co., N. M. Lands, formerly 52 claims, area 1,145 acres, apparently are now about 400 acres, in the Virginia district. The property was held formerly by the Aberdeen Copper Co., which was a rascally concern that paid a dividend of $32,175 from sale of treasury stock, and not from earnings. The property is said to show 10 fissure veins, with circa 5′ estimated average width, more or less developed by 8 shallow shafts, the 500′ Malachite shaft being the deepest, the mine having about 3,000′ of workings, at last accounts, showing auriferous copper and lead ores. Equipment includes steam power, with an air-compressor, and there is a 50-ton concentrator.

PENN-MONT MINING & MILLING CO. MONTANA

Office: 102 Trout Bldg., Lancaster, Pa. Letter returned unclaimed. [illegible] former mine office, Elliston, Powell Co., Mont. W. H. Guthrie, president; [illegible] Lichty, vice-president and fiscal agent; W. J. Merrill, secretary and [illegible] Thos. S. Rogers, superintendent at [illegible]. Organized under laws of Montana, with capitalization [illegible] including 15 lode claims and [illegible] opened by a 100′ incline shaft [illegible] in granite, carrying mainly

riani, transportation superintendent. Taylor A. Snow is business agent an Willard A. White attorney for the Penn-Wyoming Investors' Association, thes being the de facto though not the de jure officers of the company, which wa throttled, intentionally, by its former officers.

Organized Sept. 13, 1904, under laws of Wyoming, with capitalizatio $10,000,000, shares $1 par; issued, $8,963,000. Succeeded the North America Copper Co., organized 1902, under laws of New Jersey, with capitalizatio $20,000,000, shares $100 par. Of the capitalization of the Penn-Wyoming, ha was set aside for the redemption of $1,500,000 worth of bonds of the Nort American Copper Co., at the rate of 3½ for 1. Controls, or did control, throug ownership of 90% of the entire stock issue, the Haggarty Copper Mining Co. Encampment Smelting Co., Encampment Tramway Co., Encampment Pip Line Ditch Co., Encampment Land & Townsite Lot Co., Carbondale Coal Co. Emerson Electric Light Co., Saratoga & Encampment Railroad Co. and Nort American Mercantile Co., the last named corporation being the purchasing and distributing end of the Penn-Wyoming. Controls, or did control, the Battl Lake Tunnel Site Mining Co., through the ownership of $2,361,400 stock out of total issue of $2,500,000. The Battle Lake company had outstanding, June 15 1907, bonds aggregating $13,400.

Lands, including holdings of the Battle Lake Tunnel Site Mining Co aggregate 1,373 acres, property including 773 acres of patented mineral land 80 acres of coal lands, a 24-acre millsite, limestone quarry, 320 acres of timbe lands, and the entire townsites, less lots sold, of Encampment, Rudefeha an Rambler, the two latter being of little or no value.

The Ferris-Haggarty mine, 8 claims, one fractional, 5 patented, area 19 acres, discovered 1898, has an outcrop of decomposed spongy limonite, wit carbonate copper stains, under which is a fissured zone of about 20′ averag width, having a mica-schist hanging-wall and slightly stratified footwall, wit NW. strike, and dip of 50° SW. At depth of about 40′ the ore is massive bornite carrying 40 to 45% copper and $2 to $9 combined gold and silver values pe ton. The rich zone has been largely worked out, the bornite being replaced in the lower levels, by disseminated chalcopyrite, claimed to average 10% copper 1.75 oz. silver and $6 gold per ton, but yielding, in actual production, 4 to 6% copper, about 1 oz. silver and $2 to $4 gold per ton, with mixed charges, including ore from the old mine dump, estimated to average about 4% copper. A promising new ore body, opened, 1907, by crosscuts on the 140′ level, is about 1 wide, for depth of 75′ and length of 350′, and was claimed, by Superintendent Hand, to average better than 20% copper, which was a serious overestimate. The statement by Swasey & Co., of New York, that the Ferris-Haggarty has a vein of 65′ average width averaging 8% copper was another exaggeration, to market effect. A low grade copper vein was located by diamond drill, Septem ber, 1908, at a distance of 130′ in the footwall. Development is by a 1,40 main working tunnel, connecting with a 540′ shaft, and a 180′ winze has bee sunk below the tunnel level. The mine has about 6,500′ of workings. Ore is milled down to the tunnel level, through chutes, and hauled to ore-bins at the portal by compressed air locomotives. The mine was estimated, July, 1907, to be capable of producing 500 tons of ore daily, which was a serious overestimate in view of the comparatively limited extent of the workings.

The power plant of the Ferris-Haggarty mine, at the mouth of the tunnel includes three 180-h. p. boilers, a 25-drill air-compressor, and a 3-stage Norwa air-compressor, furnishing air, at 1,250 lbs. pressure per square inch, to a 5-t Porter locomotive, used for underground traction. There are 4 hoists, and 5 power drills.

Buildings at the Ferris-Haggarty include a 30x40′ wooden machine sho 20x40′ wooden carpenter shop, a 35x42′ wooden smithy, office, warehouse, ore bins, bunkhouse, messhouse and 14 dwellings.

The water-power plant proved unreliable, varying in energy delivered from 60 to 1,200 h. p., hence was supplemented by a steam plant having three 200-h. p Babcock & Wilcox boilers, and a 500-kw. Westinghouse-Parsons steam turbine Fuel for power purposes was wood, costing circa $3.50 per cord, with coke for smelting. The property also includes, or did include, a mine of lignite, on the line of the aërial tramway, at Carbondale, 12 miles from Encampment.

Buildings at the works include a machine-shop, pattern-shop, boiler-shop foundry, sawmill, smithy, office and laboratory. The Encampment Water Works Co., owned by the Penn-Wyoming, has a franchise for supplying water to the town of Encampment, and the Emerson Electric Light Co. has the lighting franchise for the town.

Operations having been greatly hampered by lack of rail facilities, a 45-mile railway, of standard gauge, was completed August, 1908, by the Saratoga & Encampment Railway Co., capitalized at $1,000,000, and controlled, through ownership of entire stock issue, by this company.

A small production was secured, 1902–1903, under the former ownership and the smelter was again blown in June 28, and blown out Oct. 20, 1905, [illegible] securing a claimed production of 2,385,629 lbs. fine copper, 3,549 oz. silver and 226 oz. gold, from 28,039 tons of ore smelted, giving an average extraction of 4.25% copper, with metal claimed by company to have been made at a cost of slightly under 9 cents per lb. Production for 1906 was 2,402,985 lbs. fine copper, claimed by the management to have been made at a total cost, f. o. b. Walcott, of 8.45 cents per lb., with an average return of 5.36% copper, from ore smelted. Production was claimed by the management to have been 2,600,000 lbs. in 1907, and 2,384,356 lbs. blister copper in 1908, with an average recovery of 6.28% copper.

The history of this company has been marked by a continuous series of scandals, continuing the scandalous career of its predecessor, and bequeathed scandals to its alleged successor, the United Smelters, Railway & Copper Co. A careful scrutiny of the devious methods of this company, its predecessors, and its alleged successor, leads inevitably to the conclusion that the trail of the serpent is over it all.

In 1898, Willis Geo. Emerson organized the Ferris-Haggarty Copper Mining Co., which corporation still remains in existence, and which is the direct owner of the only mine of importance or productive capacity that is or has been held by this company, its predecessors or its alleged successor. Control of the Ferris-Haggarty Copper Mining Co. passed, circa 1902, to the North American Copper Co., which was succeeded, Sept. 13, 1904, by the Penn-Wyoming Copper Co. The North American Copper Co. succeeded in selling stock to the public to the value of about $11,000,000, and blew up like a soap-bubble. The assets of the North American Copper Co. were bid in by Eugene M. Cobb, as agent for the Penn-Wyoming Copper Co., at a price reported variously, and even stated officially as $1,694, which figure presumably is entirely too low. It is alleged, in a bill of complaint, filed in the Wyoming courts, that the actual price paid for the property of the Ferris-Haggarty Copper Mining Co. was $300,000, with a bonus of $700,000 given the insiders, Messrs. Cobb, Norton, Draper and their associates. A suit against the Penn-Wyoming Copper Co. brought by shareholders of the North American Copper Co., was decided against the plaintiffs. Mr. Cobb and other former officers of the Penn-Wyoming deny vigorously that they were anywise connected with the management of the North American Copper Co. or were in anywise interested, except as unfortunate shareholders, but Mr. Cobb and associates seem to have profited by the history of the North American Copper Co., and have succeeded in making the Penn-Wyoming Copper Co. even greater scandal.

At an annual meeting of the stockholders of the Penn-Wyoming Copper Co. held Feb. 9, 1909, Messrs. E. M. Cobb, F. B. Draper, E. A. Norton, J. S.

Smelters, Railway & Copper Co. would have to go by the board, owing to its heavy indebtedness, although it had been claimed, July, 1909, that about $2,000,000 worth of obligations assumed by this company, when it was claimed to have succeeded the Penn-Wyoming Copper Co., had been cancelled. This call for further funds was the straw that broke the camel's back, and a few of the unfortunate bona fide investors in the Penn-Wyoming Copper Co. organized the Penn-Wyoming Investors' Association, which was called, by the officers of the United Smelters, Railway & Copper Co., an organization of blackmailers, because the Investors' Association had the effrontery to demand sight of the books, and enforced this demand in the courts. Mr. Pennock, the president of the United Smelters, Railway & Copper Co., was promptly appointed receiver, in a friendly action, officers of the company having by this time become expert in such matters. To offset the organization of the Penn-Wyoming Investors' Association, those in control of the United Smelters, Railway & Copper Co. organized a bondholders' committee, ostensibly to protect the interests of the innocent bondholders and shareholders, Mr. Edw. F. Richardson, who was killed in an automobile accident, in Denver, May 7, 1911, being chairman of this committee, with Howard A. Thornton secretary, and an office was opened at 16 Trust Bldg., Grand Rapids, Mich. The bondholders' committee apparently in reality represented almost entirely the "insiders," together with a few befogged owners of stocks and bonds bought with real money.

The corporate affairs of the Penn-Wyoming Copper Co. are complicated by the existence of either 11 or 13 affiliated subsidiary corporations, apparently all or nearly all of which issued bonds, and were operated under cover, further muddling an already turgid situation, to such an extent that it is practically impossible for anyone outside of the management to obtain a clear knowledge of the actual financial operations. There also was a wheel within a wheel, this being the Equitable Securities Co., organized by the directors and insiders of the Penn-Wyoming Copper Co., ostensibly for the purpose of marketing Penn-Wyoming stock. The directors, by virtue of the Equitable Securities Co., which was a stalking-horse, contracted among themselves to buy and sell stock, acting in the dual capacity of both vendors and purchasers, and apparently sold the Penn-Wyoming company's stock at 30 cents to the Equitable Securities Co., which marketed the stock at 50 cents to $1.25 per share. Indignant shareholders of the Penn-Wyoming estimate that as much as $1,000,000 was intercepted by the Equitable Securities Co., on its supposed way from the pockets of investors to the coffers of the Penn-Wyoming Copper Co.

The company paid dividends, at the rate of 6% yearly, for 2 years, until March, 1907, on issued stock, when the dividend rate was increased to 8% yearly, but the dividend of July, 1907, was canceled, on account of the burning of the smelter, and the next dividend was omitted also, ostensibly because of general business conditions, Swasey & Co., a brokerage firm that was pushing the shares, claiming that the dividends had been earned, and that a 2% dividend would be paid March, 1908, but this promised dividend was not paid. These dividends were being paid contemporaneously with the putting out of new stock, a policy that is prima facie evidence of fraud or fundamentally defective financial methods. H. Gulliver, of London, presumably some relation to the famous traveler, advertised, signing himself as secretary of the Penn-Wyoming Copper Co., that dividend No. 23, of 2%, for the quarter ending March 31, 1907, had been declared, and was payable Monday, Apr. 15, 1907, but it is entirely improbable that the company paid 23 dividends in all, hence the official advertisement must be considered as intentionally untruthful and uttered with fraudulent intent.

The company had a British office, at Finsbury House, London, E. C., and a London board, of which G. Antoine was chairman, H. Gulliver secretary, and H. Bromwich, treasurer. The English board also is under strong suspicion, and

issue, which at last accounts was in the treasury, listed as an asset, but which by some strange hocus-pocus, has moved over to the next column, and is now a liability, the switching of columns making the slight difference of $1,500,000; Encampment Pipeline Ditch Co., $100,000; Encampment Smelting Co., $500,000 Emerson Electric Light Co., $50,000; Encampment Tramway Co., $350,000; Encampment Waterworks Co., $50,000; Encampment Land Townsite Co. $8,000; Battle Lake Tunnel Site Mining Co., $750,000; Haggarty Copper Mining Co., $1,000,000; Carbondale Coal Co., $20,000; North American Mercantile Co., $20,000; a total indebtedness of $3,598,000, for a company that had been claimed, by its president, on Jan. 24, 1908, to owe only $423,595. Its subsidiaries as well, the president claimed, would be out of debt, except for the railroad bonds of $750,000, as soon as the company marketed its bonds, and converted its bills receivable into cash. Somebody must have lied.

It was stated, April, 1909, that the Penn-Wyoming Copper Co. had deposited with the American Trust & Savings Bank, of Chicago, as trustee, all of its preferred stock, for the sole purpose of converting and canceling the Penn-Wyoming bonds of $2,500,000, which bonds are now to be foreclosed, and it was then stated that the final payment had been made, cleaning up the indebtedness of $1,390,780 on the Penn-Wyoming, which was in the form of notes of subsidiaries and underlying collateral, plus a note for a similar amount from the Penn-Wyoming Copper Co. This mysterious bond issue of $2,500,000, which seems to have crept upon the scene unawares, and entirely unheralded by its sponsors, apparently runs for 20 years, at 6%, and bonds supposedly are convertible into preferred stock, at any time during their life. Apparently the $2,500,000 bond issue has shrunk, in some equally mysterious manner, to the amount of $1,600,000 now said to be outstanding. The Penn-Wyoming Investors' Association asserts that of the $1,600,000 bonds outstanding, only $91,000 was ever paid in by bona fide purchasers, and that not one cent of the $91,000 ever reached the company's treasury. The bonds are secured by a trust deed, and, early 1911 the bondholders were attempting to foreclose, but, strange to say, the late Edmund F. Richardson, trustee for the mysterious notes aggregating $1,390,798.62, appears as the largest holder of the bonds, and, as he is dead, it is not likely that he can be induced to explain how he secured possession of these bonds, and nobody else seems to know, or at least those who have knowledge seem unwilling to tell. It is claimed by the Penn-Wyoming Investors' Association that these notes aggregating $1,390,798.62 were illegal, having been incurred by the North American Copper Co., and that the Penn-Wyoming never profited from these notes, and never received any consideration for the assumption of same, as the property of the North American Copper Co. was sold, under foreclosure, by the International Trust Co., at Denver, Colo., on Dec. 15, 1904, to Eugene M. Cobb, acting for the Penn-Wyoming Copper Co., in satisfaction of this particular indebtedness. It would seem that the North American Copper Co. became bankrupt because of outstanding bonds of $1,500,000, and outstanding notes of $1,390,798.62, and that the property was sold under foreclosure to the Penn-Wyoming Copper Co., which assumed the indebtedness of both bonds and notes payable. The bonds apparently are held mainly by insiders, as evidenced by reluctant admission, in the federal court.

The company claimed, early 1908, to have 3,400 shareholders, and apparently about 6 000 unfortunate investors have been mulcted. It was claimed that the shares of this company were listed on the London stock exchange and the Paris bourse, but this seems doubtful.

In September, 1907, the management of this company claimed to have opened a large new vein of copper, estimating the amount of ore in sight and mined at $2,500,000, in ore of 18 to 25% copper tenor, and a few months later the same management gravely announced that it would be necessary to sink

PERCY-CHESTER CONSOLIDATED MINING CO. COLORADO.

Dead. Was succeeded by Percy-Chester Mines Co. Formerly at Red Cliff, Eagle Co., Colo. Described Vol. VIII.

PERCY-CHESTER MINES CO. COLORADO.

Office: 602 Symes Bldg., Denver, Colo. Mine office: Red Cliff, Eagle Co., Colo. Gus Olmstead, superintendent. Mine, developed by shaft and tunnel, carries auriferous and argentiferous copper ore. Equipment includes steam power, and an air-compressor. Property was under development, with a force of circa 15 men, early 1911.

PERCY RIVER SYNDICATE. AUSTRALIA.

Office: Irvinebank, Queensland, Australia. Mine office: Ortona, Gilbert Co., Queensland, Australia. G. C. Young, secretary; preceding officer, John Moffat and A. Linedale, owners; Jas. Puxley, general manager; W. Brown, superintendent.

Lands, 5 leases, area 130 acres, and an 80-acre smelter-site, lying along the southern bank of the Percy River, about 5 miles above its junction with the Gilbert River. Property is reported by the management to carry 11 [illegible] veins, in diorite, with EW. strike, and dip of 55° to 87°, of which 8 veins, under development, are estimated to average 4′ width, carrying malachite, [illegible] and chalcopyrite, averaging 15% copper, 10 oz. silver, and from a trace to 3 dwts. gold per long ton. Development is by the 125′ No. 1 shaft on vein No. 1; 165′ No. 2 shaft on vein No. 2; 55′ No. 3 shaft on vein No. 3; 70′ No. 5 shaft on vein No. 5; 150′ No. 6 shaft on vein No. 6; 25′ No. 7 shaft on vein No. 7; 130′ No. 8 shaft, on what is known as No. 2 West Lode. Development is mainly on No. 2 vein, where there is a 12-h. p. hoist. The company also has 3 veins on the Caledonia group, 10 miles south of Ortona. The syndicate was said, March, 1908, to have stocked circa 2,500 tons of oxidized ores, averaging 14.57% copper and 12.13 dwts. gold per ton, and planned erecting a small reverberatory furnace to treat same. Presumably idle.

FRANCISCO DE PAULA PÉREZ. CHILE.

Mine office: Los Condes, Santiago, Chile. Works office: Ñuñoa, Santiago, Chile. Property includes La Central mine, opened 1880, adjoining the property of the Compañía Esplotadora Los Bronces, developed by a tunnel driven jointly. Company also owns the Mina Disputada, which has increased in importance latterly, and the San Agustin mine, developed by tunnel. Ore average, after selection for smelting, about 23% copper.

The smelter, known as the Fundición La Central, has a matting furnace only. Production is estimated at 500,000 lbs. in 1905, and was 2,367 metric tons of 24% ore, equivalent to circa 1,275,000 lbs. fine copper, in 1908.

PERKIOMEN MINES. PENNSYLVANIA.

Mine office: Shannonville, Montgomery Co., Pa. Are old mines, that were quite extensively worked, for some years circa 1850–1880, and produced a large variety of copper and lead ores. Long idle.

PERSON CONSOLIDATED COPPER & GOLD MINES CO. NORTH CAROLINA.

Office: 1901–42 Broadway, New York, N Y. Letter returned unclaimed from former mine office, Virgilina, Halifax Co., Va. E. D. Beecher, president and general manager, at last accounts. Organized under laws of New York with capitalization $1,000,000, shares $10 par.

Lands, 1,372 acres, in several neighboring tracts, including the Durry [illegible] located in Person county, North Carolina, having a 330′ main shaft, developing vein averaging 4′ width, carrying ores said to range 4 to 20% in copper [illegible]. Has a 50-ton concentrator. When worked, the mine shipped [illegible] averaging 45% copper and 20 oz. silver per ton, with small gold values; [illegible] a limited amount of high-grade ore, averaging 30% copper and 10 oz. [illegible] per ton, direct to smelter. Idle several years and apparently mortgaged.

Buildings at the smelter-site include a well-equipped machine-shop, smithy, office, laboratory and dwellings, and the plant employs about 100 men, normally. Although the Churruca mine was said, 1908, to be in shape to produce about 300 tons daily of 9% ore, which would give a monthly production of about 1,000,000 lbs. fine copper, nothing has been heard of the smelter since 1909, and presumably both mine and works are idle.

PETOSKEY MINING CO. ARIZONA.

Dead. Former office was Petoskey, Mich. Company was organized 1907, and built a leaching plant, which was burned shortly after construction, apparently having secured no production. Formerly at Williams, Coconino Co., Ariz.

PETRO MINING CO. UTAH.

Dead. Lands were sold, 1905, for $30,000, to Utah-Apex Mining Co. Formerly at Bingham Canyon, Salt Lake Co., Utah.

PEWABIC CONSOLIDATED GOLD MINES CO. COLORADO.

Mine office: Central City, Gilpin Co., Colo. John C. Fleschhutz, general manager. Property, in the Russell Gulch district, has 2 shafts, known as the Pewabic and Iron, developing auriferous and argentiferous copper ore, with values mainly in the precious metals. Equipment includes a steam plant with hoists and air-compressor. The property has a 70-stamp mill, and a 150-ton concentrator, known as the New York mill, at Black Hawk.

PEWABIC MINING CO. MICHIGAN.

Dead. Was wound up, 1905, and lands passed to the Quincy Mining Co. Formerly at Hancock, Houghton Co., Mich. Described Vol. II.

PEYTON CHEMICAL CO. CALIFORNIA.

Office: 430 Mills Bldg., San Francisco, Cal. Mine office: El Dorado, El Dorado Co., Cal. Works office: Martinez, Contra Costa Co., Cal. Lands include the Noonday mine and adjoining claims, in the Diamond Springs district. The Noonday, formerly held under bond and lease, but now owned outright, has a vein of about 7′ width, in slate, traversed by small diabase dikes, carrying sulphide ore said to average about 5% copper and $2 gold per ton, with a small quantity of silver. The mine has a 130′ two-compartment shaft, equipped with a 60-h. p. engine burning petroleum, and a hoist. The smelter on the coast, has 2 reverberatory furnaces, and, during the greater part of 1910, smelted 2,000 to 4,000 tons of ore monthly, but closed down its reverberatories during the latter part of 1910.

PFAU GOLD MINING & REFINING CO. ARIZONA.

Dead. Was merged, 1907, in Verde River Copper Co. Formerly at Jerome, Yavapai Co., Ariz.

PHELPS, DODGE & CO., INC. U. S. A. & MEXICO.

Office: 99 John St., New York, N. Y. Dr. Jas. Douglas, president; Arthur Curtiss James and Jas. McLean, vice-presidents; Geo. Notman, secretary and treasurer; preceding officers, Cleveland H. Dodge, Geo. B. Agnew, Frank Hine, Wm. Church Osborn and E. Hayward Perry, directors; Walter D. ... general manager; J. Millar Jones, British agent; E. L. Carpenter, general manager Stag Cañon Fuel Co. Organized Dec. 14, 1908, under laws of New York, with capitalization $50,000,000, shares $100 par; outstanding, June 30, 1910, $44,995,600. This company was organized as the successor of the firm of Phelps Dodge & Co., which had a history of nearly a century, its founder, Wm. E. Dodge, having been one of the great pioneer merchants of America, and a noted philanthropist. Shares are listed on the New York stock exchange.

Dividends, paid quarterly, begun Apr. 1, 1909, aggregated $10 per share in 1909, and $12 per share each in 1909 and 1910. Dividends received from subsidiary companies were $5,769,354 in 1909, and $8,787,815 in 1910, with miscellaneous earnings of $256,385 in 1909, and $312,095 in 1910, all expenses in 1910 being $252,521, with dividend payments of $5,399,875, leaving a ...

PHILADELPHIA COPPER MINES CO. NEW MEXICO.

Is practically dead. Property was sold, for $161,000, to J. W. McAlpine et al, who organized the United States Copper Co., April, 1911, to take over this property. Formerly at Hanover, Grant Co., N. M. Fully described Vol. VIII

PHILADELPHIA MINING & MILLING CO. NEW MEXICO.

Dead. Was succeeded, circa 1906, by Hillsboro Consolidated Mines Co., a fraud. Formerly at Hillsboro, Sierra Co., N. M.

PHILADELPHIA-SEARCHLIGHT GOLD & COPPER MINING CO. NEVADA.

Office: 810 Witherspoon Bldg., Philadelphia, Pa. Letter returned unclaimed from former mine office, Searchlight, Lincoln Co., Nev. John C. Groome, president; Jos. W. Shannon, vice-president; J. M. Stewart, secretary and treasurer; preceding officers, Richard M. Popham, E. C. Knight, Jr. Richard W. Meirs and Chas. Wheeler, directors; W. H. Bainbridge, superintendent, at last accounts. Organized under laws of Arizona, with capitalisation $5,000,000, shares $1 par; issued, $1,000,000, at last accounts.

Lands, 23 claims, 1 fractional, area 450 acres, in the Sunrise district, 4 miles northeast of Searchlight. The mine has a 356′ vertical shaft, with crosscuts from bottom showing several veins of 3″ to 4′ width, carrying auriferous and argentiferous copper ore, of fair tenor, with quartz gangue. Has steam and gasoline power, with necessary mine buildings. Idle and presumably moribund

PHILLIPS RIVER GOLD & COPPER CO., LTD. WESTERN AUSTRALIA.

Office: Salisbury House, London, E. C., Eng. Mine and works office, Ravensthorpe, Phillips River Goldfield, Western Australia. Jas. Tyhurst, chairman; Moritz Hochschild, managing director; Neil McNeil, local advisory director; preceding officers, Eduard Koebner, L. Hirsch and H. Wildon Carr, directors. J. E. Albrow, secretary; Fred W. Morgan, mine manager. Organized Jan. 6, 1906, under laws of Great Britain, with capitalization £100,000, increased later to £200,000, and again increased, Dec. 30, 1909, to £250,000, shares £1 par; issued, £200,000, fully paid. Company absorbed, February, 1909, the Mount Cattlin Copper Mining Co., Ltd., giving £100,000 full paid shares therefor. Debentures, £100,000 authorized, at 5½%, offered, January, 1910, to shareholders, redeemable at 105, Jan. 1, 1920, or at option of company any time after Jan. 1, 1912, on 6 months' notice, debenture-holders having the right, at any time prior to Jan. 1, 1912, to exchange bonds for fully paid shares of the company, at £4 per share. Accounts for year ending June 30, 1909, showed a loss of £3,448, and for fiscal year ending June 30, 1910, loss was £55,420, leaving debit balance of £32,300.

Lands, 284 acres in 8 tracts, including the following leases: Mt. Bess 40 acres; Mt. Cattlin, 50 acres; Marion Martin, 50 acres; Mt. Desmond, acres; Desmond, 12 acres; British Flag, 20 acres; Elverdton, 40 acres; Elverton South, 20 acres. The property also includes an ironstone quarry, for flu Lands are in the Ravensthorpe division of the Phillips River goldfield, circa miles from Port Hopetoun. The mines as a whole were estimated, Dec. 1909, to have ore reserves carrying 8,000 long tons fine copper.

The Elverdton mine has a 500′ main shaft, with bottom level at 500′, a winze opens the mine to a depth of 630′. Ore is a cupriferous schist bed, to 50′ width, traceable for some distance. Equipment includes an 80-h Babcock & Wilcox boiler, and a double-drum Bowes, Scott & Western hoist, 6′ 6″ drums of 5′ 6″ face, and a 5-drill Rand air-compressor.

The Mt. Desmond mine, about one-half mile north of the Elverdton, on same ore body, has a 280′ shaft, with bottom level at 250′, and is said to have produced £13,000 of ore during development. Equipment includes a good [illegible] and a 6-drill Martin 2-stage cross-compound air-compressor. This mine [illegible]

The Mt. Cattlin mine shows a vein of about 7′ width, opened by a shaft, with bottom level at 500′, showing a 10′ vein, and mine shows, at d[illegible]

from a 3,000-gallon dam, 300x700x12′, built across Eagle River. A large stationary Worthington pump connects with the dam, and has 900′ of hose, for fire protection. The mine and mill are connected by a 3½-mile railway having locomotive, rock-cars and flat-cars, widened, 1908, to standard gauge, and connected with the Keweenaw Central railway.

The 300-ton stampmill, 50x190′, of wood, on concrete foundations, is on Eagle River, north of the mine. Wash-water is secured from a wooden dam 90′ wide and 10′ high, through a 12x24″ launder, having a drop of 13′ in a distance of 3,000′. Mill equipment includes a steam stamp, 14 Cleaves jigs and 4 Woodbury jigs.

PHŒNIX & EASTERN SMELTING & REFINING CO. ARIZONA

Works office: Phœnix, Maricopa Co., Ariz. Geo. F. Goerner, general manager, at last accounts. Late 1906 was said to plan building a 300-ton smelter in vicinity of Phœnix, but no such smelter built, and probably no prospect of building. Ralph Jacoby was one of the organizers, hence the company is regarded with much suspicion. Idle and moribund.

PHŒNIX GOLD & COPPER MINING CO. NEVADA

Office: 218 La Salle St., Chicago, Ills. Mine office: Tenabo, Lander Co., Nev. Organized circa 1907. Property is the Howie lease of the Phœnix lode on lands of the Gold Quartz Mining Co., said to have a shaft showing a 6′ vein with ore assaying up to $100 per ton in combined copper, silver and gold values. Idle and apparently moribund.

PHŒNIX GOLD & COPPER MINING & MILLING CO. WASHINGTON.

Dead. Former office was Spokane, Wash. Geo. Ilse was president and general manager. Lands were 7 claims, on Cecil D. Mountain, 14 miles northeast of Republic, showing, for circa 4,500′, a strong vein carrying auriferous copper ore, associated with iron oxides and pyrite, giving assays of 3 to 15% copper and $2 to $10 gold per ton, developed by shafts of 80′ and 20′. Formerly at Republic, Ferry Co., Wash.

PHŒNIX MINING CO. CHILE.

Office: Valparaiso, Chile. Mine office: Tocopilla, Antofagasta, Chile. Organized Apr. 18, 1905, under laws of Chile, with capitalization 250,000 pesos, shares 100 pesos par. Jas. L. Bennett, manager; Chas. Wall, mine manager.

Property is 15 acres of mineral land, 3 miles from Tocopilla, and 7 acres at the port of Tocopilla, former including the Santa Rosa mine, developed by a 320′ tunnel; the San Pedro mine, having a 20-h. p. hoist; La Teresa mine, having a 25-h. p. Fairbanks-Morse hoist and a Blake crusher, and La Colorada mine, these properties carrying a little oxidized copper ore, but mainly chalcopyrite.

Equipment includes 2 Babcock & Wilcox boilers, burning petroleum, and a small Ingersoll-Rand air-compressor. La Colorada mine is connected by ground-tram, with the railway of the Anglo-Chilian Nitrate & Railway Co. Production, shipped to the Lota i Coronel works, was circa 1,800 metric tons of 16% copper ore for the last half of 1907 and is estimated at 750,000 lbs. fine copper for 1907.

PHŒNIX MINING CO. UTAH.

Letter returned unclaimed from former office, Salt Lake City, Utah. Mine office: Bingham Canyon, Salt Lake Co., Utah. H. A. Gebhardt, superintendent. Is controlled, through a stock interest of circa 60%, by the Utah-Apex Mining Co., and is managed thereby.

Lands, 80 acres, adjoining the Utah-Apex and Yampa mines, opened by tunnels, one, of 1,600′, showing a vein of 7′ to 14′ width, carrying silver-lead ore. Smelting ore assays 35 to 40% lead and 10 oz silver per ton.

Equipment includes a good plant, with an air-compressor. A 100-ton mill, with electric power, on Carr Fork, completed 1908, treats concentrating ore averaging about 10% lead, with small silver values, putting about 5 into 1, and making a 40% argentiferous lead concentrate.

COMPAÑÍA MINERA PIEDRAS VERDES y ANEXAS. MÉXICO.

Office and mine: Alamos, Sonora, Mex. Angel Almado, president; Joaquin A. Mange, superintendent. Lands, circa 15 miles northwest of Alamos and 2 miles north of the Rio Mayo, include the Piedras Verdes, Unión and Sonora mines, having a mineralized zone of about one mile width, and 4 miles length showing red schists, carrying copper carbonate stains at surface, with quartz dikes and numerous dioritic intrusions, having veins outcropping 10′ to 40′ in width, carrying considerable oxidized ore, of good grade, and occasional native copper, in masses of considerable size. Development is by a 350′ shaft and a 375′ tunnel. Some churn drilling was done, 1910.

Equipment includes steam power, and a small matting furnace, that, 190[illegible] shipped small quantities of matte averaging about 40% copper, 20% lead and 200 oz. silver per ton. Property was said to have been bonded, 1909, to Boston interests, but apparently is under bond, at a price of 300,000 pesos, to Mr. Seeley W. Mudd.

PIEDRAS VERDES MINING CO. MÉXICO.

Office and mine: Fuerte, Sinaloa, Mex. The property shows argentiferous copper ores, slightly developed by tunnel. Idle several years and apparently moribund.

PIEDRAS VERDES MINING CO. MÉXICO.

Mine office: Suaqui Grande, Hermosillo, Sonora, Mex. Geo. M. Cochrane, superintendent, at last accounts. Has steam power. Presumably idle.

PIERCE MINING CO. COLORADO.

Dead. Stephen Hoskin was manager. Mine, slightly developed, with a force of circa 10 men, carried auriferous and argentiferous copper ore and was equipped with steam power. Formerly at Central City, Gilpin Co., Colo.

PIKEDALE COPPER CO. AUSTRALIA.

Office: 10 Citizens' Chambers, Moore St., Sydney, N. S. W., Australia. Letter returned unclaimed from former mine office, Stanthorpe, Bentinck Co., Queensland, Australia. W. Lovely, general manager. Lands, freehold, 21 miles from Stanthorpe have a fissure vein in shale, carrying self-fluxing argentiferous copper and lead ores in the upper workings, changing, at comparatively shallow depth, to highly zinciferous ores, very refractory, and for which no successful process of reduction has been secured. The mine has 13 shafts, mainly very shallow. The 170′ main shows a vein of 3′ to 4′ width. The ore produced 1907, assayed about 5% copper and 50 oz. silver, and new work developed ore averaging about 3% copper, 5% lead and 19 oz. silver per long ton, but also carrying up to 20% zinc.

The reduction plant includes a mill, built 1907, with a magnetic separating process, said to give very clean concentrates. There is a dam with 12′ of water. The smelter has a reverberatory furnace, and the addition of a blast-furnace was contemplated, circa 1908. Production was 430 long tons of ore, yielding 29[illegible] lbs. fine copper and 4,916 oz. silver, 1907. Idle and presumably moribund.

PIKE HILL MINES, INC. VERMONT.

Office: 709–82 Beaver St., New York, N. Y. Mine office: Corinth, Orange Co., Vt. N. M. Macdonald, president; H. H. Knox, vice-president; John H. Allen, secretary and treasurer; Harry G. Hunter, superintendent, last accounts; preceding officers and D. S. Conant, directors. Organized Dec. 9, 1906, under laws of Vermont, with capitalization $200,000, shares $100. Annual meeting, second Tuesday in January.

Lands, 101 acres, freehold, in the Corinth district, 14 miles from the Boston & Maine railway, showing mica-schist carrying lenses of chalcopyrite disseminated in pyrrhotite, of 3.5% estimated average copper tenor. The mine was opened all way, at intervals, during the Nineteenth Century.

[illegible] steam plant, held in reserve, and a [illegible] and a 25-kw. electric generator.

owner and manager; Fermin Arrega, superintendent, at last accounts. Lands, 40 claims, unpatented, area 800 acres, in the Santa Fé district, 8 miles from the Southern Pacific railway, showing syenite, andesite and limestone, formerly reported to carry 57 ore bodies, when there were 57 claims in the group, and now reported, by the owner, to carry 40 ore bodies, there being 40 claims in the group, the number of veins marvelously matching the number of claims, in both instances. Five ore bodies under development are reported as of 10′ to 50′ width, formerly reported to be traceable 7 miles, and now reported as 15,000′ long, carrying azurite, malachite, bornite and chalcopyrite, formerly reported to give average assays of 10% copper and 2 oz. silver per ton, which figures were too high, and now reported to average 6% copper, 2 oz. silver and $2 gold per ton. Development is by shafts of 60′ and 20′, and by tunnels of 300′, 150′ and 200′ with 730′ of workings, formerly reported by the management to show 100,000 tons of ore, with 20,000 tons blocked out for stoping, which estimates were excessive, and now reported by management to have no ore blocked out for stoping.

Equipment includes a small steam plant, and there are 3 mine buildings. The property was under option to the Pilot Range Mining Co., which failed to pay for same. Property considered promising. Idle.

PILOT RANGE MINING CO. NEVADA.

Dead. Formerly at Luning, Esmeralda Co., Nev. Described Vol. VIII.

LES MINES DE CUIVRE PILOU, LTD. NEW CALEDONIA.

Dead. Formerly at Noumea, Diahot, New Caledonia.

PILOU MINE. NEW CALEDONIA.

Mine office: Ouegoa, Arama, New Caledonia. Lands, in the vicinity of the Ao and Balade mines, in the northern part of the island, have a main vein with principal values at and near the intersection of a cross-vein, ore occurring in a lens of considerable size, proven to a depth of 240 meters though with greatly diminished copper values at depth. Ore is mainly argentiferous chalcopyrite with some galena, the richest ore mined returning 10 to 12% copper and 600 to 650 grams silver per metric ton. The mine has considerable ore of 6 to 8% copper tenor, and was estimated, 1889, to have 40,000 metric tons of low-grade ore in sight. The property was owned formerly by the Caledonia Copper Co., Ltd., and Les Mines de Cuivre Pilou, Ltd.

Equipment includes an old 250-ton concentrator, formerly making concentrates of 12 to 18% copper tenor. It was planned, late 1908, beginning smelting at Dilah, and refining the matte at Tao, where there is an electrolytic nickel refinery, but apparently this was not done. Presumably idle.

PINAL BUTTE GOLD & COPPER CO. CALIFORNIA.

Dead. Formerly at Forbestown, Butte Co., Cal.

PINAL COPPER CO. ARIZONA.

Dead. Was reorganized, 1905, as Arizona Banner Copper Co. Formerly at Globe, Gila Co., Ariz. Described Vol. VI.

PINAL MOUNTAIN COPPER CO., LTD. ARIZONA.

Dead. Formerly at Globe, Gila Co., Ariz.

PINAL MOUNTAIN MINING CO. ARIZONA.

Office and mine: Globe, Gila Co., Ariz. H. H. Harvey, president [illegible] Organized Feb. 15, 1907, under laws of Arizona, with capitalization [illegible] $5 par.

[illegible] southwest of Globe, having an 8′ outcrop, carrying [illegible] up to 25% copper, with fair gold values and [illegible] outcrop. Development is by a 300′ [illegible] paystreak carrying mainly [illegible], 6 oz. silver and $12 [illegible]

CALIFORNIA.

Mine office: [illegible]

Lands, 36 claims, area 720 acres, showing granite and schist, having 6 fissure veins, of 3′ to 40′ reported average width, carrying sulphide ores, originally estimated to average 4 to 12% copper, circa 5 oz. silver and $2 to $10 gold per ton, with estimates reduced, 1909, to 3.5 to 6% copper, 8 oz. silver and $3 to $[illegible] gold per ton, and yet too high after the reduction. Development is by the 57[illegible] Yo Tambien shaft, showing a fair body of sulphide ore, the 70′ Manitou shaft, and 8 tunnels, 3 longest of 2,200′, 2,150′ and 1,100′, with upwards of a mile of workings.

Equipment includes a 6-h. p. gasoline hoist and a 6-drill Sullivan air-compressor. There is an aërial tram between the mine and mill, latter 67x96′, of 250 tons rated daily capacity, having a 9x15″ crusher, 3 sets of rolls, 3 Harts jigs, 9 Wilfley tables and 2 Standard tables.

The management of this company displayed great persistence, and made large expenditures on the property, but fell into the doldrums on the death of Mr. Grant S. Watkins, the former secretary, in 1909, and at last accounts a mortgage was being foreclosed on the property.

PIOCHE & ARIZONA COPPER & GOLD MINING CO. ARIZONA

Dead. Formerly at Bouse, Yuma Co., Ariz. Described Vol. IX.

PIOCHE LUCKY BOY MINING CO. NEVADA

Office: 410 Utah Savings & Trust Bldg., Salt Lake City, Utah. Mine office: Pioche, Lincoln Co., Nev. F. E. Parrish, president; J. B. Wheeler, vice-president; Wm. M. McCrea, secretary and treasurer. Organized March 2[illegible] 1908, under laws of Nevada, with capitalization $250,000, shares 25 cents par, nonassessable. Lands 6 claims, patented, area circa 90 acres, about 9 miles from Pioche, carrying auriferous and argentiferous lead and copper ores, developed by a short tunnel, several shallow pits, and a 100′ shaft, with several hundred feet of drifts.

PIOCHE MONITOR MINING CO. NEVADA

Office: 17 West Second South St., Salt Lake City, Utah. Mine office: Pioche, Lincoln Co., Nev. Robt. N. Bell, president; R. K. Cobb, vice-president; H. I. Cobb, secretary and treasurer. Organized May, 1909, under laws of Utah, with capitalization $1,000,000, shares $1 par, assessable. Lands, 8 claims, [illegible] patented, carrying auriferous and argentiferous lead and copper ores.

PIONEER COPPER & SILVER MINING CO. CALIFORNIA

Dead. Former office was Reno, Nev. J. H. Platner was president [illegible] general manager; John Holly, secretary and treasurer; preceding officers [illegible] C. O. Brockless, directors. Organized February, 1907, under laws of Ariz[illegible] with capitalization $1,500,000, shares $1 par. Lands were 15 claims and a [illegible] site, in two groups, of 11 claims and 4 claims, known as the Pioneer and [illegible] Sam, circa 5 miles south of Oasis, said to carry mainly silver and gold [illegible] The mine, variously reported as having 4,000′ and 6,000′ of workings, [illegible] producer for about 15 years, until 1879. A little ore was shipped, 1909, [illegible] mill was said to have been bought, but was not installed. Formerly at [illegible] Mono Co., Cal.

PIONEER WALKER LAKE GOLD & COPPER MINING CO. NEVA[illegible]

Dead. Formerly at Yerington, Lyon Co., Nev. Described Vol. [illegible]

PISHMINSKO-KLUCHEVSKI WORKS. RU[illegible]

Office: Quai Tutschkof 18, St. Petersburg, Russia. Mine and [illegible] office: Verch Isetzk, Ekaterinburg, Perm, Russia. Is owned and operated [illegible] Count Sergei [illegible] Estate. The mine has 6 shafts, with 8 small [illegible] 100 men underground and 600 on surface [illegible] in 1905; 1,099,104 lbs. in 1907; 1,[illegible] [illegible]73 lbs. copper in 1909.

FINLA[illegible]

Ltd., at Pakic[illegible]

payer among Lake Superior mines. Formerly at Phœnix, Keweenaw Co., Mich. Fully described, under title Cliff mine, Vol. II.

PITTSBURG & HECLA DEVELOPMENT CO. ARIZONA

Dead. Formerly at Bisbee, Cochise Co., Ariz. Fully described Vol. V.

PITTSBURG-IDAHO MINING CO. IDAHO

Dead. Was succeeded by Pittsburg-Idaho Mining & Milling Co. Formerly at Greer, Nez Perce Co., Idaho. Fully described Vol. VI.

PITTSBURG-IDAHO MINING & MILLING CO. IDAHO

Office: Kamiah, Idaho. Mine office: Greer, Nez Perce Co., Idaho. Jas. F. Bridwell, president; Daniel Laverty, vice-president and general manager; Hugh Laverty, secretary and treasurer; E. E. Krengel, engineer; preceding officers, Fred Worrell, Otto Gorke, Jas. Laverty, William S. Pitman and Patrick Laverty, directors. Organized January, 1903, under laws of Idaho, as successor of Pittsburg-Idaho Mining Co., with capitalization $1,000,000, shares $1 par.

Lands, 19 claims, area 380 acres, in the Lo Lo district, said to show 6 contact veins, between gneiss and quartz-porphyry, of which 2, of 50' to 100' width, slightly developed, carry cuprite, malachite, bornite and chalcopyrite, giving assays up to 12% copper, 14 oz. silver and $20 gold per ton. Mine has about 1,700' of workings, including pits and shafts, deepest 180', with tunnels of 40', 290' and 600' Equipment includes gasoline power, and the management planned, circa 1907, a hydro-electric installation, to utilize water from the Clearwater River. There are 5 small buildings. Presumably idle.

PITTSBURG-JEROME COPPER CO. ARIZONA

Office: 331 Fourth Ave., Pittsburg, Pa. Mine office: Jerome, Yavapai Co., Ariz. Jos. K. Aikins, president; Thos. Houlette, vice-president; E. [illegible] Thompson, secretary and treasurer; preceding officers, D. F. Crawford, W. [illegible] Ogden, A. C. Spindler, C. A. Cooper, G. C. Blackmore, and D. M. Clemens, directors. Organized 1904, under laws of Arizona, with capitalization increased March 9, 1906, to $3,000,000, shares $1 par; issued, $1,482,699, at last accounts 1908. Annual meeting, first Monday in March.

Lands, 26 claims, area circa 520 acres, lying 2 to 3 miles south of Jerome, shortly northwest of the Black Hills property, and about midway between the United Verde and Equator mines. Development is by the Pittsburg shaft, planned to have been sunk 1,000', said to show, at 358' depth, [illegible] iferous and auriferous sulphide ore, of about 4% copper tenor. Development was hampered by a heavy inflow of very acid water.

Equipment includes a 50-h. p. Fairbanks & Morse hoist, and an Ingersoll Rand 2-stage air-compressor. Idle since June, 1907, ostensibly on account of differences in the directorate, but probably from lack of cash as well.

PITTSBURG-JEROME COPPER & GOLD MINING CO. ARIZONA

Dead. Was succeeded, circa 1904, by Pittsburg-Jerome Copper Co. Formerly at Jerome, Yavapai Co., Ariz.

PITTSBURG-MAYER MINING CO. ARIZONA

Dead. Office was Pittsburg, Pa. Company was reorganized, [illegible] Consolidated Mining Co. F. E. Miller was secretary and treasurer; [illegible] Lands were [illegible] 3 miles east of Mayer, developed [illegible] with [illegible] Formerly at Mayer, Yavapai Co. [illegible]

[illegible] IDAHO

PIT[illegible] MONTANA

[illegible]

Su[illegible]

[illegible]

Wal[illegible]

Butte, [illegible]

$30,000,000, shares [illegible]

president; M. J. Gannon, secretary and treasurer. Organized 1904, under laws of Delaware, with capitalization $50,000, increased later to $1,000,000, shares $1 par.

Lands, 104 hectares, including the Solada mine at Nochixtlán, and the Zavaleta mine in the Zimatlán district, carrying auriferous and argentiferous copper ores, with mainly gold values, but having some ore ranging up to 5 and 9% in copper tenor. Property is served by the Mexican Southern railway. The mines, developed by shaft, are said to have circa 7,000′ of workings, on a 5′ vein, and formerly were claimed to have 50,000 tons of ore blocked out.

The 50-ton Zavaleta mill, connected with the mine by a 1,500′ ground-tram, is equipped with 10 stamps, a 10′ Lane slow-speed mill, and a Pinder concentrator. There also is an electric light plant. The advertising of this company made exaggerated claims. Presumably idle.

PITTSBURG & SONORA DEVELOPMENT CO. MÉXICO.

Dead. Formerly at Cumpas, Moctezuma, Sonora, Mex. Described Vol. VIII.

PITTSBURG & TENNESSEE COPPER CO. TENNESSEE.

Dead. Property was the Polk County mine, now owned by Tennessee Copper Co. Formerly at Copper Hill, Polk Co., Tenn.

PITTSBURG & UTAH GOLD, SILVER, COPPER & LEAD MINING CO. UTAH.

Dead. Former office was Pittsburg, Pa. Property, in the vicinity of Ophir, apparently was but slightly developed. Formerly at Ophir, Tooele Co., Utah.

PITTSMONT COPPER CO. MONTANA.

Office: 1126 Farmers Bank Bldg., Pittsburg, Pa. Mine and works office: Butte, Silver Bow Co., Mont. J. H. Reed, president; R. T. Rossell, secretary and treasurer; preceding officers, T. H. Gibbon, Hay Walker, Jr., and D. C. Noble, directors; Oscar Rohn, manager. Organized Sept. 8, 1909, under laws of West Virginia, practically as successor of Pittsburg & Montana Copper Co., with capitalization $11,000,000. Statement to the authorities of Silver Bow county, 1910, gave capital paid in as $6,000,000, with no indebtedness, notwithstanding which the company is responsible for $2,500,000 bonds outstanding of the Pittsburg & Montana Copper Co. This is a holding company, which in turn is held, owning 90% of the stock and all of the bonds of the Pittsburg & Montana Copper Co., in addition to which this company has bought the entire assets of the Pittsburg & Montana Copper Co., at foreclosure sale, but still holds the stock, and is responsible for the bonds, which it also holds. The agreement of this company with the East Butte Copper Mining Co., made at the time the latter named company took over the property, provided that the East Butte should issue 300,000 shares of stock, to acquire 83% of the capital stock of the Pittsmont Copper Co., which in turn holds 90% of the stock of the Pittsburg & Montana Copper Co., the 300,000 shares of East Butte also to secure the collateral given in exchange for the collateral trust bonds. For further particulars of a somewhat involved financial situation, the reader is referred to the descriptions of the East Butte Copper Mining Co. and Pittsburg & Montana Copper Co., in this edition.

PITTSMONT SMELTER. MONTANA.

Owned by East Butte Copper Mining Co., at Butte, Silver Bow Co., Mont.

PIZARRO COPPER MINING CO. NEW MEXICO.

Dead. Was a swindle. Formerly at Silver City, Grant Co., N. M. Described Vol. VIII.

PLACERVILLE COPPER MINING & REDUCTION CO. COLORADO.

Mine office: Placerville, San Miguel Co., Colo. Organized circa May, 1907, under laws of Colorado, with capitalization $500,000, by A. B. Cooper, F. D. Margowski and L. L. Knutson, presumably as successor of Placerville Gold & Copper Mining Co. Lands, 8 claims. Presumably idle.

to 100′ depth, and a tunnel of 1,004′ with about 2,000′ of underground workings. Equipment includes a 40-h. p. steam plant and 3-drill air-compressor. Buildings are a 36x40′ machine-shop, 38x20′ carpenter-shop, and 6 other mine structures. Idle, except for annual assessment work, since October, 1907.

PLUTUS MINING CO. UTAH.

Office: Provo, Utah. Mine office: Eureka, Juab Co., Utah. Jesse Knight, president; Jacob Evans, vice-president; R. Eugene Allen, secretary and treasurer; J. A. Stallings, assistant secretary; John Roundy, superintendent. Organized 1907, under laws of Utah, with capitalization $100,000, shares 10 cents par, assessable; fully issued. Absorbed the Tetro Mining Co., January, 1909. Shares are listed on the Salt Lake stock exchange.

Lands, 14 claims, patented, including the Tetro group of 3 claims, from which the Tetro Mining Co. paid $18,000 in dividends. Property carries auriferous and argentiferous lead and copper ores, developed by a 600′ shaft, circa 3,700′ of tunnels, and 1,250′ of other workings. A 3′ vein of carbonate ore, opened 1909, was claimed, in the press, to average about 45% lead and 30 oz. silver per ton.

Equipment includes a 75-h. p. electric motor, hoist and air-compressor. Buildings include necessary shops and an office. Production, 1903–1904, under former ownership, was 1,250 tons of ore, said to have netted circa $70,000. Property considered promising and management good.

POCAHONTAS COPPER MINING CO. CALIFORNIA.

Office: 112 Market St., San Francisco, Cal. Mine office: Lewis, Mariposa Co., Cal. David Ross, general manager; J. G. Roberts, superintendent. Lands, 150 acres, supposedly held under bond and lease from Mrs. Abby Waller, including the Great Northern mine, in the White Rock district, showing several veins of cupriferous iron ore, between diorite, with altered diabase gangue. The main ore body, of circa 100′ width, occurs in a mineralized zone up to 1,000′ in width, having an oxidized zone of about 100′ depth, from which a limited production of high-grade ores was made, many years ago. Development is by a new 200′ shaft, and a new tunnel, the new workings being said to show ore carrying 6 to 12% copper and circa $2.50 gold per ton.

Equipment includes steam power and a hoist, and buildings include an office, laboratory, smithy and bunkhouses. Ore is shipped via La Grande, the nearest rail point, 15 miles distant, to the Peyton Chemical Works, at Bay Point, California, and some selected ores were shipped, 1907, to the Tacoma smelter. Messrs. Roberts, Higgins & Co., former operators, under bond, shipped 9 carloads of ore, from six months work. Presumably idle.

POCAHONTAS COPPER QUEEN MINING CO. ARIZONA.

Office: Pocahontas, Ark. Mine office: Mayer, Yavapai Co., Ariz. Joel W. Voorhees, president and general manager; J. D. Hardwick, vice-president; D. A. Chapin, secretary; Benj. A. Brown, treasurer; W. H. Skinner, superintendent; preceding officers, T. P. Eastland, Wm. S. Shannon and L. C. Yates, directors. Organized 1906, as successor of Big Bug Gold & Copper Mining Co., with capitalization $1,000,000.

Lands, 14 claims, 4 miles northwest of Mayer, in 2 groups, about 1 mile apart. The smaller group of 4 patented claims carries auriferous copper ores. The Spar group of 10 claims, bought, 1908, of the Spar Mining Co., has a vein 8 to 14′ in width, carrying mainly gold and silver-lead values, and the property is said to have shipped 23 carloads of high-grade ore, under former ownership, that gave sufficient returns to pay the purchase price, and the cost of development. The mine has a 200′ two-compartment shaft, and a 100′ shaft. Production of the Spar Mining Co. was 1,000 lbs. fine copper, 3,000 oz. silver and 150 oz. gold.

Equipment includes steam power, and some grading has been done by

15, 1909, which was a serious mistake. The property was taken over March 1[illegible] 1909, from the Compañía Minera Poderosa de Collahuasi, this company ha[illegible] been organized to bring the property under the laws of Great Britain, in ord[illegible] to make an English market for the shares, the former owner being paid £480,0[illegible] in stock, or 96,000 full paid shares, for its property. The old company earne[illegible] profit of £84,923 in 6 months ending June 30, 1908, and paid dividends [illegible] £60,000.

Lands, 37 contiguous claims, area 185 hectares, or 457 acres, including t[illegible] Poderosa, which is the principal producer, and the San Carlos, Rosario, C[illegible] dor and other mines. The lands lie at an extreme elevation of 15,400′, on t[illegible] Bolivian plateau, above the timber-line, and are barren of vegetation, with t[illegible] exception of a fungus bearing the botanical name of fungi cordillerensi, loca[illegible] known as yareta, which constitutes the fuel of the district. There are no hig[illegible] hills in the vicinity, no running streams, and potable water is scarce. Th[illegible] climate is extremely bleak, winter prevailing the year around, with snow or ha[illegible] falling nearly every day in the twelvemonth. Copper mines were worked in t[illegible] district during the era of Spanish dominion, and previously by the Indians, [illegible] evidenced by remains of ancient furnaces, fragments of matte, scoria, and too[illegible] left in old workings. Development of the mines was begun 1903, and regular o[illegible] shipments were begun January, 1906.

The country-rock is feldspathic and quartzose andesite, fissile and slightl[illegible] stratified, having a dip of about 70° W., and an amygdaloidal diabase has a N[illegible] strike, dipping with the country-rock to the westward. There has been consid[illegible] able disintegration, and few outcrops are shown, these usually carrying low-grad[illegible] malachite, chrysocolla and brochantite, with gangue mainly of much decompos[illegible] felsitic country-rock. The Poderosa vein system consists of several paral[illegible] veins with considerable faulting, having a general strike of N. 40° W. and dip [illegible] 70° SW., crossed, at practically right angles, by a secondary set of leaner ve[illegible] the master veins being fissures in a shear-zone. Ores in the oxidized zone a[illegible] brochantite, chrysocolla, atacamite, cuprite, melaconite, malachite and te[illegible] hedrite, the latter decidedly argentiferous, succeeded, in the zone of se[illegible] enrichment, by chalcocite and bornite, these latter being the principal [illegible] produced.

The Poderosa mine has 510′, 430′ and 235′ shafts, with a total of a[illegible] 20,000′ of workings, showing oxidized ores down to and including the 400′ le[illegible] The mine has 2 main veins, known as the Poderosa and Portillo, of 3′ to [illegible] width, carrying high-grade paystreaks of 1′ to 20′ width, with an average of [illegible] proven for length of 2,600′, and depth of 500′, yielding ore averaging about [illegible] copper and 8 oz. silver per long ton. The hanging-wall is well defined, b[illegible] ore shades gradually into the altered country-rock on the footwall, where [illegible] is an occasional gouge, and there is a fluccan of 3″ to 12″, and even up to [illegible] width, on the hanging. The gangue being decomposed quartzose felsite, is [illegible] soft, requiring heavy timbering, and the old timbering remaining in [illegible] extremely poor. Oregon pine is imported, at a cost, 1907, of £9 per 1,0[illegible] livered at Antofagasta, with carriage charges of 4d. per square foot from [illegible] fagasta to the mine, but freights have been much reduced by the railw[illegible] built, the property now being served by the Ollagüe branch of the Antofag[illegible] Bolivian railway. Levels are opened at 22-meter intervals, and connect[illegible] winzes. The mainshaft was only 6x8′ inside of timbers, at last accounts. T[illegible] is moderately wet, making about 90,000 gallons of water per day, in [illegible] season, and is equipped with Worthington, Cameron and Tangye pumps. [illegible] [illegible] 20 Murphy drills [illegible] of the Poderosa mine were [illegible] [illegible] 90,000 long tons, averaging [illegible] [illegible] management [illegible] [illegible] probable [illegible] [illegible]

POINT LEWIS SMELTER. CALIFORNIA.

Owned by Mountain Copper Co., Ltd., at Martinez, Contra Costa Co., Cal.

POLAND-AMERICAN GOLD MINING & MILLING CO. ARIZONA.

Dead. Was organized circa 1904, by Chas. J. George, a prolific promoter of short-winded mining companies, as a merger of the American Gold & Copper Co. and the Poland Extension Gold Mining & Milling Co., with capitalization $2,000,000, shares $1 par. Lands were circa 100 acres, showing auriferous and argentiferous copper ore, and equipment included steam power and a 10-stamp mill. Formerly at Humboldt, Yavapai Co., Ariz.

POLAND EXTENSION GOLD MINING & MILLING CO. ARIZONA.

Dead. Was merged, 1904, in Poland-American Gold Mining & Milling Co. Formerly at Poland, Yavapai Co., Ariz. Described Vol. V.

POLAND MINING CO. ARIZONA.

Office: 11 Pine St., New York, N. Y. Mine office: Poland, Yavapai Co., Ariz. Hon. Frank M. Murphy, president; Orleans Longacre, Jr., vice-president; A. W. Edwards, secretary. Is controlled, through stock ownership, by the Development Company of America.

Lands, 38 claims, 7 patented, developed by the 8,070′ Poland tunnel, with about 3 miles of workings. Equipment includes a 20-stamp mill and concentrator. Production was 18,672 lbs. fine copper, 108,999 lbs. lead, 8,596 oz. silver and 3,178 oz. gold in 1908; 16,107 lbs. copper, 261,754 lbs. lead, 15,344 oz. silver and 6,135 oz. gold in 1909.

POLARIS MINING & MILLING CO. ARIZONA.

Office and mine: Clifton, Graham Co., Ariz. C. A. Van Dorn, president; Sam. Abraham, vice-president; J. H. Kerby, secretary; J. R. Hampton, treasurer; G. A. Franz, general manager; preceding officers, W. F. Hagan, W. T. Poland, T. A. Balmer and E. M. Williams, directors. Organized March 11, 1902, under laws of Arizona, with capitalization $2,500,000, shares $1 par. No bond issue, formerly authorized, was recalled and cancelled. Stock is bonded to the Southwestern Development & Improvement Co. Annual meeting, third Wednesday in January.

Lands, 40 claims, area 700 acres, also a 70-acre millsite and 400 acres miscellaneous lands, in the Greenlee district, on the San Francisco River, circa 7 miles from Clifton, the nearest rail point. Property, lying northeast of the Clifton Consolidated and New England mines, shows granite, with parallel porphyry dikes, and many phonolite and rhyolite dikes, at acute and right angles to the vein system, carrying ore mainly as contact deposits between limestone and igneous rocks, and as disseminated ores in porphyry. Lands show 4 ore bodies, of which 2, under development, are of 8′ to 100′ estimated average width, traceable circa 6,000′, carrying oxide, carbonate and sulphide ores, estimated to average 3% copper, 4 to 15 oz. silver and $4 to $15 gold per ton. The copper ores are associated with gold-bearing quartz having a clay gangue. The lower workings show mainly auriferous and argentiferous chalcopyrite. The mine is opened by the 105′ Black Prince shaft, the 100′ Nonesuch shaft, the 140′ Golden [illegible] shaft, the 560′ Black Prince tunnel, the 320′ Fraction tunnel, the 397′ [illegible] Eagle tunnel and the 532′ Phonolite tunnel, with circa 2,500′ of workings. Last accounts, estimated, circa 1907, to put 10,000 tons of ore in sight, with 4,000 tons blocked out for stoping.

Improvements include 8 mine buildings. The property is operated [illegible] lease, expiring 1912, by the Southwestern Development & Improvement Co., which planned, 1908, the erection of a concentrator, and eventually a smelter also, but has failed to supply either.

GEWERKSCHAFT POLA[illegible] GERMANY.

[illegible] Wiesbaden, Prussia. Ger[illegible] commandit. Organized [illegible]

ent. Lands, 15 claims and 4 millsites, adjoining the Big Vein Copper Co., in the foothills of the Santa Catalina Mountains, 8 miles northeast of Tucson. The mine has a 75′ shaft, showing ore assaying up to 10.3% copper, with an average tenor of about 5%. Production was 51,536 lbs. fine copper in 1907. In financial straits and idle since 1909.

POONA COPPER CO. AUSTRALIA.

Office: Adelaide, South Australia. Mine office: Moonta, Daly Co., South Australia. Organized 1907. Lands, 240 acres, including the Poona and Matta Darra mines, adjacent to the Moonta mine of the Wallaroo & Moonta. Property is developed by a 283′ main shaft, having a steam hoist, and there was an old 120′ incline shaft, which has caved. The mine has 4 levels, showing considerable chalcopyrite, of good average tenor. Employed 8 men, at last accounts, early 1908. Presumably idle.

PORCUPINE MOUNTAIN COPPER CO. MICHIGAN.

Dead. Formerly at Ontonagon, Ontonagon Co., Mich. Fully described Vol. VIII.

POROPETSU MINE. JAPAN.

Mine office: Poropetsu-mura, Poropetsu-gori, Iburi, Japan. Ryoji Oda, owner and manager. Production, 1908, was 153,232 lbs. fine copper, 55,2[illegible] momme silver and 54,660 momme gold.

AKTIESELSKABET PORSA KOBBERBRUGER. NORWAY.

Mine office: Porsa, Altenfjord, Finmarken, Tromsö, Norway. Ingolf Bjornstad, manager. The Porsa mine was under development, with a small force, with promising indications, at last accounts. The Vesterdalens mine, at Naeverfjord, Finmarken, Tromsö, yielded, under former ownership, 160 metric tons of first grade ore, and 1,500 tons of second grade ore, containing about 375,000 lbs. fine copper, 1902.

PORTAGE LAKE & BISBEE MINING CO. ARIZONA.

Office: 12 First National Bank Bldg., Hancock, Mich. Letter returned unclaimed form former mine office, Bisbee, Cochise Co., Ariz. John Fraser, vice-president; W. I. McMaster, secretary; Chas. Lewis, treasurer. Organized April, 1903, under laws of Arizona, with capitalization $1,000,000, shares $5 par, succeeding Portage Lake & Calumet Development Co.

Lands, 12 claims, 3 fractional, partly patented, area 191 acres, freehold, 1 miles southeast of Bisbee, showing country rock of limestone, with a porphyry contact. The mine has a 302′ shaft, with 2 compartments, well timbered, with small air-compressor, Worthington sinking pump, 75-h. p. hoist, boarding-house, bunkhouse and smithy. Extensive diamond drilling was done, 1903–1904, which considerable leached ore was cut, the showing, though not including workable ore bodies, being of an encouraging nature. Idle since 1904.

PORTAGE LAKE & CALUMET DEVELOPMENT CO. ARIZONA.

Dead. Was reorganized, April, 1903, as Portage Lake & Bisbee Mining Co. Formerly at Bisbee, Cochise Co., Ariz.

PORT KEMBLA SMELTER. AUSTRALIA.

Owned by Electrolytic Smelting & Refining Co. of Australia, Ltd., at Port Kembla, Camden Co., N. S. W., Australia.

PORTLAND COPPER CO. WASHINGTON.

Mine office: Berlin, King Co., Wash. Lands, 5 miles from Berlin, on the 17′ vein, with EW. strike, carrying native copper, bornite and chalcocite, opened by tunnels of 40′ and 75′. Idle several years.

PORTLAND COPPER MINING CO. WYOMING.

Dead. Formerly at Rambler, Carbon Co., Wyo. Fully described [illegible]

PORTLAND GOLD & COPPER MINING CO. WASHINGTON.

Office: 7-127½ First St., Portland, Ore. Mine office: Spirit Lake, Skamania Co., Wash. Harvey Bailey, president and general manager; [illegible] Wyss, vice-president; H. W. Bailey, secretary and treasurer; A. [illegible]

SOCIEDAD MINERA PORVENIR DE COLLAHUASI. CHILE.

Dead. Former office was Valparaiso, Chile. Organized Apr. 10, 1904, under laws of Chile, with capitalization 550,000 pesos, shares 100 pesos par. No trace of mining operations ever secured, and company probably was one of a crop of flotations resulting from the development of the rich Poderosa mine. Formerly at Collahuasi, Tarapacá, Chile.

PORVENIR DE SONORA CO. MÉXICO.

Dead. Was reorganized, 1902, as Coast Line Copper Co. Formerly at La Calera, Altar, Sonora, Mex.

SINDICATO MINERO DE POSCO. PERÚ.

Office: Iquique, Chile. Mine office: Posco, Camaná, Arequipa, Peru. Organized Dec. 9, 1905, under laws of Chile, with capitalization £10,000, shares £1 par. No trace of operations secured.

POSTAL GOLD, PLATINUM & COPPER MINING CO. WYOMING.

Dead. Formerly at Rambler, Carbon Co., Wyo. Fully described Vol. V.

POSTAL SAVINGS MINING & MILLING CO. WYOMING.

Dead. Formerly at Centennial, Albany Co., Wyo. Described Vol. VIII.

POTOSI MINING CO., LTD. IDAHO.

Office: 30 East Park St., Butte, Mont. Mine office: Silver City, Owyhee Co., Idaho. J. E. Masters, superintendent. Has auriferous and argentiferous lead and copper ores, with electric power.

COMPAÑÍA MINERA POTOSINA. MÉXICO.

Dead. Formerly at Charcas, Moctezuma, San Luis Potosí, Mex.

COMPAÑÍA MINERA POTRERILLOS. CHILE.

Office: Santiago de Chile. Mine office: Chañaral, Atacama, Chile. Organized Dec. 6, 1906, under laws of Chile, with capitalization 650,000 pesos, shares 50 pesos par. Presumably idle.

POULIN MINE. MONTANA.

Owned by Anaconda Copper Mining Co., at Butte, Silver Bow Co., Mont.

POWERS GULCH DEVELOPMENT CO. ARIZONA.

Dead. Former office was Globe, Ariz. John Hoffman was president; Lee Matson, vice-president; Geo. R. Hill, secretary and treasurer. Lands were 20 claims, 3 miles south of the Cactus mine, on Pinto Creek, developed by two 100′ shafts, and tunnels of 50′ and 150′, the latter opening a 9′ vein carrying a little bornite and chalcopyrite, associated with pyrite, assaying about 2.5% copper. The company also claimed a paystreak giving average assays of 30% copper. Formerly at Crowley, Gila Co., Ariz.

NEGOCIACIÓN MINERA DE POZOS. MÉXICO.

Mine office: Pozos, Ciudad Porfirio Díaz, Guanajuato, Mex. Property includes Santa Brigida y Anexas, Santa Lucía and La Argentina mines, yielding gold, silver and copper, latter as a by-product. Has steam power.

POZOS MINING CO. MÉXICO.

Mine office: Ahualulco, Jalisco, Mex. Kratz & Carroll, managers, at last accounts. Property has auriferous and argentiferous copper ores. Presumably idle.

PREMIER COPPER & ASBESTOS CO. CAPE COLONY.

Mine office: Prieska, Prieska district, Cape Colony. A. M. Reid, consulting engineer, at last accounts. Capitalization £20,000; issued, £18,000. Lands, 14,000 morgen, or nearly 30,000 acres, known as the Schreuder ground, near the Orange River, apparently carrying mainly asbestos, having a continuation of the seam developed by the Cape Asbestos Co., Ltd. Presumably idle.

PREMIER MINING, MILLING & LEASING CO. NEW MEXICO.

Dead. Formerly at Pinos Altos, Grant Co., N. M. Described Vol. VIII.

PRESIDENT COPPER & GOLD MINING CO. MONTANA.

Letter returned unclaimed from former office, Butte, Mont. Mine office, Boulder, Jefferson Co., Mont. Dr. Ferdinand Grattan, president; C. S. S[illegible]

PRIEST LAKE COPPER MINING & MILLING CO. IDAHO.

Office: 323 Lindelle Blk., Spokane, Wash. Mine office: Coolin, Bonner Co., Idaho. Lands, 22 claims, between Granite and Reeder creeks, which empty into Priest Lake. The Copper Age claim has a 90′ shaft, and there is a 20′ shaft on the Pearl claim, showing ore said to give combined assay values of $12 to $45 per ton, in copper, silver and gold. Was developing with a small force, last accounts, 1910.

PRIEST LAKE MINING & SMELTING CO. IDAHO.

Office and mine: Coolin, Bonner Co., Idaho. C. D. McLean, president and general manager; L. R. Chace, vice-president; Chas. W. Carey, secretary, treasurer and superintendent; preceding officers, Randall C. McLean and John A. Gerow, directors. Organized May 14, 1908, under laws of Arizona, with capitalization $1,500,000, shares $1 par, nonassessable; issued, $1,200,000. Annual meeting, June 1st, each year.

Lands, 30 claims, unpatented, area 600 acres, and a 5-acre millsite, showing 3 contact deposits between schist and granite, of which one, under development, carries chalcopyrite and galena, estimated by management to average 1% copper, 13% lead, 5 oz. silver and $1 gold per ton. The mine has shafts of 68′, 40′, 48′ and 20′, with tunnels of 650′, 440′, 80′, 128′ and 100′. There is no power equipment. Work was resumed Jan. 23, 1911, after several years idleness.

MINA PRIMAVERA. BRAZIL.

Mine office: Cacapava, Rio Grande do Sul, Brazil. Lands, near the Santa Barbara River, are in a mountainous district, showing Cambrian stratified beds and granite, having a nearly vertical vein, variously reported as lying between granite and mica-schist, and as between conglomerate and sandstone. Ores are carbonates, silicates and chalcocite, mainly the latter, occurring disseminated in small nodules, having an average tenor of about 7% copper, with traces of silver, opened by a 100′ main shaft. Idle.

PRIMROSE COPPER SYNDICATE. TRANSVAAL.

Dead. Formerly at Pietersburg, Zoutpansberg, Transvaal. Described in Vol. IX.

PRINCE ALFRED MINE. AUSTRALIA.

Office: National Mutual Bldgs., Adelaide, South Australia. Mine office: Belton, Granville Co., South Australia. H. Hancock, manager, at last accounts. Mine, 28 miles northeast of the nearest rail station, at Carrieton, was opened on a small scale, 1872, and a little further work was done 1889, and the mine was again unwatered 1901. The property shows a bed of clay-slate of 12′ to 15′ width, traversed irregularly by veins of calcite, with malachite disseminated throughout, in seams, coatings and patches, succeeded, at depth of 120′, by chalcopyrite, occurring as impregnations of fine veins and seams, and in massive aggregations, associated with occasional pyrite, spathic iron and calcite. The mine has 3 shafts, deepest 240′, but apparently the vein has faulted below the 170′ level. The property has a small mill, and, during the first half of 1905, concentrated 1,608 long tons of ore, yielding 207 long tons of concentrates, 24% copper tenor. Production is estimated at 150,000 lbs. fine copper for 1904, and production was 78,400 lbs. fine copper in the first half of 1905. Idle.

PRINCE LYELL MINING CO., N. L. TASMANIA.

Dead. Formerly at Gormanston, Montagu Co., Tasmania. Described in Vol. VIII.

PRINCE MINES DEVELOPMENT CO. COLORADO.

Mine office: Copperfield, Fremont Co., Colo. E. S. Hallas, superintendent, at last accounts. Lands show copper ore. Has steam power.

PRINCE MINING & DEVELOPMENT CO., LTD. BRITISH COLUMBIA.

Office and mine: Revelstoke, West Kootenay district, B. C. J. T. Lyon, president; J. A. Stone, vice-president; J. M. Scott, secretary, treasurer and

PRINCE WILLIAM COPPER CO. ALASK

Dead. Formerly at Valdez, Prince William Sound, Alaska. Describ Vol. VIII.

PRINCE WILLIAM SOUND AMALGAMATED COPPER CO. ALASK

Dead. Formerly at Ellamar, Prince William Sound, Alaska. Describ Vol. VIII.

PRINCE WILLIAM SOUND MINING CO. ALASK

Dead. Formerly at Valdez, Prince William Sound, Alaska. Describ Vol. VIII.

LIZANDRO A. PROAÑO. PER

Office, mine and works: San Mateo, Pacococha, Huarochirí, Lima, Pe Lands, 512 hectares, with 64 small mines, including 1 flux mine. Prope includes 37 mines, in 176 pertenencias, area 352 hectares, in the province Huarochirí, department of Lima, and 27 mines, area 130 hectares, in the provi of Yauli, department of Junín. Properties include the Germania, Siber Perú, Zambita, La Purísima, Siete de Octubre, Belgica and Cuarto, in the vici of Pacococha; Huáscar and the Perú de Viso, at Viso; 26 de Agosto and Ch pichaca, at Aruri, all in the province of Huarochirí, all carrying chalcopyri more or less argentiferous.

The Germania, Siberia and Perú mines, with combined area of 74 h tares, are worked jointly, employing, 1908, an average force of 120 men.

The Germania mine, area 14 hectares, opened 1887, but worked superfici until recently, is at Pumagrande, Huarochirí, 17 kilometers from the smel with telephone connection. The Germania has a fissure vein of about 5′ aver width, in decomposed hornblendic rhyolite, carrying argentiferous and sligh auriferous chalcopyrite and galena, with occasional sphalerite and pyrite, quartz gangue, averaging about 8% copper, 7% lead and 4% zinc, with g silver values and a little gold. Development is by tunnel, and a new 500-m tunnel was being driven, 1910. The Germania is estimated to have ab 1,000,000 tons of ore available, though but partially developed, estimated carry 80,000 metric tons of copper, 2,895,000 marcos of silver, and 50,000 gold, and is capable of a present production of about 200 metric tons of ore da The physical composition of the ore does not permit wet concentration. Germania has an old smelter, of about 20 tons daily capacity, not in present

The Siberia mine, area 30 hectares, has a vein of about 5′ average minim width, parallel with the veins of the Germania and Perú, opened by No. 1 tu of 85 meters, No. 2 of 60 meters, No. 3 of 40 meters, and No. 4 of 35 meters.

The Mina Perú, area 10 hectares, has a vein paralleling those of the G mania and Siberia, carrying about 8% copper, and up to 25% lead, with ab the same silver values as in the Germania. The Perú has been estimated to h in sight about 500,000 metric tons of ore, estimated to carry 40,000 metric t of copper, 125,000 metric tons of lead, 1,447,528 marcos silver and 25,000 gold. Only 10 men were employed at the Mina Perú, 1908.

The Purísima and Purísima Segunda mines, in the vicinity of the G mania, Siberia and Perú, have veins of about 5′ width, carrying argentife copper and lead ores in the Purísima Segunda, and silver-lead ore in the P sima. Formerly about 35 men were employed in these mines, but they were at last accounts.

The Mina Huáscar, in the vicinity of Tamboraque, has copper and sulphides, latter sparingly, carrying good gold and silver values.

The Mina Victoria, area 4 hectares, 64 kilometers from the smelter at Ta boraque, with rail connection, carries chalcopyrite and sphalerite, with [illegible] quantities of galena, all strongly argentiferous, estimated to average [illegible] 10.[illegible]% copper, [illegible]% lead and 24% zinc. The mine is estimated to [illegible] 200,000 [illegible] of mixed ores, and has necessary mine buildings, [illegible] [illegible] 1908.

Property includes the Silver Age and Franklin mines, carrying an argentiferous and auriferous sulphide complex of copper, lead and zinc ores, giving assays up to 4.3% copper, 23% lead, 22% zinc, 152.5 oz. silver and 4.65 oz. gold, developed by the Silver Age tunnel, of circa 3,000′. Equipment includes steam power. The property is popularly credited with having produced approximately $1,000,000 worth of ore, under former ownership.

PRODUCER MINING & SMELTING CO. ARIZONA

Dead. Lands reverted to Frank Brownell, former owner. Formerly at Casa Grande, Pinal Co., Ariz. Fully described Vol. VI.

PROGRESSIVE MINING CO. UTAH

Office: 229 South West Temple St., Salt Lake City, Utah. Mine office: Milford, Beaver Co., Utah. L. B. Bohn, president; I. Lessing, vice-president and manager; C. T. Mixer, secretary, treasurer and consulting engineer; preceding officers, Isadore Mayer, F. J. Nichols and C. C. Crismon, directors. Organized August, 1905, under laws of Utah, with capitalization $250,000, shares 50 cents par, assessable; fully issued. Lands, 6 claims, patented, in the Star district, 8 miles from a railway, carrying argentiferous copper and lead ores. The mine has a 190′ incline shaft, with circa 1,500′ of workings, developing a [illegible] vein, carrying ore assaying up to 28% copper, 5 to 20 oz. silver and $1.60 gold per ton. A few small shipments have been made of ore running up to 5.[illegible] copper, 11.6% lead, 43.4 oz. silver and $1.40 gold per ton.

NEGOCIACIÓN MINERA DE PROMONTORIO, S. A. MÉXICO

Office: Ap. 60, Durango, Dgo., Mex. Mine office: Promontorio, El Oro, Durango, Mex. Maximiliano Damm, general manager. Organized 19[illegible] under laws of México. Property is the Dulces Nombres mine, 82 miles from the nearest rail station, at Chinacates. The mine shows rhyolite, with a fissure vein having a strike of N. 55° W., dipping vertically from surface, with southwest dip at depth, carrying large quantities of argentiferous and slightly auriferous copper ores, including chalcocite, values being mainly in silver, with small by-products of gold and copper. The mine has 3 shafts, the Refugio, which is the main shaft, being 675′ deep, with 14 levels opened, and mine is developed for a length of about one-half mile.

Equipment includes gas power, and 6 tubular boilers, burning wood, with an electric plant having a 120-kw. a. c. generator, and there is a dam for water storage, said to have cost $50,000. The reduction works, 2 miles by tram, or [illegible] by wagon-road, north of Promontorio, with a drop of 600′, include a [illegible] concentrator having a cyanide plant, and a 60-ton smelter with a matting furnace. Property employed 75 men, 1907.

PROMONTORIO CONSOLIDATED MINING CO. MÉXICO

Dead. Formerly at Nogales, Magdalena, Sonora, Mex. Described Vol. [illegible]

PROMONTORIO MINING & SMELTING CO. MÉXICO

Dead. Formerly at Lampasos, Moctezuma, Sonora, Mex.

PROMONTORY MINING CO. [illegible]

Dead. Formerly at Promontory, Box Elder Co., Utah. Described Vol. [illegible]

PROMONTORY SIGNAL MINING CO. [illegible]

Office: 451 South Main St., Salt Lake City, Utah. Letter [illegible] claimed from former mine office, Promontory, Box Elder Co., Utah. [illegible] Lehn, president and treasurer; W. E. Buys, vice-president; Edw. A. [illegible] secretary; H. E. Buys, manager; preceding officers, G. L. Asher, H. C. [illegible] and L. J. Risco, directors. Organized circa July, 1908, under laws of Utah, capitalization $[illegible],000, shares 10 cents par, assessable. Lands, 7 [illegible] patented, carrying auriferous and argentiferous copper ore, approximately slightly developed. Idle.

PRO PATRIA [illegible] MILLING CO. COLO[illegible]

[illegible] Described Vol. VIII.

assaying circa 1% copper and $4 to $1,000 gold per ton, with small silver values. Has several shafts, all under 100′, and an 800′ tunnel, with a total of about one-half mile of workings. Idle several years, from lack of funds, and company was reported, late 1910, to plan abandoning property, and liquidating.

PROVIDENCE MINING CO., LTD. BRITISH COLUMBIA.

Office: 525-204 Dearborn St., Chicago, Ills. Letter returned unclaimed from former mine office, Greenwood, Boundary district, B. C. Mark F. Madden, president; Dr. Frank Byrnes, vice-president; M. S. Madden, secretary; John B. Heney, treasurer; P. J. Dermody, superintendent. Capitalization increased, January, 1907, from $200,000 to $2,000,000. Bonds, $50,000 authorized, at 6%. Paid dividends of $38,000, to end of 1906, apparently from money that should have been retained for development work.

Mine has a 600′ shaft, planned to be sunk to 1,000′, showing argentiferous and auriferous copper sulphides, with principal values in gold, and has considerable ore blocked out. Has a 10-drill air-compressor. Production, 1907 was 700 tons of ore, and, to end of 1907, the mine had produced ore worth $400,000. Idle and presumably moribund.

PROVIDENCIA GOLD, SILVER & COPPER MINING CO. ARIZONA.

Dead. Formerly at Tucson, Pima Co., Ariz. Described Vol. II.

PROVIDENCIA MINES CO. MEXICO.

Mine office: Cosalá, Sinaloa, Mex. E. A. Stent, manager, at last accounts. Organized circa 1906, with capitalization $500,000, to operate the Campanilla mines. Idle.

PROVO MINING CO. UTAH.

Office: Provo, Utah. Mine office: Eureka, Juab Co., Ariz. Mrs. K. A. Hines, president; W. H. Dusenbury, secretary and treasurer; D. Roberts, superintendent. Organized 1907, under laws of Utah, with capitalization $100,000, shares 10 cents par, assessable. Is controlled, through stock ownership, since 1908, by Eureka Lily Mining Co. Shares are listed on the Salt Lake stock exchange. Lands, 3 claims, patented, developed by shaft, with about 700′ of workings, showing auriferous and argentiferous lead ore. Property was being worked, in a small way, by lessees, at last accounts.

PRUDENTIAL COPPER MINING CO. ARIZONA.

Office: 18 Federal St., Chicago, Ills. Mine office: 35 Bank of Arizona Bldg., Prescott, Ariz. Geo. T. Clark, president; Geo. H. Jenkins, vice-president and treasurer; Fletcher B. Gibbs, secretary; Ernest A. Haggott, consulting engineer; preceding officers, Fred W. Clark, Geo. T. Aimer, and Alice R. Woods, directors. Capitalization is 500,000 shares, and company is controlled, through the ownership of 422,778 shares, by the Estate of Maj. Shea Smith. Lands, 12 claims, patented. Idle several years.

PRUDENTIAL MINING CO. CALIFORNIA.

Letter returned unclaimed from former office, Medford, Ore. Mine office, Crescent City, Del Norte Co., Cal. H. S. Reed, manager, at last accounts. Lands, near Shelly Creek, are slightly developed by shaft and tunnel, showing veins, of 25 to 30 width, carrying slightly auriferous and argentiferous chalcopyrite, sphalerite and pyrrhotite. Idle some years, and apparently moribund.

PRUDENTIAL MINING & DEVELOPMENT CO. ARIZONA.

Dead. Former office was Nogales, Ariz. I. G. King was president and general manager; Dr. M. H. Barr, secretary; Louis Hudgin, treasurer. Organized 1902, with capitalization $1,000,000, shares $1 par, but did not begin business until September, 1909, and lasted but a short time. Lands were 12 claims, area 240 acres, on the western slope and at the southeastern end of the Patagonia Mountains, 4 miles from the Sonora border, 7 miles from the Santa Cruz River and 5 miles from Nogales. Property, adjoining the Buena Vista group of the Black Mountain company, well watered, showed auriferous and argentiferous oxidized ores of copper, succeeded, at shallow depth, by bornite and chalcocite

COMPAÑÍA DE MINAS y FUNDICIONES DE PÚQUIOS. CHILE.

Dead. Was succeeded, Jan. 8, 1906, by Compañía Minera de Púquios. Formerly at Púquios, Rancagua, Atacama, Chile. Described Vol. VI.

COMPAÑÍA MINERA DE PÚQUIOS. CHILE.

Office: Casilla 178, Valparaiso, Chile. Mine office: Púquios, Rancagua, Atacama, Chile. Employs 60 men. E. J. J. H. Sandiford, chairman; P. H. MacClelland, vice-chairman; H. S. Sydney-Merritt, secretary and treasurer; preceding officers, J. C. Kenrick and Walter Squire, directors; Archibald Start, general manager; R. Benbow, mine superintendent. Organized Nov. 7, 1905, under laws of Chile, with capitalization £100,000, shares £1 par, as successor of Compañía de Minas y Fundiciones de Púquios, and reorganized Jan. 8, 1906, under laws of Chile, with capitalization £80,000, shares £1 par. Annual meeting, fourth Saturday in February.

Lands, 44 claims, area 144 hectares, showing diorite carrying 3 ore bodies with EW. strike, known as the Jefe, Repalon and Estaca lodes, intersected at nearly right angles by the Verde, Sofia and Farellón lodes. The line of junction between the Jefe and Verde lodes gives dikes of 30′ width. The Sofia and Jefe lodes are under development, latter, of circa 4′ average width, traceable 2,500 meters, showing oxidized ores, bornite and chalcopyrite, giving estimated average assays of 12% copper and up to 24 oz. silver per long ton, with traces of gold. Development is by the old Farellón shaft of 693′ the old Estaca shaft of 595′, the new Sofia shaft of 429′, also by the 610′ Sofia South tunnel, 612′ Jefe East tunnel and 500′ Jefe West tunnel, with a total of 3,140′ of new workings, estimated to show 3,000 long tons of ore, with 1,100 tons blocked out for stoping.

The mine, opened 1862, has been in the hands of various owners, including the Compañía Farellón de Púquios, which held it previous to the predecessor of the present company. The Sofia mine was closed twice, by floods, caused by storm waters, and also by reason of the ore becoming base, in the transition zone.

Equipment includes 2 hoists, good for 900′ each, and 2 Rand and Walker air-compressors. There are several buildings, including an office, hotel, store and foremen's dwellings. Ores were sent to Caldera for reduction, by the Ferrocarril de Copiapó, connected with the mine by a Bleichert aërial tram of 2 kilometers length, completed May, 1908. Fuel is Australian coal, costing 55s. per long ton.

Production was 295 metric tons of ore, from development work only, yielding 104,000 lbs. fine copper, 1907, giving an average return of 14.7% copper. The property experienced all sorts of troubles during 1908–1909, and very little work was done. Was developing, with a small force, at last accounts.

PURITAN COPPER & GOLD MINING CO. NEW MEXICO.

Dead. Was a swindle, promoted by Benj. F. Coburn, of Boston, with "guaranteed" 10% dividends for 5 years. Formerly at Tres Piedras, Taos Co., N. M. Described Vol. II.

PURITAN GOLD & COPPER CO. UTAH.

Dead. Lands, in the vicinity of the Eddie group, were slightly developed by tunnel. Surface rights were sold, 1908, to Utah Copper Co., as a site for dumping overburden stripped from the Utah mine. Formerly at Bingham Canyon, Salt Lake Co., Utah.

COMPAÑÍA DE MINAS i FUNDICIONES DE PUTAENDO. CHILE.

Dead. Former office was Santiago de Chile. Organized Jan. 17, 1907, under laws of Chile, with capitalization 720,000 pesos, shares 36,000 pesos par. Equipment included a smelter with one small reverberatory furnace. Mine and smelter were idle, 1908–1909, and company was liquidated, with a reorganization planned. Formerly at Putaendo, Aconcagua, Chile.

PYNE SMELTING CO. CALIFORNIA.

Dead. Formerly at West Alameda, Alameda Co., Cal. Described Vol. VII.

shows chalcopyrite giving assays of 11.4% copper, and estimated to average 2 to 4% copper, with small and variable silver values, and about $1 gold per ton. The company claims an average ore value of $14 per ton, from several hundred assays. Col. Dewey has been quoted as claiming 300,000,000 tons of ore above the water-level which claim is entirely unwarrantable, though the vein is very wide and persistent, and there is no question that the ore deposit is of great size.

Equipment includes a 200-h. p. hydro-electric plant, taking water from Sinlahekin Creek, and there is an air-compressor. Buildings include a sawmill, carpenter-shop, smithy, office, barn, 26-room bunkhouse, library, cold-storage plant, changing-house and boarding-house for 100 men. Development has been retarded by lack of transportation facilities, but the Great Northern railway is now building to within about 18 miles, and survey was made, several years ago, for the line of the Okanogan Electric railway, planned to run from Nighthawk to Brewster, Washington, crossing the property. The management announces that its plans are to complete the development work by the end of 1912. The claims of the company as to tonnage and ore values are much greater than are warranted by present development, but the property is considered promising, and the management is to be commended for persistence, in the face of repeated discouragements.

QUANTOCK MINING & MILLING CO. MONTANA.

Mine office: Coloma, Powell Co., Mont. H. B. Salisbury, superintendent, at last accounts. Property has gold, silver and copper ores, and is equipped with steam power.

QUARTZ KING MINING CO. ARIZONA.

Office: 3118 South Grand Ave., Los Angeles, Cal. Mine office: Parker, Yuma Co., Ariz. Hon. Theo. A. Bell, president; Hon. J. G. Maguire, vice-president; Hon. Richard Melrose, secretary; Col. E. B. Atkinson, treasurer; J. O. Royer, general manager; L. M. Simon, superintendent; O. E. Clark, consulting engineer; preceding officers, Fred Simon, Dr. St. George Fechtig, Prosper Chaix, Miss Marie Feraud and E. A. Hoffman, directors. Organized July 25, 1904, under laws of Arizona, with capitalization $1,500,000, shares $1 par. Annual meeting, first Tuesday in August. The company was financed mainly by Swedish capital, supplied largely by the late King Oscar, about 500,000 kroner having been expended, up to 1910.

Lands, circa 2,000 acres, 4 miles north of Parker, having 4 shafts, of about 100′ depth each, and several tunnels, longest 500′, showing auriferous copper ore. Equipment includes gasoline power. Property employed circa 35 men, 1909, but presumably is idle.

QUEBEC COPPER CO., LTD. BRITISH COLUMBIA.

Dead. Formerly at Deadwood, Boundary district, B. C.

MINAS LA QUEBRADA. VENEZUELA.

Owned by South American Copper Syndicate, Ltd., at Aroa, Lara, Venezuela.

QUEEN BEE COPPER MINING CO., N. L. AUSTRALIA.

Office and mine: Wrightville, Robinson Co., N. S. W., Australia. T. S. Farquhar, chairman; preceding officer, J. R. Ratcliff and G. D. Elliott, directors; John Fox, mine manager. Organized Dec. 15, 1903, and paid 13 dividends aggregating £16,625, to Dec. 31, 1907. The company has been somewhat handicapped by lack of capital.

Lands, in the Bee Mountains, circa 11 miles southeast of Cobar, show a vein of 1′ to 20′ width, intermixed with barren streaks, the widest ore shoots being 5′ to 10′, with best shoot circa 3′ wide and 120′ long, carrying chalcopyrite, galena and sphalerite, assaying 1 to 2 oz. silver per long ton, with slaty gangue. The mine has a 613′ main shaft, with bottom level at 570′ and a winze there which has been said to show an 8′ vein carrying ore averaging about 8% copper. Assays have been secured, from selected ores, up to 45% in copper tenor. The

of low-grade auriferous and argentiferous copper ore. Equipment includes steam power, and a 15-stamp pan-amalgamation mill. Idle several years.

QUEEN OF ARIZONA COPPER CO. **ARIZONA.**

Dead. Was merged, circa 1902, in Great Belcher of Arizona Co. Formerly at Providence, Yavapai Co., Ariz. Described Vol. III.

QUEEN PRINCESS COPPER CO. **COLORADO.**

Dead. Was merged, 1909, in Copperfield Consolidated Mining Co. Formerly at Copperfield, Frémont Co., Colo. Described Vol. VIII.

QUEEN REGENT COPPER & GOLD CO. **NEVADA.**

Dead. Was succeeded by Queen Regent Merger Mines Co. Formerly at Fairview, Churchill Co., Nev., and Rawhide, Esmeralda Co., Nev. Described Vol. VIII.

QUEEN REGENT MERGER MINES CO. **NEVADA.**

Office: 337 Monadnock Bldg., San Francisco, Cal. Letters returned unclaimed from former mine offices, Fairview, Churchill Co., Nev., and Rawhide, Esmeralda Co., Nev. G. W. Lewis, president; J. E. Kerr, vice-president and general manager; L. E. Foster, secretary; preceding officers, H. B. Wade, F. G. Manley and E. S. Parkinson, directors. Organized circa 1910, under laws of California, as successor of Queen Regent Copper & Gold Co., with capitalization $2,000,000, shares $1 par.

Lands, 17 claims, known as the Copper King group, on the southern side of Copper Mountain, claimed to show a hematite gossan of 50′ to 300′ width, carrying copper values, and said to show, in a trench, native copper of 12% tenor with gold and silver values aggregating $42 per ton, which seems a remarkable, if not impossible, combination. Development is by 2 shallow shafts and tunnels, one, of 100′, cutting a 4′ vein. The company claims that upwards of $50,000 has been expended on the property. The original company was promoted by Jas. E. Kerr, who has a long list of unsuccessful flotations to his credit. Property was in hands of lessees, 1908.

QUEENSLAND COPPER CO., LTD. **AUSTRALIA.**

Dead. Was reconstructed, Sept. 27, 1910, as New Queensland Copper Co., Ltd. Formerly at Mount Perry, Bowen Co., Queensland, Australia. Very fully described Vol. VIII.

QUEENSLAND COPPER FREEHOLDS, LTD. **AUSTRALIA.**

Office: 4 Broad Street Place, London, E. C., Eng. Mine office: Cloncurry, Beaconsfield Co., Queensland, Australia. T. G. Scott, chairman; preceding officer, C. K. Butler, C. H. McEuen and H. Edwards, directors; C. Dunlop Comrie, secretary; L'Estrange Nicolson, manager; Alex. Hill & Stewart, consulting engineers. Organized Jan. 31, 1907, under laws of Great Britain, with capitalization £300,000, shares £1 par; issued, £250,000, fully paid. Company [illegible] a third interest in the Mountain [illegible] Copper Co., Ltd.

Lands, 378 acres, freehold, [illegible] including the Mulhon and [illegible] circa 90 miles north of Cloncurry [illegible] azurite, malachite and chalcocite [illegible] existence of a 200′ zone, carrying [illegible] discontinuing diamond drilling, 190[illegible]

QUEENSLAND EXPLORATION CO., [illegible]

Office: Queen St., Brisbane, Que[illegible] Broad Street Place, London, E. C., Eng. [illegible] Co., Queensland, Australia. Lord Ernest [illegible] officer, F. C. D. Haggard, A. B. Dealtry, [illegible] directors; C. Dunlop Comrie, secretary; [illegible] ganized Jan. 22, 1906, under laws of Queensland [illegible] shares £1 par; issued, £192,010, fully paid [illegible] Cloncurry S[illegible] and is controlled thereby [illegible]

M. Longyear and Otto Kirchner, directors; W. A. O. Paul, secretary and treasurer; Chas. L. Lawton, general manager; Jas. W. Shields, mill superintendent; Alex Laist, smelter superintendent; F. J. McLain, clerk; E. R. Lynch, assistant clerk.

Organized March 30, 1848, under special charter from the state of Michigan with capitalization $500,000, shares $25 par; reincorporated March 6, 18[illegible] under laws of Michigan for a second period of 30 years, with capitalization $1,000,000, increased, June 5, 1889, to $1,250,000, again increased, June 3, 18[illegible] to $2,500,000, and again increased, Aug. 8, 1906, to $3,750,000, shares $25 p[illegible] and reincorporated, 1908, for a third term of 30 years; issued, $2,750,000. H[illegible] about 2,200 shareholders. Old Colony Trust Co., Boston, transfer agent. Shares are listed on the Boston stock exchange. Annual meeting, first Wednesday in June.

The Quincy paid its first dividend in 1862, and profits have been disbursed to shareholders in every succeeding year, except 1866 and 1867, giving the company a continuous dividend record of more than 40 years, from 1868, to date, rendering it the oldest dividend paying American copper mine, and second only to the Tharsis Sulphur & Copper Co., Ltd., which has a record of continuous dividends since 1867, or one year longer than the Quincy's record. Recent dividends, by years, have been as follows: $550,000 in 1903; $500,000 in 1904; $600,000 in 1905; $1,250,000 in 1906; $1,350,000 in 1907; $495,000 in 1908; $440,000 in 1909; $550,000 in 1910, with a $1 dividend paid February, 1911, giving total dividends, to end of 1910, of $19,440,000.

The following table gives statistics of production, costs, etc., 1864–19[illegible]

Year.	Product. Pounds.	Yield fine copper per fathom broken. Pounds.	Price obtained. Cents.	Cost per pound exclusive of construction. Cents.	Number of miners.	Average [illegible]
1864.....	2,498,574	562	44.8	26.7	242	$65
1865.....	2,720,980	501	....	....	212	57
1866.....	2,114,220	451	31.3	29.0	227	55
1867.....	1,921,620	526	22.7	18.9	167	50
1868.....	1,417,941	447	25.2	23.1	157	50
1869.....	2,417,365	446	21.9	16.7	210	51
1870.....	2,496,774	528	21.5	15.3	181	46
1871.....	2,409,501	441	22.8	15.2	104	47
1872.....	2,269,104	391	32.5	22.9	233	60
1873.....	2,621,087	491	26.5	18.6	223	52
1874.....	3,050,154	577	21.9	15.1	234	45
1875.....	2,798,281	485	22.7	15.8	217	46
1876.....	3,073,171	507	20.0	15.7	227	47
1877.....	2,837,014	467	18.6	15.1	247	42
1878.....	2,991,050	395	14.9	14.0	234	41
1879.....	2,639,958	403	16.3	13.7	212	39
1880.....	3,609,250	563	18.5	11.8	192	41
1881.....	5,702,606	766	18.7	10.6	212	45
1882.....	5,682,663	800	17.1	9.5	152	40
1883.....	6,012,239	850	13.7	8.9	165	40
1884.....	5,680,087	722	12.2	8.6	157	45
1885.....	5,848,497	710	11.4	7.5	132	44
1886.....	5,888,517	638	11.1	6.8	140	45
1887.....	5,603,691	781	11.7	8.6	142	49
1888.....	6,367,809	690	15.9	10.1	[illegible]	[illegible]
1889.....	6,405,686	690	12.0	9.4	[illegible]	[illegible]

either section. Steam from the compressor-plant exhausts into a dam. T
boiler-house has 5 Hawley down-draft furnaces.

No. 6 shaft, 1,928′ north of No. 2 and only 200′ south of the Franklin li
was 5,500′ deep June, 1908, and was bottomed on the 66th level, May, 19
Production has been somewhat decreased by No. 8 shaft taking considera
ground under the Franklin mine, previously tributary to No. 6. Equipm
includes an Allis-Chalmers duplex hoist, with a 22′ 6″ straight-face drum, ra
8-ton skips, and a 1,300-gallon bailer, a centrifugal feed-water heater be
attached to one cylinder of the hoist. Equipment includes a 100-drill 2-st
compound air-compressor. The 56x75′ boiler-house has four 250-h. p. Wic
water-tube vertical boilers, nine 100-h. p. locomotive firebox boilers, and
powerful fire-pump.

The Franklin mine lies next north of No. 6. The Quincy bought the
Franklin mine, area 160 acres, for $170,000, taking possession December, 19
and closing the mine immediately. It is doubtful if the old shafts ever wi
used by the Quincy.

No 3 Franklin shaft is 3,200′ deep, bottomed at the former boundary li
with the Quincy, and was a scram for some years before taken over. Idle si
the end of 1908.

No. 5 Franklin shaft, 2,850′ deep, also is bottomed at the former bound
line. Some fair stopes were opened, 1905, on the West Lode, through cross
from this shaft. Idle since taken over by the Quincy.

No. 8, the Mesnard shaft, is 4,168′ north of No. 6, and was bottomed at t
53d level, May, 1911, at a depth of circa 5,300′. Levels in this shaft have be
opened uniformly at 135′ intervals, and former numbering made the 24th le
of No. 8 correspond with the 42d level of No. 6. This shaft showed poorly in t
upper levels, but the lower workings, while by no means up to the Quincy avera
of some years ago, in either quantity or quality of ore developed, show a b
wider and better mineralized than above, and the ground is of very satisfac
and profitable average, the improvement that began on the 10th level being re
marked below the 20th level, and the present average of No. 8 is nearly or q
up to the present average of the older workings. No. 8 is connected with t
workings to the south on each level from the 42d, which was the first to p
under the old Franklin mine, to the 49th, inclusive. Regular production w
begun circa April, 1907, and this is now the main shaft of the mine, wi
normal output of 1,600 tons daily, and a record production of 2,100 tons i
single day.

The shaft-rockhouse at No. 8, [illegible] and structural steel, is 41x[illegible]
the ground and 150′ high. Stam[illegible] dumped from the skips, [illegible]
upon grizzlies of 2″ steel bars, [illegible] at an angle of [illegible]
section, with a lower section at [illegible] which [illegible]
center to center, this combination [illegible]
grades, fine stuff going to ore-bins [illegible]
receiving equal portion, which feed [illegible]
no shoveling being required. Rock [illegible]
section of the grizzly falls to the [illegible]
grizzlies save one half on rockhouse [illegible]
remaining employés.

The power-house at No. 8, of [illegible]
with a 9′ basement under the engine room [illegible]
cylinder engine, with double-conical drum [illegible]
mum diameter, good for 6,000′ depth. [illegible]
power-house, is a 65-drill Nordberg 2-[illegible]
The boiler room has ten 250-h. p. Park[illegible]
coal-bins that have direct rail connection [illegible]
concrete smokestack, standing on a 16′ ba[illegible]

RAMMELSBERG MINE. GERMANY

Office and mine: Goslar, Hanover, Prussia, Germany. Employs circa 6[illegible] men. Bergrat Wolff, chairman; Bergrat Richard, manager. Property, owned jointly by the Prussian Crown and the Duchy of Brunswick, is a very ancient mine, worked since A. D. 972.

Lands, 2 miles south of Goslar, carry 2 lenticular ore bodies, of 15' to 9[illegible] width and circa 1,300' length each, with known depth of 700 meters, in schist intercalated in Devonian slates. The ore is a dense mixture of chalcopyrite, galena, sphalerite and pyrite, with occasional tetrahedrite, gangue being mainly of barium sulphate, aluminum silicate and calcium-magnesium carbonate. Ore is estimated by the management to average 5 to 6% copper, 8% lead, 2[illegible] zinc, 5 oz. silver and 1 dwt. gold per metric ton. Ore mined is divided into grades, first averaging 18.37% copper and 3.85% lead; second grade averaging 12.07% copper and 1.7% lead; third grade averaging 5.44% copper and 1[illegible] lead. The three grades of ore carry from 0.008 to 0.017% silver, and from 0.00011 to 0.00013% gold. All ores are slightly arsenical, ranging from 0.[illegible] arsenic in the richer copper ore to 0.2% arsenic in third grade ore. The mine also has mixed ore, carrying about 5% copper and 6% lead, with both gold and silver values, and lead ore averaging 9.15% lead, with a trace of copper.

The mine is developed by shafts of 296 and 316 meters depth, and has upwards of 10 miles of workings, formerly estimated to show circa 15,000,000 metric tons of cupriferous and plumbiferous slates, the mine being estimated by the present management, to have 5,000,000 metric tons of ore blocked out for stoping.

Equipment includes 2 hoists, good for 350 meters each, and a 70-drill air compressor, with necessary buildings. There is no mill, ores going direct to the smelter, after a limited amount of hand-dressing.

The copper smelter, known as the Okerhütte, at the mine, is of 300 tons daily capacity, while lead ores are reduced at other works, known as the Julius[illegible] and Sophienhütte. The Okerhütte has 20 kilns and ovens for calcining, two 25-ton blast-furnaces and five 15-ton reverberatory furnaces. The first product is a matte of 35 to 40% copper tenor, carrying 3 to 4 [illegible] mixed ores treated, and this matte is roasted and re[illegible] produce also considerable speiss, carrying about 51 [illegible] zinc and 0.175% combined gold and silver, with trace[illegible] iron, arsenic, bismuth, antimony and sulphur. The [illegible] Okerhütte are blister copper and anodes.

The Okerhütte includes an electrolytic refinery a[illegible] ity of latter being 25,000 metric tons of 50° Beaumé [illegible] trolytic refinery has 600 tanks, with multiple arra[illegible] nual production of the Okerhütte is circa 1,700 me[illegible] various forms, and about 1,100 metric tons of bl[illegible] 3,608,930 lbs. electrolytic copper, 1,074 metric tons [illegible] lead, 11,522 kgs. silver and 96.5 kgs. gold, also quanti[illegible] including copperas, zinc sulphate, soda, etc., in 190[illegible] 1905, and circa 3,600,000 lbs. in 1909. The mine and [illegible] technical skill and success.

COMPAÑÍA MINERA RAMÓN CORONA.

Office: San Pedro, Coah., Mex. Mine o[illegible] huahua, Mex. Sr. D. Francisco I. Madero, pre[illegible] at last accounts. Property, adjoining the Nai[illegible] bodies of argentiferous lead and copper ores, and pro[illegible] silver-lead ore. Presumably idle.

COMPAÑÍA MINERA IGNACIO RODRÍGUEZ RAM[illegible]

Office: Primera Bucareli 23, México, D. F. Mine[illegible] Jiménez, Chihuahua, Me[illegible] Santiago Rodríguez, pre[illegible]

tion having been secured at a considerable loss, and company voted, Dec. 9, 1909, to wind up, voluntarily. Formerly at Okehampton, Devonshire, Eng.

RANKIN COPPER MINING CO. WYOMING.

Office and mine: Rawlins, Carbon Co., Wyo. Organized 1904, with capitalization $25,000. Apparently no work has been done on the property. Idle and presumably moribund.

RANSON COPPER MINING CO. OF ONTARIO, LTD. ONTARIO.

Office: Sault Ste. Marie, Mich. Mine office: Sault Ste. Marie, Algoma, Ont. B. Frank, president; David Rustander, secretary; D. J. Ranson, superintendent; R. H. Taylor, consulting engineer. Organized 1902, under laws of Ontario, with capitalization $3,000,000, shares $1 par. Lands, 3,600 acres, in Chesley and Anderson townships, said to show 14 veins, of which 6 contact veins have been opened by 8 shafts, of 23′ to 75′ depth, veins averaging 25′ width and giving assay values up to 12% copper and 3 oz. silver per ton, from chalcopyrite. Has steam power. Idle some years and apparently moribund.

RARITAN COPPER WORKS. NEW JERSEY.

Owned by International Smelting & Refining Co., at Perth Amboy, Middlesex Co., N. J.

RARUS MINE. MONTANA.

Owned by Anaconda Copper Mining Co., at Butte, Silver Bow Co., Mont.

RATTLER MINING CO. ARIZONA.

Dead. Formerly at Globe, Gila Co., Ariz. Described Vol. VIII.

RAVEN COPPER CO. MONTANA.

Office: Hartford, Conn. Mine office: 56 Silver Bow Blk., Butte, Silver Bow Co., Mont. E. C. Frisbie, president; Robt. A. Griffing, treasurer; preceding officers and E. B. Curtis, directors; Geo. A. Packard, general manager. Organized circa July, 1909, under laws of Maine, with capitalization $1,000,000, shares $1 par, assessable; 60 cents paid. This company paid the old corporation $50,000 for its property, in addition to assuming the bonded indebtedness, amounting to circa $35,000, which has been retired, and shareholders of the old company were given the privilege of acquiring new stock, share for share, on payment of 25 cents per share, the new stock being issued as 50 cents paid, and a 10 cent assessment was levied, Aug. 15, 1910. Rumors of an assessment, March, 1911, were denied by the management, but it is probable that money will be needed shortly. The stock of the old company was introduced to the Boston market by a stock exchange firm, and went to $8 per share, and from there back to 50 cents.

Lands, 2 fractional claims, patented, area 23 acres, known as the Raven and Snoozer, the former owned outright, and a six-sevenths interest in the Snoozer, a one-seventh interest formerly having been owned by the Red Metal Mining Co., and now is owned by the Anaconda Copper Mining Co., which has given permission to work the Snoozer for a term of years, and also has given a temporary lease on the Old Glory shaft, toward which the Snoozer vein dips. Lands are well located, having an EW. length of circa 2,000′, in line with the Mountain Consolidated mine of the Anaconda.

The Snoozer mine, to which development is confined, carries 4 veins, of which the northernmost is in dispute as to ownership of the apex. The Snoozer has shafts of 75′ and circa 200′, and had 5,780′ of workings, 1908. Ore was mined from the Snoozer through the Buffalo shaft of the Anaconda, until 1906, when the old company was enjoined from working the Snoozer vein, which is claimed by the Anaconda to apex on the La Plata vein of that company, and July, 1907, the lease of the Buffalo shaft was canceled by the Anaconda. Ore produced, prior to suspension, June, 1906, averaged about 30 tons daily, carrying about 4% copper, 8 oz. silver and $1.25 gold per ton. The mine is said to carry good silver ore on the upper levels, but drifting on the 200′ level had shown nothing of commercial value, April, 1911. The Snoozer has been opened

bonds; issued, $200,000. The entire bond issue was under option to the General Development Co., which took $100,000 bonds, and the General Development Co. is said to have placed $300,000 in the Ray Central treasury, in exchange for stock. The option of the General Development Co. was relinquished October 1910, on the advice of J. Parke Channing, after the expenditure of about $300,000 on development work. The original underwriting of the bond issue was at 80, netting the company $80,000 for $100,000 bonds sold. Apparently $100,000 bonds additional were placed, early 1911. The company had a cash balance of $79,404 on June 30, 1910, and a cash balance of $10,281 on Dec. 31, 1910. The company had 1,965 shareholders, early 1911. Bankers Trust Co., New York, registrar; Guaranty Trust Co., New York, transfer agent. Shares are listed on the New York curb. Annual meeting, third Wednesday in January.

Lands, 780 acres, about one-third patented, including the Calumet, Lead, Globe-Isabella, Copper Contact, Copper Zone, Little Frank, Nation-Wedge and Juárez-Adventure groups, all in the vicinity of the Ray Consolidated and Arizona-Hercules properties, on Mineral Creek. The company was reported, in the press, to have taken over the Marquand group, 10 claims lying west of the Ray Consolidated, March, 1910. A townsite has been platted adjacent to the new townsite of the Ray Consolidated, and is a source of income from the sale of lots.

The mineralization of the Ray district is practically identical with that of the Miami district some 30 miles to the northeast, and a part of the Ray Central property carries a continuation of the mineral zone of the Ray Consolidated mine. According to Mr. Frank H. Probert, a primary mineralization was begun by the intrusion of masses of diabase and granite-porphyry, succeeded by oxidation, leaching and secondary enrichment, giving chalcocite disseminated in schist. The ore body is a tabular mass, clearly defined, dipping gently to the southeast, of variable thickness and undulating contour, the leached zone constituting the overburden averaging about 100′ in thickness. The upper schist-diabase contact was thought, at first, to limit the downward extension of the ore, but Mr. Probert is now of the opinion that the diabase and granite-porphyry also are enriched to the point of commercial tenor, in places. The disseminated ores of the camp as a whole average about 2.25% in copper tenor, and the ore being readily amenable to concentration, a suitable mill should secure 70 to 75% extraction of assay values.

The Globe-Isabella group, area 30 acres, having the Ray Consolidated on the north, west and south, and the Arizona-Hercules to the east, has been proven largely by the very extensive churn drill borings conducted on the adjoining properties. The principal development of the Ray Central has been on this group, which is opened by 2 shafts, in addition to which 2,487′ of drill-holes have been bored. The Globe-Isabella mine, opened to depth of 600′, had 16,578′ of workings, February, 1911, developing ore of commercial value 83′ to 240′ in thickness. The Globe and Madeline shafts are connected on the 300′ level, and the 200′ level of the Madeline is connected with the workings of the Ray Consolidated. The 600′ level has 371′ of laterals, all in ore of average grade, and the Madeline shaft shows a maximum thickness of 240′ of commercial ore. Some high grade ore, with a little native copper and oxidized ores, claimed to average circa 3.5% copper, carrying small gold and silver values, was shipped from the Madeline workings, under the former [illegible]. The management plans churn drilling, 1911, to determine the [illegible] of another possible cupriferous zone on the Globe-Isabella and [illegible].

The [illegible] area circa 100 acres, is the [illegible] section grade [illegible] district [illegible] 8,000 [illegible] shipped from [illegible] fault [illegible]

giving one share for three, and through purchase, 1911, of the real assets of the Gila Copper Co., which is now in process of liquidation. Company controls the Ray & Gila Valley Railroad Co., capitalized at $2,500,000, of which $779,000 stock is outstanding, and is held in the treasury of the Ray Consolidated Copper Co. Company's balance sheet, of Dec. 31, 1910, showed expenditures of $5,948,969.92 for the original property, added lands and reconstruction of the old plant, with expenditures of $3,026,200.31 for mine development and new construction, and expenditures, not apportioned, for organization, administration, taxes, etc., of $176,632.38, with $122,915.06, cash on hand, $56,328.41 accounts receivable, and $379,362.36 supplies on hand. Liabilities were $65,673.62. Mercantile Trust Co., New York, and Boston Safe Deposit & Trust Co., registrars; Guaranty Trust Co., New York and Old Colony Trust Co., Boston, transfer agents. Fiscal year, formerly ending June 30th, has been changed to run with the calendar year. Shares are listed on the Boston stock exchange. Annual meeting, formerly held fourth Tuesday in September, has been changed to third Friday in April.

Lands are 1,000 acres of mining claims at Ray, mainly patented, on Mineral Creek, 6 miles from Kelvin, with additional holdings, including the townsite of Kelvin, 18 patented millsites, area 87 acres, at Kelvin, 21 unpatented millsites, area 105 acres at Kelvin, and a tract of 4,000 acres in Gila and Pinal counties about 15 miles southeast of Kelvin and 21 miles from the mines, purchased for the site of reduction works and tailings disposal. The Gila property, additional, includes 950 acres of quartz claims and millsites.

About 580 acres of the 1,000 acres at Kelvin are classed as mineral ground, and about 175 acres have been developed, with a certainty that more or less of the additional mineral ground will be found to carry workable values. The former owners expended about $1,000,000, mainly in misdirected work.

The property shows a mineralized zone extending for about 9,000' through the property, of approximately 3,000' average width, but narrowing at both ends. This zone consists essentially of a highly metamorphosed iron-stained rhyolite-porphyry, cut by diabase dikes. A great fault, at the eastern end of the porphyry, is succeeded by quartzite and limestone, while schist is found to the west. The silicified rhyolite-porphyry is leached to a considerable depth, the leached zone being succeeded by impregnations and seams of chalcocite and pyrite, with a little chalcopyrite and occasional copper oxides. The ore occurrence is similar genetically to those at Bingham, Ely, Miami and Morenci, except for the specific nature of the rock-form in which the disseminated ore is carried. Some oxidized copper ores are found near surface, but the top of the rhyolite-porphyry belt is largely leached, to depths varying from 30' to 40', the leached zone being succeeded by primary copper sulphides, greatly enriched by the secondary redeposition of chalcocite, latter constituting the main ore value. An average sample of ore on the 50' level gave 2.4% copper, 3.4% iron, 2.6% sulphur and 90.3% insoluble matter. The many drill-holes bored have shown an average capping of 240' depth, succeeded by an average of 118' thickness of ore, on the Ray proper, with 315' of capping and 171' thickness of ore on the Gila ground. Under the former ownership the property was said to show nearly 1,000,000 tons of ore, claimed to average 4.5% copper, which latter figure was entirely too high, as the average tenor of ore developed is 2 to 2.5% copper, though there is some ore of higher grade, and ore developed April, 1911, ran 2.3 to 2.4% in copper tenor.

The Ray mine has been developed by underground workings and extensive churn drill borings, and the Gila property has been proven mainly by drill. Six churn drills have been employed, averaging about 50' each daily, boring holes, to an average depth of nearly 400' each, with a total of 140,000' of drill-holes being bored checkerboard fashion, in 200' [illegible]

of ores 17 into 1, with a 70% recovery of assay values. An old smelter, built by the former management, but not blown in, was burned March, 1906.

The reduction plant occupies a 4,000-acre site at Hayden, partly in Gila and partly in Pinal county, about 16 miles from the mine. All buildings are of steel and concrete construction. In its essential features the concentrator is a duplicate of the Garfield mill of the Utah Copper Co.

The mill, of 8,000 tons normal daily capacity, has eight 1,000-ton sections, and is so designed that it may be enlarged, on the unit plan, and serious consideration was being given, March, 1911, to increasing the mill immediately to 10,000 tons daily capacity. The crushing department has 16 sets of 42x10" rolls, and 24 six-foot Garfield Chilean mills. Sizing is done by 48 impact screens, and concentration is effected by Garfield roughing tables, 72 Wilfley tables, Woodbury tables, Frue vanners and horizontal-motion suspended vanners. Water, derived from the Gila River and the adjoining hills, is sent to a 4,000,000-gallon reservoir at the millsite through 30" pipes, by pumps having a capacity of 7,000 gallons per minute.

The mill went into partial commission in March, and April, 1911, was treating an average of about 850 tons of ore daily, in one unit, with the second unit expected to be in commission within 30 days. In April, 1911, the first unit was making about 40 tons of 30% concentrates daily, with a recovery of about 70% of assay values. The concentrates are well adapted to smelting, as regards sulphur and iron contents, and only a small amount of limestone is required for fluxing. Concentrates are shipped to the El Paso smelter, until the completion of the company's own smelter.

The power plant, at the millsite, of 10,000 h. p. capacity, supplies electric current for the operation of the entire property, except locomotives. The plant has water-tube boilers with four 2,500-h. p. Allis-Chalmers triple expansion engines, direct-connected to four 1,750-kw. electric generators.

The 1,600-ton smelter, adjoining the mill, now under construction, is expected to go into blast during the latter half of 1911. The smelter will include a converter department, and blister copper will be sent to the Perth Amboy works for refining.

Miscellaneous buildings at the works include necessary shops, warehouses and minor structures, all of steel frame on concrete foundations.

Forces, early 1911, were about 1,000 men, but when the mine and reduction works are in full operation, normal forces will range between 2,500 and 3,000 men. Production, secured exclusively from experimental work, was 605,108 lbs. fine copper and 324 oz. silver in 1909. With the mine and works running at full capacity, on the average grade of ore, the management expects an annual production of at least 80,000,000 lbs. fine copper yearly, but it is probable that the mine and works will not be running at their normal capacity until nearly quite the end of 1911. The management expects to lay down finished copper on the seaboard, at a cost under 9 cents per pound, and the company's engineers estimates that a net profit of at least $1.75 per ton of ore can be secured. President Aldrich figures a life of 26 years for the property, this estimate being predicated on proven ore. The tonnage already developed places the Ray Consolidated among the very greatest copper mines of the world, with a certainty that the present enormous ore tonnage will be largely increased, and a possibility that it may be doubled. The management is practically the same as that of the Utah Copper Co., the pioneer among the so-called porphyry mines of the world, and is thoroughly experienced, strong and capable.

RAY COPPER MINES, LTD. ARIZONA

Dead. Lands were sold, circa 1907, to the Consolidated Copper Co.

Formerly at Ray, Pinal Co., Ariz. Fully developed property.

RAY EXTENSION COPPER CO. ARIZONA

Letter returned.

REBELJ & VIS COPPER MINES, LTD. SERVIA.

Office: 17 Waterloo Place, London, S. W., Eng. J. J. Abell, R. T. B. Stewart, C. Mijatovitch, Gen. L. Lazarevitch, G. A. Howell and A. D. M. Tucker, directors; A. F. V. Wild, secretary. Organized Nov. 21, 1907, under laws of Great Britain, with capitalization £25,000, shares £1 par; issued, £8,792, fully paid. No trace of operations secured.

R. E. BRUNER COPPER CO. ARIZONA.

Office: 914 Commerce Bldg., Kansas City, Mo. Mine office: Patagonia, Santa Cruz Co., Ariz. Frank C. Peck, president; Roland E. Bruner, secretary; Robt. W. Waddell, treasurer; Jas. R. Bent, superintendent. Organized under laws of Arizona, at dates variously reported by the management as June 24 and July 5, 1907, with capitalization $3,000,000, shares $1 par, nonassessable; issued, $2,320,000.

Lands, 15 claims, unpatented, area 300 acres, adjoining the Anaconda-Arizona Copper Co., and near the Mansfield mine. A 54′ tunnel, on the Mescal claim, is said to give indications of lead-copper ore, and company claimed, August, 1908, to have opened a vein for nearly a mile in length, presumably by trenching, and then planned driving a tunnel of at least 500′ length, on the Mescal claim, which tunnel apparently had reached a length of 200′, January, 1911.

RECORD MINES CO. ARIZONA.

Office: 512 Bradbury Bldg., Los Angeles, Cal. Mine office: Bouse, Yuma Co., Ariz. Geo. Mitchell, manager; Thos. A. Varden, superintendent. Lands, 23 claims, nearly 10 miles due south of Bouse, with a good wagon-road connection, on the main road to Quartzite, in the foothills of the Palomas Mountains. The property carries about 4 miles of the strike of an ore zone of 1 to 2 miles claimed width, cut by several diorite dikes, having veins with a gneiss foot and presumably a gneiss hanging, though latter is covered with drift, the veins showing gossans of specular hematite, underlaid by oxidized ores to shallow depth, succeeded by auriferous and argentiferous copper sulphides, an average sampling, September, 1910, giving 4.5% copper.

The property, known as the Mudersbach mine, which is one of the oldest locations in the district, was taken over, circa August, 1910, from the Eureka Gold & Copper Mining Co., for a price reported to have been $250,000. The main vein has been opened at several points by trenches, and 2 short tunnels, and is developed to only shallow depth. The mine has a number of pits and shafts of 10′ to 50′ depth, showing ore, and 2 main shafts, No. 1 having been 190′ deep, October, 1910. It was planned sinking both shafts to 500′. The first level is at 100′. Several carloads of 7% ore were shipped, August, 1910, to the Clark smelter.

Equipment includes two 15-h. p. gasoline hoists, a gas engine and air compressor. The mine was developing, with a small force, at last accounts.

RED BIRD MINING CO. MONTANA.

Office: Helena, Mont. Mine office: Austin, Lewis & Clark Co., Mont. J. M. Clements, president and treasurer; Frank Jacquemin, vice-president; A. A. Pelletier, secretary and general manager; preceding officers [illegible] Lucas and C. O. Clark, directors. Organized Aug. 19, 1902, under laws of Montana, with capitalization $1,500,000 [illegible] to end of 1905.

Lands, 7 claims, area 140 [illegible] fissure veins, of which 2, of 5′ [illegible] Bird shaft and the 300′ Copper [illegible] phide ore averaging 1.3% copper [illegible] Red Bird mine has about one mile [illegible] ore in sight. Estimated average [illegible] management, were 21% copper, 4[illegible]

which does not look well. Letter returned unclaimed from former mine office, Redding, Shasta Co., Cal. H. D. Irwin, president; R. W. Mayhew, vice-president; Thos. Gilbert, secretary; preceding officers, A. Ahnefeld, T. S. Rasmussen and J. H. Creighton, directors; Geo. C. Henley, superintendent, at last accounts. Organized under laws of South Dakota, with capitalisation $1,000,000, and, according to the charter, under the laws of South Dakota, the stock is nonassessable, but the California courts have ruled that there is no such thing as nonassessable stock. Has authorized a bond issue, at 6%.

Lands, circa 30 claims, and company claims to have 425 acres of patented lands. Property is at the mouth of Middle Creek and on Clear Creek, in the Muletown district, circa 7 miles west of Redding, and includes placer gold claims. The company managed, by herculean efforts, to sink a 41′ shaft, April, 1906. The company claimed, 1905, that it had a hydro-electric power plant, which was untrue, and claimed to plan building a 500-ton smelter, which was not built. The company's advertising is not liked, and its habit of moving offices occasionally, and furtively, seems peculiar. Is regarded with much suspicion.

REDEMPTION COPPER MINING & MILLING CO. ARIZONA.

Office: Kingman, Ariz. Mine office: Chloride, Mohave Co., Ariz. O. D. M. Gaddis, president; C. M. Stowe, vice-president; J. E. Perry, secretary; C. E. Dotterer, treasurer. Lands, known as the Clyde mine, have shafts of 100′ and 114′, with tunnels of 125′ and 195′, and about 1,000′ of workings, developing a vein of about 2′ average width, having a paystreak carrying about 3% copper, 25 oz. silver and $2 gold per ton, with oxidized ores near surface. Equipment includes gasoline power, and there is a 25-ton concentrator, putting about 3 into 1. The first carload of concentrates was shipped, to the Humboldt smelter, circa June, 1910.

RED FOX MINING CO. BRITISH COLUMBIA.

Mine office: McGuigan, Yale district, B. C. The property carries argentiferous lead and copper ores, slightly developed. Idle some years and apparently moribund.

RED GULCH GOLD-COPPER MINING & MILLING CO. COLORADO.

Dead. Was merged, 1909, in the Copperfield Consolidated Mining Co. Formerly at Copperfield, Frémont Co., Colo. Described Vol. VIII.

RED HILL MINING & SMELTING CO. CALIFORNIA.

Dead. Formerly at Victor, San Bernardino Co., Cal. Described Vol. VIII.

RED HORSE COPPER CO. IDAHO.

Mine office: Springston, Kootenai Co., Idaho. Jasper Neederhood, president; John Neederhood, vice-president; preceding officers and Geo. Rae, directors; Rudolph A. Jonas, manager, at last accounts. Organized 1904, under laws of Idaho, with capitalization $1,500,000, shares $1 par. Lands, 18 claims, having a shallow shaft and a 748′ tunnel, and reported to have circa 1,500′ of workings, showing ores claimed to assay 18% copper, with high gold value, which is beyond any possible average for the mine. Equipment is said to be a 3-drill air-compressor. The company's advertising, through H. J. Leigh, fiscal agent, was outrageously exaggerated, and highly misleading. Mine presumably moribund.

RED JACKET & BISBEE DEVELOPMENT CO. ARIZONA.

Dead. Formerly at Bisbee, Cochise Co., Ariz. Fully described Vol. VIII.

REDMAN MINING & MILLING & SMELTING CO. ARIZONA.

Office: 17 [illegible] Place, New York, N. Y. Mine office: Mayer, Yavapai Co., Ariz. [illegible] Wintemute, secretary and [illegible] John D. [illegible], superintendent, at [illegible] Organized under laws of Arizona, with capitalization $2,500,000, [illegible]

Lands, claimed at [illegible] 1 mile northeast of Mayer, [illegible] workings, showing a [illegible]

Ortiz, general manager. Lands, 1,000 hectares, showing 2 parallel ore zones, one of which, said to range up to 40 meters width, has argentiferous and auriferous lead oxides, carrying 750 to 5,000 grams silver and up to 50 grams gold per metric ton, succeeded, at depth, by a large body of cupriferous pyrite, said to assay 3 to 8% copper, with fair silver values. Mine is developed mainly by 14 tunnels, and has about 6 miles of workings, with electric haulage, and has a considerable amount of ore developed.

Transportation, to the nearest railway, at Rio Balsas, is by means of 1,800 mules, but a 20-mile aërial tram has been planned.

The reduction plant includes a mill and a smelter, with two 25-ton lead stacks. The management has planned a pyritic smelter for the treatment of copper ores, present production being mainly silver and lead, estimated at about $1,000,000 value, 1909. The property was under option, early 1910, at a price of 20,000,000 pesos, to the Exploration Co., Ltd., of London. Apparently the property, already valuable, is capable, if given better transportation facilities and a copper smelter, of being made a large copper producer.

REFUGIO SYNDICATE, LTD. MÉXICO.

Office: 5 Moorgate St., London, E. C., Eng. Letter returned unclaimed from former mine office, La Cananea, Arizpe, Sonora, Mex. S. A. Bird, chairman; Henry H. Knox, consulting engineer; J. S. Dare, secretary. Organized Nov. 30, 1905, under laws of Great Britain, with capitalization £11,250, in 1,000 "A" shares; 10,000 ordinary shares of £1 par each, and 5,000 deferred shares of 1s. par. Company was promoted by the Venture Corporation, Ltd. Lands are said to be 6 groups of copper claims, area 412 hectares. No trace of operations secured, and company is not regarded favorably.

REID-NEWFOUNDLAND CO. NEWFOUNDLAND.

Mine office: New Bay, Newfoundland. Donald McKenzie, superintendent, at last accounts. The company sank a shallow prospecting shaft, 1907. Presumably idle.

COMPAÑÍA MINERA LA REINA. MÉXICO.

Dead. Sold lands, circa 1907, to Mexican Mines Syndicate, Ltd. Formerly at Cusihuiriáchic, Iturbide, Chihuahua, Mex. Fully described Vol. VII.

REINA COPPER CO., LTD. SPAIN.

Office: 18 Walbrook, London, E. C., Eng. Mine office: Cabezon, Asturias, Spain. M. Graham, chairman; preceding officer, Maj.-Gen. Sir Chas. Holled-Smith, K. C., A. B. Wyld and H. Palmer, directors; H. F. Stanton, secretary. Organized Aug. 13, 1906, with capitalization £5,000, increased November, 1906, to £60,000, shares £1 par; issued, £47,692, fully paid. Lands 7 hectares. No trace of operations secured.

MINA REINA DE COBRE. MÉXICO.

Mine office: Alamos, Sonora, Mex. Alfredo R. Cano y Ca., owners; J. G. Cano, manager. Property includes the Reina del Cobre and Porfiria mines, developed by shaft and tunnel, carrying auriferous and argentiferous copper ores. Mines employ about 50 men, when operated. Presumably idle.

COMPAÑÍA MINERA REINA DE COBRE, S. A. MÉXICO.

Dead. Former office was México, D. F. Jas. Butler was general manager; Juan de Peza, superintendent. Organized Sept. 5, 1903, under laws of Mexico, with capitalization 100,000 pesos. Property was the Luna de Oaxaca. Formerly at Ejutla, Oaxaca, México.

COMPAÑÍA MINERA REINA DE COBRE DE SONORA. MEXICO.

Dead. Formerly at Caborca, Altar, Sonora, Mex., and Santa Ana, Magdalena, Sonora, Mex. Described Vol. VIII.

REINDEER GOLD MINING & MILLING CO., LTD. IDAHO.

Office [illegible] Co., Idaho. [illegible] dent; I. R. [illegible]

president; Walter Haynes, secretary and treasurer; preceding officers, J. R. Baker, Harry Owens, A. H. Drummond and Geo. F. Ropes, directors; W. S. Baker, fiscal agent, at last accounts. Capitalization $250,000, shares $1 par. The company claimed to be paying regular monthly dividends, at the rate of 8% yearly, on the 25th day of each month. Lands are claimed to be 9 claims, 20 miles from Albuquerque, claimed to be in the heart of the richest mineral zone of the continent, which is untrue. Presumably idle, and the company is viewed with much suspicion.

RELIANCE MINING & MILLING CO. NEVADA.

Dead. Lands went to Gem Consolidated Mining Co. Formerly at Tenabo, Lander Co., Nev. Described Vol. VIII.

RELIANCE MINING & MILLING CO. PENNSYLVANIA.

Dead. Formerly at Hunterstown, Adams Co., Pa.

RENDALL ORE REDUCTION CO. ARIZONA.

Dead. Lands were sold to Ajo Copper Co., circa 1909. Formerly at Ajo, Pima Co., Ariz. Fully described Vol. VIII.

RENO-YERINGTON COPPER CO. NEVADA.

Dead. Formerly at Yerington, Lyon Co., Nev. Described Vol. VIII.

REPUBLIC CONSOLIDATED MINING & MILLING CO. COLORADO.

Dead. Formerly at Idaho Springs, Clear Creek Co., Colo. Described Vol. VI.

REPUBLIC MINES CO. NEW MEXICO.

Office: 526 Exchange Bldg., Denver, Colo. Mine office: Lucero, Mora Co., N. M. Felix J. Woodward, president; Walter Littlefield, vice-president; Marcus Finch, secretary, treasurer and general manager. Organized Dec. 8, 1903, under laws of Colorado, with capitalization $500,000, increased, circa 1908, to $1,000,000, shares $1 par.

Lands, circa 7,500 acres, patented, half freehold and half held under bond and lease, known as the Constitution group, 30 miles from a railroad, stretching for 8 miles along Coyote Creek, from Mora River to the adjacent mountains, showing a series of 3 parallel cupriferous beds of slate and arenaceous shale, alternating with limestone, having an approximately NS. strike. The lands are said also to include coal, limestone and iron ore deposits. The property has upwards of 120 openings, mainly shallow pits, with a 50′ shaft and several tunnels, longest 650′, and is said to have about 4,000′ of workings. There are 3 main beds, of 3′ to 8′ claimed average thickness, with 3 minor beds, said to show considerable chalcocite, claimed to give average assays of 8 to 17% copper, with an estimated average tenor of 6%. The management estimated the value of its ore bodies, to depth of 350′, at $45,000,000, which estimate was absolutely unwarranted by the limited amount of development. Mr. J. Hugh Bauserman claimed, March, 1909, that the company was building a smelter, but nothing has been heard of this alleged smelter. Idle and is not regarded favorably.

REPUBLIC MINING CO. ARIZONA.

Mine office: Johnson, Cochise Co., Ariz. Lands, 9 claims, including the Old Republican mine, having a 350′ shaft; the Republic Extension mine, with shafts of 50′, 75′ and 150′, and the Mammoth mine, having incline shafts of 150′ and 400′. Property shows auriferous and argentiferous sulphides, up to 15% in copper tenor. Idle.

REPUBLIC SMELTING CO. COLORADO.

Office and works: Leadville, Lake Co., Colo. Capitalization $500,000. Property is the remodeled 500-ton smelter, with 3 furnaces, formerly owned by the Boston Gold-Copper Co. Idle.

RESCUE COPPER CO. ARIZONA.

Dead. Was merged, Feb. 19, 1907, in Cornelia Copper Co. Formerly at Ajo, Pima Co., Ariz. Described Vol. VII.

mines, carrying auriferous and argentiferous lead and copper ores, opened by tunnel, and equipped with steam power. Property is being worked by lessees.

REY DEL ORO MINING CO. **MÉXICO.**

Mine office: Mulatos, Sahuaripa, Sonora, Mex. Formerly was controlled through ownership of entire stock issue, by Greene Gold-Silver Co., which became bankrupt. Lands, 6,400 acres of mineral property, with miscellaneous holdings giving a total area of 24,700 acres. Wood and water are scarce. Mineral lands include the Mulatos mine, which is the principal property, and La Blanca and La Colorada mines. The Mulatos shows immense dikes, up to 500' in width, carrying gold on the cleavage faces of a fractured silicious gouge, which forms veins and veinlets in the dikes, copper carbonates occurring sparingly, in streaks, in the dikes, and there also are several narrow copper veins, of some promise. The ore averages about 1 oz. silver and $3 gold per ton, and is readily amenable to cyaniding. Production, claimed to have been upwards of $18,000,000, has been made mainly from rich ores, extracted from and near surface, by gambusinos, and treated in arrastras. Probably the estimated production is much exaggerated.

Equipment includes an old 60-ton mill, having 6 Bryan mills and a 25-ton cyanide plant. Idle.

COMPAÑÍA MINERA LOS REYES. **MÉXICO.**

Mine office: Zitácuaro, Michoacán, Mex. Rafael Rodríguez Gil, general manager. Mine, developed by tunnel, has copper ore, with a small steam plant. Was under development, at last accounts.

REYNOLDS-ALASKA DEVELOPMENT CO. **ALASKA.**

Office: 42 Broadway, New York, N. Y. Mine office: Latouche, Latouche Island, Alaska. Marvin F. Butler, president; Walter C. Gilbert, vice-president; J. Frank Birdsell, secretary and treasurer; Chas. S. Herzig, consulting engineer; preceding officers, A. E. Austin, Hon. J. G. Brady, J. S. Conabeer, H. M. Coffin, John Yule, O. C. McGilvara and Edmund Smith, directors; G. M. Richards, superintendent; A. F. Hancock, foreman. Organized 1903, under laws of Washington, with capitalization $3,000,000, shares $1 par, in $1,000,000 cumulative 6% preferred stock and $2,000,000 common stock. Authorized, March 3, 1908, a $500,000 twenty-year 6% gold bond issue; issued, $125,000. Annual meeting, first Tuesday in April.

Lands are 102 claims. The company formerly held 6,000 acres of coal and oil lands, but these were dropped. The former management claimed 3,000,000 tons of ore in sight, which wildly untruthful claim is repudiated by the present management.

The Boulder Bay group of 31 claims, area circa 620 acres, on the Kenai peninsula, shows a contact deposit between greenstone and slate, carrying chalcopyrite, assaying up to 11% copper and $3 gold per ton, but probably averaging 2 to 4% in copper tenor, developed by 2 tunnels. Equipment includes a 60-h. p. boiler and a 5-drill Rand air-compressor. The Copper Mountain group of 9 claims is on Landlock Bay, near Boulder Bay.

The Iron Mountain group of 62 claims includes the Duchess and Blue Fox properties, on Horseshoe Bay, circa 60 miles west of Boulder Bay, Latouche Island. The Blue Fox mine has a 4' vein of ore, formerly claimed to average 7% copper, slightly developed by a shaft, now filled with water.

The Duchess mine, on which work is now centered, is developed by 2 tunnels, the upper a 375' drift tunnel, and the lower having 105' of drifts on the [illegible] bod[illegible] which has an average width of 16', and not of 100', as claimed by the former [illegible]ment. This group shows massive sulphide ore, estimated by [illegible] pre[illegible]ment to average about 5% copper.

[illegible] includes a 200-h. p. hydro-electric installation, with a [illegible] steel [illegible] on Big Falls Creek [illegible] Pelton wheel, direct-connected [illegible]

No. 1 shaft, 275′ north of the Franklin Junior boundary, is 8x18′ in size with 3 compartments, 500′ deep, sunk on the Pewabic amygdaloid, which is 8′ to 10′ wide, with 2′ to 3′ near the hanging-wall well mineralized, at points four levels being opened, with very limited drifting thereon. This shaft, abandoned 1902, is filled with water, to the first level, on which it connects with No. 2.

No. 2 shaft, 1,200′ north of No. 1, also is 8x18′ in size, and is bottomed at the 10th level at depth of 1,272′, below which there is a 125′ winze. Most of the openings are north of this shaft, with drifts to the southward on the 8th, 9th and 10th levels, the 10th level drift being circa 2,400′ in length. The south drift on the 8th level from No. 2 shaft develops a fair stretch of copper ground toward the Franklin Junior, and a 1,400′ drift on the 8th level north from No. 2 shaft showed 25′ to 75′ stretches of payable ground. The Pewabic bed of the Rhode Island property is being developed by north drifts from No. 1 Pewabic shaft of the Franklin Mining Co., at a depth of about 2,000′, where the bed averages 8′ to 10′ width.

In addition to drill borings, considerable underground work has been done in testing various parallel copper-bearing beds. The Albany & Boston or Allouez conglomerate has been opened by crosscuts on the 500′ and 1,000′ levels, but the showing secured was discouraging. A crosscut of about 200′ length on the 10th level, about 1,100′ south of No. 2 shaft, has disclosed an amygdaloidal bed of some promise. The east crosscut on the 8th level, at a point of 1,000′, cut 2 apparently valueless beds, one being the Mesnard epidote. The East Lode, about 5′ wide, carries a little copper, but nothing of promise. The West Lode, 96′ from the Pewabic, is 7′ to 9′ wide, carrying occasional bunches copper. The 4 amygdaloidal beds lying between the West Lode and the Allouez conglomerate have been tested by NS. drifts, 3 proving barren.

No. 3 shaft, 1,800′ north of No. 2, was begun May, 1905, but work was discontinued at slight depth.

Equipment includes a frame shafthouse at No. 2, with an engine-house having a Nordberg hoist capable of raising 2-ton skips from a quarter-mile depth, and a 12-drill Rand air-compressor. Buildings include a 30x60′ machine shop and smithy, a 30x50′ frame warehouse and 15 dwellings.

The Rhode Island was idle during 1910, and the plan of developing at great depth, through the north drifts of the Franklin, is correct, as the Pewabic bed to the south of the Rhode Island has shown great improvement below a depth of 2,000′, in both the Mesnard shaft of the Quincy, and the main shaft of the Franklin.

RHODE ISLAND MINING CO.

Office and mine: P. O. Box 190, Wallace, Idaho. A. G. Webb, president; Chas. Bolinger, vice-president; C. E. Clark, secretary; preceding officers and Lonergan and F. J. Martin, directors. Capitalization $50,000, shares $1 par. [illegible] 5 claims, 1 fractional, about 2 miles northwest of Osburn, at a contact deposit of 15′ to 25′ surface width, between a quartzite foot and hanging development is by a shaft of circa [illegible] crosscut tunnel of about [illegible] showing silver-lead ore, chiefly [illegible] slight [illegible] giving assays up to 8% copper [illegible] company [illegible] May, 1907, to [illegible] by the [illegible]

RHODESIA [illegible]

Office: [illegible] Bulawayo, [illegible] sia. Edmund [illegible] P. Coventry, [illegible] and Dr. F. [illegible] field, metallurgist.

Columbia, as successor of Richard III Development Co., Ltd., with capitalization $650,000, shares $1 par. Paid a 2½% dividend, 1907.

Lands, 49 acres, carrying the eastern continuation of the Leonora-Tyee ore body. The mine has a 589′ two-compartment shaft, in barren ground, reaching the ore by drifts, with 2,181′ of workings on 5 levels, showing some ore of good average tenor. Considerable shipments have been made, to the Tyee smelter, and shipments of 3,200 tons, June, 1907, averaged about 4.5% copper, 3 oz. silver and 0.135 oz. gold per ton. Idle.

KUPFERERZBERGWERK RICHELSDORF I. GERMANY.

Mine office: Nentershausen, Hessen-Nassau, Germany. E. J. Emery, J. W. Piepmeyer, Otto Vetter, C. Julius Winter and A. Sternberg, directors. Has 1,000 shares. Lands, on Richelsdorfer Mountain, are the Richelsdorf and Karl-Alexander mines, showing cobalt and nickel ores, partially developed.

RICHFIELD CONSOLIDATED MINING CO. UTAH.

Dead. Formerly at Bingham Canyon, Salt Lake Co., Utah. Described Vol. IX.

RICHFIELD COPPER CO. MÉXICO.

Office: Scranton, Pa. Letter returned unclaimed from former office 1410 H St., Washington, D. C. Mine office: Querobabí, Ures, Sonora, Mex. Dr. J. K. Bentley, president; Maj. J. A. Cooper, vice-president; Dalbys L. Fricke, secretary; John A. Schadt, treasurer; preceding officers, Hon. J. A. Wood, Otis Robinson, Geo. Stark, Ward C. Hoffner, John Hershberger and Jacob Hafer, directors; John Glasson, superintendent. Organized 1908, as successor of Richfield Mining Co., with capitalization $5,000,000, shares $1 par. Bonds $250,000 authorized, at 6%; issued, $200,000. Scranton Trust Co., registrar. Annual meeting, second Saturday in October.

Lands, 1,300 acres of mineral property, with timber and ranch lands giving total holdings of 26,512 acres, in the Ures district. The Dos Nacionos group, 12 miles east of Tuape, and 35 miles from a railway, is said to have 7 ore deposits, between granite and limestone, of 16′ to 40′ estimated average width, opened by 2 shafts and 2 tunnels, showing oxidized ores and chalcopyrite, formerly reported to assay 3% copper and 20 to 60 oz. silver per ton, with small gold values, but reported, by present management, to average 5% copper, 10 oz. silver and $5 gold per ton. The mine is said to have a body of good ore at depth of 350′.

Equipment includes a 120-h. p. steam plant, with two 20-h. p. hoists and a 4-drill air-compressor. There are several mine buildings. The property was reported in the press, July 3, 1909, to be installing a small reverberatory smelter to burn wood, and the management reported, Feb. 22, 1911, that plans were being prepared for the installation of a smelter. A shipment, early 1910, to the Aguascalientes smelter returned about 1.5% copper and 26 oz. silver per ton. Apparently very little work has been done since the mine was closed, 1907.

RICHFIELD MINING CO. MÉXICO.

Dead. Was succeeded, 1908, by Richfield Copper Co. Formerly at Querobabí, Ures, Sonora, Mex. Described Vol. VI.

RICHMOND & ANACONDA CONSOLIDATED MINING CO. UTAH.

Office: 516 Dooly Bldg., Salt Lake City, Utah. Mine office: Knightsville, Juab Co., Utah. John Dern, president and general manager; Jas. Chapman, vice-president and treasurer; F. C. Dern, secretary; C. C. Griggs, superintendent. Organized 1892, under laws of Utah, with capitalization $500,000, shares $1 par, fully issued and fully paid, but since made assessable, with assessments levied. Is controlled by Uncle Sam Consolidated Mining Co. through ownership of $400,000 stock. Shares are listed on the Salt Lake stock exchange.

Lands, 2 claims, patented, area circa 40 acres, lying just west of the Humbug mine of the Uncle Sam. The property carries auriferous and argentiferous

RIO BACANUCHI MINING CO. MÉXICO.

Dead. Formerly at Bacanochi, Arizpe, Sonora, Mex. Described Vol. VIII.

RIO BLANCO SMELTER. PERÚ.

Owned by Peruvian Mining, Smelting & Refining Co.

COMPAÑÍA MINERA RIO COLORADO. CHILE.

Dead. Formerly at Victoria, Santiago, Chile. Described Vol. VIII.

RIO DOLORES COPPER CO. UTAH.

Office: 818 Marion St., Denver, Colo. Mine office: Castleton, Grand Co., Utah. John Chase, president and general manager; Col. Thos. B. Crawford, secretary and treasurer; preceding officers and Victor Elliott, directors; John Jackson, general manager. Organized Feb. 8, 1906, under laws of Arizona, with capitalization $2,000,000, shares $1 par, nonassessable; issued, $1,750,000. Is controlled, through ownership of 350,000 shares, by Intermountain Industrial Mining Association, under the same general management. Annual meeting, first Thursday in July.

Lands, 20 claims, partly patented, area 400 acres, including 200 acres of mill and smelter sites, at the head of Castle Creek, 6 miles above Castleton, on Mineral Mountain, in the La Sal district. Lands show mainly granite, with porphyritic intrusions, said to carry 12 ore bodies, of which the company reports 3 under development, as of 5′ average width, carrying copper sulphides estimated to average 5% copper, 40 oz. silver and 0.5 oz. gold per ton, which figures seem high, especially as former estimates of the management were 2 to 3% copper, 10 oz. silver and $3 gold per ton. The property also carries galena. Development is reported by the management to include 2,000′ of workings, and is reported, independently, to include an 80′ shaft. The management estimates 10,000 tons of ore blocked out for stoping. Equipment includes a 20-h. p. gasoline engine, and a 2-drill Sullivan air-compressor. There are 6 log buildings. The company was promoted by Fred G. Shaffer, a well known mining faker, but is now in the hands of Col. Crawford. Idle several years, owing to lack of funds.

RIO DOLORES MINING CO. COLORADO.

Letter returned unclaimed from former office, Chicago, Ills. Mine office, Rico, Dolores Co., Colo. W. K. Cowan, treasurer, at last accounts. Lands 2 miles north of Rico, are said to show a 3′ vein, carrying ore assaying up to 8% copper. Idle several years, with affairs badly tangled. Company was said, December, 1910, to plan reorganization and resumption of work.

SOCIÉTÉ ANONYME DES MINES DE CUIVRE ET DE PLOMB ARGENTIFÈRE DU RIO FARDÈS. SPAIN.

Office: 3 Place Royale, Brussels, Belgium. Mine office: Molinillos, Ciudad Real, Spain. August Dupont, E. Roth le Gentil, J. B. Cesari and E. Dufour, directors; H. M. Scherb, manager. Organized July 1, 1903, under laws of Belgium, with capitalization f2,500,000, shares f250 par, as successor of Société Anonyme des Mines de Cuivre et de Plomb Argentifère du Rio Fardès ci-devant Mines de Molinillo (Espagne). Annual meeting, first Monday in May. Lands, near Molinillos, carry argentiferous lead and copper ores. Idle several years, and presumably moribund, probably borne down by the shadow of its past and weight of its present title.

RIO GRANDE & DOLORES SILVER MINING CO., LTD. MÉXICO.

Office: 37 Old Jewry, London, E. C., Eng. Mine office: Mineral de Guadalupe, La Unión, Guerrero, Mex. Walter J. Cutbill, chairman; preceding officer, Lieut.-Col. A. B. Haig, C. M. G., J. S. Middleton, and Brooke Mockett, directors; A. Kitching, secretary; Arthur M. Bourne, manager; Geo. A. Bryan, assistant manager. Organized Dec. 11, 1877, under laws of Great Britain, with capitalization £10,000, increased, August, 1881, to £17,000, shares £10 par. £10,000 ordinary shares and £7,000 cumulative preference shares, fully issued and fully paid. After the payment of a 10% dividend on preference shares remaining profits are divided equally. Debentures, £10,000, at 10%.

de Rio Tinto, Huelva, Spain. Works office: Port Talbot, Glamorganshire, Wales. Chas. Wm. Fielding, chairman; preceding officer, Rt. Hon. Earl of Denbigh, Lionel C. G. Sartoris, John MacFarlan and John M. Macdonald, directors; J. Gordon Macleod, secretary; Turquand, Youngs & Co., auditors; London Joint Stock Bank, bankers; Freshfields, solicitors; Walter J. Browning, mine manager; R. E. Palmer, assistant manager; G. W. Porteous, traffic manager; Gordon Douglas, engineer; J. Angus, consulting engineer.

Organized March 29, 1873, under laws of Great Britain, with capitalisation £3,250,000, increased, November, 1905, to £3,500,000, shares £5 par, in £1,625,000 cumulative 5% preference shares and £1,875,000 ordinary shares. The new issue of 50,000 ordinary shares, par £5, was sold to shareholders at £63 per share, netting the company £3,150,000, for the redemption of an outstanding bond issue of £2,989,740, at 4%, which was fully retired. Transfer form, common; fee, 2s. 6d.; warrants to bearer are issued in denominations of 1 share, fee 6d., and 5, 10 and 25 shares, fee 1s.; fee for conversion into registered shares, 2s. 6d. per certificate. Stock Exchange settlement; all shares quoted in the official list. Fiscal year ends with the calendar year; accounts are issued in April, and an interim semi-yearly report is issued in October. Dividends are payable in Paris by the Société Générale, 54 Rue de Provence.

Dividends were begun 1879, and have been paid continuously, varying greatly, according to net earnings. Dividends on the old ordinary shares, of £10 par, 1879 to 1896, ranged from 6s. in 1886 to 38s. in 1896. On the present ordinary shares of £5 par, dividends have ranged from 40% in 1897 to 110% in 1906. Dividends were small at first, because the company was seriously handicapped by three different sets of mortgage bonds, bearing 5% interest. In 1895 the mortgage debt was consolidated into a single issue of £3,600,000 first-mortgage debentures, bearing 4% interest, with a sinking fund and semi-annual redemption, which would have extinguished the mortgage in 1919, but, by the issue of new share capital, November, 1905, floated at the tremendous premium of 1,160%, the company placed itself in an impregnable financial position, the credit for this able stroke of finance having been due mainly to Mr. Fielding. Recent dividends on ordinary shares have been as follows: £3 12s. 6d., or 72½%, for 1901; £2 10s. or 50%, for 1902; £3 10s., or 70%, for 1903; £3 10s., or 70%, for 1904; £4, or 80%, for 1905; £5 10s., or 110%, for 1906; £4 7s. 6d., or 87½%, for 1907; £2 15s., or 55%, for 1908; £3, or 60%, for 1909, with an interim dividend of £1 5s., or 25%, for 1910. The company's dividends in 1907 were the greatest ever paid in one year by any copper mine. The company has a reserve fund of £500,000, of which £400,000 are invested in consols, and £100,000 are in choice selected shares. Gross income was £1,250,112, with expenses and losses of £232,127, in 1910.

Lands, 23,000 acres, freehold, of which 1,922 hectares, or circa 4,700 acres, were secured from the Spanish government, and 18,300 acres adjoining were purchased from private owners. Mining operations are conducted in an area of practically 5 square miles.

The Rio Tinto is much the most ancient of the great mines of the present day, with a history stretching back into the mists of antiquity. The first semi-authentic account of the mines dates from the Eleventh Century before Christ, when the Phœnicians traded in copper made from its ores. Carthage, that vigorous young offspring of Tyre, succeeded to the hegemony of the Iberian mines, and worked the Rio Tinto mines extensively, for several centuries, being displaced, in turn, by the Romans, after the repulse of the second Punic invasion and the total overthrow of the Carthaginian power. The Rio Tinto was worked by the Romans, for centuries, upon a very considerable scale, and, after the decadence of the Roman power, the mines were operated, in a very crude way, by the Goths. Again the fortunes of war gave the Iberian peninsula to new masters, and the Moors, in turn, were owners and operators of this great copper deposit.

is separated from the Sierra Andevallo, which is some 12 miles distant, by the rivers Odiel and Járrama, and the mines are 51 miles by rail from the seaport of Huelva, in the province of that name, lying in the extreme southwestern corner of Spain, near the Portuguese boundary.

The ore bodies of the Rio Tinto occur in mammoth lenses, with clay-slate on the south and porphyry to the north, and are surmounted by large gossans much decomposed. The surface ore has been leached to the point of absolute worthlessness, the zone of secondary enrichment beginning at a depth of approximately 100′, and continuing to an average depth of 300′. Diamond drill borings have shown untouched ore bodies, carrying upwards of 130,000,000 long tons of ore, giving sufficient reserves for about 60 years production, at the present rate of mining, and it is unlikely that the full extent of the ore bodies available has been proven. The ore is of 2 classes, by far the larger part being cupriferous pyrite, the second class consisting of copper sulphides disseminated in silicified porphyry gangue. For removal of overburden there are 14 steam shovels, the largest having dippers of 4 cubic yards capacity, and about 2,000,000 cu. meters of overburden are removed yearly, on the average, though this figure has been considerably exceeded, in some years, under exceptional requirements.

The ore produced is classed in three grades, smelting ore carrying 4 to 6% copper, export ore about 3.5% copper and 45 to 50% sulphur, while leaching ore has 1.5 to 2% copper only. The average amount of copper contained in the ores treated has ranged from 1.5% copper, in 1876, the first year of production by the present company, to 3.234% in 1884, the average of copper extracted being 2.39% in 1903, 2.34% in 1905, 2.411% in 1906, in which year the low grades of ore averaged copper returns of 2.302% and 1.198%, and 2.349% in 1909. The ores carry an average of circa 1.5 oz. silver per long ton, with traces of gold, and considerable silver is saved, by the Claudet process, at the smelter. About one-third of the total production is exported for sulphur contents and about one-third of the ore produced is smelted, balance being leached, or sent abroad to burners. The ores average 4 to 5% copper in the zone of secondary enrichment, and with depth decline gradually in value, until at about 1,000′ depth the average copper tenor is only about 1.25%. The main ore body is cupriferous pyrite, carrying copper in the form of fine grains of chalcocite, not chalcopyrite, as formerly generally held. Owing to the ore being unusually rich in sulphur, the shipping ores of the Rio Tinto are in good demand, and, in addition to supplying various British works, the company exports washed sulphide ore, in very large quantities, to Germany, France, Belgium and a number of acid works in the United States. The reserve heaps at the mine are estimated to carry about 150,000 long tons fine copper, and the copper output of the mine has shown but small fluctuations since 1898.

The Rio Tinto has 3 mineral zones, carrying a succession of lenses, the main being known as the South or Nerva lode, the San Dionisio or Middle lode and the North lode, in addition to which there are 2 smaller detached lenses, adjacent to the North lode, which also are being worked opencast. There are 5 different mines, of which 4 are worked opencast, and one underground. The underground mine is worked pillar-and-stall, with levels at intervals of 12½ meters, levels being opened 4 meters high, and the entire floor divided into galleries and cross cuts 4x4 meters, leaving pillars of 6x6 meters, which is not an entirely satisfactory method of extraction, leaving, as it does, more ore in the pillars than is mined.

The San Dionisio mine, the westernmost and deepest of the group, has a shaft of nearly 1,200′ depth. The work of changing over the San Dionisio to opencast extraction was begun 1907, and completed 1911. The overburden, consisting principally of porphyry and slate, was removed by steam-shovels, and carried through tunnels, on the different levels, similar work being done on the South Lode opencast extension. Ore will be mined by steam-shovels to as great a depth as practicable, below which it will be necessary to hoist by shafts.

el. The San Dionisio is likely to be the chief source of ore sup-
cades to come, and work has been planned systematically, for
ıce.
ssible preference is given to opencast workings, which have the
of giving complete extraction of the ore, and also are more
ınage costs, in the long run, though requiring enormous initial
the removal of overburden. Fortunately, the financial re-
ıpany permit the outlay of vast sums, the principal of which will
many years, but which eventually will be returned, in full, with
ıterest. The possibility of using the caving system for under-
as considered, but an adverse decision was reached. Timber
h priced. The depth of the largest pit is about 600′, and be-
t the immense ore bodies are worked by drift-stopes, the cap-
and sent down the shafts, to fill and hold the ground, as the ore
ım-shovels recently have replaced manual labor, to a consider-
pencast ore extraction, and, during 1909, when an unusual
rden was removed, in preparing the San Dionisio for quarrying
hovels, 50 locomotives, 1,000 cars and several thousand men
the task of removing about 7,000,000 tons of very hard rock
apping of the ore-body.
ctric power plant, installed 1908, replaced a number of widely
ıeconomical steam installations. The mining equipment is
ring to extraction being mainly opencast, the Rio Tinto lacks
spectacular mining machinery found at many other great cop-
rough no lack of enterprise, but owing to the company's for-
n requiring the minimum of such magnificent but costly

in pit are the roast-yards, leaching bed, precipitation plant and
ethods of leaching are described at length in the chapter on
in this volume. The average rainfall of the Sierra Morena,
8″ yearly, but there are protracted seasons of drought, alter-
ly with heavy rainfalls, hence extensive water storage is nec-
are large dams for this purpose, the last having been built 1907.
s no longer calcined, the copper becoming soluble by natural
ted by systematic sprinkling. About 7,000,000 gallons of
ıgly charged with copper sulphate, are treated daily, in the
ı plants, yielding cascara, or copper precipitate.
at the mine, built 1902, with American equipment throughout,
easingly large proportion of ore on the ground, including con-
grade formerly leached. The smelter has two 42x160″ elliptical
las, 23′ 4″ over all in height, with charging doors 10′ above the
re detachable, and mounted on wheels. Each furnace has 8
l 2 charging doors, ore and fuel being charged alternately.
e continuous discharge into 30-ton settlers, 12′ in diameter and
ave continuous slag discharge. Furnace product is low-grade
4% copper tenor, taken in 8-ton ladles, by electric traveling
verter department, where there are 6 stands, rotated hydraul-
pit. Shells, 80x120″, of horizontal barrel type, with spherical
yeres each, are in 2 parts, for convenience in lining, and are
a 4″ external course of fire-brick, rarely replaced, and an inner
″ thick, of ground silica and low-grade quartzose copper ores,
for a binder. When newly lined the shells have a capacity of
ch, increasing to about 8 tons when the inner linings are nearly
smelter product is converter bars, of 98 to 99% copper tenor.
towns for employés built on the property of the Rio Tinto,
er of new dwellings were erected, 1909–1910, to replace those

destroyed, early 1908, by subsidence of the workings of the South L

The Rio Tinto employs about 15,000 men, in Spain, of which number ab 60 members of the staff are British, the balance being native workmen, earn average wages of 15 reals, equal to about 60 cents, per day of 8 and 9 hou There is no Sunday work, and the men are paid daily, the labor being docile, a rule, and giving very efficient and satisfactory workmen, in all grades. T population of the dual mining township of Rio Tinto-Nerva is about 30,0 and that of the port of Huelva is circa 25,000, hence it is estimated that the Tinto Co., Ltd., is the direct source of support of 50,000 people in Spain, indirectly supports perhaps half as many more in Spain, England, and up the Continent.

The mines are connected with the seaport of Huelva by the Rio Tint Huelva railway, a single-gauge line of 87 kilometers length, built, 1873, by t company, and slightly lengthened, 1908. This line does a general freight a passenger business, in addition to handling the company's heavy traffic. Huelva, which probably is built on the site of the old Phœnician city of Onob at the junction of the Tinto and Odiel rivers, known to the Phœnicians a Carthaginians as the Urium and Anas, the company has extensive railway t minals and wharves. The company owns the steamer Don Hugo, of 1,249 to registered burden, plying between Spain and Wales.

For many years the company maintained extensive smelters and acid wo at Cwm Avon, Wales, but the lease was surrendered in 1906, the works be poorly located for the receipt and dispatch of material.

The new Welsh reduction plant, at Port Talbot, Glamorganshire, is a modern smelter, of good design and equipment, receiving material by sea fro Spain, and having direct rail connection with the Great Western railway. Elec tric power is used throughout, and there are 2 Temperley electric transporters for carrying bags of precipitate and bars into the ore-sheds. The Port Talb works have five 30-ton refining furnaces, top-charged by cars operated electri ally, with side-slag discharge. Slags from the reverberatories, carrying 4 to 6 copper, are resmelted in a water-jacket blast-furnace. The works have mecha ical dipping, with traveling carriages running on rails, the carriages having ba bearings, with metal weights on the handles to counterbalance the charge The cinder from the acid plant is treated by the Henderson wet process, for th extraction of copper.

Production, 1876–1910, was 16,569,238 tons of pyrites shipped, an 33,190,235 tons of ore treated locally, a total of very nearly 50,000,000 long ton this ore yielding 599,152 long tons fine copper. Copper produced at the mine amounted to 54,575,370 lbs. in 1909, and 51,049,600 lbs. in 1910. Productio has been very regular, since 1891, with a minimum of 19,530 long tons in 190 and a maximum of 24,364 long tons in 1909. Ore mined 1910 was 2,146,7 long tons, of which 637,020 tons were shipped direct, and 1,509,745 tons we reserved for local treatment, deliveries to customers amounting to 683,605 ton of sulphur ore, and 578,443 tons of cupreous ore. The maximum copper produ tion of the Rio Tinto was 80,214,400 lbs. in 1904, and recent production wa 72,307,200 lbs. in 1905; 75,879,520 lbs. in 1906; 72,390,200 lbs. in 1907; 74,867,3 lbs. in 1910. The company has been coöperating with the leading America producers, since August, 1910, in a policy of slight curtailment, owing to th excessive supply of copper. Average cost, formerly about 7 cents per lb. n is only 6 cents per lb. of finished copper, after deduction of revenues from su phur ores sold, and miscellaneous sources. The management of the compa is of the best, both technically and financially, and the mine itself, after 3,0 years of production, scarcely requires commendation.

RIO TINTO COPPER CO. **MEXICO**

Office: Perry Payne Bldg., Cleveland, Ohio. Mine and works office: Te rasas, Iturbide, Chihuahua, Mex. Employs circa 350 men. R. B. Hutch

ager; Capt. M. D. Murray, mine superintendent; H. L. Schnei-
rintendent; J. M. Baker, smelter foreman; F. W. Topken, mas-
Organized under laws of Ohio, holding property through a
an company, and is operated as a close corporation, under the
an, McKinney & Co. The Rio Tinto Mexicano mine and works
8, for a price said to have been $187,500, and this company also
operty formerly held by the San Rafael Copper Mining Co.
ds, about 25 miles north of Chihuahua, are 159 hectares, in a
hectares, and a smaller tract of 6 hectares, including nearly all
neral property of the Terrazas camp, except a few lead mines.
includes the Rio Tinto mine, of 50 hectares, and properties for-
the Rio Tinto Mexicano Mining Co., Boston & Mexican Min-
Mining Co. and San Rafael Copper Mining Co. The principal
e Rio Tinto Mexicano, San Rafael, Promontorio, Verde and
all connected underground. The company also owns the
, at Savanarola, circa 50 miles south of Chihuahua and 35 miles
rrying argentiferous copper and lead ores.

to Mexicano mine was opened 1860, closed 1902, and reopened
as been owned and operated by a number of different mining
ship having been vested mainly, until purchased by the present
ssrs. Enrique and Juan A. Creel. The mine shows contact
limestone and altered andesite, there being 5 known ore
morphic zone traced circa 1,500 meters, the ore body, with
, maximum of 100′, and average of about 20′ width, being
y large extent. Ore also occurs between the bedding planes of
large quartzite dike, and the ore bodies, while erratic in size
re connected, and practically continuous, as a rule. The lime-
age dip of 45° NW., and the property also has some silver-lead
loped is mainly oxidized, though there are occasional sulphides
at depth. The oxidized ores range 2 to 5% in copper tenor,
l and zinc, with an average of about 3% copper, 2 to 4 oz. silver
ts gold per ton. The gangue is mainly limestone, somewhat
xtensive diamond drill borings, 1909, are said to have shown

is developed by a number of shafts, to a depth of 440′ only,
miles of workings. The ground is firm, breaking well and re-
ing, pillars having been removed to give chambers up to 100′
the mines have proven quite wet, but a powerful pumping
d, 1907.

ael mine, which is the more important, has 2 shafts, the deeper
-compartment shaft, known as the Verde. The Promontorio
afts, circa 1,000′ apart, the main Promontorio shaft being 350′
ce gravity tram to ore-bins. The Promontorio also has 2 old
mbia mine has a 275′ shaft, with about one-half mile of work-
ous shafts include the Bronce, of 120′, Pedernal, of 180′, San
nd Vinagre, of 100′.

ncludes steam and gas power. The San Rafael main shaft has
lers and a 100-h. p. double-drum Ottumwa hoist, with 4-drill
mpressors. There are 5 gasoline hoists, of 6 to 22 h. p., at
ts. Fuel is wood, costing 7 pesos per cord, and coal, costing 13
on. Buildings include various shops, of adobe, 5 stone shaft-
lobe dwellings, for employés.

on between the mines and smelter is by a one mile narrow-
king ore from bins at the San Rafael, Promontorio and Colom-
ed with a 6-ton Porter locomotive and 5-ton iron ore-cars.

The reduction works, at Ter
kilometer spur from the main lir
small sampling mill, and there ar
bins. The plant, doing a gener
again 1910, when the smelting ca
ment added.

The furnace building, formerl
two 300-ton 42x192″ El Paso F
smelter began with two 36″ circul
ton blast-furnaces, and those in tu
The first large blast-furnace, blow
until the installation of the conve
the company had contracted for
untrue. The slag line has a 14-to

The converter department, ir
with a 40-ton electric traveling cr

The power-house is 34x80′, a
The power plant has a 250-h. p. c
Connersville blower, and a 100-k
crane, relining department, samp
having a 200,000-gallon storage t
pipeline from a pumping station o

The following figures of proc
ships: circa 1,000,000 lbs. fine c
2,250,000 lbs. in 1908; circa 2,50
1910. The company was said, A
and matte stacked up, awaiting
finished late that year. Ore treat
age returns of circa 2.5% copper, s
smelted at a cost of about 7 pesos
copper, of about 12.5 cents per p
exists in immense quantities, and
given an adequate smelting equi
producer, and apparently is capab
ing nearly or quite 1,000,000 lbs. f

RIO TINTO COPPER MINING

Dead. Formerly at Encampi

RIO TINTO COPPER SYNDICA

Dead. Formerly at Middel
scribed Vol VIII.

RIO TINTO DEVELOPMENT

Dead. Apparently was a
Bldg., Denver, Colo. Described

RIO TINTO GOLD & COPPER

Dead. Formerly at Prescott,

RIO TINTO (HILLGROVE) CO

Dead. Was organized Aug.
2s. 6d. par. R. Hill was secretary.
land, Australia. Prospecting ope
erty was abandoned, 1908. For
Australia.

COMPAÑÍA MINERA RIO TIN

Dead. Was succeeded, 190
Terrazas, Chihuahua, Mex. Full

RIO TINTO MINES & SMELT

Dead. Formerly at Terra

EADWELL MINING CO. **WASHINGTON.**
kane, Wash. Mine office: Curlew, Ferry Co., Wash. G. B. ; J. L. Martin, vice-president and manager. Lands, 7 claims, of Curlew and 24 miles from Phœnix, B. C., said to show 4 th NS. strike, claimed to range 50′ to 100′ in width, carrying rgentiferous chalcopyrite and galena, said to give assays of copper, lead, silver and gold values. The mine, developed nent work, has several shallow shafts, and a tunnel, planned to at was 85′ long in 1909, and 200′ long in 1911

)PPER CO. **ARIZONA.**
succeeded by Rio Tonto Mining & Milling Co. Formerly at icopa Co., Ariz. Described Vol. VIII.

INING & MILLING CO. **ARIZONA.**
ied unclaimed from former office, Phœnix, Ariz. Mine office: icopa Co., Ariz. Chas. J. Fisher, president and treasurer. 910, as successor of Rio Tonto Copper Co. Lands, 10 claims, outh of and adjoining the White Cloud mine, in the Pichaco istrict, 14 miles east of Morristown, the nearest rail point. ed to show gossans 200′ to 300′ wide, traceable up to 700′ in res assaying 2 to 25% copper. Development is by a 46′ two- ft, planned to be sunk 500′. Equipment includes a 12-drill Was developing, with a small force, at last accounts.

)PPER CO. **MÉXICO.**
ied unclaimed from former office, Kansas City, Mo. Mine me, Mina, Chihuahua, Mex. Oliver Krull, manager, at last alization, $2,000,000. Lands are the San Carlos group, 20 game and circa 50 miles from Choix, having 2 shafts, one show- xed copper and lead sulphides, and the other a 2′ vein of copper ; 12 to 15% in tenor. Idle and apparently moribund.

LD & COPPER MINING CO. **CALIFORNIA.**
a bad egg, officers having been prominent state officials of erly at Fair Play, El Dorado Co., Cal. Described Vol. VIII.

PPER CO. **MÉXICO.**
ed unclaimed from former office, Bisbee, Ariz. Mine office: Huerta, Ures, Sonora, Mex. M. Newman, president; Dr. C. ident; L. A. Brown, second vice-president; Jesse Yoakum, Henkle, treasurer. Organized circa 1909, and apparently is nagement was changed, 1910. Lands, 1,185 acres, including Segundo group, showing some traces of antigua workings, n Antonio Copper Co. A dispute over the Arizona denounce- n the company's favor, December, 1909, but this property was , circa September, 1910, and the company apparently still is in Apparently very little work has been done. Presumably idle.

TD. **ITALY.**
ondon Wall, London, E. C., Eng. Mine office: Riparbella, Lord Teynham, chairman; preceding officer, Sir T. D. Pile, B. di Castell-Bianco and F. D. de Mallortie, directors; G. T. tary. Organized Dec. 31, 1907, under laws of Great Britain, per Mines, Ltd., and name changed, March, 1909, to present zation £300,000, shares £1 par; issued, £150,500, fully paid. es. No trace of operations secured. Idle and apparently

LE CONSOLIDATED GOLD **WYOMING.**
MILLING CO.
ne, Wyo. Mine office: Morgan, Carbon Co., Wyo. Dr. tary and treasurer. Presumably idle.

RISING SUN COPPER MINING & SMELTING CO. MARYLAND.

Dead. Formerly at Mt. Washington, Baltimore Co., Md.

RITO ALTO COPPER CO. COLORADO.

Dead. Formerly at Hillside, Frémont Co., Colo. Described Vol. VIII.

RIVER COPPER CO. MEXICO.

Office: 517 John St., Appleton, Wis. Mine office: San Antonio de la Huerta, Ures, Sonora, Mex. Capt. John R. Wood, general manager; Frank X. Pelber, superintendent. Property, in the vicinity of the San Antonio, and under the same general management, was developed slightly, 1910. Presumably idle.

RIVERSIDE COPPER CO. ARIZONA.

Dead. Formerly at Morristown, Maricopa Co., Aris. Described Vol. VI.

RIVERSIDE COPPER MINING CO., LTD. IDAHO.

Office: Wardner, Idaho. Letter returned unclaimed from former mine office, Cataldo, Kootenai Co., Idaho. Lands are about 10 miles from Cataldo. Idle several years and apparently moribund.

RIVERTON MINING & MILLING CO. WYOMING.

Mine office: Shoshoni, Frémont Co., Wyo. L. W. Peterson, manager, at last accounts. Lands are said to show an ore zone of circa 100′ width, on which little but exploratory work has been done. Presumably idle.

ROARING PORK MINING & MILLING CO. WYOMING.

Dead. Formerly at Rambler, Carbon Co., Wyo.

ROBERTA MINING & MILLING CO. IDAHO.

Letter returned unclaimed from former office, Butte, Mont. Mine office Gem, Shoshone Co., Idaho. Wm. Dyer, president; Jos. Lutey, Jr., vice-president; H. L. Tanner, secretary; W. C. Orton, treasurer; Thos. Roberts, manager; preceding officers, Curtis Lewis and Alex. Penaluna, directors. Lands, 12 claims patented, well timbered, on Nine Mile Creek, carrying 4 known veins. Development is by 3 short tunnels, lower, of 150′, planned to be driven 2,000′, to get back of 800′, to cut 4 veins, one of which shows, at surface, auriferous lead and copper carbonates, giving assays up to 6% copper, 10% lead, 16 oz. silver and gold per ton. Idle since circa 1908, and presumably moribund.

ROBERT EMMET COPPER CO. MONTANA.

Office: 30 Church St., New York, N. Y. Mine office: Amazon, Jefferson Co., Mont. Wm. Q. Ranft, president and general manager; Samuel Pratt, vice-president; John J. Schmitt, secretary and treasurer; E. L. Freeman, assistant secretary and treasurer; preceding officers, Jas. W. Cunningham, Isaac F. Lamars, John E. McArthur, Thos. C. Marshall, and Thos. H. Burke, directors; A. MacArthur, consulting engineer. Capitalization $3,000,000, shares $5 par.

Lands, 6 claims, patented, area circa 90 acres, carrying 3 veins, having generally NE. strike, developed by a 500′ shaft, showing 4′ of slightly auriferous copper ore of good grade on the 350′ level, and a 1,200′ tunnel having about 1,000′ of laterals, showing a main vein up to 12′ width, carrying auriferous and auriferous copper and lead ores, assaying up to 15% copper, 15% lead, 5 oz. silver and $2 gold per ton.

Equipment includes 10-drill air-compressor and a good electric plant, with station having 3 General Electric transformers, stepping down a 60,000-volt current, taken from the United Missouri River Power Co., the Robert Emmet company also furnishing power to adjoining operators. Idle since July, 1907.

ROBINSON MINING CO. NEVADA.

Mine office: Ely, White Pine Co., Nev. Capitalization $1,000,000, shares $1 par. Lands, 11 claims, area circa 138 acres, near the Giroux Consolidated, having a 40′ shaft showing ore said to give average assays of 3.42% copper, 3% lead, 7 oz. silver and 80 cents gold per ton. Idle several years and apparently moribund.

ROBLES GRANDE GOLD & COPPER MINING CO. NEVADA.

Dead. Formerly at [illegible] Nev. Described Vol. [illegible]

ROEBURNE COPPER & GOLD MINES, WESTERN AUSTRALIA, N. L. AUSTRALIA

Office: Sydney, N. S. W., Australia. Mine office: Roeburne, Western Australia. Organized circa January, 1907, with capitalization £40,000, shares 10s. par. Lands are the Carlow Castle group, leasehold, carrying 2 ore bodies, said to show considerable ore. Shipped, 1907, several small trial parcels of copper ore to New South Wales smelters, but, owing to fall in price of copper latter half of 1907, concentrated efforts on gold claims. Presumably idle.

ROGERS-ARIZONA MINING CO. ARIZONA

Office: Claypool Bldg., Indianapolis, Ind. Mine office: Cave Creek, Maricopa Co., Ariz. M. Z. Campbell, president; J. D Marlar, superintendent. Lands, in vicinity of Rogers Springs Mining Co., circa 30 miles north of Phœnix, show a vein carrying chalcocite, and development was under way, with a small force, at last accounts, 1910.

ROGERS COPPER & IRON CO. TENNESSEE

Dead. Formerly at Ducktown, Polk Co., Tenn. Described Vol. VI

ROGERS FREEHOLD COPPER MINES, LTD. AUSTRALIA

Office and mine: Townsville, Elphinstone Co., Queensland, Australia. Organized Aug. 31, 1907, under laws of Queensland, with capitalization £65,000, shares 10s. par. No trace of operations secured.

ROGERS MINING CO. COLORADO

Dead. Formerly at Pearl, Larimer Co., Colo. Described Vol. VI.

ROGERS SPRINGS MINING CO. ARIZONA

Letter returned unclaimed from former office, Detroit, Mich. Mine office: Cave Creek, Maricopa Co., Ariz. H. H. Udell, manager, at last accounts. Organized circa 1907, and is closely connected in management with the Rogers Springs Smelting Co., which planned building a smelter. Lands supposedly are 20 claims, 36 miles from Phœnix, the nearest rail point, said to carry auriferous copper ore, with gasoline power equipment. Presumably idle.

ROGERS SPRINGS SMELTING CO. ARIZONA

Office: Claypool Bldg., Indianapolis, Ind. Works office: Cave Creek, Maricopa Co., Ariz. Mount Campbell, fiscal agent. Is closely connected in ownership and management, with Rogers Springs Mining Co. Company planned building a 100-ton smelter, which was to have been in operation [illegible] 1909, but failed to materialize, the actual work of clearing a site having been started April, 1909, in which month the company was said to have [illegible] 30-ton furnace. The management planned using petroleum for fuel, converting crude oil into gas, and burning the latter, which was expected to give such intense heat that matting and conversion will be done in a single operation, [illegible] finished copper as a product, which seems entirely too much to have [illegible] Idle and presumably moribund.

ROGUE RIVER MINING & SMELTING CO. ORE[illegible]

Dead. Formerly at Grants Pass, Josephine Co., Ore. Described [illegible]

ROHR-GEDDES MINING & DEVELOPMENT CO. NEW ME[illegible]

[illegible] Raton, N. M. Letter returned unclaimed from former [illegible] Union Co., N. M. Fred Rohr, president; Robt. Vogl, vice-[illegible] L[illegible] treasurer; Frank A. Wall, secretary; J. E. Geddes, [illegible] [illegible] a few miles west of the Pittsburg Copper Co., [illegible] cook [illegible] having several pits and shafts of 15' to 40' [illegible] 267' [illegible] ore said to assay 22% copper, with small [illegible] silver [illegible] moribund.

RAFAEL R[illegible]

Office [illegible] Toconilla, Antofagasta, Chile. [illegible] includes Tres [illegible] vein traceable 140 meters [illegible] to depth of circa [illegible] about 200 metres [illegible] averaging circa [illegible] idle.

of which were born with weak constitutions, and presumably has inherited the family debility.

FUNDICIÓN EL ROMERO. **CHILE.**

Office and works: Los Vilos, Petorca, Aconcagua, Chile. Santiago Tagle H., owner and manager. Property includes lands in the vicinity of Caimanes. The smelter has a 10x20′ reverberatory furnace, burning wood, with a 20′ chimney, and employed, 1907, an average of 25 men, at average wages of 1.5 pesos daily. Ores smelted are mainly from the Reyes and adjoining mines. In 1907 the smelter treated 155 metric tons of 13.8% copper ore, yielding 36,196 kgs. of matte of 53.4% average copper tenor, with slags averaging 0.5% copper. Idle since 1907.

RONQUILLO COPPER CO. **MÉXICO.**

Office and mine: 2 Postoffice Bldg., La Cananea, Arizpe, Sonora, Mex. A. D. Nanney, president; G. C. Eastman, vice-president and superintendent, P. J. Tehaney, secretary. Organized Aug. 31, 1905, under laws of Arizona, with capitalization $1,000,000, shares $1 par, and holds property through the Ronquillo Mining Co., S. A., organized under the laws of México.

Lands, 72 hectares, well timbered, one-half mile from the Sonora River, 4 miles from Janoverachi, and 8 miles south of La Cananea. The Swansea group was sold, circa 1907. The Ronquillo mine has a vein up to 40′ in width, traceable nearly one mile, showing antigua workings, carrying cuprite, melaconite, and azurite near surface, with an iron-porphyry gangue. The mine is opened by a tunnel and 3 shafts. No. 1 shaft, 71′ deep, is said to be bottomed in a 40′ vein of 13% copper ore. No. 2 shaft, 32′ deep, gave ore assaying up to [illegible] copper. Both Nos. 1 and 2 shafts were abandoned by reason of soft ground. No. 3, a two-compartment shaft, circa 100′ deep, at last accounts, is sunk in country rock, water in the shaft being strongly impregnated with copper. Idle several years.

ROOIPUTS COPPER CO. **CAPE COLONY.**

Office: Johannesburg, Transvaal. Mine office: Upington, Gordonia, Cape Colony. Chas. A. O. Bain, chairman; preceding officer, G. H. Poole, Gustav Sonn and W. J. Holmes, directors; H. Sothcott, secretary. Organized August, 1908, under laws of Transvaal, with capitalization £6,000.

Lands are mining rights to the Farm Rooiputs, area 13,400 morgen, equivalent to circa 25,000 acres, adjoining the Areachap property on the north, held under option from June 30, 1908, at £1 per month for first year, and £3 per month for second year, with right to remove all ore at 2s. 6d. per ton, during term of the option, and privilege of purchasing the mineral rights on the Farm Rooiputs for £10,000 and 500 shares in any company floated. Diamonds are said to have been discovered on the farm, and it is supposed to carry the extension of the Areachap ore bodies. Presumably idle.

ROOSEVELT GOLD & COPPER MINING CO. **ARIZONA.**

Dead. [illegible] office was P. O. Box 477, Bisbee, Ariz. W. G. McDonald was president [illegible] manager. Lands, 15 miles from Ft. Thomas, had 60′ shaft, show[illegible] tachite, chalcocite and chalcopyrite, of good average assay value. [illegible] Ft. Thomas, Graham Co., Ariz.

ROOSEVELT G[illegible] & COPPER MINING CO. **MONTANA.**

Dead. Form[illegible] Bow Co., Mont. Described Vol. VII.

ROOSEVELT MI[illegible] CO. **CALIFORNIA.**

Office: Pasadena [illegible] San Bernardino Co., Cal. L. E. Porter, g[illegible] superintendent, at last accounts. Lands show ores of [illegible] a gasoline engine [illegible] compressor and a [illegible]

ROOT RIVER [illegible] **ONTARIO.**

Offi[illegible]

F. B. [illegible]

MINA ROSARIO. CHILE.

Mine office: Tamaya, Ovalle, Coquimbo, Chile, Is owned by the Fami... Lecaros. Mine, opened 1850, is 590 meters, in depth, and produced, 1866-18... ore to extent of 64,589 short tons, averaging 17.7 to 29.4% copper tenor. In... some years, owing to decreased ore values at depth, and heavy timbering charg... but, with a railroad to Tongoi, and modern equipment, probably could b... worked to advantage.

COMPAÑÍA MINERA ROSARIO. ARGENTINA.

Mine office: Calamuchita, Córdoba, Argentina. The mine has pyr... carrying chalcopyrite, with quartz gangue, averaging 5 to 6% copper. Has a smelter with a 36″ blast-furnace, that made matte averaging 65% copper and 30 oz. silver per ton, sent to Great Britain for reduction and refining, when the mine was working. Idle several years.

MINAS ROSARIO i PROVIDENCIA. CHILE.

Mine office: Chañarcillito, Caldera, Atacama, Chile. Mines show 2 par... allel ore bodies, averaging 8 to 10 meters width, in diorite and limestone, trac... able for some distance, one, showing oxidized ores of copper, associated with spathic iron, these averaging about 4% in tenor and requiring concentration. The second vein carries oxidized ores only, to depth opened, these averaging about 5% copper. Ores, which are free smelting, are sent to Tierra Amarilla for reduction. Production, 1903, was about 450 metric tons of ore, averaging 16% in tenor, equivalent to about 160,000 lbs. fine copper. Presumably idle.

ROSELLE MINING CO. BRITISH COLUMBIA.

Dead. Formerly at Centreville, Liard River division, Cassiar district, B. C. Described Vol. V.

ROSEMONT COPPER CO. ARIZONA.

Office: 11 Broadway, New York, N. Y. Mine office: Rosemont, Pima Co., Ariz. Is controlled by Adolph Lewisohn and Lewisohn Brothers. The mine is said to have considerable ore bodies, occurring under geological conditions similar to those at Bisbee. Idle some years.

ROSEWOOD CREEK COPPER & GOLD MINING CO., LTD. AUSTRALIA.

Dead. Was liquidated, voluntarily, 1908. Formerly at Rosewood, Denison Co., Queensland, Australia. Described Vol. VIII.

ROSSLAND-GREAT WESTERN MINES, LTD. BRITISH COLUMBIA.

Dead. Was reorganized, May 17, 1902, as Rossland-Kootenay Mining Co., Ltd. Formerly at Rossland, Trail district, B. C.

ROSSLAND-KOOTENAY MINING CO., LTD. BRITISH COLUMBIA.

Office: Salisbury House, London, E. C., Eng. Mine office: Rossland, Trail district, B. C. C. Williamson Milne, chairman; preceding officer, Dr. G. Shack-Sommer and Ernest E. Surridge, directors; Bedford McNeill, consulting engineer; F. A. Labouchere, secretary. Organized May 17, 1902, under laws of Great Britain, as a reconstruction of Rossland-Great Western Mines, Ltd., and Kootenay Mining Co., Ltd., with capitalization £150,000, shares £1 par; issued £148,607. Lands, 171 acres, carrying auriferous and argentiferous copper ores of low grade, also surface rights to 113 acres additional. The company also owns a quarter interest in the Nueva Chihuahua property, at Santa Eulalia, Itmo. Chihuahua, Mex. Idle since August, 1904.

ROSS MINING & MILLING CO. COLORADO.

Office: Ross Bldg., Waynesburg, Pa. Mine and works office: Silverton, San Juan Co., Colo. J. M. Mitchell, president; Frank L. Ross, secretary; E. Hamilton, treasurer; J. B. Ross, manager; Patrick Lonergan, mine superintendent, at last accounts. Organized Dec. 13, 1904, under laws of Colorado, with capitalization $2,500,000; shares $1 par, nonassessable. Had an indebtedness July 31, 1909, of $111,173, of which circa $100,000 was in the form of 6% bonds. Pittsburg Trust Co., registrar and transfer agent. Annual meeting, first Saturday in September.

soula Co., Mont. A. L. Thurston, president; A. E. Wayland, secretary. Capitalization $1,500,000, shares $1 par. Lands, 4 claims, 6½ miles from a railroad carrying an ore body without defined walls, opened by a 60′ shaft, showing ore giving assay values in lead, copper, silver and gold. Presumably idle.

ROUSE-GARDNER MINING CO. **COLORADO.**

Dead. Formerly at Central City, Gilpin Co., Colo. Described Vol. VI.

ROUTT COUNTY GOLD & COPPER MINING CO. **COLORADO.**

Dead. Formerly at Steamboat Springs, Routt Co., Colo. Described Vol. VIII.

ROWAN GOLD & COPPER MINING CO. **NORTH CAROLINA.**

Dead. Formerly at Gold Hill, Rowan Co., N. C. Described Vol. VI.

ROWLEY COPPER MINES CO. **ARIZONA.**

Office: Baxter Springs, Kans. Mine office: Gila Bend, Maricopa Co., Ariz. T. H. Goodwin, president; Mrs. Dora Rowley, vice-president; J. T. McRuer, secretary; J. O. Goodwin, treasurer. Organized July, 1909, under laws of Arizona, with capitalization $10,000,000, shares $1 par, and was selling stock at 5 cents per share, 1910, which was too high, in view of the large capitalization, especially as the property was bought for $20,000 cash, and $1,000,000 stock. Lands, 6 claims, unpatented, area 120 acres, circa 28 miles from Gila Bend, having a 150′ shaft, showing argentiferous and auriferous oxidized copper ores, claimed by the management to give average assays of $28.24 per ton.

ROYALBERG COPPER MINES, LTD. **NORWAY.**

Office: 18 Ropemaker St., London, E. C., Eng. Mine office: Fiskum, Kongsberg, Christiania, Norway. W. Jackson, H. O'Reilly and A. S. Plews, directors; E. T. Evans, secretary; E. C. Plews, manager and engineer; Ingw[illegible] Otterbeek, superintendent, at last accounts. Organized Apr. 24, 1903, under laws of Great Britain, with capitalization £40,000, increased December, 1904, to £100,000, shares £1 par; issued, £82,000, fully paid. Debentures, £8,500 at 5%, and £1,900 of 8% prior-lien debentures. For 21 months ending June 30, 1908, the operation showed a loss of £2,667, increasing the debit balance to £8,090.

Lands, 18 claims, area circa 50 acres, title by crown grant, also 20 acres timber lands, opened by shafts of 40′, 70′ and 100′ and tunnels of 120′ and 25[illegible] showing four 3′ fissure veins, in mica-schists, said to give average assays of 14[illegible] copper, 20% lead, 10% zinc and 24 oz. silver per ton, from sulphide ores, and estimated to show 30,000 tons of ore, with 15,000 tons blocked out for stoping. The West Norway railroad is 2 miles distant, and it was proposed to develop 1[illegible] h. p. from a nearby waterfall. There is a small concentrator at the mine, and small shipments of concentrates have been made to British works. Presumably idle.

ROYAL CONSOLIDATED COPPER CO. **NEVADA.**

Office: 1206 Fullerton Bldg., St. Louis, Mo. Mine office: Hawthorne, Esmeralda Co., Nev. L. L. Crisp, president and general manager; G. [illegible] Werth, vice-president; R. E. Drake, secretary and treasurer; B. H. [illegible] superintendent; preceding officers, Robt. W. Alt and Albert Lawson, [illegible] Organized Apr. 27, 1907, under laws of Arizona, with capitalization $2,[illegible] shares $1 par, nonassessable; issued, $1,434,477, Dec. 31, 1910. Bonds, $[illegible] authorized, at 7%; issued, $2,300, Dec. 31, 1910. Annual meeting, first Monday in April.

There are two companies of this title, one organized under the [illegible] Arizona, and the other under the laws of Nevada, the Arizona company [illegible] ently acting as a holding corporation, and the Nevada company as [illegible] company, the stock of latter apparently being owned by the Arizona [illegible]

Lands, 10 claims, 1 fractional, area circa 200 acres, 8 miles from [illegible] miles from Hawthorne, [illegible] and 10 miles from [illegible] cording to [illegible] expert explained [illegible]

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UT
...MILLING CO.
...from former office, Provo, Utah. Mine
...Franklin N. Millett, president; John H. Str
...Clifton, secretary and treasurer; preceding officers
...directors. Organized May, 1909, under
...$55,000, shares 5 cents par.
...unpatented, in the Clifton district, having a 4'
...showing argentiferous and auriferous copper ore
...copper and $7 to $60 gold per ton. Presumably idle.
MÉX
...MINING CO.
...Monroe St., Chicago, Ills. Letter returned unc
...La Poza, Ures, Sonora, Mex., with notation by
...in existence there. Wm. E. Jones, president
...Aguilar, vice-president; R. C. White, secre
...Ricardo P. Cubillas, assistant treasurer;
...at last accounts. Organized Nov. 26, 1906, under
...$5,000,000, shares $1 par. Chicago Ti
...meeting, first Monday in November.
...held in trust, at last accounts, by the vice-pres
...under laws of México. Lands show 4 fissure
...under development, traceable about 1½ miles
...8' in width, opened by shafts of 326', 150' and
...showing ore averaging about 2.2% copper
...silver and from a trace to $5 gold per ton
...occasional carbonates. Company estimates
...and 10,000 tons broken in the stopes. Prop
...intermittently thereafter by Mexican owners.
...good for 500' depth, and 10 mine buildings.
...concentrator. Idle and presumably mer
MÉX
...3o Piso 25, México, D. F. Mine
...Potosí, Mex. Julio Limantour, president;
...T. A. Verger, general manager, at last accounts.
...laws of México, with capitalization 250,000
...2 pesos 50 centavos per share. Lands, 64 h
...Todos Santos and Anexas de Todos Santos
...with about 200 metres of workings, showing
...and lead. Equipment includes gasoline
...at the shafts, and ore is shipped to the Ag
...when mine is operated.
WYOMI
...MINING CO.
...Carbon Co., Wyo. Described Vol.
ARIZO
...Co., Ariz. C. H. Ferry, managing dir
...The mine has a 200' shaft, with levels
...copper ore. Buildings include a lab

ROYAL MORELOS COPPER CO. MÉXICO

Dead. Was succeeded, 1908, by Occidental Copper Co. Formerly a Palomas, Bravos, Chihuahua, Mex. Fully described Vol. VIII.

ROYAL THARSIS MINING CO. TASMANIA

Dead. Lands were sold, for £13,347, to Mount Lyell Mining & Railway Co. Ltd. Formerly at North Mount Lyell, Montagu Co., Tasmania.

ROYAL VICTORIA MINING CO. BRITISH COLUMBIA

Dead. Formerly at Grand Forks, Boundary district, B. C. Described Vol. VIII.

ROY MINING & MILLING CO. UTAH

Letter returned unclaimed from former office, Provo, Utah. Mine office Ibapah, Tooele Co., Utah. Franklin N. Millett, president; John H. Stratton vice-president; Don C. Clayton, secretary and treasurer; preceding officers. Paul A. Millett and Walter Cox, directors. Organized May, 1909, under laws of Utah, with capitalization $55,000, shares 5 cents par.

Lands, 12 claims, unpatented, in the Clifton district, having a 4′ vein opened by a 25′ shaft, showing argentiferous and auriferous copper ore, giving assays of 1 to 17% copper and $7 to $60 gold per ton. Presumably idle.

RUBEÑA MINING CO. MÉXICO

Office: 1208-134 Monroe St., Chicago, Ills. Letter returned unclaimed from former mine office, La Poza, Ures, Sonora, Mex., with notation by postmaster that no such company is in existence there. Wm. E. Jones, president and general manager; Hon. Victor Aguilar, vice-president; R. C. White, secretary; E. J. White, treasurer; Hon. Ricardo P. Cubillas, assistant treasurer; H. F. Wiggin, superintendent, at last accounts. Organized Nov. 26, 1906, under laws of Arizona, with capitalization $5,000,000, shares $1 par. Chicago Title & Trust Co., registrar. Annual meeting, first Monday in November.

Lands, 140 acres, held in trust, at last accounts, by the vice-president pending protocolization under laws of México. Lands show 4 fissure veins in granite, of which 2, under development, traceable about 1½ miles on the company's land, range 30″ to 8′ in width, opened by shafts of 326′, 150′ and 100′ and by tunnels of 225′ and 30′, showing ore averaging about 2.2% copper, 8% lead, some zinc, 15 to 2,550 oz. silver and from a trace to $5 gold per ton, ore being mainly sulphides, with occasional carbonates. Company estimates 5,000 tons of ore on the dumps and 10,000 tons broken in the stopes. Property opened 1835, was worked intermittently thereafter by Mexican owners. Has steam power, with 6x8″ hoist good for 500′ depth, and 10 mine buildings. Company planned building a 100-ton concentrator. Idle and presumably moribund.

COMPAÑÍA MINERA RUBÍ. MÉXICO.

Office: Centro Mercantil, 3o Piso 25, México, D. F. Mine office Matehuala, Catorce, San Luis Potosí, Mex. Julio Limantour, president; Manuel Lomeli, secretary; T. A. Verger, general manager, at last accounts. Organized July 24, 1907, under laws of México, with capitalization 250,000 pesos, shares 50 pesos par; paid in, 2 pesos 50 centavos per share. Lands, 84 hectares, including the Rubí, Bonanza, Todos Santos and Anexas de Todos Santos groups, opened by two 75-metre shafts, with about 200 metres of workings, showing ore carrying gold, silver, copper and lead. Equipment includes gasoline hoist. Property is served by a railway at the shafts, and ore is shipped to the Aguascalientes smelter, 6 kilometers distant, when mine is operated.

RUBY COPPER & GOLD MINING CO. WYOMING.

Dead. Formerly at Encampment, Carbon Co., Wyo. Described Vol. VI.

RUBY GOLD & COPPER CO. ARIZONA

Mine office: Parker, Yuma Co., Ariz. C. H. Ferry, managing director; W. E. Balcolm, general manager. The mine has a 200′ shaft, with levels at 100′, 150′ and 200′, showing auriferous copper ore. Buildings include a laboratory and store.

of Kasaan. The property shows diorite, felsite, quartzite, calcite and chloritic schists, with occasional limestone, having a shear-zone of about 1' width, carrying 2 ore bodies with a generally EW. strike. The main ore body between greenstone and granitic rock, has been developed to maximum width of 45', for length of 200', and to depth of 100', the full length and depth of the ore body being unknown. Ore occurs as shoots of massive chalcopyrite, and as chalcopyrite impregnations in magnetite, with some pyrite and molybdenite, with gangue containing calcite and decomposed gangue rock. A shipment of 138 tons of selected ore, made February, 1911, to the Tacoma smelter, assayed 6.78% copper, 0.55 oz. silver and 0.165 oz. gold per ton, with an excess of iron. The mine is developed by 3 tunnels, longest 160', and by 3 shafts, deepest a 200' two-compartment shaft.

Equipment includes a small steam plant, with a hoist, and there are necessary mine buildings, and accommodations for 50 men. Ore is taken over a 3-mile private railway, of 42" gauge, equipped with a Porter locomotive and ore cars, to Venus Bay, where it is loaded on vessels or barges for shipment.

Work was suspended, late 1907, on account of the depression in the metal market, and was resumed July, 1910. About 20,000 tons of ore have been shipped, all from the first or 100' level, and development is in progress on the 2[illegible] level. Production for 1910 is estimated at 300,000 lbs. fine copper, with small gold and silver values. Property considered promising.

RUSSELL-BALL COPPER CO. ALASKA.

Dead. Lands, on Dryer Bay, Knight's Island, just across from the Bebbard-Elliott holdings, were said to have an 8' ore shoot, high up on the mountain. Development was planned for 1908, but the company came to grief. Formerly at Valdez, Alaska.

RUSSELL GULCH MINING & DEVELOPMENT CO. COLORADO.

Dead. Formerly at Russell Gulch, Gilpin Co., Colo.

RUSSELL UNITED COPPER CO. ARIZONA.

Dead. Property was sold, July 21, 1904, to Arizona Consolidated Mining Co. Formerly at Johnson, Cochise Co., Ariz.

RUTHBURG CONSOLIDATED COPPER CO. IDAHO.

Dead. Formerly at Weiser, Washington Co., Idaho. Described Vol. I.

RUTHERFORD COPPER MINING CO. TASMANIA.

Mine office: Burnie, Russell Co., Tasmania. Ore is said to average 7.5% in copper tenor. Idle several years.

RYE COPPER CO. ARIZONA.

Letter returned unclaimed from former mine office, Payson, Gila Co., Ariz. E. F. Eisenhour, president and general manager; Chas. T. Martin, secretary; H. S. Duncan, superintendent, at last accounts. Organized 1905, under laws of Arizona, with capitalization $1,000,000, shares $1 par.

Lands, 17 claims, area 340 acres, well timbered, with a good water-power, east of the Mazatzal Mountains, in a slightly explored district, 16 miles from Payson, circa 75 miles north of Globe, and about the same distance south of Flagstaff. Property shows diorite, with intrusive porphyry dikes, and has contact deposits carrying sulphide ores, associated with hematite, near surface. Development is by trenches, shafts, and a 325' tunnel planned to be driven [illegible], latter showing an ore body of about 6% average copper tenor. Idle since circa 1909.

RYE PATCH CONSOLIDATED MINES CO. NEVADA.

Office: 210 Judge Bldg., Salt Lake City, Utah. Mine office: Rye Patch, Humboldt Co., Nev. Clinton D. Ray, president; S. A. Greenwood, secretary, David W. Jeffs, general manager; preceding officers, Weston [illegible] and Hyrum Stewart, directors. Organized April, 1899, under laws of [illegible] with capitalization $250,000, shares 25 cents par, assessable. Lands, 2 claims patented, 14 miles from a railway, being an old mine that was worked [illegible]

SAGINAW VALLEY COPPER MINING CO. WYOMING

Dead. Lost lands, 1905. Formerly at Encampment, Carbon Co., Wy. Described Vol. V.

SAHUARIPA EXPLORATION CO. MÉXICO

Mine office: Sahuaripa, Sonora, Mex. Lands include the Esperitu San mine, 12 miles east of Sahuaripa, opened circa 1842, and closed in 1900, owi to striking water. This has a blanket vein of argentiferous and plumbifero tetrahedrite, carrying up to 250 oz. silver per ton. Idle some years.

ST. CROIX CONSOLIDATED COPPER CO. WISCONSIN

Office and mine: Superior, Douglas Co., Wis. Robt. Kelley, president Dr. A. S. Andrews, vice-president; W. W. Strickland, secretary; Ernest A. Ar nold, treasurer and managing director. Organized 1903, under laws of Wisco sin, with capitalization $1,500,000, shares $1 par, nonassessable. Lands, cov 15,000 acres, about 35 miles south of Lake Superior, on the St. Croix range Douglas county, Wisconsin, carrying the western extension of the Keweenaw copper belt of Lake Superior. Idle since organization, the corporation being land-holding company only, that has done no mining work, and plans none.

ST. DAVID'S GOLD & COPPER MINES, LTD. WALES

Dead. Was succeeded, July 21, 1903, by St. David's Gold Mines (1903) Ltd. Formerly at Barmouth, Merionethshire, Wales. Described Vol. III.

ST. DAVID'S GOLD MINES (1903), LTD. WALES

Office: 29 Cornhill, London, E. C., Eng. Mine office: Barmouth, Mer ionethshire, Wales. Godfrey C. Isaacs, chairman; E. T. McCarthy, consulting engineer; H. J. Nicholls, mine manager; James Junner, secretary. Organized July 21, 1903, under laws of Great Britain, as a reconstruction of St. David's Gold & Copper Mines, Ltd., with capitalization £60,000, shares 5s. par. Debentures, £40,000 authorized, at 6%; issued, £10,750. The old company paid dividends of 70%, and the present company paid one dividend of 3d. per share July 11, 1904, and Feb. 15, 1905. Accounts for 1908 showed debit balance increased from £21,567 to £28,787.

Lands, 800 acres, carrying gold and copper ores. Equipment includes 50 stamp mill, and an Elmore vacuum oil flotation plant.

ST. EUGENE CONSOLIDATED MINING CO., LTD. BRITISH COLUMBIA

Dead. Was merged, circa 1910, in Consolidated Mining & Smelting Co. of Canada, Ltd. Formerly at Moyie, East Kootenay, B. C. Described Vol. V.

ST. EUGENE MINE. BRITISH COLUMBIA

Owned by Consolidated Mining & Smelting Co. of Canada, Ltd., at Moyie East Kootenay district, B. C.

ST. GEORGE COPPER & COAL MINES, LTD. AUSTRALIA

Office: Brisbane, Queensland, Australia. Letter returned unclaimed from former mine office, Fairlight, Banks Co., Queensland, Australia. Organized 1906, under laws of Queensland, with capitalization £50,000. Lands include a prospecting area of 160 acres, 2 mineral leases of 20 acres each, and a coal prospecting area of 640 acres, the copper claims being on Little River, near Etheridge, in the Cook district, 31 miles from the Laura terminus of the Cook town railway. The property is said to show cinnabar also, and a little exploratory work is said to have given a promising showing. Idle.

ST. GEORGE COPPER MINING CO. UTAH

Office: Salt Lake City, Utah. Mine office: Ibapah, Tooele Co., Utah. Clarence K. McCornick, president; Grant C. Snyder, secretary and manager; B. L. Cutler, superintendent, at last accounts. Capitalization $400,000. Lands, near the Alice Consolidated Mining Co., in the Dugway Mountains, show a 4′ to 5′ vein, carrying ore giving assays of 4 to 40% copper. Mine developed by a main shaft of circa 250′ depth. Equipment includes gasoline power, and there is a small smelter.

Lands, 800 acres, being the S. ½ of Sec. 19 and W. ½ of Sec. 20, T. 56 N., R. 32 W. Property, lying next south of the Old Colony, east of the Laurium and southeast of the Calumet and Hecla, was opened 1844, as the New York & Michigan, under permit from the Federal War Department, and later became the Washington, changing that name eventually to the present title. In very early days a shaft showing some fine copper was sunk at the junction between the trap belt and the eastern sandstone. Idle many years, until 1910, when exploratory work was resumed, and was doing some diamond drilling, with encouraging results, early 1911.

ST. LOUIS COPPER MINING CO. **ARIZONA.**

Dead. Former office was 503 Security Bldg., St. Louis, Mo. Jas. W. Shaw was president; Silas Cook, vice-president; Geo. Hanlon, secretary; H. W. Herweek, treasurer; S. G. McWade, general manager. Organized circa 1906, and apparently did little or no work. Formerly at Duquesne, Santa Cruz Co., Ariz.

ST. LOUIS GOLD GULCH MINING CO. **NEW MEXICO.**

Mine office: Silver City, Grant Co., N. M. G. A. Easton, manager, at last accounts. Property shows gold and copper ores, and equipment includes a 50-ton concentrator. Presumably idle.

ST. LOUIS UNITED COPPER MINING CO. **NEW MEXICO.**

Dead. Formerly at Jarilla, Otero Co., N. M. Described Vol. VI.

ST. MARIE COPPER CO. **COLORADO.**

Dead. Was a swindle, perpetrated by John Reilly and W. W. Wilson, two notorious confidence men. Formerly at Leadville, Lake Co., Colo.

ST. MARY MINING CO. **UTAH.**

Office: 531 Atlas Block, Salt Lake City, Utah. Mine office: Milford, Beaver Co., Utah. Patrick Ryan, president, treasurer and general manager; H. Ev. Smith, vice-president; J. J. Kinney, secretary; Dennis W. Ryan, superintendent; D. P. Rohlfing, engineer; preceding officers are the directors. Organized November, 1908, under laws of Arizona, with capitalization $500,000, shares $1 par, assessable; issued, $440,000.

Lands, 4 claims, 3, of 30 acres area, being patented, near the Moscow and Red Warrior mines, on the eastern flank of Picacho Mountain, 4 miles from Milford, in the Star district. The property shows 5 contact veins between lime[illegible] and an igneous intrusive, carrying auriferous and argentiferous lead, copper [illegible] zinc ores, of which 2, under development, are estimated by the management [illegible] carry ore averaging 17% copper, 15 oz. silver and $2 gold per ton. A car[illegible] smelter shipment gave returns of 17.07% copper, 2.5% zinc, 10.5 oz. silver [illegible] $2.20 gold per ton. Development is by the 200′ Mars shaft and the 500′ [illegible] Mary tunnel. The mine, opened about 1870, was operated, in a small [illegible] until 1890, with considerable production.

Equipment includes a 35-h. p. hoist, good for 800′ depth, and a 4-drill [illegible] compressor. There are 4 buildings. Management plans deepening the sha[illegible]

ST. MARY'S CANAL MINERAL LAND CO. **MICHIGAN.**

Entire stock issue is held by St. Mary's Mineral Land Co.

ST. MARY'S COPPER CO. **MICHIGAN.**

Dead. Was organized March, 1863, under laws of Michigan, with capitalization $500,000, shares $25 par, and to Dec. 31, 1871, had levied assessments to about $100,000. Lands were 320 acres, being the N. ½ of Sec. 18, T. 55 N., R. 33 W., bought of St. Mary's Canal Mineral Land Co., lying between the Pontiac mine, now known as No. 8 shaft of the Quincy, and the Albany & [illegible] mine, now known as the Franklin Junior. The company was organized at the same time as the Pontiac and Mesnard, owing to the finding of a big [illegible] copper, taken from the Mesnard epidote bed, that was left by prehistoric miners. Some work was done, 1860–1864, on the Mesnard bed and a [illegible] shafts of 50′, 75′ and 100′ being sunk on the Mesnard epidote, [illegible] was secured. The company was wound up, circa 1890, and [illegible]

Equipment includes electric power and an 8-drill air-compressor, and the mine is connected with the mill by a 1½-mile tramway.

The 50-ton reduction plant, known as the Colorado mill, includes a concentrator and leaching plant, 76x119′ in size and 4 stories high. The leaching plant, idle for some years, is said to have effected an extraction of 77% of assay values, as against an extraction of 85% of assay values in the smelter.

The production of the Sedalia mine, under former ownership, was 5,406 tons of ore, averaging 5.21% copper, that yielded 563,513 lbs. fine copper in 1906, and was 4,209 tons of ore of 6.85% average copper tenor, equivalent to 576,696 lbs. fine copper in 1907. Owing to the reconstruction of this company, and to continued and repeated failures to make good, under the same management, the company is not regarded favorably.

SALIDA GOLD & COPPER MINING CO. COLORADO

Dead. Formerly at Salida, Chaffee Co., Colo. Described Vol. V.

SALIDO GOLD-COPPER CO. MEXICO

Office: 824–356 South Spring St., Los Angeles, Cal. Letter returned unclaimed from former mine office, Alamos, Sonora, Mex. Dr. Finis E. Yoakum, president and general manager; N. N. Dietz, secretary. Organized under laws of Arizona, with capitalization $3,000,000, shares $1 par. Apparently is a twin of Los Alamos Mining & Milling Co. Lands, 30 hectares in the Alamos district, said to show a 60′ vein. Stock of the company was "insured" and "guaranteed" hence, of necessity, proved worthless, as any stock that is either "guaranteed" or "insured" is dangerous, and one that is both "guaranteed" and "insured" may be considered practically hopeless. Idle and moribund.

SALISBURY COPPER CO. NORTH CAROLINA

Office: P. O. Box 33, Salisbury, N. C. Letter returned unclaimed from former mine office, Gold Hill, Rowan Co., N. C. T. B. Brown, president; W. S. Blackmer, secretary and treasurer; Richard Eames, Jr., general manager, at last accounts. Organized 1904, under laws of Arizona, with capitalization $100,000, shares $100 par.

Lands, 50 acres, freehold, on the line of the Southern railway, showing altered slate, carrying a fissure vein with NE. strike, formerly estimated at 15′ average width, but now estimated at 4′ width, developed by a 100′ shaft, showing chalcopyrite, formerly reported as giving average assays of 15% copper, 2 oz. silver and $5 gold per ton, but now reported to average 5% copper and $5 gold per ton. Idle several years and presumably moribund.

SALMON RIVER MINING CO. NEVADA

Office: 19 West Granite St., Butte, Mont. Mine office: Contact, Elko Co., Nev. Moses Jones, superintendent, at last accounts. Property has auriferous and argentiferous copper ore, and had gasoline power and a small smelter circa 1904. Idle some years and presumably moribund.

SALMON RIVER MINING & MILLING CO. WASHINGTON

Mine office: Conconully, Okanogan Co., Wash. Wm. McDaniel, manager, at last accounts. Lands, on Peacock Mountain, are said to give a fine showing of copper. Development by tunnel was planned. Presumably idle.

SALTDALEN OG STREMEN'S GRUBERSELSKAB. NORWAY

Mine office: Kaafjord, Tromsö, Norway. Property is sundry copper claims, under development, 1907. Presumably idle.

SALTESE CONSOLIDATED COPPER MINING & MILLING CO. MONTANA

Office: 107 Second St., Moscow, Idaho. Letter returned unclaimed from former mine office, Saltese, Missoula Co., Mont. Geo. E. Hughes, president; Wm. Daxon, vice-president and treasurer; Fred D. Willard, secretary; preceding officers, Chas. E. Merwin and J. E. Harrison, directors; W. J. Hughes, superintendent, at last accounts. Capitalization $1,500,000, shares $1 par, assessable.

Lewisohn, O. B. Van Sant, Andrew Sakes and J. E. Shoenberg, directors; Wm. ... Fisher, manager. Organized Oct. 10, 1906, under laws of Maine, with capitalization $2,200,000, shares $10 par. Debentures were $236,000, at 6%, payable out of net earnings, but apparently have been nearly all retired. Net profits were reported to have been circa $120,000, in 1907.

Lands, 108 claims, known as the Copper Mountain mine, at an elevation of 7,200′ above sea-level, in the Newfoundland district, and 100 acres within the limits of Salt Lake City. The company also held options, 1909–1910, on copper properties in the Seven Devils district of Idaho, but apparently withdrew from that field.

The Copper Mountain mine has a number of tunnels and shafts, the 1,300′ main tunnel having a back of about 400′, and a 500′ tunnel has been planned to be driven 1,200′, to give a back of circa 900′ and enter the sulphide zone, which apparently is hypothetical, rather than assured. The mine has upwards of 2 miles of workings, and experienced some trouble, 1909, from caving ground. The mine was estimated, 1908, to have in sight and blocked out, 75,306 tons of copper ore, of 1.1% average tenor, which cannot be considered as commercial ore; 27,960 tons of 3.13% copper ore, which is dangerously low, under the circumstances, and 138,370 tons of ore of 7.2% copper tenor, which is high-grade ore that should prove profitable. Ore shipped, apparently all oxidized, has averaged about 7% copper tenor.

Equipment includes a small gasoline power plant, and the mine has an aerial tram to shipping bins. Production was circa 24,000 tons of ore, shipped to Salt Lake smelters, yielding 2,234,446 lbs. fine copper, in 1907. A little copper ore was shipped during the first half of 1910, and, November, 1910, the mine was shipping daily about 150 tons of 56% iron ore, for fluxing, to the Murray smelter, this apparently having no copper values. Property considered promising.

SALT LAKE & ELY COPPER CO. NEVADA.

Dead. Formerly at Ely, White Pine Co., Nev. Described Vol. VIII.

SALT LAKE MINING & MILLING CO. UTAH.

Letter returned unclaimed from former office, Provo, Utah. Mine office, Callao, Juab Co., Utah. W. B. Hughes, president; D. B. Hughes, secretary and treasurer. Organized 1907, with capitalization $100,000, shares 10 cents par. Lands are in the Detroit district. Idle several years and apparently moribund.

SALUDA COPPER MINING CO. SOUTH CAROLINA.

Office: Lynchburg, Va. Letter returned unclaimed from former mine office, Donalds, Abbeville Co., S. C. Frank P. Harman, president; J. P. Smith, vice-president; John F. McGee, secretary, treasurer and general manager; preceding officers, P. K. McCully, Sr., J. M. McConnell, Thos. Atten and G. G. Ould, directors. Organized under laws of South Carolina, with capitalization $50,000. Lands, about a mile from Donalds, were prospected, to some extent, by individuals, before organization of the company. Development is by temporary shafts, showing sulphide copper ore carrying small quantities of gold. It is claimed that the average of 10 assays was 40% copper, which seems doubtful unless samples were selected with great care. Company planned shipping ore to Ducktown, Tennessee, and building a smelter, but failed in both plans. Idle and presumably moribund.

COMPAÑÍA MINERA SALVADÓRA DEL HUANACO DE TALTAL. CHILE.

Office: Iquique, Chile. Mine office: Taltal, Antofagasta, Chile. Organized March 17, 1905, under laws of Chile, with capitalization £12,000, shares £5 par. Presumably idle.

SAMPO MINING & DEVELOPMENT CO. FINLAND.

Dead. Was succeeded, December, 1906, by Finnish-American Mining Co. Formerly at Kisko, Åbo, Finland and Joensuu, Kupio, Finland. Fully described Vol. VI.

NG CO. **UTAH.**

Bingham Canyon, Salt Lake Co., Utah. Is controlled by the Co., through a stock ownership, secured March, 1903, by a predmpany, and, to all practical intents and purposes, is a part of ies Co., under which title the property is described.

NERA DE SAN ACASIO y ANEXAS. **MÉXICO.**

San Juan de Guadalupe, Durango, Mex. Property includes and Tres Rosas mines, carrying gold and copper ores. Has

USTIN. **CHILE.**

Los Bronces, Los Condes, Santiago, Chile. Mine, opened neters, has irregular workings, owing to ore bodies being conand faulted, but the ore developed is of good tenor. The dump metric tons of 5% ore, valueless at present, but of a sort highly icentration. The mine has no machinery plant, and uses mules i, employing about 70 men. Ore production, sold to the Maihe Compañía Esplotadora de Lota i Coronel, aggregated 2,913 ected ore, of circa 24% average copper tenor, 1908-1909, yieldabout 800,000 lbs. fine copper yearly, 1908 and 1909.

NERA DE SAN ANTONIO. **MÉXICO.**

ierly at La Cruz, Centro, Tamaulipas, Mex. Described Vol. VI.

ARIZONA MINING CO. **ARIZONA.**

ied unclaimed from former office, San Antonio, Tex. Mine a, Santa Cruz Co., Ariz. Wm. Kemp, president; T. E. Mumme, . E. Bethell, secretary; E. E. Bethell, treasurer and general Harrison, superintendent. Lands, near the Salero mine, carry ins, a 20′ pit showing a 3′ vein of argentiferous lead and copper ift, in a vein up to 30′ width, shows ore said to average 10% lead per ton. Was developing, with a small force, at last accounts.

COPPER CO. **MÉXICO.**

Mountain, Mich. Mine office: San Antonio de la Huerta, x. Otto C. Davidson, president; Dr. J. A. Crowell, vice-presiele, secretary and treasurer; preceding officers, Col. Louis W. o Sebenius, C. D. Fraser, D. M. Clemson, Hon. Richard C. Kingsford and John R. Wood, directors; Hugh F. Ellard, super-

Barling, assistant superintendent and engineer. Organized der laws of Arizona, with capitalization $2,500,000, shares $10),000, in $1,000,000 full paid and $500,000 part paid stock, a $1 ; been levied, Sept. 15, 1910, on the latter. Direct title is held ntonio Copper Co., S. A., organized Apr. 12, 1908, under laws ll stock owned by this company. Statement for 10 months 1910, gave disbursements of $117,985.85, with a cash balance 0.85, and the company apparently was without liabilities.

ips, area circa 2,000 acres, about 3 miles from San Antonio de e Yaqui River, and company is said to have about 7,500 acres he property was worked, 1862, in a small way.

mineralized zone of circa 200′ to 500′ width, developed by 20 nine had 11,761′ of workings March 31, 1910, and a year later ress, to have nearly 30,000′ of workings. Ore includes high-arbonates, with sulphides of good average tenor, there being antity of chalcocite, giving assays up to 11% copper. Mr. bridge estimated, March 4, 1910, that the San Antonio had ane, 300,000 tons of ore, figured conservatively, averaging 7% low values in the precious metals, and that the newer tunnels s tonnage five-fold. A survey was made, December, 1910, for be driven 4,400′, to give a back of circa 1,200′, and to be

equipped with double tracks, as a main haulage avenue. About 200 men are employed. Railway connections were secured, 1910, and the management plans an 11,000′ tramline, to connect with the railway and a smelter-site about 2½ miles from the portal of No. 20 tunnel. Property considered promising and management good.

SAN ANTONIO MINING CO. COLORADO.

Office: 312 Century Bldg., Denver, Colo. Mine office: Red Mountain, Ouray Co., Colo. Employs circa 25 men. M. T. Chestnut, president and general manager; Otto Koehler, vice-president; Wm. L. Stephens, secretary and treasurer; preceding officers, E. B. Morgan, Wilbur M. Warnock, Fred Cold. A. W. Crawford and J. H. Kinnerman, directors; John F. Roper, mine superintendent, at last accounts. Organized Feb. 5, 1908, under laws of Colorado, with capitalization $500,000, shares $1 par. Annual meeting, last Tuesday in February.

Lands, 30 claims, area circa 200 acres, a 20-acre millsite and 10 acres miscellaneous lands, one mile from a railway, in the Red Mountain district of Ouray and San Juan counties. Property, including the Carbon Lake mine, shows porphyry, carrying several ore bodies, estimated at 20′ to 30′ width, said to be traceable more than 3,000′, reported by the company to carry enargite averaging 12% copper, 10% lead, 10 oz. silver and $3 gold per ton, which estimate is considered high. Development is by shafts of 37′ and 200′, the Camp Robber tunnel of 625′, and the Koehler tunnel of 2,800′, with a back of about 500′.

Equipment includes a 5-drill air-compressor and there also are 10 mine buildings and dwellings. The mine was said to be shipping about one carload of ore daily, at last accounts, August, 1910.

SAN ANTONIO MINING & EXPLORATION CO. MÉXICO.

Mine office: Tapalpa, Sayula, Jalisco, Mex. John P. Johnson, president; José Gonzalez Brizuela, secretary; B. S. Dewey, treasurer. Has surface ores assaying 6% copper, 750 grams silver and 15 grams gold per metric ton. Presumably idle.

SAN BALTAZAR COPPER CO. MÉXICO.

Dead. Formerly at Tlacolula, Matamoros, Oaxaca, Mex. Fully described Vol. VIII.

SOCIEDAD MINERA SAN BÁRTOLO. CHILE.

Office: Calle de Compañía 1213, Santiago de Chile. Mine office: San Bártolo, Calama, Antofagasta, Chile. Luis Claro Solar, chairman; Guillermo Subercaseaux, vice-chairman; José Luis Santa María, secretary; remaining officers and Carlos Larrain Claro, directors. Organized Aug. 8, 1905, under laws of Chile, with capitalization £120,000, shares £1 par.

Lands show 5 sandstone beds, carrying disseminated native copper. Equipment includes a 200-ton mill of modern design, built 1908, equipped with 2 crushers, 3 Chilian mills, 2 sets of rolls, 2 jigs and 12 Wilfley tables. Property considered promising. Idle, company's funds having given out.

SAN BARTOLO COPPER MINES, LTD. CHILE.

Dead. Was liquidated, voluntarily, 1903. Formerly at Gatico, Antofagasta, Chile.

COMPAÑÍA MINERA SAN BERNABE y ANEXAS. MÉXICO.

Office and mine: Zacatecas, Zacatecas, Mex. C. A. Bentley, manager, at last accounts. Lands, 25 hectares, including La Confianza, El Faro and La Fama mines, west of the Malanoche mine. Lands include the oldest mine in Zacatecas, discovered circa A. D. 1546, which was a considerable producer of silver in olden days. Property formerly was under option to an English company, but option was dropped after unwatering the old shaft. Ore is argentiferous copper, associated with some lead, values being mainly in silver. Made small shipments, 1909, of argentiferous lead and copper ores.

)INO GOLD, COPPER & LIME CO. **CALIFORNIA.**
merly at San Bernardino, San Bernardino Co., Cal. Described

)INO MINING CO. **MÉXICO.**
nerly at La Cananea, Arizpe, Sonora, Mex. Described Vol. VIII.
)INO MINING & MILLING CO. **ARIZONA.**
merly at Douglas, Cochise Co., Ariz. Fully described Vol. VII.
)O MINING CO. **MÉXICO.**
Merchants Loan & Trust Bldg., Chicago, Ills. Mine office:
, Sonora, Mex. Property is the Mexican incorporation of the
Development Co., and is controlled by the Sonora Central

UNO. **SPAIN.**
Paimogo, Huelva, Spain. Lands adjoin the Sociedad Anonima
Paimogo. Mine, supposedly bottomed, is not a producer, but
arently might be followed. Idle several years.
)LIDATED MINING CO. **IDAHO.**
nerly at Priest River, Kootenai Co., Idaho. Described Vol. VIII.
NO MINING & SMELTING CO. **ARIZONA.**
merly at Calabasas, Santa Cruz Co., Ariz. Described Vol. VIII.
COPPER CO. **ARIZONA.**
ds were sold to Saddle Mountain Mining Co. Formerly at
Co., Ariz.
COPPER CO. **MÉXICO.**
7-25 Broad St., New York, N. Y. Mine office: Linares, Sexto,
x. Works office: San José, Centro, Tamaulipas, Mex. W. H.
ident; S. H. Steele, secretary and treasurer; Robt. K. Painter,
. Burne, superintendent. Organized 1896, under laws of New
alization $100,000, shares $1 par.
ca 6 square miles of mining concessions, and 6,400 acres of timber
n Carlos district of Tamaulipas, the mineral lands including
Vegonia and Los Remedios mines, having contact deposits
ie and porphyry, carrying oxidized and sulphide copper ores,
, developed by upwards of 50 shafts, and by 7 miles of tunnels,
igs of about 10 miles. Transportation is by a 38-mile private
as the Ferrocarril Linares al Golfo, connecting with the Gulf
exican Central line, which handles the company's own traffic
itisfactory general business. The mine was closed down March,
bout 500 men, but is said to have been leased, circa November,
Burne.
)EVELOPMENT CO. **ARIZONA.**
nerly at Globe, Gila Co., Ariz. Described Vol. VIII.
MINING CO. **MÉXICO.**
Broadway, New York, N. Y. Mine office: Ures, Sonora, Mex.
president; F. Willard Carlisle, secretary and treasurer; Geo.
ngineer. Capitalization $500,000, shares $1 par. Company
1909, to reorganize under proposed title of Sonora United
69 acres, including various groups. San Carlos No. 1, area 10
rlos No. 2, adjoining, area 50 acres, are 9 miles south of Matape,
heast of the terminal of the Torres y Prieta railroad, connect-
thern Pacific. The San Carlos group shows good outcrops
eins carrying rich ore. La Paloma group, area 25 acres, 8 miles
a 50' shaft, showing ore assaying 13% copper. A 15-ton mill
ril, 1908, on San Carlos No. 1. Idle.
L COPPER CO. **NEW MEXICO.**
-116 Broad St., New York, N. Y. Mine office: Arroyo Seco,

Taos Co., N. M. Richard Hopkins, president; B. F. Shakespeare, secretary; J. K. Turner, manager; Geo. Oates, superintendent, at last accounts. Organized circa 1901, as successor of Rio Hondo Copper Mining Co. Lands, 1,[illegible] acres, with water-rights and a railroad franchise. The mine has an 80′ ore body, carrying copper, gold, silver and lead, opened by a 1,000′ tunnel. Company was said to have bought the Hawkeye group, near Amizett, Taos Co., N. M. Original development was for copper, but later operations have been confined to developing a big ledge of gold-bearing quartz. Equipment includes a 10-stamp mill and 25-ton cyanide plant, and there is said to be a small smelter.

SAN CRISTOBAL MINING CO. SANTO DOMINGO.

Office: 807 Baily Bldg., Philadelphia, Pa. Mine office: San Cristobal, Santo Domingo. I. B. Thorn, president; F. M. Justice, vice-president; Walter Smedley, secretary and treasurer; Dr. E. Fahrig, consulting engineer; preceding officers, A. R. Justice, J. P. Moore, H. B. Wall, E. J. Hedden and W. E. Jackson, directors. Organized May 12, 1909, under laws of Arizona, with capitalization $2,325,000, shares $100 par, nonassessable; issued, $1,500,000. Bonds are prohibited by the charter. Logan Trust Co., Philadelphia, registrar and transfer agent. Annual meeting, first Wednesday in June.

Lands are upwards of 250,000 acres, freehold, mainly timbered, in the San Francisco district. The San Francisco Hills mine, near San Cristobal, sold early 1910, to the Blanton Copper Mining Syndicate, is said by E. A. Blanton, Jr., to show a body of chalcopyrite of 500′ width, carrying 5 to 20% copper and $[illegible] $12.50 gold per ton, but obviously these figures are much too high for anything like an average for an ore body of 500′ width. The present management reports that its property carries malachite and azurite in the surface zone, succeeded by chalcopyrite and bornite at depth, all ores being estimated to average 3.5 to [illegible]% copper, 2 oz. silver and $2 gold per ton. Smelter shipments of 138 tons of [illegible] selected ore returned $24.44 copper values, and $12 gold per ton.

The former owners of this property reported that a 42″ gauge railway was under construction early 1906, but the present management reported Feb. 1, 1911, that construction of this line had just begun. The company owns a share interest in the Blanton Copper Mining Syndicate, which company holds its property subject to a $75,000 cash payment Oct. 6, 1911, and this company is doing no work.

COMPAÑÍA MINERA SAN DIEGO. MÉXICO.

Dead. Formerly at Parras de la Fuente, Parras, Coahuila, Mex.

SAN DOMINGO GOLD & COPPER CO. ARIZONA.

Dead. Was merged, circa 1903, in Picacho Blanco Mining Co. Formerly at Morristown, Maricopa Co., Ariz.

MINA SAN DOMINGOS. PORTUGAL.

Owned by Mason & Barry, Ltd.

SAN FELIPE MINING CO. MÉXICO.

Office: Philadelphia, Pa. Mine office: Hostotipaquillo, Ahualulco, Jalisco, Mex. Col. N. Z. Seitz, president and general manager; Geo. F. [illegible], superintendent, at last accounts. Organized 1902, under laws of Arizona, with capitalization $1,000,000, shares $1 par. Development is by a tunnel, planned to be driven 3,000′, to cut the San Felipe veins, at depths of 1,600′ and 2,[illegible], which tunnel apparently died in its infancy. The property includes a mill claimed to be 50 tons daily capacity, which the company claimed to be remodeling. The company paid dividends from stock sales, and is considered a [illegible] bit of stockjobbery. Idle and presumably mo[illegible]

MINA SAN FERNANDO. MÉXICO.

Office: San Fernando, Tamazula, Du[illegible], Coahuila, manager, at last accounts. Property inclu[illegible] auriferous and argentiferous copper ores, equip[illegible] a 100-ton concentrator, and a 40-ton smelt[illegible]

'ernando Copper Mining Co., and it is generally understood as effectively scrammed, before abandonment. Production ne copper, 1903. Mine was closed down circa 1905, but appared amount of work has been done, within the past 2 years.

NERA DE SAN FERNANDO. **MÉXICO.**

Zimatlán, Oaxaca, Mex. Muñoz Gomez, manager, at last uriferous copper and argentiferous lead ores, employing circa resumably idle.

O COPPER MINING & SMELTING CO. **MÉXICO.**

nerly at Ensenada, Norte, Baja California, Mex. Described

)MINA INDUSTRIAL DE MINAS DE COBRE **CUBA.**
ANDO y SANTA ROSA.

nerly at Santa Clara, Cuba. Described Vol. VIII.

MINERA SAN FRANCISCO y ANEXAS. **MÉXICO.**

nerly at Asientos, Ocampo, Aguascalientes, Mex.

:O DEL ORO MINES, LTD. **MÉXICO.**

reorganized Oct. 21, 1908, as San Francisco del Oro Mining rly at Parral, Hidalgo, Chihuahua, Mex. Described Vol. VIII.

:O DEL ORO MINING CO., LTD. **MÉXICO.**

London Wall, London, E. C., Eng. Mine office: Parral, ıua, Mex. Earl of Denbigh, chairman; preceding officer, Hon. hcote, H. G. Ricardo, Stanley E. Clay, E. W. Janson, and W. ectors; Harold A. Searle, secretary; W. S. Harrison, manager. 1, 1908, under laws of Great Britain, as a reconstruction of San ro Mines, Ltd., with capitalizaton £375,000, shares £1 par; Shareholders of the old company were given new stock, credited . full paid £1 stock, and a final call of 1s. was payable September, res, £50,000 authorized, at 7%, repayable at par, on or before ıssued, £33,000.

acres, 14 miles southwest of Parral, carrying silver, lead, copper, ues, in about the order named. Ore reserves were claimed, 1907, 300,000 long tons, averaging 12% lead, 23% zinc and 26 oz. th variable copper values, ore being difficult of reduction. Ship- to nearby smelters, and the old company claimed to have earned ling £22,000 in the first 18 months of operation, but apparently ıt continue. Production, by the old company, was 7,294 metric zing 187,736 pesos, in 1907.

apparently under construction, early 1911, includes a central ation, and a railway connecting the mine with a mill that was s in 1907, when said to be under construction, and was rated, 0 tons, and was still under construction.

:O MINING CO. **MÉXICO.**

Autlán, Jalisco, Mex. L. E. Fuller, president, at last ac- ed 1905. No trace of operations secured. Presumably mori-

:O MINING CO. **MÉXICO.**

bee, Ariz. Mine office: San Felipe, Arizpe, Sonora, Mex. J. e-president and general manager; H. M. Whitney, President; ecretary; W. E. Tester, assistant secretary; J. W. Wood, treas- superintendent, at last accounts. Organized Oct. 23, 1905, izona [illegible] capitalization $60,000, shares $10 par. Lands, 16 [illegible] of adjacent lands, mainly idle.

SANGASHO MINE. JAPAN

Mine office: Sangasho-mura, Nishi-Usuki-gori, Hyuga, Japan. Mine has no power equipment. Production was 72,964 lbs. fine copper, 1907, with no later production reported. Presumably idle.

SAN JAVIER COPPER CO. MÉXICO.

Office: 800–189 La Salle St., Chicago, Ills. Mine office: San Javier, Hermosillo, Sonora, Mex. Jacob J. Smith, president; Chas. F. Sollars, vice-president; Chesley R. Perry, secretary; W. Schellinger, mine manager, at last accounts. Organized April, 1907, under laws of South Dakota, with capitalization $5,000,000, shares $1 par, and is incorporated under laws of México, with same title. Lands are said to be 3 groups, claimed to carry high grade argentiferous copper ore. This company, in its advertisements, October, 1907, promised a dividend within 6 months, which was not paid, and is considered a swindle. Idle and presumably moribund.

MINA SAN JOSÉ. CHILE

Office and mine: Tamaya, Ovalle, Coquimbo, Chile. Silva i Rivas, owners. Mine, opened 1844, is 517′ deep. Idle some years.

SAN JOSÉ CONSOLIDATED MINING CO. MÉXICO.

Dead. Formerly at Nacozari, Moctezuma, Sonora, Mex. Described Vol. VIII.

SAN JOSÉ MINING CO. CUBA

Dead. Was succeeded, circa 1902, by El Cobre Mines. Formerly at El Cobre, Santiago de Cuba.

MINAS SAN JOSÉ y OTRAS. SALVADOR

Office and mines: Melapán, Santa Ana, Salvador. Luna Herman[illegible] owners and managers. Properties carry auriferous and argentiferous copper ores. Equipment includes steam power and a small and antiquated smelter.

MINA SAN JUAN. SPAIN

Mine office: Paimogo, Huelva, Spain. D. José De Soto, manager, at last accounts. Lands, 102 hectares, including 4 old mines. Idle several years.

COMPAÑÍA MINERA SAN JUAN. MÉXICO

Mine office: Muleje, Sur, Baja California, Mex. Idle several years.

SOCIEDAD MINERA SAN JUAN. CHILE

Office: 55 Calle Prat, Valparaiso, Chile. Mine office: Higuera, La Serena, Coquimbo, Chile. Guillermo Lyon, president; José María M[illegible], managing director; preceding officers, E. A. Sandiford, Ruperto Alvarez and Cirilo Armstrong, directors; Miguel Scantlebury, general manager; R[illegible] Spargoe, mine superintendent; Ricardo Everett, smelter superintendent. Organized Feb. 17, 1906, under laws of Chile, with capitalization 1,000,000 pesos in 300,000 pesos preferred and 700,000 pesos common shares, par 20 pesos, [illegible] pesos paid in. Semi-annual meeting, March and September.

Lands, 66 hectares and a 9-hectare millsite, known as Ají é Anexas, at [illegible] Casas. The property shows syenite and diorite, carrying 8 strong parallel [illegible] having an EW. strike, with dip of 60°, and widths of 5′ to 10′, the main [illegible] about 2 meters average width, carrying sulphide ore of 6 to 7% copper [illegible] The mines were estimated, 1907, to have about 20,000 tons of ore blocked [illegible] stoping, and 220 meters of new workings were made, 1908. The mine is developed by the following shafts: Las Casas of 70′; Ají of 500′; Aguilas of [illegible] sario of 300′; Cocinera of 240′; Capriciosa of 700′; San Juan of 1,200′; [illegible] 200′; San Pablo of 600′. About 4,500 metric tons of 4% copper ore are [illegible] dump. The mines were opened 1820, and have been in continuous [illegible] since, being among the oldest copper producers of Chile.

Equipment includes a 100 h. p. power plant, with 6 hoists, said to be [illegible] 1,000′ depth each, and a Siemens & Halske generator for lighting, and [illegible] electric drills. Buildings include a 100x100′ machine-shop, 30x30′ [illegible] and a 30x30′ smithy, all of wood, and there are about 30 dwellings for [illegible]

2 smelters, having a combined capacity of 230 metric tons daily.
uan smelter, connected with Las Casas mine by a 1,069-meter
; five 16-ton reverberatory furnaces, and 12 kiln calciners.
) Porvenir smelter, at Higuera, in the valley about a mile below
ing ore therefrom in carts, has a 120-ton rectangular blast furnace,
nous coal costing 30 pesos per metric ton. Product is matte of
rage copper tenor, sent to the Guayacán smelter for conversion,
ping port being Totoralillo, 19 kilometers distant, with carriage
8 pesos per metric ton for the transportation of matte.
e company employed 80 men at the mines, at average wages of 2
and 3 pesos underground, and 45 men at the smelter, at average
os daily. Average cost of mining is about 3 pesos per long ton,
; 10 pesos per ton, ores treated averaging 8% copper. In 1908
venir smelter treated 7,474 metric tons of ore, assaying 7.56%
; 1,096 metric tons of Australian coal, and securing 1,005 metric
pper matte, with slags assaying 0.5%. The mine production
c tons of 7.2% copper ore, 1908. Production was circa 1,750,000
in 1907, and 1,063,499 lbs. in 1908.

UTISTA MINING CO. **MÉXICO.**

3 Ouray Bldg., Washington, D. C. Mine office: Moctezuma,
Dr. F. S. Chamberlain, president; A. G. Drake, secretary and
Carter, treasurer; Geo. F. Woodward, general manager; Wm. M.
ndent, at last accounts. Organized March, 1906, under laws of
apitalization $5,000,000, shares $10 par.
laims, on El Cerro Rosario, including antiguas showing large slag
ng from ancient smelting operations. Property carries a mineral-
a 1,000′ claimed width, traceable about 1,500′, between limestone
Development is by a 2-compartment 100′ shaft on the Rosario
ts of 50′ and 126′ on other claims. La Bronzosa mine carries
anite and chalcopyrite, associated with pyrite, and La Cobriza
how 30′ of ore carrying highly argentiferous cuprite. Property
ve yielded ores assaying up to $300 gold per ton. Idle.

AN DE MALAJA. **CUBA.**

: Santa Clara, Santa Clara, Cuba. Lands, 6 miles northeast
showing a 100′ gossan, are but slightly developed. Long idle.

NES CO. **MÉXICO.**

7 Equitable Bldg., Denver, Colo. Mine office: San Javier, Her-
Mex. J. F. Williams, superintendent, at last accounts. Ores
r and copper values.

NING CO. **COLORADO.**

. Perkins was manager. Mine, developed by shaft, had auriferous copper ore, and was equipped with steam power, employ-
n, 1903. Formerly at Central City, Gilpin Co., Colo.

ELTING & REFINING CO. COLORADO.

perty was sold by the sheriff, circa October, 1909, partly to the Milling Co., and partly to the Henrietta Mining & Milling Co.
erton, San Juan Co., Colo. Fully described Vol. VIII.

MINES CO. NEW MEXICO.

7 Hennepin Ave., Minneapolis, Minn. Mine office: San Pe-
., N. M. R. C. Thompson, president; Dr. Edw. Gorgen, vice-
Hemen, secretary; Clarence R. Thompson, treasurer; Geo. W.
l manager; Jos. Stuart, superintendent; preceding officers, J. D.
re, and A. M. Churchill, directors; T. F. James, engineer. Or-
1904, under laws of New Mexico, with capitalization $2,000,000,
assessable; issued, $1,500,000. Annual meeting, second Tues-

Lands, 10 claims, unpatented, area 200 acres, showing a contact deposit between syenite and limestone, of 3′ estimated average width, with NS. strike and dip of 15° to 25°, carrying copper carbonates and chalcopyrite, estimated by the management to average 3 to 12% copper, without lead or zinc, 15 oz. silver and $2 to $6 gold per ton. Lands are in 3 groups, 2 miles from San Pedro adjoining the Santa Fé Gold & Copper Mining Co. Development is by a 40° incline shaft, and tunnels of 300′, 350′, 200′ and 450′, estimated to show 1,000 tons of ore.

Equipment includes a small steam plant, and there is a 20-ton concentrator having Dodge crushers, a Huntington mill and 1 Wilfley table. Idle, but management plans boring 10 diamond drill holes, 1911.

SAN LUCAS COPPER CO. MÉXICO.

Mine office: Choix, Fuerte, Sinaloa, Mex. Is controlled, through ownership of entire stock issue, by El Magistral Copper Co.

COMPAÑÍA MINERA SAN LUIS. MÉXICO.

Dead. Formerly at Tepezalá, Ocampo, Aguascalientes, Mex.

SAN LUIS MINING CO. MÉXICO

Office: 1104–27 William St., New York, N. Y. Mine office: Gabino, Durango, Mex. John G. Gibbons, president; W. J. Robinson, vice-president; Myra B. Martin, secretary and treasurer; Col. Britton Davis, managing director; preceding officers, Seymour W. Tulloch, Angel L. Negrete, J. Edward Layng, Walter S. Perry and Hollister S. Logan, directors; A. McFarlane, superintendent.

Organized Nov. 16, 1900, under laws of West Virginia, and capitalization increased, 1905, to $3,000,000, shares $1 par. First dividend, 1%, was paid January, 1906, and a second dividend was paid July, 1906, both unearned. Direct title to this property apparently is held in the name of Lucía Mining Co., but everything connected with this corporation, and the other swindles of the Logan-Martin-Treadwell gang, is so mixed, and the methods employed are so devious, that it is difficult, if not impossible, to determine the nature of the operations, or the real ownership of the properties. This gang has been so extremely crooked, in its various mining swindles, that it is impossible to guarantee the accuracy of any statement regarding the San Luis or its affiliated corporations except the assertion that the Logan-Martin-Treadwell gang is composed of swindlers, and any corporation of which they are in control necessarily will be conducted as a swindle. Annual meeting, second Wednesday in April.

Lands, 506 pertenencias, area 1,241 acres, in 64 groups, and a 25-acre mill site, in the San Lucas and Pánuco de Coronado districts of Durango. Company also claims to hold El Cura ranch, area 35,000 acres.

The mineral property shows limestone and porphyry, carrying fissure veins and contact deposits, the company reporting 64 ore bodies, of which 6, under development, were estimated, by the management, to average 3% copper, 1% lead, 1% zinc, 35 oz. silver and $4 gold per ton, mainly from sulphide ores; company claiming, at end of 1905, to have 17,314′ of workings, estimated to show 300,000 tons of ore, with 200,000 tons blocked out, which figures are discredited, because of the phenomenal untruthfulness of some of its officers. The mines were discovered circa A. D. 1650, and worked, more or less irregularly, until 1830, when closed, on account of water and Indian troubles, remaining idle until reopened, 1901, by the present company.

The San Luis mine shows a considerable body of copper ore, of low to medium tenor, with some high-grade silver ore.

The Potosina mine, with 1,994′ of workings at last accounts, is said to show, at the western end, a considerable body of ore of smelting grade, and a large quantity of milling ore.

The San Gonzalo mine, 350′ deep, has a vein showing mainly low-grade ore, carrying silver values above, with copper on the lower levels, and is reported to have a 2′ vein carrying 25 kgs. silver per ton, with some gold.

ana mine carries a continuation of the vein of the San Gonzalo
said to have been proven for 1,600′ by trenches and pits, of 10′
ıd has an idle 120′ shaft.
has a 2′ vein of argentiferous galena, giving assays up to 45%
and 3 grams gold per metric ton, opened by a shallow shaft, but
some years, on account of water.
cas mine, area 19 hectares, circa 35 miles northwest of Gabriel, is
claimed to have nearly 2 miles of workings, carrying mainly lead
ıd presumably is idle.
ıra mine, adjoining the San Lucas, has a heavy gossan over a 3′
e ore, claimed to give assays of 32% copper and 12 grams gold
leveloped by an old shaft.
blo mine has parallel veins, said to carry 6″ to 36″ paystreaks of
ing assays up to 16% copper, 360 oz. silver and 14 grams gold
opment is by an abandoned incline shaft, and a 175′ vertical
ipped with headgear and hoist.
includes steam plants, claimed to aggregate 750 h. p., with 6
rsoll-Sergeant air-compressors, of 12 drills combined capacity.
re claimed to include a 25x150′ stone machine-shop, 25x150′
r-shop, stone smithy, offices, 4 general stores and a large number
vorkmen, with a total of 175 buildings.
′ mill, of adobe and iron, has 2 crushers, 1 jig and 4 Bartlett
ıration seems to have proven more satisfactory than leaching.
d leaching mill, of 120 tons claimed daily capacity, has 2 calcin-
l apparently treated only about 40 tons of ore daily, when in

1905, was reported as 30,725 tons of ore, of which 5,845 tons
ımelters, 6,481 tons were leached, and 15,118 tons were concen-
: was reported to have yielded circa 450,000 lbs. fine copper, and
5, were claimed to have been 277,530 pesos.
ıbons, a director, brought suit, 1907, in the Supreme Court of
'er $500,000, alleged to have been lost or wasted by the late
S. Logan, a notorious shyster lawyer, who died July 19, 1906,
ıral" having been acquired as former president of the "Sons of
volution," which is greatly to the credit of that body of patriots,
ıeir ancestors to bleed for the cause of liberty. The suit of Mr.
l proceedings against Myra B. Martin, the Logan Estate, Hon.
ıd Col. Britton Davis.
the company were claimed, 1905, to have been paid, notwith-
he capitalization of the company was increased, and the pay-
s begun, simultaneously with the selling of treasury stock, this
n a deliberate and intentional swindle, on the part of the man-
has been connected with some of the most notorious mining
etrated in the United States, these including the George A.
opete companies. The company promised, over the name of
yra B. Martin, dividends of fabulous size, but Miss Martin
l her gang attempted to place the responsibility for their frauds
n of an innocent man, Mr. Louis Ross, formerly general man-
by accusing him of bad management and making misleading
ed the company to pay dividends. As a matter of fact, Mr.
very few honest men ever connected officially with this com-
ıagement, instead of being bad, was exceptionally good, in short,
company's mining affairs was so unexpectedly capable that the
h obviously started the S. a Luis as a mere bit of stockjob-
e conclusion that the mine was valuable, hence wrecked the

company, in accordance with the piratical methods employed by this outfit in all of its mining deals.

Despite the efforts of Mr. Ross, and a few other honest men interested in the property, the management borrowed money, 1906, or at least is supposed to have borrowed money, according to the records, from some of the parties connected with the outfit, and October, 1908, judgment was taken, by default, for $51,000, in favor of "Hon." Geo. B. Agnew, on 2 notes, made 1906, running for 18 months, payable to Myra B. Martin.

The newspapers that accepted the putrid advertising of this rotten concern, well knowing it to be a swindle, were foremost in their denunciations of the company, there being no further revenue derivable from the printing of the company's lies. Property considered valuable, but the company is a swindle.

COMPAÑÍA MINERA DE SAN LUIS POTOSÍ. MÉXICO.

Dead. Formerly at Mapimí, Durango, Mex.

SAN LUIS POTOSÍ SMELTER. MÉXICO.

Owned by Compañía Metalurgica Mexicana, at San Luis Potosí, S. L. P., Mex.

SAN MARCOS MINING CO. MÉXICO.

Dead. Formerly at Etzatlán, Ahualulco, Jalisco, Mex. Describe... Vol. IX.

SAN MARCUS-SALOME DEVELOPMENT CO. ARIZONA.

Letter returned unclaimed from former office, Pittsburg, Pa. Mine office Salome, Yuma Co., Ariz. Lands, about 4 miles from the Socorro mines, in the Harquahala Mountains, in the vicinity of Salome, are but slightly developed. Idle several years and presumably moribund.

SAN MARINO MINING & MILLING CO. WASHINGTON.

Mine office: Nespelem, Okanogan Co., Wash. Capitalization $50 [illegible]. Lands, 4 claims, area 64 acres, in process of patenting, at last accounts. Property shows a NS. vein and 3 cross veins. Development is by a 180' tunnel with back of 150', intersecting a 12' vein carrying mainly gold and silver values by an opencut 25' deep showing ore assaying well in gold and silver, and by shafts of 28' and 40', latter showing ore assaying 2 to 3% copper and $[illegible] per ton in combined gold and silver values.

COMPAÑÍA MINERA SAN MARTÍN y ANEXAS, S. A. MÉXICO.

Office: Ap. 145, Oaxaca, Mex. Mine office: San Martín de los Cansecos, Oaxaca, Mex. Frank M. Leonard, president and general manager; Lic. J... Acevedo, vice-president; Ranulfo Bravo, secretary, treasurer and superintendent; Jas. W. Bradley, manager; preceding officers, Frank J. Woods, Frank Sistermans and Myron R. Walker, directors; Jesús Linares, mine superintendent. Organized Jan. 15, 1907, under laws of México, with capitalization [illegible] pesos, shares 10 pesos par, in 35,000 fully paid shares, and 5,000 assessable shares; issued, 37,995 shares, at last accounts. Has paid dividends of 3 pesos per share.

Lands, 5 groups, area 55 hectares, including San Martín, La Esperanza, Kimberley, La Frida and La Luz mines, circa 10 miles from Ocotlán, one being antigua, said to have been worked by Aztecs before the Spanish conquest. The property shows diorite, carrying a vein of 10' to 12' average width, traceable [illegible] mile, with strike of 11° W., carrying ore returning, from shipments, 2% [illegible], 2% lead, 6% zinc, 5 kgs. silver and 100 grams gold per metric ton.

Equipment includes a mill, built by a former owner, having 6 stamps and Wilfley tables, now idle, because of poor location.

The property, which is said to have supported itself, in the development stage, from sales of shipping ore, was optioned, December, 1909, for a short term to Denny Brothers, for 450,000 pesos, and apparently the first payment was made thereon, May 1, 1909, but the management reported, Feb. 4, 1911, that the property was under option to C. A. Barnard, Q. C., of Montreal, at a [illegible]

hich $200,000 had been paid, and that Mr. Barnard took pos-
›perty June 14, 1910, and was to pay the balance during 1911.
d to be producing $10,000 to $12,000 of high grade ore monthly,
scalientes. Property considered promising and management

MINING CO. **MÉXICO.**
eo Bolivar 407, Chihuahua, Chih., Mex. Mine office: Uruá-
ıuahua, Mex. John J. Clague and John J. Waterson, managers
Lands, 68 hectares, having 4 shafts and a 1,600′ tunnel, devel-
ıg copper, lead, zinc, silver and gold. Equipment includes a
wheel, and a concentrator with two 4′ Bryan mills, 2 Bartlett
fley tables, and there is a small smelter with a 25-ton rever-

GUEL. **PERÚ.**
Morococha, Junín, Perú. Dr. Octavio Valentine, manager.
is owned by the Sociedad Minera Copaycocha, which is con-
ro de Pasco Mining Co.; 40% is owned by Lizandro A. Proaño,
id Stuart.
developed by the Copaycocha and Vulcano tunnels, lower of
length, and ore is mainly enargite, with some tetrahedrite and
iated with pyrite. Mine was opened 1894, and in 10 years
re averaging circa 20% copper and 333 grams silver per metric
s. fine copper and 10,794 kgs. fine silver. Production, 1905,
f about 800 tons monthly, of ore averaging circa 22% copper
per ton, presumably after careful selection. Production is
0,000 lbs. fine copper, 1907.

MINERA SAN MIGUEL. **MÉXICO.**
Matehuala, Catorce, San Luis Potosí, Mex. W. B. A. Ding-
ıd manager. The mine carries gold, and argentiferous copper
as freibergite. Equipment includes steam power, and there
ing plant. Forces are about 300 men, normally.

MINERALES DE SAN MIGUEL. **SPAIN.**
succeeded, Oct. 12, 1904, by San Miguel Copper Mines, Ltd.
onáster, Huelva, Spain.

COPPER CO. **NEW MEXICO.**
Tecolote, San Miguel Co., N. M. Frank J. Buck, superin-
ıccounts. Idle.

COPPER MINES, LTD. **SPAIN.**
ıaurence Pountney Hill, London, E. C., Eng. Mine office:
lva, Spain. Nicol Brown, chairman; preceding officers, Dr. N.
ging director; H. Schmitz, Count A. Pisani Jourdan and T.
ctors; T. Stephenson Dick, secretary; F. O. Harvey, consulting
ized Oct. 12, 1904, under laws of Great Britain, with capitaliza-
ıcreased, November, 1908, to £200,000, shares £ par; issued,
ıaid. A former debentures, issue of £75,000, at 6%, was re-
Dividends were 18¾% in 1905, and 18¾% in 1906, with no
Accounts for 1908 showed a profit of £2,352. Reserve fund
9.
acres, including the San Miguel and adjoining mines of cuprif-
he property was worked, for some years, by Sociedad Mineira
Huelva, a Portuguese company, until taken over, 1904, by the
In 1907 the lower levels of the mine caved in, since which time
been limited to opencast ore extraction. The mine has ore
d, June, 1909, at 700,000 long tons, and in addition there are
s of partly leached ore, on surface, in teleras and tereros.
reserves formerly were estimated at 2.5% copper tenor.

The company owns a 19-kilometer private railway, built at a cost of £40,000 from Almonáster to El Cerro, connecting with the latter point with the Ferro carril Zafra y Huelva.

Production was 1,767,360 lbs. fine copper in 1899; 1,612,800 lbs. in 1900 978,880 lbs. in 1906; 797,440 lbs. in 1907; 21,660 metric tons of pyrites, 7,06 metric tons of cupriferous pyrite, and 711 metric tons of copper precipitate yielding 1,124,480 lbs. fine copper, in 1908. The company was seriously handicapped for several years by the caving of the lower levels, 1907, but seems to be working into somewhat better position.

SOCIEDAD MINEIRA DE SAN MIGUEL DE HUELVA. SPAIN

Dead. Was succeeded, Oct. 12, 1904, by San Miguel Copper Mines, Ltd. Formerly at Almonáster, Huelva, Spain.

COMPAÑÍA MINERA SAN PABLO. MÉXICO

Mine office: San Pedro de las Colonias, Parras, Coahuila, Mex. Jas. Cuyas, superintendent, at last accounts. Property carries gold, silver and copper ores, and employed, about 20 men, 1908.

SOCIÉTÉ ANONYME DES MINES DE SAN PEDRO. SPAIN

Office: 28 Rue de Châteaudun, Paris, France. Mine office: Zalamea La Real, Huelva, Spain. M. E. Ascherson, chairman; preceding officers, Mesnier, H. Prévost and A. Taraud, directors; Carlos Marchal, agent. Organized Feb. 27, 1899, under laws of France, with capitalization f450,000, increased later to f600,000, shares f100 par. Lands include the Barranco de los Buy group of 10 old mines, area 167 hectares. Production was 1,977 metric tons pyrite, 18,978 metric tons of cupriferous pyrite, and 4 metric tons of copper precipitate, estimated to have yielded circa 1,000,000 lbs. fine copper, 1908.

SAN PEDRO COPPER CO. NEW MEXICO

Mine office: San Pedro, Santa Fé Co., N. M. Idle since circa 1899.

SAN PEDRO COPPER CO., S. A. MÉXICO

Office: 1400 Alworth Bldg., Duluth, Minn. Letter returned unclaimed from former mine office, La Cananea, Arizpe, Sonora, Mex. Jas. H. Kirby, president and superintendent; H. B. Paull, vice-president; Geo. Young, secretary; John A. Campbell, treasurer; preceding officers and L. A. Hagy, director. Dr. L. D. Ricketts, general manager. Organized July 28, 1906, under laws of México, with capitalization 50,000 pesos, shares 10 pesos par, and is controlled through ownership of entire stock issue, by the Greene Cananea Copper Co. Property, consisting of the América, Copper Belt, Bryan, Seguro, Square, Oriente and eastern part of Massey No. 2 claims, and a 40% undivided interest in the Sierra de Cobre mine, is described under title of Greene Cananea Copper Co. Production was 637,341 lbs. fine copper, 14,909 oz. silver and 132 oz. gold in 1908; 3,271,641 lbs. copper, 51,584 oz. silver and 399 oz. gold in 1909.

COMPAÑÍA MINERA SAN PEDRO DE NOLASCO. CHILE

Dead. Formerly at San Pedro de Nolasco, Victoria, Santiago, Chile. Described Vol. VIII.

COMPAGNIE DES MINES DE CUIVRE DE SAN PLATON. FRANCE

Office: 7 Rue Pillet-Will, Paris, France. Mine office: Almonáster, Huelva, Spain. Guillermo Sundheim, manager. Organized Oct. 18, 1[illegible] under laws of France, with capitalization f3,000,000, shares f100 par. In 1[illegible] net earnings were 393,568 francs, 69 centimes, and after allowance for amortization, there was left a net balance of 238,211 francs, 16 centimes, and net earnings for 1908 permitted an addition of f25,000 to the reserve fund, after the payment of a dividend of f150,000. Dividends were 5% in 1907, and 5% in 1908.

Lands, 46 hectares, including the San Platon, Segundo San Platon and Aumento de San Platon mines. Production was 26,116 metric tons of cupriferous pyrite, estimated to have yielded circa 750,000 lbs. fine copper, 1907.

SAN POIL MINING & EXPLORATION CO. WASHINGTON

Letter returned unclaimed from former office, Spokane, Wash. Mine

, Ferry Co., Wash. S. L. Boyer, manager, at last accounts. nder laws of Washington. Lands are 9 groups, carrying copper parently but slightly developed. Idle and presumably mori-

OPPER MINING CO. **MÉXICO.**
erty passed to the Rio Tinto Copper Co. Formerly at Terraz-huahua, Mex. Described Vol. VIII.

OPPER MINING CO. **MÉXICO.**
erly at Hermosillo, Sonora, Mex. Described Vol. VI.

INING CO. **MÉXICO.**
succeeded by Mercer-San Rafael Mining Co. Formerly at Jalisco, Mex. Described Vol. VI.

NERA SAN RAMÓN DE FREIRINA. **CHILE.**
iago de Chile Mine office: San Juan, Freirina, Atacama, l Nov. 22, 1904, under laws of Chile, with capitalization 160,000 pesos par. Presumably idle.

PPER CO. **ARIZONA.**
erly at Gleeson, Cochise Co., Ariz. Described Vol. V.

MINING CO. **MÉXICO.**
ine: Zacatecas, Zacatecas, Mex. C. A. Bentley, general Petit, superintendent. The mine, opened to depth of 300′, nd argentiferous copper and lead ores, and some ore was devel-ng up to 30% copper, with good gold and silver values. The l limited production of ore of excellent average grade. Equip-nalacate, for hoisting. Property was said to have been op-o the Cape Copper Co., Ltd., but presumably this option was

. MINING CO. **MÉXICO.**
Terrazas, Chihuahua, Mex. Alberto Terrazas, president; general manager, at last accounts. Property is San Salvador shafts, showing lead and copper ores. Equipment includes a

PPER CO. **ARIZONA.**
quette, Mich. Mine office: Paradise, Cochise Co., Ariz. an, president; Hon. Norman W Haire, vice-president; S. R. y and treasurer; preceding officers, Thos. F. Cole, John A. Rice and Thos. H. Collins, directors; Fred W. Hoar, manager; perintendent. Organized circa January, 1907, under laws of struction of the Chiricahua Development Co., with capitaliza-ares $10 par.

ms, 7 patented, area circa 750 acres, 16 miles from nearest taken over, April, 1903, by predecessor of present company, rated by Capt. Thos. Burns as a silver mine. The mine has a l, with a 100′ winze 700′ from the portal, cutting circa 50′ of ntly the apex of a sulphide ore body. The 400′ Mars shaft, aving a 150′ gossan, passed through leached ore, and is pyrite of 2 to 4% copper tenor. The 400′ Planet shaft has a level.

cludes two 150-h. p. boilers, two 2,000′ Lake Shore double-a 16-drill Sullivan air-compressor. There are several mine veral years, except for annual assessment work.

ZONA MINING CO. **ARIZONA.**
Box 1715, Bisbee, Ariz. Mine office: Middlemarch, Co-A. W. McPherson, president; Geo. H. Neale, vice-president; etary and treasurer; Wm. Goar, general manager; preceding Bennett, directors. Organized April, 1906, under laws of

Arizona, with capitalization $2,500,000, shares $1 par; issued, $1,400,000. Annual meeting, second Tuesday in February.

Lands, 14 claims, unpatented, area 280 acres, between the Middlemarch and Black Diamond mines, on Dragoon Mountain, in the Black Diamond district, 8 miles from the Southern Pacific railway, at Pearce. The property shows limestone and porphyry, with 5 ore bodies, of which 2, under development, have argentiferous carbonates and sulphides, latter mainly chalcopyrite, estimated by the management to carry an average of 10% copper, 15% lead and 6 oz. silver per ton, which figures seem high. Development is by tunnels of 70′ and 90′ and by shafts of 56′, 110′ and 300′.

Equipment includes a small steam plant, with a 10-h. p. hoist, good for 500′ depth, and there are 2 buildings. Idle several years

SANTA ANA MINING CO. MÉXICO.

Dead Formerly at Jiménez, Chihuahua, Mex. Described Vol. IX.

COMPAÑÍA INDUSTRIAL y MINERA DE SANTA BÁRBARA. PERÚ.

Mine office: Yauli, Junín, Perú. Dr. Octavio Valentine, manager; Manuel Quintana, superintendent. Property is a custom smelting plant treating ores from the San Miguel, Gertrudis, Natividad and Victoria mines, in which Dr. Valentine is interested, with reduction charges of 17.5 soles per short ton. The smelter is 112 miles from Lima, at an elevation of 13,420′ above sea level, being 6 miles from Morococha by trail, and circa 25 miles by rail. Ores are received mainly by llamas, which carry average loads of about 110 lbs., and the railroads find it difficult to compete with the llamas, owing to heavy grades and the great cost of rail construction. The plant includes a small calciner, hand reverberatories, and 3 water-jacket blast-furnaces of 25, 50 and 100 tons daily capacity. There is a 20-ton Krupp ball mill, jigs, spitzkasten, centrifugal separators, a centrifugal dryer, a 6′ pulp mill, and a Van Meter oil concentrator. Power is furnished by a 60-h. p. turbine.

SANTA CASILDA COPPER CO. MÉXICO.

Office: Primera Calle de San Francisco 2, México, D. F. Letter returned unclaimed from former mine office, Uruapán, Michoacán, Mex. Hon. M. Horner, president; Alberto Woern, vice-president; R. A. Mills, secretary; R. R. Velad, treasurer; preceding officers and Pablo Kosidowsky, directors. Organized under laws of México, with capitalization 1,500,000 pesos. Company is said to have been floated by A. J. Peyton & Co., of New York, who promoted Santa Emilia Copper Co., Dona Louisa Copper & Gold Mining Co., and La Natividad Mining Co., the two latter named corporations having been swallowed.

Lands, well watered, show a superficial zone of oxidation, succeeded by a sulphide zone carrying mainly chalcopyrite, and the mine is said to have small quantities of ore of 15 to 18% copper tenor, and a considerable amount of low grade sulphides averaging about 4% copper. Property includes a concession for the development of 1,000 h. p. from a near-by river. Management was said to plan a 200-ton concentrator. Idle since 1908, from lack of funds.

SANTA CRUZ COPPER CO. MÉXICO.

Dead. Formerly at Santa Cruz, Magdalena, Sonora, Mex.

SANTA CRUZ MINING CO. ARIZONA.

Office: 51st St. and Allegheny River, Pittsburg, Pa. Mine office: Patagonia, Santa Cruz Co., Ariz. W. W. Hall, president; W. B. Barnes, vice-president; R. D. McDonald, secretary; Wm. M. Schwartz, general manager; J. A. Tustin, superintendent, at last accounts. Organized Oct. 5, 1901, under laws of Arizona, with capitalization $1,000,000, shares $1 par. Is controlled, through ownership of nearly all of the outstanding stock, by the Sonora Central Mining Co.

Lands, 6 claims, area 124 acres, 2 miles east of Patagonia, in the Harshaw district, showing several fissure veins, of about 20′ estimated average width, to give a general average assay of 8.5% copper, 20 oz. silver, 5% nickel and

inly from chalcocite, which figures are much too high. Devel-
hafts, deepest circa 350′. Presumably idle.

INERA SANTA ELENA DEL **MÉXICO.**
INEXAS, S. A.

Sultepec, México, Mex. Organized Aug. 24, 1907, under laws
apitalization 66,000 pesos. Property includes La Santa Elena,
a Salvadora and La Esmeralda mines. Presumably idle.

. COPPER CO. **MÉXICO.**

Wall St., New York, N. Y. Letter returned unclaimed from
e, Coapa, Morelia, Michoacán, Mex. John A. Kennedy, presi-
n, vice-president and general manager; Manuel L. Ward, secre-
er; J. R. Crum, superintendent, at last accounts. Organized
of Delaware, with capitalization $1,000,000, and reorganized,
under laws of Maine, with capitalization $2,000,000, shares $1
eased capitalization, $500,000 was given shareholders, as a stock
ance placed in the treasury, part going to the general manager
in by him. Is controlled, through ownership of majority of
n Development Co.

acres, in the Tacámbaro district, circa 40 miles southwest of
miles from the Mexican National railway. The mine, devel-
)′ Napoleon tunnel, and a 625′ two-compartment shaft, is said
)0′ of workings, and the management was said to plan deepen-
′ and crosscutting, circa 800′, to intercept the Guadalupe vein.
the mines had not shown ore in payable quantities, but the
ned to consider the situation encouraging.

ncludes a steam plant, and there are various mine buildings,
workmen.

milia is controlled by the same people as promoted the Nativi-
nd the Dona Louisa Copper & Gold Mining Co., which were
arently this company is but little better. Idle and presumably

A MINING & MILLING CO. **MÉXICO.**

nerly at Velardeña, Cuencamé, Durango, Mex. Described

É. **MÉXICO.**

Salto de Agua, Palenque, Chiapas, Mex. This property,
the Chiapas Mining Co., Ltd., is developed by a 1,560′ tunnel
haft, showing a mineralized zone of circa 100 meters width, be-
l limestone, apparently formed by contact metamorphism.
in argentiferous and auriferous copper ore, but the ore body is
x, carrying cuprite, malachite, bornite, chalcopyrite, tetrahed-
phalerite, galena, and free gold, associated with pyrite, with a
ainly wollastonite. The best grade of concentrating ore is
seminated in a gangue of wollastonite and garnet. Equipment
power plant, 30-stamp mill, 100-ton concentrator and 75-ton
03 the mine made 370,483 lbs. fine copper. Idle since 1904.

ERA LA SANTA FE. **MÉXICO.**

er office was Monterey, N. L., Mex. Manuel Amaya was
ized 1907, under laws of México, with capitalization 36,000
own as the Santa Fé group, carried copper ore. Formerly
o, Nuevo León, Mex.

SOLIDATED MINING CO. **MÉXICO.**

ed unclaimed from former office, Bisbee, Ariz. Mine office:
spe, Sonora, Mex. P. J. Tehaney, president and general
ackard, vice-president; C. I. McReynolds, secretary; R. L.
preceding officers and C. W. McHenry, directors. Organized

April, 1909, under laws of Arizona, with capitalization $500,000, shares $2.5[illegible] par.

Lands, 238 hectares, on the Sonora River, below La Cananea, worked, 18[illegible], by Col. Wm. C. Greene. The mine, developed by the 350′ Santa Fé shaft, [illegible] 206′ Montoyo shaft, shows an argentiferous and auriferous complex of copper, lead and zinc sulphides, giving ores assaying up to 7% copper and circa 300 oz. silver per ton. Equipment includes a hoist, and management was said to plan a 100-ton mill.

SANTA FÉ COPPER CO. **NEW MEXICO.**

Dead. Was organized 1888, became bankrupt 1892, and was practically reorganized Jan. 20, 1899, as Santa Fé Gold & Copper Mining Co. Gen. U. S. Grant once was president, and the company operated extensively, and was a considerable producer. Lands were 2,400 acres of mineral property, and 46,00[illegible] acres of miscellaneous holdings, all in the old San Pedro land grant. Formerly at San Pedro, Santa Fé Co., N. M.

SANTA FÉ DEVELOPMENT CO. **MÉXICO.**

Dead. Formerly at Ysabal, Moctezuma, Sonora, Mex. Described Vol. VIII.

SANTA FÉ GOLD & COPPER MINING CO. **MÉXICO.**

Office: 920 Merchants Loan & Trust Bldg., Chicago, Ills. Mine office Alamos, Sonora, Mex. Letter returned unclaimed from former mine office Fuerte, Sinaloa, Mex. Is controlled, through stock ownership, by International Copper & Gold Co., which is controlled, through stock ownership, by the Sonora Central Mines Co. Lands are 8 groups, in the states of Sonora and Sinaloa. Owing to the company being merely a stepping-stone for the Sonora Central Mines Co., and the further fact that the Sonora Central claims direct ownership to all properties actually owned by the Santa Fé, the various properties described in detail under this title Vol. VII, are listed, in this volume, under title of the Sonora Central Mines Co.

SANTA FE GOLD & COPPER MINING CO. **NEW MEXICO**

Office: 334–11 Broadway, New York, N. Y. Mine office: Santa Fé, N. M. E. C. Westervelt, president; E. H. Westlake, secretary and treasurer; preceding officers, O. B. Van Sant, Ernest W. Brown, Herman Asendorf, DeSmet Maguire, M. Kaufman, E. Macnamara and Chas. N. King, directors; Albert H. Case, superintendent; W. H. Wierum, consulting engineer.

Organized Jan. 20, 1899, under laws of New Jersey, with capitalization $2,500,000, shares $10 par, as a reconstruction of the Santa Fé Copper Co., organized 1888, which became bankrupt 1892. The company began business with $500,000 cash, and cash balances were $170,750 on Dec. 31, 1907; $118,945 on Dec. 31, 1908; $60,118 on Dec. 31, 1909, and $38,832.14 on Dec. 31, 1910. Income was $344,941 in 1907, and $181,741 in 1908. State Street Trust Co., Boston, registrar; Old Colony Trust Co., Boston, transfer agent. Shares are listed on the Boston stock exchange. Annual meeting, fourth Tuesday in January.

Lands, 49,400 acres, being 3,400 acres of copper property and 46,000 acres of miscellaneous lands, latter including coal areas of promise, all in the San Pedro land grant. The San Pedro mine, 21 miles from the Santa Fé railway, is opened by a single shaft, on a blanket vein of circa 150′ average thickness, dipping at an angle of less than 15°, about half the ore body being workable, though low average grade. Ore is chalcopyrite, with garnet and quarts gangue, and, being highly silicious, requires heavy iron and lime fluxes. Ore smelted, 1901, is said to have given average returns of circa 4.25% copper, 3 oz. silver and $1 in gold per ton, but ore smelted 1907 returned an average of only 2.7% copper, 0.[illegible] silver and 75 cents gold per ton.

Production was begun Jan. 1, 1901, and suspended November, 1901, after which nothing but diamond drilling was done, until the smelter was blown in Feb. 10, 1907, but again blown out Oct. 12, 1907, since which date the management reports having blocked out 100,000 tons of ore, averaging better than

available for stoping on immediate notice. New openings were

ncludes a steam plant, with a hoist and a 15-drill air-compressor.
ats second class ore, of about 2% copper tenor, making 15%
l the management formerly planned the installation of a Weth-
arator, for treating low-grade ores.
at the mine, has one 125-ton blast-furnace, burning Colorado
ing matte of about 60% average copper tenor, shipped to New
sion, when the smelter was in blast.
employs about 350 men, when in operation, labor being mainly

was 370,483 lbs. fine copper in 1903, and in 1907 was 21,298
ed, yielding 1,223,457 lbs. fine copper, 17,625 oz. silver and 786
at an average cost of circa 14 cents per lb., after deduction of
l silver values.
low in grade, though possessing an immense tonnage of poten-
siderable ore developed for stoping, but a large part of the ore
ation, and rail connections are absolutely necessary, if the mine
at a profit. Property considered promising and management

ING CO. **NEVADA.**
nerly at Luning, Esmeralda Co., Nev.
ING & REDUCTION CO. **NEW MEXICO.**
nerly at Santa Fé, Santa Fé Co., N. M.
UDIS MINES, LTD. **MÉXICO.**
Villa Alta, Oaxaca, Mex. R. H. Jeffrey, general manager.
onsiderable number of mines, among these being La Purisima,
d Los Remedios, carrying auriferous and argentiferous copper
eloped by 16 tunnels, with a total length of circa 2,000 meters,
pest 200 meters, on the Mina Dolores.
INING CO., LTD. **PERÚ.**
nchurch St., London, E. C., Eng. Mine office: Morococha,
pt. W. B. McTaggart, J. P., chairman; A. Turner, secretary.
30, 1906, under laws of Great Britain; with capitalization
£1 par; issued, at last accounts, £8. No trace of operations
rently abortive.
NTA INES y MOROCOCHA. **PERÚ.**
Calle de Aparicio, Lima, Perú. Mine office: Morococha,
berto Pflucker, president; Leopoldo Pflucker, vice-president;
retary and treasurer; Vicente Pazos y Sacio, general manager;
e superintendent, at last accounts. Organized under laws of
lization 1,200,000 soles.
laims, area 240 hectares, and the Hacienda Morococha, area
1 the Tuctu district. Mineral lands are in the Morococha
4 large lakes, connected by streams having waterfalls available
s. Mines include the San Francisco and San Miguel, carrying
contact deposits between limestone, diorite and quartz-por-
out one meter average width, carrying sulphoarsenide copper
nor up to 25% copper and 16 oz. silver per ton.
pened 1898, are developed by the 300-meter Ausiliar tunnel,
dia Falda tunnel and the 800-meter Laguna tunnel, with about
rkings, estimated, 1907, to show circa 20,000 metric tons of ore
toping. Ore produced is divided into 2 grades, averaging
% copper respectively, and, for the first 6 years of operation,
3% copper and 330 grams silver per ton, after hand-selection,
d by the Ferrocarril Central del Perú.

Equipment includes a hydro-electric installation, with a 40-kw. Siemens & Halske generator for light and power, and 3 electric drills. Fuel is domestic coal, costing about 9 pesos per ton, and cost of mining was given by company as averaging circa $2.50 per ton, ore being dressed to an average copper content of about 25%, and sold to the Casapalca smelter. There also is a small gold mine, known as the Santa Ines, at Castrovirreyna, Huancavelica, Perú, having a 6-ton amalgamating plant.

Production was circa 3,600 metric tons of ore, carrying about 2,000,000 pounds fine copper, 1905. At last accounts the property was under option to Messrs. Haggin and McKim, apparently for the Cerro de Pasco company.

SANTA ISABEL MINING & MILLING CO. COLORADO.

Office: Colorado Springs, Colo. Letter returned unclaimed from former mine office, Creston, Saguache Co., Colo. Howard F. Browning, superintendent, at last accounts. The mine carries argentiferous and auriferous copper ore, and is mainly a silver and gold producer, securing a little copper as a by-product. Equipment includes steam power, and there is a 75-ton concentrator. Idle.

COMPAÑÍA MINERA SANTA JOVITA DE COLLAHUASI. CHILE.

Dead. Formerly at Collahuasi, Tarapacá, Chile. Described Vol. VIII.

SANTA LUCÍA SYNDICATE, LTD. CHILE.

Office: 4 Copthall Chambers, London, E. C., Eng. Mine office: Los Anjeles, La Ligua, Aconcagua, Chile. H. K. Paxton, director; F. E. Hodges, secretary. Organized Dec. 24, 1906, under laws of Great Britain, with capitalization £15,000, shares £1 par; issued, £5,570, fully paid. Property was an option on copper mining claims on the Canaveral Estate, near Los Anjeles, which option was surrendered, and apparently the company now holds no property and is moribund.

MINA SANTA MARÍA. HONDURAS.

Letter returned unclaimed from former mine office, Comayagua, Honduras. According to the story, which is a monument to the colossal genius of the prevaricator who invented it, the mine, which has but slight development, is a mountain of solid ore, ten miles in circumference, assaying 10 to 75% copper. Idle many years.

COMPAÑÍA MINERA SANTA MARÍA DE LA PAZ. MÉXICO.

Office: 10 Cinco de Mayo, San Luis Potosí, Mex. Mine office: Matehuala, Catorce, San Luis Potosí, Mex. Pedro Barrenechea, president; Rafael G. Barrenechea, secretary; Luis Campo, general manager; José Torres, superintendent at, last accounts. Organized under laws of México, with capitalization 240,000 pesos, shares 25 pesos par. From 1895 to 1904 inclusive, the mine yielded 11,327,210 pesos worth of ore, and, the company paid 5,778,270 pesos dividends therefrom.

The mines, extensively developed, carrying auriferous and argentiferous lead and copper ores, with values mainly in silver and lead, gold and copper being by-products, is opened to depth of about 1,500', with extensive developments.

Equipment includes steam, gas and electric power. The reduction plant includes a 300-ton concentrator, having Blake crushers and Chilean mills, and a smelter having two 40-ton furnaces. The company employed about 1,500 men at last accounts.

COMPAÑÍA MINERA y BENEFICIADORA DE SANTA MARÍA DE LA PAZ y ANEXAS, S. A. MÉXICO.

Mine office: Tejupilco, México, Mex. Organized Aug. 20, 1903, under laws of México, with capitalization 15,000 pesos. Property is La Helvetia mine, carrying argentiferous copper ore. Presumably idle.

SANTA MARIA GOLD & COPPER MINING & REDUCTION CO. UTAH.

Office: P. O. Box 517, Ogden, Utah. Mine office: Utah Hot Springs,

Utah. Don Maguire, president and manager. Organized 1907, tah, with capitalization $500,000, shares $1 par.
watered and fairly timbered, are extensive, including mill and ing in a very rugged territory in the Sierra Madre district of the ains. The property carries 7 fissure veins, practically parallel, ross-fissure and one contact deposit, veins ranging 12′ to 70′ in ying argentiferous and auriferous chalcopyrite, associated with ional small amounts of galena, ore being mainly of concentrating ne is developed by the 2,000′ Clara Belle tunnel, cutting 3 veins, cut 8 ore bodies, with backs of 200′ to 1,800′. The mine has workings, showing considerable ore, estimated as sufficient to

nclude a power-house having an air-compressor, and a smithy ouse.

A MEXICO MINING ASSOCIATION. **MÉXICO.**
errill Bldg., Milwaukee, Wis. Mine office: Parral, Chihuahua, Gruber, president and general manager; Arthur H. Gruber, easurer; preceding officers and Rt. Rev. Mgr. Alois Plut, direct- Yetmar, vice-president; A. S. Mitchell, consulting engineer; uperintendent. Organized under laws of Wisconsin, with capi- 00, shares $1 par. Lands, 50 claims, in 3 groups, known as iola and Santa Clara, in the Galeana district of the San Blas e Sierra Madre, midway between and 25 miles from the Mexican rra Madre Pacifico railways. Principal development is on La ich has shafts of 75′ and 150′, showing rich oxidized ores, assay- opper, shipments from which are said to have averaged 15%

INERA SANTA RITA. **MÉXICO.**
rned unclaimed from former office, Chihuahua, Chih., Mex. anta Bárbara, Hidalgo, Chihuahua, Mex. Alberto Terrazas, el Horcasitas, manager, at last accounts. Property is the Santa e Chorreros Mountains, showing ore carrying values mainly in ably idle.

COPPER CO. **NEW MEXICO.**
perty was sold, 1898, for $1,000,000 and company practically re- ta Rita Mining Co. Formerly at Santa Rita, Grant Co., N. M.

COPPER MINING & SMELTING CO. **ARIZONA.**
Paso, Tex. Letter returned unclaimed from former office, 1509 St. Louis, Mo. Mine office: Arivaca, Pima Co., Ariz. S. H. dent; C. F. Elliott, secretary and general manager; J. M. Wyatt, ling officers, Geo. P. Meyers and N. C. Wilson, directors. O - 901, under laws of Arizona, with capitalization $3,000,000,

nally claimed to be 40 claims, area 630 acres, 4 timbered claims, elter-site, apparently have shrunk to 220 acres, in the Tyndall anta Rita Mountains, 13 miles from Arivaca. The property imed to show 10 veins, of which 4, under alleged development, average 8′ to 30′ in width, and were asserted to carry sulphide ive average assays of about 18% copper, 6 to 10% lead, 1 to 3 oz. silver and $2 to $8 gold per ton, which figures were utterly he mine formerly was claimed to have 5 pits and shafts, of 20′ d 5 tunnels of 40′ to 260′ length, with circa 1,000′ of workings. s alleged, late 1910, to be driving the Blacksmith tunnel. This d officers repeatedly, and also changed offices, without leaving as a mere stockjobbing scheme under the former man- suspicion under the present management.

SOCIEDAD MINERA S
Office: Santiago de
Organized Dec. 12, 1905,
shares 50 pesos par. Pr
SANTA RITA MINING
Dead. Property sol
Co. organized thereon.
described Vol. VIII.
COMPAÑÍA MINERA
Letter returned unc
office: Arqueros, Coquir
Chile, with capitalization
parently moribund.
COMPAÑÍA MINERA
Mine office: Mazap
slight development only,
SANTA ROSA COPPEI
Dead. Lands were
Arizona. Formerly at M
SANTA ROSA DE MA
Dead. Formerly at
SANTA ROSA DEVELC
Dead. Lands were
at Fronteras, Arizpe, So
SANTA ROSA DEVELC
Dead. Was succeed
at Mazapil, Zacatecas, M
SANTA ROSALÍA MIN
Mine office: Tejupi
auriferous and argentifer
employed, 1906, circa 40
SANTA ROSA MINING
Letter returned un
office: Ayutla, Autlán,
Rancho Pelayo, near the
slightly auriferous copper
able ore said to assay $2
Equipment includes
smithy and superintende
stamp mill and a new 10
Huntington mill, 4 Overs
and 2 Callow settling tar
COMPAÑÍA MINERA
SANTA TERESA,
Dead. Formerly a
scribed Vol. IX.
SANTIAGO CONSOLID
& TUNNEL CO.
Mine office: Georg
superintendent. The mi
ment includes steam pow
SANTIAGO COPPER
Dead. Was succes
El Cobre, Santiago de C
SANTIAGO MINING C
Office: 517 Francis

ice, Parral, Hidalgo, Chihuahua, Mex. Geo. J. Greene, presi-
ie, vice-president; T. G. Travis, secretary and treasurer; Nat P.
manager, at last accounts; preceding officers and Henry Roach,
nized March 7, 1907, under laws of Arizona, with capitalization
es $1 par. Annual meeting, third Thursday in February.
ims, area 79 acres; also 1 claim, area 20 acres, in Otero county,
The Chihuahua property shows limestone and porphyry, carry-
, said to be fissure veins of 12′ average width, giving average
copper, 15% lead, 22 to 25 oz. silver and $6 gold per ton, from
le ores. The mine has 7 shafts, of 55′ to 150′ depth, with total of
estimated to show 150,000 tons of ore blocked out for stoping,
cessive. Equipment includes a 250-h. p. electric plant, with 3
1,000′ each, a 7-drill air-compressor, 60x85′ machine-shop of
, and other mine buildings. In 1908 the management planned
Idle and presumably moribund.

) MINING & SMELTING CO. **MÉXICO.**

Uruáchic, Rayón, Chihuahua, Mex. T. A. Ripperdan, su-
last accounts. Mine carries auriferous and slightly argentifer-
said to average about 50 pesos per ton in gross values. A
)9, has a 25-ton reverberatory matting furnace.

IGO GOLD & COPPER CO. **SANTO DOMINGO.**

a swindle, of which Sly Dorsey was president and Con O'Con-
Formerly at San Cristobal, Santo Domingo. Fully described

NERA SANTO DOMINGO HUACHUAMACHAY. **PERÚ.**

Morococha, Junín, Perú. The mine has a vein of 60 to 70
h, traceable circa 400 meters, with irregular mineralization,
erous copper ores, developed by 4 tunnels, at distances of 40
cally. Selected ore is exported to Liverpool for reduction.

'GO MINING CO. **MÉXICO.**

ned from former office, San Antonio, Tex. Mine office:
camé, Durango, Mex. C. W. Comstock, general manager,
The mine carries copper and lead ores, and employed 40
Presumably idle.

GO SYNDICATE. **SANTO DOMINGO & HAYTI.**

erty was sold by the sheriff to the San Cristobal Mining Co.
Cristobal, Santo Domingo. Described Vol. VIII.

'YME DES MINES ET USINES DE **SPAIN.**
A.

ue Mogador, Paris, France. Mine office: Santomera, Mur-
ques-Duparc, J. Foques-Duparc, J. L. Baille and R. Canat de
Organized May 2, 1905, under laws of France, with capitaliza-
s, shares 500 francs par. Was endeavoring, July, 1908, to
pitalization 1,100,000 francs, shares 100 francs par. Idle.

INING CO. **MÉXICO.**

erly at Symón, San Juan de Guadalupe, Durango, Mex.

)PPER CO. **MÉXICO.**

on, Ariz. Mine office: San Javier, Hermosillo, Sonora,
tree, president; George Grunig, vice-president; Wm. Foster,
Fuller, treasurer. Organized under laws of Arizona, with
00,000, shares $1 par, and holds direct title to lands through
ora de Cerro Verde, S. A. Organized under laws of México.
nencias, 80 miles east of La Colorada, also 300 pertenencias
the southward, and circa 4 miles north of the Yaqui River.

SAPHO MINING CO. NEVADA.

Mine office: Ely, White Pine Co., Nev. John Webber, superintendent. Capitalization $1,000,000, shares $1 par. Lands adjoin the Ely Northern. Development is by a 41′ shaft and a tunnel, having a back of 250′ at last accounts; said to show auriferous oxidized ores assaying 6 to 22% copper, with a paystreak said to carry about $30 gold per ton. Idle.

SARANAC MINING CO. WASHINGTON.

Dead. W. A. Clark, C. J. Orland, H. D. Elliott and C. D. Shade were directors. Lands were 6 claims, showing auriferous and argentiferous copper ore, and equipment included a small steam plant and hoist. Formerly at Meyers Falls, Stevens Co., Wash.

SARATOGA DEVELOPMENT CO. COLORADO.

Mine office: Central City, Gilpin Co., Colo. John Owen, manager. Idle at last accounts. Has gold, silver and copper ores, with steam power. Equipment includes steam and air power.

SARATOGA PYRITIC SMELTING CO. COLORADO.

Dead. Formerly at Ironton, Ouray Co., Colo. Described Vol. VI.

SARATOGA SMELTING & REFINING CO. COLORADO.

Dead. Property was a pyritic smelter at Ironton, in the vicinity of Ouray. Company was succeeded, 1903, by the Continental Smelting & Refining Co., which became bankrupt 1907. Formerly at Ironton, Ouray Co., Colo.

SASAGATANI MINE. JAPAN.

Mine office: Hatazako-mura, Kanoashi-gori, Iwami, Japan. Tojuro Ito, owner. The mine has numerous contact deposits, ranging up to 50′ in width, carrying slightly argentiferous chalcopyrite, sphalerite, galena and arsenopyrite with quartz and limestone gangue. Equipment includes a 95-h. p. installation and average forces were 296 persons, 1908. Production was 274,512 lbs. fine copper and 62,961 momme fine silver in 1900; 324,183 lbs. copper in 1907; 308,358 lbs. copper and 109,215 momme silver in 1907; 320,110 lbs. copper and 101,750 momme silver in 1908.

SASCO SMELTER. ARIZONA.

Owned by Southern Arizona Smelting Co.

SATER COPPER CO. NEW MEXICO.

Dead. Lands were sold under foreclosure, Dec. 12, 1906. Practically was succeeded by Fort Pitt Copper Co. Formerly at Kenton, Oklahoma, with lands in Union County, New Mexico. Fully described Vol. VI.

SAUK RIVER MINING CO. WASHINGTON.

Dead. Formerly at Darrington, Snohomish Co., Wash. Fully described Vol. VIII.

SAULT GRAY COPPER CO. ONTARIO.

Dead. Was absorbed, circa 1903, by Copper Queen Mining Co. Formerly at Bruce Mines, Algoma, Ont.

SAULT PROSPECTING & DEVELOPMENT CO. ONTARIO.

Dead. Was succeeded, circa 1903, by Copper Queen Mining Co. Formerly at Bruce Mines, Algoma, Ont.

SAUX HEAD COPPER MINING CO., LTD. MICHIGAN.

Dead. Formerly at Marquette, Marquette Co., Mich. Fully described Vol. VIII.

SAVAGE GOLD & COPPER CO. ARIZONA.

Office: 625 Noble St., Chicago, Ills. Operating office: Douglas, Ariz. Mine office: Paradise, Cochise Co., Ariz. F. M. Wajtalewicz, president; J. Lewandowski, vice-president; P. Dryzmalski, secretary; A. P. Behnke, treasurer and superintendent; preceding officers, J. Kosinski, A. Spetz, J. Z. Wierzbicki, A. Czajor, J. C. Hess, Jr., and Albert Hindera, directors; Jas. Reay, general manager. Organized Jan 6, 1904, under laws of Arizona, with capital of $3,000,000, shares $1 par. Annual meeting, first Tuesday in November.

claims, area circa 1,000 acres, in the California district, lying
othills of the Chiricahua Mountains, near the San Simón valley,
Lodeo, the nearest rail station. Patents were applied for, and
1909. The property shows 5 irregular ore bodies, apparently
4, under development, are of 2′ to 36′ width, giving assays of 5%
and from nothing to 30 oz. silver per ton, lead values being from
a.
nt is by 5 shallow shafts, to depth of 300′, the 710′ Snowball
wing an ore body ranging up to 23′ in width. There also is a
1 circa 3,000′ of workings.
includes a 60-h. p. Otto gasoline engine and a 75-kw. electric
tors, and electric hoist and electric drills.
lked-of 50-ton smelter failed to materialize, though it was
time, that the material therefor was on the ground. Company
ry, 1908, to plan beginning shipments to the Copper Queen
led utterly to make any production. Idle since August, 1909,
rded favorably.

& COPPER MINING CO. COLORADO & NEW MEXICO.

lorado Springs, Colo. Letter returned unclaimed from former
a Rita, Grant Co., N. M. J. R. McKinney, president; M. W.
sident; L. L. Aitken, secretary and treasurer; preceding officers,
l E. C. Sharer, directors. Organized 1899, under laws of Colo-
alization of $1,500,000, shares $1 par. Company owns a 50%
ittle Lake Exploration Co., at Encampment, Carbon Co., Wyo.,
est in the Arizona Copper & Gold Mining Co., having 5 claims
ima Co., Ariz.
n lands are 7 claims, area 105 acres, said to be in the vicinity of
but idle, apparently for several years.
lo lands are 4 fractional claims, area 12 acres, known as the
ternational Gold King mine, on Gold Hill, near Cripple Creek,
., having a 520′ main shaft. This property was under lease
asing Co., 1910.

PER CO. NEW MEXICO.

sdale Bldg., Duluth, Minn. Operating office: Silver City,
d works office: Silver City, Grant Co., N. M. David L.
ent; Geo. J. Lonstorf, vice-president; Harvey P. Smith, secre-
erritt, treasurer; preceding officers, Carl Landsee, Walter A.
val A. Smith, Thos. A. Merritt and J. E. Rotthaus, directors,
erintendent. Organized Sept. 16, 1908, under laws of Arizona
on $2,000,000, shares $10 par, half in full-paid and half in part
r $5 paid. The company was a merger of the Copper Gulf
Comanche Mining & Smelting Co., and also absorbed the Casa
nent Co., owning, in fee simple, all property formerly owned by
lining & Smelting Co., and holding all but 320 shares of the
Copper Gulf Mining Co. In January, 1911, the company had
ull paid stock and 48,467 shares of part paid stock outstanding.
0 cents were levied October, 1910, and February, 1911. Cash
911, was $7,229.59.
00 claims, area circa 4,000 acres. Of the Burro Mountain
ims, 49 are patented, and receivers' receipts are held for 54
. The Pinos Altos group has 29 claims, 16 patented. The
co[illegible] of 4 patented claims, and the Chloride Flat of 17
[illegible] Harshaw claim of the Pinos Altos group was aban-
[illegible] of small value.
[illegible] Burro Mountain group of 150 claims has an
[illegible] 1,000 acres of iron ore lands, known as the

Iron Mountain mine, held for fluxes, about 1 mile west of Silver City, with ranch and orchard lands, and springs having an estimated flow of 400,000 gallons daily. The Burro Mountain group of the Comanche was 43 claims, adjoining the holdings of the Burro Mountain Copper Co. on the southeast, circa 15 miles southeast of Silver City. The Copper Gulf group consisted of claims having an area of 1,440 acres. A bond on the Reward mine was forfeited, circa 1910.

The lands now held by the Savanna comprise many different groups held at various times in the past by many different companies, including former holdings of the Copper Gulf Development Co., Comanche Mining & Smelting Co., Alessandro Copper Mining Co., Virginia Copper Mining & Smelting Co. and Leopold-Tyrone Copper Co.

The principal property is the Burro Mountain or Comanche-Copper Gulf group, but considerable development has been secured on the Pinos Altos group also. The Jennie group of 4 claims, patented 1910, on the Gila River, 35 miles northwest of Silver City, is not worked, owing to its inaccessibility. Development on the Chloride Flat property has been confined to assessment work.

Operations are confined to churn drilling, begun February, 1910, with a force of 15 to 20 men, and necessary assessment work, but some work is being done on the Pinos Altos group by Corrigan, McKinney & Co., who hold 12 claims under a $100,000 option, dated July 13, 1910, payable half Dec. 1, 1911, and half Dec. 1, 1912. As a further consideration, Messrs. Corrigan, McKinney & Co. took up a $30,000 note of the Comanche Mining & Smelting Co., and are carrying same without interest, until Jan. 1, 1912.

The Burro Mountain-Copper Gulf group shows a central stock of granite porphyry, surrounded by granite and coarse-grained porphyry, without the occurrence of sedimentaries in the district, with the exception of a breccia-conglomerate, occurring in small ridges along the crests of the hills. In a mineralized zone of about 2 by 3 miles there are numerous occurrences of strong and well-defined fissure veins in altered monzonite-porphyry and quarts-porphyry, carrying sulphide ores, including both chalcocite and chalcopyrite, associated with pyrite, having very little silver and practically no gold, ranging 2 to 10% in copper tenor, with an average of probably around 3%. The upper workings of this group show oxide, carbonate and silicate ores, estimated by former owners to carry average values of 5 to 8% copper, which figures probably were too high.

The Burro Mountain-Copper Gulf group as a whole has 8 principal shafts of about 300′ average depth, with 4 miles of workings. The Comanche had 3 shafts connected on the 300′ level, and the Copper Gulf had 5 shafts, all of about the depth, with 10,218′ of workings in the Gettysburg, Virginia and Copper Gulf shafts, April, 1909, developing sulphide ore of 3 to 4% estimated average copper tenor.

The Virginia mine, having a 300′ shaft, is an old property, that shipped for several months of 1907, circa 3 carloads of ore weekly, to the Calumet & Arizona smelter, said to have averaged $23.25 per ton in value. This mine was idle in 1908, to have circa 100,000 tons of ore developed, on the 100′ level.

The principal underground work, 1909, was at the Gettysburg mine, having a 350′ shaft, from the bottom of which a crosscut was run to the Fairhaven mine. Drilling on the Gettysburg apparently has not given very encouraging results.

The Fairhaven mine is developed by the Fairhaven tunnel, which crosses the great Sampson dike, on which the big ore body of the Burro Mountain Copper Co. is located, the tunnel cutting this ore body about 100′ from its portal.

The Boone, Oquawka and Klondike shafts of the Comanche group had 6,449′ of workings April, 1909. These 3 mines have shafts of about 300′ each, and ore has been developed for about 700′ in length, by drifts and borings, latter, near the Oquawka shaft, encountering 15′ of sulphide ore, 3.4% copper. The underground workings of the Boone shaft [illegible]

and lessees, early 1910, extracted some high grade ore, for about
the company 15% of the net smelter returns, but were forced to
posit changed from a small shoot of rich ore to a large vein of low
Copper Gulf mine also has a 300′ shaft. "B" shaft, sunk near
innel, is 300′ deep, with about 100′ of drifts on the 300′ level,
nercial ore, but churn drill borings in the vicinity have exposed
f low grade material, a small part of which is low grade commer-
planned investigating this deposit by drifts from the shaft. In
drill holes were bored, to an average depth of 440′, aggregating
n at an average cost of $1.89 per foot. The Savanna did con-
; along the boundary with the Burro Mountain Copper Co., at
e of both companies, this work resulting in a rather indifferent
Virginia-Copper Gulf-Colwell groups, but several holes on the
oup showed sulphide ore of 5.25% average copper tenor, with
e existence of a large body of good ore, apparently improving in
north and east, in which direction later holes have been bored,
point are much deeper than were drilled previously, being put
950′ in depth, requiring 4 to 6 weeks per hole to drill. Two
employed, April, 1911. The holes on the Copper King claim,
emung mine, offer strong encouragement for the development of
ble body of ore. Borings on the Faulkner claim show ore assay-
per, and No. 39 drill hole, on the Altos claim, gave cores assay-
r at depth of 135′, and chalcocite averaging about 1.5% copper
with commercial ore from 625′ to 745′ depth. No. 45 drill hole,
No. 39, also shows commercial ore.

dro mine has 9 ore bodies, near porphyritic intrusions, showing
lphide ores, claimed by the former owner to give average assays
d 5 to 40 oz. silver, which figures were much too high. The
old shafts, deepest 225′, with total workings of 1,300′.

ltos group, taken over from the Comanche, is 30 contiguous
iles northeast of Silver City, having 4 fissure veins, carrying
e, azurite and chrysocolla in the oxidized zone, succeeded by
t are more or less zinciferous. The Pinos Altos group has 4
00′ depth, and had 29,258′ of workings April, 1909. The Pinos
s a considerable producer, for some years, under the ownership
of the late Senator Hearst, and has developed large bodies
argentiferous copper and zinc sulphides, carrying up to 3% cop-
% zinc, with $8 to $20 combined gold and silver values, per ton.
rkings are the Gillette shaft, sunk on Pacific No. 1 claim, and
on Pacific No. 2 claim. Messrs. Corrigan, McKinney & Co.,
e 600′ Hearst shaft, and started drifting on the bottom level,
a fire, which burned the shaft badly. The shaft is being re-
rface to bottom, and the 900′ Gillette shaft had been partially
May, 1911.

is somewhat inadequate, and a pumping plant was installed,
igan shaft, to furnish water for drilling and camp use, and a
nt was installed also at drill hole No. 21, which developed
r.

y owns the 21-mile Silver City, Pinos Altos & Mogollon
-gauge line having 24" tracks, connecting Silver City and Pinos
has 5 Shay mountain-climbing locomotives, with necessary
The line was optioned, 1910, to Corrigan, McKinney & Co.,
llasted and improved by that firm.

has 2 mills, one being a 50-ton concentrator and leaching plant,
he Alessandro mine, of small present importance. The new
0′ west of the smelter, is of about 200 tons daily capacity,

equipped with crushers, 4 Huntington mills, rolls, jigs, elevators and 12 Wilfley tables, and, with minor alterations, could be brought to a daily capacity of about 300 tons. This mill also has a magnetic separation process plant, for the treatment of zincy ores.

The smelter, at Silver City, on the Silver City branch of the Santa Fé railway, has large ore-bins. There are 200-ton and 300-ton water-jacket blast-furnaces, one calciner, and one reverberatory furnace, and the works have a briquetting plant and a converter department. Slag losses were said to have been only 0.39% copper, when the smelter was operated by the Comanche company.

The reduction plant includes a power-house, boiler-house, machine shop, carpenter-shop, office and a number of dwellings for employés, with electric lighting.

The management planned continuing the present campaign of churn drilling, until improvement in the copper situation warrants the inauguration of regular mining and production. Property considered promising and management good.

SAWATARI MINE. JAPAN.

Owned by Mitsu Bishi Goshi-Kwaisha.

SCANLAND MINE. ARIZONA.

Office and mine: Paradise, Cochise Co., Ariz. F. S. Douglas, general manager; L. H. Scanland, owner and mine superintendent. Lands, 12 claims, unpatented, area 240 acres, also a 10-acre millsite, in the California district, showing limestone, quartzite and porphyry, with 4 ore bodies, of 4′ to 30′ width, of which one, under development, traceable circa 4,500′, carries some oxides and carbonates, but mainly chalcopyrite, galena and sphalerite, estimated to average 3% copper, 20% lead and 23% zinc, with a trace of gold. Development is by a 150′ shaft and 470′ tunnel, with circa 700′ of workings. Idle several years, except for annual assessment work.

SCANTIC GOLD MINING & MILLING CO. COLORADO & MEXICO.

Dead. Formerly at White Cross, Hinsdale Co., Colo., and Charcas, S. L. P., Mex. Described Vol. VIII.

KUPFERKIESBERGBAU SCHATTBERG. AUSTRIA.

Mine office: Schattberg, Tyrol, Austria. Is a small mine, and was a small producer circa 1906. Presumably idle.

SCHELL CREEK RANGE ORE DEVELOPMENT CO. NEVADA.

Office: 406-35 Congress St., Boston, Mass. Letter returned unclaimed from former mine office, McGill, White Pine Co., Nev. Frederick R. Tibbitts, president; Paul I. Welles, vice-president; Harold N. Willis, secretary and treasurer; preceding officers, Chas. Sumner Smith and Henry H. Melville, directors; E. [illegible] Fletcher, general manager; Wm. Balch, mine superintendent; Edwin E. Cl[illegible] consulting engineer. Organized Sept. 11, 1908, under laws of Arizona, with capitalization $2,000,000, shares $1 par; issued, $627,212. International Trust Co., Boston, registrar. Annual meeting, second Thursday in September.

Lands, 31 claims, area 620 acres, known as the Muncy mine, 24 miles [illegible] McGill, and connected therewith by a toll-road having a maximum grade of [illegible] over which it was planned shipping ore by a 5-ton auto-truck. Property [illegible] porphyry and old sedimentary beds, mainly limestone and quartzite. Appar[illegible] little or no mining work has been done. Idle and presumably moribund.

GEWERKSCHAFT SCHLESISCHE NICKELWERKE. GERMANY.

Dead. Formerly at Glasendorf, Schlesien, Germany. Described Vol. [illegible]

SCHULER & VOGEL. MEXICO.

Mine office: Las Minas, Jalisco, Mex[illegible] ship, by A. Schuler and G. Vogel. Pro[illegible] erous and argentiferous copper ore. Pr[illegible]

SCHULL COPPER MINING CO., LTD. [illegible]

[illegible] liquidated, reduced[illegible]

Cor[illegible] Vol. VI.

HRENBOLD JUSTUSHÜTTE. **GERMANY.**
orks office: Weidenhausen, Hessen-Nassau, Germany. Lands lthalsberg mine, carrying iron and copper ores, and the Königsch, Fides and Hainau iron mines. Smelter has one cupola

OPPER CO. **ARIZONA.**
merly at Chloride, Mohave Co., Ariz.

PPER CO. **PENNSYLVANIA.**
Phœnixville, Chester Co., Pa. Property is the Jones mine, ownship, Berks Co., Pennsylvania. Company operated the and built a small smelter. Idle since 1878.

SOLIDATED MINING CO. **UTAH.**
ned unclaimed from former office, Provo, Utah. Mine office: Co., Utah. Samuel Schwab, president; J. P. Creer, vice-presiex, secretary and treasurer. Organized March 31, 1909, under ith capitalization $100,000, shares 10 cents par, assessable. , unpatented, in the East Tintic district, developed by tunnel, rous and auriferous lead and copper ores.

FT SCHWARZWÄLDER ERZBERGWERKE. **GERMANY.**
berg, Germany. Mine office: Littenweiler, Höllenthalbahn, . Eduard Dahmen, Hermann Behrens and Jean Balthasar, tee; Max Reichard, superintendent. Has 1,000 shares. Mines s lead, zinc and copper sulphides. Equipment includes steam d mill are connected by an aërial tram. Employs 200 men. ut 300 tons of concentrates yearly.

G & MILLING CO. **WASHINGTON.**
erly at Bossburg, Stevens Co., Wash.

INING CO. **UTAH.**
ed unclaimed from former office and mine, Park City, Summit). Lewis, president; Jas. Byrne, vice-president; S. L. Raddon, surer. Organized May, 1909, under laws of Utah, as a reconopper Apex Mining Co., with capitalization $100,000, shares ssable. Lands, 10 claims, 7 patented, on Scott Hill, between od and Uintah districts, carrying auriferous and argentiferous res. Mine is developed by a shallow shaft, showing argentiff good assay tenor, and an 800′ tunnel. Equipment includes lle.

F MINING CO. **UTAH.**
tlas Blk., Salt Lake City, Utah. Letter returned unclaimed office, Park City, Summit Co., Utah. Frank Harris, presi-, vice-president; H. Park, secretary, treasurer and general ed Nov. 14, 1902, under laws of Utah, with capitalization par, assessable; fully issued, and the fourteenth assessment 910. Shares are listed on the Salt Lake stock exchange.
ns, patented, held under a bond and lease expiring July 11, , on the divide between Thaynes and Big Cottonwood cañon. opened to depth of about 900′, by incline shafts, and a 1,671′ back of circa 1,200′ on the incline, and a 200′ winze therefrom. shows auriferous and argentiferous copper and lead ore, and 21 oz. silver per ton, from which several small ship- circa 14% copper and 20 to 50 oz. silver per ton. No ore has been shipped since 1907, ayable ore at depth. Equipment

SCOTTISH COPPER MINES SYNDICATE OF BRITISH COLUMBIA, LTD. BRITISH COLUMBIA

Dead. Formerly at Kamloops, Yale district, B. C. Described Vol. V

SCOTTISH NORTH QUEENSLAND EXPLORATION CO., LTD. AUSTRALIA

Office: 16 Bothwell St., Glasgow, Scotland. Mine office: Chillagoe, Lynd Co., Queensland. Alex Macdonald, managing director; preceding officers: Dr. G. Gardner, T. Dunlop and W. W. Blackie, directors; J. M. Lochhead, secretary. Organized Aug. 19, 1907, under laws of Great Britain, with capitalization £10,000, shares £1 par. Debentures, £5,000 authorized, £4,170 issued.

Lands, in the Klondyke district, near the Tate River, about 25 miles from Mungana and 17 miles from a railway, include the British Empire, Bonnie Scotland, Hercules, Caledonia, Clansman, Chieftain, Atlas and Eldorado leases, developing by several shallow shafts.

SCOTT MINES CO. ARIZONA, NEVADA & UTAH

Letter returned unclaimed from former office, 322 Judge Bldg., Salt Lake City, Utah. Mine offices: Bouse, Yuma Co., Ariz., and Pioche, Lincoln Co., Nev. C. C. Parsons, president; E. L. Godbe, vice-president; René Van Bourghoudt, secretary and treasurer; preceding officers, A. L. Hoppaugh, R. J. Gratz and H. Frank Carey, directors. Organized under laws of Nevada, with capitalization $5,000,000, shares $1 par, and controls, through stock ownership, the Pioche & Arizona Copper & Gold Mining Co., having claims at Bouse and Pioche, the Rawhide Northern Consolidated Mines Co., at Rawhide, Nevada; the Tiewaukee Leasing Co., of Bingham Canyon, Utah, and the Wild Bill Mining & Milling Co., having property in Beaver county, Utah. The management was changed, circa 1910, as the result of internecine dissensions. Presumably

SCOTT-THOMPSON SYNDICATE, LTD. ENGLAND

Office: 34 Clement's Lane, London, E. C., Eng. Mine office: Illogan, Cornwall, Eng. J. H. Scott, T. Flack, G. D. Perks, T. Barry and E. L. Phillips, directors. Organized May 10, 1906, under laws of Great Britain, with capitalization £20,000, shares £1 par; increased, January, 1907, to £30,000; July, 1907, to £40,000, and June 10, 1908, to £50,000, in £40,000 ordinary and £10,000 B shares. Has £10,000 first and £10,000 second mortgage debentures, convertible into fully paid shares at option of holders. Property is the North Crofty mine, carrying arsenical copper, zinc and tin ores. The mill has 5 magnetic concentrators.

SCRANTON EXTENSION MINING CO. UTAH

Letter returned unclaimed from former office, Lehigh, Pa. Mine at Eureka, Juab Co., Utah. Geo. Beck, president; L. P. Johnson, vice-president; Jas. M. Kirkham, secretary and treasurer. Organized December, 1908, under laws of Arizona, with capitalization $100,000, shares 10 cents par. Idle, apparently since organization, and presumably moribund.

SEABOARD COPPER CO. VIRGINIA

Office: 77 South Market St., Boston, Mass. Mine office: Virgilina, Halifax Co., Va. Geo. R. Leghorn, president; H. J. Sampson, vice-president; Edward L. Pond, secretary; C. C. Merritt, treasurer; L. W. Tucker, general manager. Organized July, 1902, under laws of New Jersey, with capitalization $300,000, shares $1 par.

Lands, 135 acres, including the Dorothy and Bailey mines, in the Virgilina district, 3 miles from the Southern railroad, showing a fissure vein in slate, estimated width, carrying cuprite, malachite and azurite in the upper part, with bornite below, estimated to average 3 to 4% copper, with combined gold and silver values of $1 to $1.20 per ton. Development is by shafts of 30, 100 and 115', and by 2 tunnels, of 165' each, with a total of 840' of underground workings, estimated to show 40,000 tons of ore, with 10,000 tons blocked out in stoping, and with 6,000 [illegible] on the dumps, ready for milling.

includes a 275-h. p. steam plant, with a 25-h. p. Lidgerwood 500′ depth, and a 5-drill Ingersoll-Sergeant air-compressor. ·ton· mill, and buildings include an engine-house, bunkhouse · since 1904, and apparently moribund.

'ELL GOLD & SILVER MINING CO., LTD. **IDAHO.**

merly at Custer, Custer Co., Idaho. Described Vol. VIII.

:OPPER CO. **ALASKA.**

A. Barrette was superintendent. Lands were 6 claims, about he Rush & Brown property, on Kasaan Bay, Prince of Wales chalcopyrite giving assays up to 20% copper. Formerly at of Wales Island, Alaska.

[COPPER-GOLD MINING CO. **NEVADA.**

Stimson Blk., Los Angeles, Cal. Mine office: Searchlight; . Samuel T. Graham, president; J. W. Cornick, vice-president; retary, treasurer and general manager; preceding officers, Robt.). Allen, directors; John H. Ohman, superintendent. Organized under laws of Arizona, with capitalization $1,000,000, shares ssable. Annual meeting, first Monday in November.

aims, area 140 acres, said to be surveyed for patent, formerly 6 ore bodies, with 3 under development, and now reported to veins in granite, with one, under development, of 4′ average 4,500′, carrying copper carbonates and chalcocite, formerly management to average 12.8% copper and up to $40 gold per timated to average 29% copper and $9 silver per ton, the sur- in the number and nature of the ore bodies being somewhat velopment is by the 100′ Oom Paul shaft, and tunnels of 20′, work having been done for some time. The property has no ildings. The company reports that the property is under op- The old management did badly by the property, and the new st accounts, was offering stock for sale, and promising enormous n, hence is regarded unfavorably.

' GOLD & COPPER CO. **ARIZONA.**

merly at Patagonia, Santa Cruz Co., Ariz. Described Vol. VIII.

NG & MILLING CO. **COLORADO.**

merly at Idaho Springs, Clear Creek Co., Colo.

;KA COPPER CO. **ALASKA.**

New York Block, Seattle, Wash. Mine office: Latouche, , Alaska. E. Sparks, president; Geo. W. Terwilliger, vice- J. Hodge, secretary; Jos. Bjorn, treasurer; preceding officers directors. Organized under laws of Washington, with capitali- 0, shares $1 par, nonassessable.

claims, area circa 700 acres, near Montgomery Bay, in the ntral part of Latouche Island. Lands are in 2 groups, one of ewater, with another group of 25 claims about a mile from the ing said to carry the extension of the Beatson-Bonanza vein. by a 287′ tunnel, on the Delta claim, showing a vein of 4′ to 6′ ore that, after assortment, has assayed 11 to 22% copper. on other claims have shown ore giving good assay values. The 1 claim has a 101′ shaft, with an 85′ crosscut, showing 2 veins,

includes steam power, and there is a mill, to be operated by ving five 1,000-lb. stamps, with room for additional stamps, 2 one slime table.

TON COPPER CO. **WASHINGTON.**

erly at Skykomish, King Co., Wash. Fully described Vol. VIII.

SEATTLE CASCADE MINING CO. **WASHINGTO**

Office: Seattle, Wash. Mine office: Berlin, King Co., Wash. F. C Winquist, manager; Robt. Dixon, superintendent. Lands, 6 claims, about mile north of the Una mine, on Miller River, 4 miles from Berlin, showing a ve of 4′ to 5′ width, carrying auriferous and argentiferous galena and chalcopyri with values in silver, lead, copper and gold in the order named, developed by 400′ tunnel having a back of 275′. Equipment includes water power and a compressor. Management planned, 1910, a 100-ton concentrator, to have crusher, Chilean mill and Wilfley tables.

SEATTLE CONTACT MINING CO. **NEVAD**

Letter returned unclaimed from former office, Seattle, Wash. Mine off Contact, Elko Co., Nev. G. A. Marshall, president. Lands, 48 claims, kn as the Delano group, developed by a 100′ shaft and 300′ tunnel, with several exploratory tunnels. A 3′ vein of ore, cut in the main tunnel, 30′ from the port gave assays of 25% copper, 0.5 oz. silver and $5 gold per ton. There also parallel vein, of 16′ estimated width, said to average 5% copper.

SEATTLE COPPER & ASBESTOS CO. **WASHINGT**

Office: 531 Peoples Bank Bldg., Seattle, Wash. Letter returned claimed from former mine office, Leavenworth, Chelan Co., Wash. Edw Peterson, president and general manager; J. A. Metcalf, vice-president; C Anderson, treasurer; A. Van Epps, superintendent; preceding officers directors. Organized 1906, under laws of Washington, with capitali $2,000,000, shares $1 par, nonassessable.

Lands are reported by the company as 27 claims and 2 millsites, in 7 claims known as the Chrisolite group, on Mt. Stewart, and the compan claimed 2 water-powers, at the base of Mt. Stewart. The copper gro claims, 3 miles from the Aurora Mining Co., is claimed to have 2 copp one, of 3′ width, between granite and schist, traceable 6,000′, carrying ite, chalcocite and chalcopyrite, estimated by the company to average 20 per, 6 to 29% lead and 10 to 20% zinc, which figures are entirely too hig last accounts this property had only a 50′ tunnel. The company also asbestos claims. Presumably idle.

SECRET COPPER MINING CO., N. L. **AUSTR**

Mine office: Illewong, N. S. W., Australia. Jas. Wilson, manager accounts. Organized December, 1907, under laws of New South Wales capitalization £1,200, shares £10 par. The mine has a 250′ shaft, with cut from the bottom.

SECRET MINING & MILLING CO. **U**

Letter returned unclaimed from former mine office, Alta, Salt Lake Utah. Wm. M. Minor, president; Chas. P. Minor, vice-president; Harper, secretary; R. W. Clough, treasurer; preceding officers, E. D. H and John C. Swickard, directors. Organized circa April, 1906, under Utah, with capitalization $300,000, shares $1 par. Lands, 4 claims, acres, adjoining the Albion mine on the southeast, having a tunnel showing lead ore that has given assays up to $100 per ton. Idle and seems likely come a dead secret.

SECTION TWELVE EXPLORATION CO. **MIC**

Hancock, Mich. Mine office: Houghton, Houghton Co. manager; Ja Edwards, engineer. Is a private syndic 0,000, ar, convertible into shares at sub mining company to succeed th

lying northeast of the Sup lands being in S R. 33 W. The p all showing

ıygdaloidal bed, thought to be the northern extension of the Bal-
: by trenches, and cores taken at depth by diamond drill borings
in promising quantities. At surface the bed carries calcite and
with copper carbonates from weathering, with some native cop-
y conglomerate bed, 60′ to 150′ in the footwall, that outcrops
nforms to the conglomerate in the foot of the bed at the Baltic
ce 1910, awaiting improved conditions in the copper market.
ered promising.

)LD & COPPER CO. **WYOMING.**

: Atlantic City, Frémont Co., Wyo. Lands, west of Atlantic
ːin of 20′ estimated width, carrying ore said to give good gold
ıably idle.

NING & DEVELOPMENT CO. **MONTANA.**

·merly at Princeton, Granite Co., Mont. Described Vol. IX.

PER CO. **COLORADO.**

: Salida, Chaffee Co., Colo. Capitalization is 90,000 shares.
ed for 10 years to the Salida Gold & Copper Mining Co., which
nd was succeeded by the Shawmut Consolidated Mining Co.,
ː to grief, and was succeeded by the Salida Copper Co., which
at last accounts. Property described under title of Salida

MINING CO., S. A. **MÉXICO.**

artado 295, San Luis Potosí, Mex. Mine office: Zacualpam,
o, Mex. G. Waddill, president; preceding officer, F. C. Doty,
)ff, E Lavin and Pedro Barçena y Trueba, directors; A. Kraemer,
)rganized 1907, under laws of México, with capitalization 300,000
pesos par.

ectares, adjoining the Carboncillo mine, being an antigua mine,
n worked in the Sixteenth Century. Property carries 7 defined
y about 1,500 meters of tunnels, the Bobo tunnel developing a
′ width, carrying ore said to assay up to 3 kgs. silver and 4 to 10
metric ton. The company also owns claims in the state of
·ying auriferous and argentiferous copper ore, which are idle.
ıid, 1908, to have ordered a 120-ton mill. Presumably idle.

NYME DES MINES DE CUIVRE DU SEIBAL. **BRAZIL.**

Rue de Chabrol, Paris, France. Mine office: Camaquam, Ca-
ınde do Sul, Brazil. Al. Fluert, president. Organized May 5,
ı of France, with capitalization 415,000 francs, shares 100 francs
near the Camaquam mine, carries argentiferous and auriferous
associated minerals. Presumably idle.

JAPAN.

Saganoseki-mura, Kita-Amabe-gori, Bingo, Japan. Produc-
904,463 kwan copper ore, valued at 28,567 yen.

FT SELBECKER BERGWERKS-VEREIN. **GERMANY.**

ned unclaimed from former mine office, Selbeck, Rheinprovinz,
y. Heinrich Stein, Louis Hagen, Franz Hagen, Paul von Rath,
hausen and Dr. H. Busch, directors; Wilhelm Löhmer, super-
ınized with capitalization 1,000,000 marks, shares 1,000 marks
ıstruction of Aktiengesellschaft Selbecker Bergwerksverein.
small properties, having 3 shafts, developing galena, sphaler-
rite. Employed circa 300 men, at last accounts, and manage-
eepening shafts, enlarging the electrical plant, and adding
Production, 1908, was circa 5,000 metric tons of zinc blende,
and 250 tons of chalcopyrite.

ING & LEAD CO. **CALIFORNIA.**

Exchange Bldg., San Francisco, Cal. Works office:

Selby, Contra Costa Co., Cal. H. B. Underhill, Jr., president; Eugene B Braden, vice-president; Chas. J. Durbrow, secretary; E. N. Engelhardt, superintendent. Organized 1875, under laws of California, and is controlled, through stock ownership, secured 1905, by American Smelters Securities Co., a subsidiary corporation of the American Smelting & Refining Co. The works represent an investment of about $4,000,000.

The smelter occupies a somewhat circumscribed site, having grown rapidly at Vallejo Junction, near Carquinez Strait, receiving ore by rail and water, and drawing ore from all of the Pacific states of the Union, with a greater portion of the supply coming from Nevada. The works include a 400-ton smelter having lead stacks, a 200-ton lead reverberatory, a refinery for parting gold and silver, and a plant for the manufacture of bluestone. Equipment includes steam, electric and air power. Some trouble has been had with the agricultural interests over alleged damages from fumes, and an injunction was secured, 1907, by the authorities of Solano county, but the works were not closed, and it is probable that much of the fume damage claimed was mythical. The plant includes a baghouse, and also a special chamber having the Cottrell process for precipitating solids from fumes, used in connection with the parting room of the gold and silver refinery.

The Selby is perhaps the largest smelter producer of gold in the United States, or possibly in the world, as the 1908 production of refined gold was $25,200,000, being nearly a quarter of the entire production of the United States, in addition to which the works turned out circa $8,000,000 worth of refined silver and $1,800,000 worth of lead.

SELLHEIM SILVER & COPPER MINES, LTD. AUSTRALIA.

Office: Darragh's Bldgs., Queen St., Brisbane, Queensland, Australia. Mine office: Sellheim, Sellheim Co., Queensland, Australia. P. W. Cox, secretary and manager. This is a case of three twins, the other two being the Cloncurry Copper & Gold Exploration Co., Ltd., and the North Queensland Gold & Copper Association, Bowen, Ltd., all promoted by the secretary and manager, who seems a black crow. The only property is land near Sellheim held under application for a mineral lease, but this property is idle, and has been worked for some years, and the company apparently was organized to work the pockets of British investors.

SELMA MINES CO. UTAH.

502 Newhouse Bldg., Salt Lake City, Utah. Mine office: Knightsville, Juab Co , Utah. Chas. Tyng, president; Willard Hanson, vice-president; Chas. W. Carlson, secretary and treasurer; preceding officers, E. R. Morgan, L. C. Peterson, J. C. Jenson and John Anagyros, directors; L. P. Peterson, manager. Organized December, 1909, under laws of Utah, as successor of Selma Consolidated Mining Co., with capitalization $50,000, shares 5 cents par, assessable.

Lands, 10 claims, unpatented, near the Lehigh Tintic mine, supposed to carry the northern extension of the mineral zone of the Colorado mine, 2 miles from a railway. The property has a lime-porphyry contact, with 3 principal fracture zones carrying argentiferous lead and copper ores, and has secured small quantities of exceedingly high grade ore. Development is by a 3-compartment shaft, and a 900′ tunnel showing leached ground, with occasional bunches of good ore. The mine has a cave up to 20′ high, 35′ wide and 100′ long. The old company expended about $75,000 on development.

Equipment includes steam and electric power, with an electric hoist and air-compressor. Buildings include shops and a boarding-house.

SEMINOLE COPPER CO. UTAH.

Office: 208 Brooks Arcade, Salt Lake City, Utah. Mine office: Coalville, Juab Co., Utah. Chas. D. Wilson, president; W. F. Wilson, vice-president; F. L. Wilson, secretary; preceding officers, W. R. Wilson and J.

s. Organized 1907, under laws of Utah, with capitalization 25 cents par.

aims, adjoining the Wilson Consolidated, and holdings of the & Milling Co. The property shows veins carrying free gold, t deposit, between limestone and monzonite-porphyry, carrying gentiferous copper and lead ores, with some surface ores assay- copper tenor. The property is also said to show lead, tin and ment is by shaft.

PPER MINING CO. **GEORGIA.**

perty was sold, 1904, by the sheriff, to Carl Henrich, for $33,000. ucceeded by Lincoln Gold & Copper Mining Co. Formerly at es Co., Ga. Fully described Vol. III.

D MINING & MILLING CO. **COLORADO.**

Breckenridge, Summit Co., Colo. M. M. Howe, manager, at roperty carries auriferous and argentiferous copper ores, with the precious metals. Equipment includes a small steam plant.

ES CO. **COLORADO.**

) Association Bldg., Chicago, Ills. Mine office: Black Hawk, Chas. Kingsley Ray, president; John G. McConnell, vice- . H. Brown, secretary; W. J. Blake, superintendent; preceding . Hicks, directors. Organized 1906, under laws of Colorado, n $1,500,000, shares $1 par. Lands, 2 claims, having a 550′ 2,000′ of workings, showing veins of 5′ to 7′ width, with a 2′ ng mainly ore of concentrating grade, with values in silver, nainly the latter. Equipment includes a hoist good for 1,500′, ent plans an electric power installation.

G CO. **MICHIGAN.**

shburton Place, Boston, Mass. Operating office: Calumet, ce: Ahmeek, Keweenaw Co., Mich. Rodolphe L. Agassiz, .. Flagg, secretary and treasurer; Jas. MacNaughton, general ng officers, Francis L. Higginson and Francis W. Hunnewell, ell Smith, superintendent. Organized March 23, 1860, under with capitalization $500,000, shares $25 par, fully issued, $10 ed, through ownership of 11,207 shares, by the Calumet & The company had a debit balance, Jan. 2, 1911, of $112,953. o., Boston, registrar. State Street Trust Co., Boston, transfer eeting, fourth Monday in March.

acres, having been 3,240 acres originally, reduced, 1880, by neek mine. The tract, which is just north of the Mohawk and very irregular and somewhat awkward in outline, heavily , and a considerable portion is swampy. The property carries eenaw and Allouez conglomerates, and the Osceola, Kearsarge gdaloidal beds, reliance being placed mainly upon the Kear- Seneca carries 1¾ miles of the strike, this bed outcropping on orner of the property. The mine is served by the Keweenaw

ratory work was done, 1865, and again in 1880, on the Kear- e, when 2 shafts were sunk on that bed, to a depth of about k was abandoned shortly, and this part of the property was set meek Mining Co. The Seneca property was diamond drilled, some good cores from the Kearsarge amygdaloidal bed.

is by a single three-compartment shaft, known as No. 1, located about 3,000′ north of No. 1 shaft of the Gratiot mine. rted through 14′ of overburden, with an anchorage of 44′ in 8′ of concrete from the collar, and is perfectly watertight and face seepage. The shaft is sunk in the footwall, being 60′

from the Kearsarge bed on the first level, 250′ on the 3d level, and 220′ on the 5th level. The shaft was 957′ deep May, 1911, with 5 levels, spaced, about 200′ apart to the 3d level, below which they are opened at 175′ intervals. Developments show little or no copper values above the 4th level, but the bed has been opened by crosscuts and drifts on several levels, with a total of 1,783′ of laterals. On the 5th level the Kearsarge bed is about 15′ wide, and, for a distance of 150′, carries a 4′ paystreak having fair copper values. No. 1 shaft has a large temporary frame shaft-rockhouse, with an 18x24″ crusher.

There is room on the tract for a second shaft on the outcrop of the Kearsarge bed, but this must be reached by vertical or sharply inclined shafts on the balance of the property, as the outcrop is not carried, though the underlay extends under the entire tract.

Equipment includes a small power-house, having a Lake Shore duplex hoist raising 2½-ton skips, good for depth of 2,000′, a 15-drill air-compressor and 2 locomotive firebox boilers. Buildings include a boarding-house and bunkhouse. Operations were suspended April, 1911. Property considered promising.

It is proposed by the Calumet & Hecla Mining Co. to merge the Seneca in a new Calumet & Hecla, exchanging stock on the basis of thirty one-hundredth shares of new Calumet & Hecla stock for one share of Seneca, and 15,455 shares, or more than 75% of the stock issue, were voted in favor of this consolidation plan, at the annual meeting, March, 1911. For further particulars regarding this proposed merger, readers are referred to the article descriptive of the Calumet & Hecla Mining Co.

SENTER-DUPEE DEVELOPMENT CO. MICHIGAN

Letter returned unclaimed from former office, Calumet, Mich. Mine on Delaware mine, Keweenaw Co., Mich. Capt. Thos. Hoatson, manager; H... G. Wright, superintendent. Organized December, 1910, but not incorporated, being a private syndicate. Lands, 1,520 acres, held under long term option, to 3 miles south of the Delaware mine and northeast of Gratiot Lake, near the eastern sandstone, in about the center of Keweenaw county, and carrying about 2 miles of the strike of the Keweenawan formation. Lands are the S. ½ of Sec. 26; S. ½ of Sec. 27; N. ½ of Sec. 34; N. ½ of Sec. 35; SE. ¼ of Sec. 34; E. ½ NW. ¼ Sec. 33, T. 58 N., R. 30 W. Diamond drilling was begun January, 1911, some difficulty being experienced in getting into solid rock, owing to boulders in the overburden, and in February, 1911, an amygdaloidal bed was cut, giving a core showing considerable copper.

SENZE KUPFERBERGWERK GESELLSCHAFT. ANGOLA

Office: Bremen, Germany. Mine office: Senze do Itombe, Angola. Fr. Oloff, chairman; F. W. Meyer, vice-chairman; preceding officers, P. Burhan, C. A. Wuppesahl and E. Haas, directors; C. H. Cremer, manager. Organized Apr. 26, 1910, under laws of Germany, with capitalization 200,000 marks, shares 2 marks par.

Lands, 2 kilometers from Senze do Itombe, and 192 kilometers from Loanda, show a 5-meter bed of calcareous sandstone, dipping at about 20°, said to carry about 5% copper. A little work was done on the property, from time to time, under former ownerships.

SOCIEDAD MINERA DE LA SERENA. CHILE

Mine office: Higuera, La Serena, Coquimbo, Chile. Lands include the Llanca and Llanquita mines, in the vicinity of the Mina Cocinera, having a vein of about 1 meter width, with EW. strike, opened to depth of 240 meters on length of circa 400 meters, mine being wet, for Chile, below depth of 180 meters. Equipment includes a 40-h. p. steam plant, and the mine employed 85 men. Production was 600 metric tons of 11% copper ore, equal to circa 110 tons fine copper, 1908.

SERRANO GOLD & COPPER MINING CO. MEXICO

Office: Main St., Danville, Pa. Letter returned unclaimed from [illegible]

Cananea, Arizpe, Sonora, Mex. J. X. Grier, president; C. E. ; M. I. Low, treasurer; D. H. Collins, general manager, at last ized February, 1903, under laws of Arizona, with capitaliza- shares $1 par. Lands, 112 pertenencias, south of Cananea, us copper ores. Idle several years and presumably moribund.

K MINING CO. **ARIZONA.**

Wendendale, Yuma Co., Ariz. Seth Bullock, general mana- laims, well watered, having Cottonwood Springs thereon, in . No trace of mining operations secured.

CONSOLIDATED COPPER CO. **IDAHO.**

Continental National Bank Bldg., Salt Lake City, Utah. dore, Washington Co., Idaho. W. W. Byrne, president and Thos. Marioneaux, vice-president; John W. Geiger, secretary; asurer, preceding officers, August Tetreault and J. W. Kooger, urner, superintendent. Organized Aug. 15, 1907, under laws capitalization $5,000,000, shares $5 par, nonassessable; issued

ims, unpatented, area 220 acres, 6 miles down the river from ine, and 20 miles from a railway. Development is by a 75′ tunnel, former showing ore assaying 8.6% copper and 3 oz. The property has no power equipment or buildings. Idle, assessment work.

COPPER CO. **IDAHO.**

Realty Bldg., Elmira, N. Y. Mine office: Landore, Washing- ohn Bull, Jr., president; Chas. F. Riddle, vice-president; Chas. cretary; Fred D. Smith, general manager; preceding officers, Wm. B. Fisher and Jas. A. Howard, directors; J. C. Bowen, Organized March 31, 1908, under laws of Arizona, with capi- 00, shares $1 par, nonassessable; issued, $1,440,625. Annual uesday in March.

ims, 1 fractional, patented, area 175 acres, including the h and Margaret mines, 14 miles from a railway. The prop- act deposits, between diorite and limestone, having a strike nated by the management to range 15′ to 50′ in width, carry- succeeded, at a little depth, by sulphides, the management be, in order of importance, chalcopyrite, bornite and azurite, ge 5% copper, 2 oz. silver and $1.50 gold per ton. Develop- by tunnels, there being drift tunnels of 1,200′ and 350′, and a el, with 3,500′ of workings, estimated by the management to of ore, with 58,000 tons blocked out for stoping. The Arkan- uced a little high grade ore in the past.

ludes a 125-h. p. electric plant, taking power from the Oxbow gon-Idaho Power Co., and there is a sawmill near the mine. lans driving the 500′ Iowa or No. 2 crosscut tunnel to length ates that this work should develop 450,000 tons of ore, of both smelting grades.

MINING & DEVELOPMENT CO. **IDAHO.**

rly at Landore, Washington Co., Idaho.

UR & COPPER CO., LTD. **SPAIN.**

orge Square, Glasgow, Scotland. Operating office: Patio lla, Spain. Mine office: Aznalcóllar, Sevilla, Spain. Jas. eceding officer, A. N. Henderson, and C. H. Graham, direct- secretary; John S. Macdougall, general manager; Robt. ager. Organized August, 1877, under laws of Great Britain, [illegible], shares £10 par, fully issued. Is a close corpora- [illegible]. Property, at the eastern end of the Sierra

Morena, in the province of Sevilla, carries cupriferous and argentiferous pyr... having good values in both copper and silver. The mine has been worked ... many years by the present company, and is supposed to have returned ... profits. Production was 2,867,200 lbs. fine copper in 1905; 4,569,600 lbs. ... 1906; 4,152,000 lbs. in 1907; 4,838,400 lbs. in 1908; 4,076,800 lbs. in 19... 3,651,200 lbs. in 1910.

SHACKETT MINING CO. CALIFORNIA

Dead. C. J. Shackett was president and general manager; H. L. McNe... vice-president and treasurer; J. N. King, secretary. Was organized under l... of Arizona, with capitalization $100,000, shares $1 par. Lands were 7 cla... unpatented, showing auriferous and argentiferous copper ore. Formerly ... Skidoo, Inyo Co., Cal.

SHAFTER MINING CO. COLORADO

Office: 1 Broadway, New York, N. Y. Mine office: Idaho Springs, C... Creek Co., Idaho. Thos. Peyton, president; M. S. Peyton, vice-presid... Chas. D. Ross, secretary and treasurer; Arthur H. Roller, general manag... Edmund Lect, mine superintendent; F. L. Stout, mill superintendent, at l... accounts. Organized 1880, under laws of New York, with capitaliz... $100,000, shares $100 par.

Lands carry auriferous and argentiferous copper ores, values appar... being mainly in gold. There is an 80-ton mill having 20 gravity stamps, ... equipment includes steam and electric power. Company employed 20 me... last accounts.

SHAMBLÜRGSKI WORKS. RUSSIA

Letter returned unclaimed from former office, Tiflis, Russia. Mine ... Berchalinsk, Tiflis, Russia. A. A. Broli, owner and manager, at last ac... Mine has 5 shafts, and employed, 1909, an average of 75 men, of whom 67 ... underground. Production, 1909, was 264,000 poods of ore, estimated to co... circa 250,000 lbs. fine copper.

SHAMROCK COPPER CO. NEW MEXICO

Dead. Formerly at Nogal, Lincoln Co., N. M. Described Vol. VIII.

SHAMROCK MINE. CALIFORNIA

Office: P. O. Box 117, Placerville, Cal. Mine office: Greenwood, ... Dorado Co., Cal. Lle. H. Wilkins, owner and manager. Lands, 28 claims, ... 560 acres, in Section 26, and 12 claims, patented, area 150 acres, in Section ... T. 13 N., R. 9 E. Property, well watered and timbered, 3 miles from G... wood, in the Foothill copper belt, carries about 4,500' of the strike of a copp... body having a hematite foot and porphyry hanging. Several prospect sh... shows the continuity of the vein, which carries sulphide ore, estimated to a... about 6% copper, with fair to good gold and silver values. Developme... the 80' Lipton tunnel, showing an ore body of 2' to 4' width, giving assays ... 4% copper, 12 oz. silver and $10 gold per ton, and the 180' Dundee drift ... breasted in a vein of about 4' width carrying a 2' paystreak showing good v... in copper, gold and silver. The floor of the Dundee tunnel gives ore ... 4% copper, 12 oz. silver and $10 gold per ton, with some ore assaying up to ... copper, 12 oz. silver and $20 gold per ton. Presumably idle.

SHAMROCK MINING CO. ARIZONA

Mine office: Vicksburg, Yuma Co., Ariz. Robt. McEntee, pres... Lawrence McEntee, vice-president; T. J. Prescott, manager. Lands, 8 ... northwest of Vicksburg, in the Plomosa district, carry argentiferous copper ... with good assay values in copper and silver, developed by a 125' shaft. Pro... was bonded, 1910, to F. L. Richmond.

SHAMROCK MINING CO. UTAH

Mine office: Marysvale, Piute Co., Utah. W. J. Wostenholm, mana... Lands, in Bullion Cañon, have a 3' vein, developed by 2 tunnels, No. 1, the ... tunnel, showing ore assaying up to 8% copper, 60 oz. silver and $12 gold per to...

wer tunnel, of 162', December, 1910, showing ore giving assays 3 oz. silver and $108 gold per ton. A few carloads of rich ore 10.

PER MINING SYNDICATE. **AUSTRALIA.**

Cobar, Robinson Co., N. S. W., Australia. Mine, slightly 72' shaft at last accounts, 1908. Idle and presumably mori-

PPER CO. **ARIZONA.**

Devonshire St., Boston, Mass. Mine office: Metcalf, Graham ks office: Clifton, Graham Co., Ariz. Nathan L Amster, B. Clough, vice-president; David A. Ellis, secretary; R. Town- treasurer; preceding officers, Col. Chas. Hayden, Berthold hibald McNeil, Wm. A. Paine and Jas. Virdin, directors, assistant secretary and assistant treasurer; John W. Bennie, ; H. H. Dyer, general superintendent; H. A. Collin, mine super- H. Bond, mill superintendent; Thos. Neilson, metallurgist; , engineer.

Nov. 13, 1899, under laws of Delaware, with capitalization es $10 par, increased, July, 1909, to $3,300,000; issued, $300,000 held in the treasury for conversion of an issue of onds, authorized May, 1909, by the Shannon-Arizona Railway into Shannon stock at $20. The company also has a direct issue iginally $600,000, reduced, Sept. 1, 1908, to $179,000, with a inking fund for bond redemption, reducing the bond issue, less 58,653.91, at end of the fiscal year, Aug. 31, 1910. The balance 1910, showed $312,840.79 investments in subsidiary properties, r and accounts receivable of $124,838.18, and current accounts 226.65. Surplus was given as $1,091,866.95. The company shareholders. Shares are listed on the Boston stock exchange. ut Bank, Boston, registrar; Boston Safe Deposit & Trust Co., Annual meeting, third Wednesday in November.

a controls the Coronado Mining Co. through ownership of 51%, and operates, under lease, the property of the Leonard Copper Copper Belle mine, at Gleeson, Cochise Co., Ariz.

aims, area circa 400 acres, at Metcalf, in the Greenlee district, circa 100 acres area, and some limestone claims on the Frisco aims, and a half interest in another claim, were bought circa ading the Weaver claim. Apparently the Greenlee group, ton & New England property on the north, is held under lease. s reported, in the press, to have bought the Blue State group of acres, showing gold and copper, opened by a shallow shaft, at , Ariz., for a reported price of $100,000. The Shannon has a nt with the Arizona Copper Co., Ltd., by which extra-lateral l mutually, obviating all possibility of future litigation over

etween limestone and porphyry, under heavy gossans of fairly e oxidized ores favoring the limestone, and ores of the porphyry ilicious sulphides, latter predominating. The ore occurs in osits, some of which are up to 300' in the greatest dimension. odies are large, and, while the ore is low in grade, and bunchy, ry great. The mine shows oxide and carbonate ores, of 3 to 8% the upper levels, and sulphide ores of 2 to 6% tenor rkings, the sulphide ores being mainly chalcopyrite, with

The mine, as a whole, is deficient in sulphide ores, and about roduction is silicious ore, too low in grade to smelt, and not

readily amenable to concentration. The concentrating ores averaged 2.5% and smelting ores circa 5%, in January, 1910.

The mine is developed by shafts, tunnels and open pits, underground workings reaching a depth of circa 1,300′ below the crest of the mountain, and the mine had upwards of 10 miles of workings, 1910, with considerable ore reserves. There are 4 pits, some showing cupriferous iron ore averaging 2% copper, highly valuable for fluxing the silicious sulphides produced from the underground workings. The 1,100′ or so-called ore level, is the deepest, exploring 4 winzes, the deepest winze being No. 2, of 120′, February, 1911, bottomed in ore up to 6% in copper tenor, an upraise showing about 20′ of smelting ore, and a large quantity of low grade smelting ore of about 3% tenor. The ore level formerly was supposed to mark the bottom limits of payable ore. The East and West winzes are about 1,500′ apart, and it is obvious that an immense amount of ore exists below what formerly was considered the bottom limit of payable ore, much of the new ore being of excellent average grade. Ore developed below the ore level is to be extracted by shafts betwen the Carter and West levels. The mine is timbered with 12x12″ square sets. Extraction is by double-track tunnels, one, of 7x8′ in size, connecting with a 1,400′ double-track incline tram, leading to the Coronado railway, with 6 ore-bins at either end, the tramway, inclined at 36°, having 10-ton cars, operating in counterbalance, with retarding engine at the upper end, the steel cable passing around a 13′ drum, which runs a small air-compressor that generates power, while serving as an auxiliary brake.

The company owns and operates the Shannon-Arizona railway, which is capitalized at $600,000 shares $100 par, with Nathan L. Amster as president; David A. Ellis, vice-president; Chas. R. Jeffers, secretary and assistant treasurer; Alex. B Clough, treasurer; preceding officers, John W. Bennie, Jas. Campbell and C. G. Cole, directors. This standard gauge line, of about 8 miles length, was built and equipped at a cost of about $600,000, the terrain traversed being very rugged, and including a 900′ tunnel. The line was completed February, 1910, and not only is saving considerable money to the Shannon on ore haulage, but also gives immunity from the serious interferences formerly caused by annual floods. The Shannon company also was said, 1908, to have secured a controlling interest in the Clifton Northern railway.

The 500-ton concentrator, on the San Francisco River, 8 miles from the mine, has ore-bins 100′ long, in 2 sections, for first and second-grade ores. The mill is of steel, in 2 connected sections, terraced, the 64x95′ upper section having a 9x15″ Blake crusher at the ore-bin, Huntington mills and a 220′ Robins belt conveyor, trommels and jigs. The 57x144′ lower section has 33 Frue vanners, 1 Wilfley and 2 Standard tables. The concentrator treats daily about 400 tons of ore, averaging 3 to 5.5% copper, and puts about 5 into 1, effecting a saving of about 75% of contained values. In 1906 tailings carried up to 1.2% copper, due to highly oxidized condition of ores, but tailings have been stored and may be leached later. Formerly there was much trouble from acid waters eating the jig screens, while brass or copper screens in the jigs were worn out too rapidly by abrasion. This trouble was overcome by a simple but ingenious application of the principle of electrolysis, a low-voltage electric current being applied to the jigs by which the screen became a cathode in the circuit, this attracting hydrogen from the water, which in turn attacks the metallic salts, and the copper freed is deposited on that portion of the screens formerly eaten away. The 32x50′ steel power-house at the concentrator has two 250-h. p. Stirling water-tube boilers and a 300-h. p. Nordberg tandem-compound engine. Water is pumped from wells near the San Francisco River by a 600-gallon electric triplex pump.

The 1,000-ton smelter, at Clifton, 7 miles from the mines, had two 33-inch water-jacket blast-furnaces, each 42x170″ at the tuyeres, which were the

furnace by a new section between, built on the plan first used at orks, making a single blast-furnace of 1,000 tons daily capacity. rging floor are 23 ore-bins, each 20x20x16′, with chutes. Fumes -furnace pass through a 10′ dust-flue to a 20x20x100′ dust-cham- r bottom, discharging periodically into cars on a railway track in h, fumes passing from the dust-chamber, through a 170′ flue, to a estack. Slags, said to average about 0.515%, are hauled by an tive. The converter plant has 2 stands. The briquetting plant, nd fines, has a daily capacity of 60 tons, and there is a small l connection. The 60x80′ smelter power-house, of steel, on stone is a 300-h p. tandem compound condensing engine, direct-con- ers, and converter blast is supplied by a 250-h. p. Nordberg air- uel is petroleum.

any owns general stores, at Morenci and Clifton, doing a com- business of about $500,000. There are about 60 dwellings for the Shannon owns and operates a water company. Forces are n at the mines, mill and smelter.

has been as follows: 11,892,960 lbs. fine copper in 1906; fine copper, 34,037 oz. silver and 950 oz. gold in 1907; 16,281,983 189 oz. silver and 925 oz. gold in 1908; 15,379,588 lbs. copper, r and 1,233 oz. gold in 1909, and 15,873,481 lbs. copper, 47,726 4 oz. gold in 1910. For fiscal year ending Aug. 31, 1907, produc- 7 tons of ore smelted, yielding an average extraction of 48 lbs. ton, in addition to 15,338 tons of custom ore smelted, and was ore smelted, giving an average extraction of 53.4 lbs. fine copper ition to custom ores, in 1908. The amount of ore smelted has ken annual increase since the fiscal year 1904, when the amount is, and ore smelted in the fiscal year 1910, was 311,456 tons. shown a steady improvement, metal having cost, laid down in cents per lb. in 1906; 14.7 cents per lb. in 1907; 12.64 cents per lb. ents per lb. in 1909, and 11.75 cents per lb. in 1910. Property able and management good.

MONT MINING CO. **CALIFORNIA.**

rson City, Nev. Mine office: Winthrop, Shasta Co., Cal. president; Hon. Wils Brougher, vice-president; Jas. T. Davis, . LeMasters, treasurer; preceding officers and J. C. Tranter, Graham, superintendent. Capitalization $1,000,000, shares $1 ble. Lands, 7 claims, area 120 acres, known as the Graham pper City district, in the west central part of the Shasta copper les east of the Bully Hill mine and smelter, and 8 miles from the . The property is said to have a surface showing somewhat f the Bully Hill mine, and is developed by a 75′ shaft, 4 short ral opencuts, showing streaks and bunches of high grade copper worked too superficially to locate important ore bodies. Build- bin and smithy.

'ER CO. **CALIFORNIA.**

nine: 502 California St., Redding, Cal. J. W. Girdner, presi- . Furber, secretary; Sherman P. White, treasurer. Organized nder laws of Arizona, with capitalization $1,000,000, shares $1 groups, including the Pit River group of 25 claims, circa 1 mile , showing a good gossan, and the Arizona Consolidated group, es from Redding, formerly worked for placer gold, showing a of circa 600′ width, carrying auriferous and argentiferous copper ge tenor. Idle.

'ER EXPLORATION CO. **CALIFORNIA.**

rned unclaimed from former office, San Francisco, Cal. Mine

office: Redding, Shasta Co., Cal. M. E. Dittmar, managing director; O Scribner, secretary; preceding officers, W. P. Harman, Frank H. Buck and W Leland, directors. Lands, formerly 760 acres, were said, March, 1911, to b nearly 1,000 acres, between the Balaklala and Iron Mountain mines, near Ke nett, including the Spread Eagle group of 22 claims, said to be held under an month bond and lease, at $125,000. The property has 8 tunnels, of abo 3,000′ aggregate length, No. 7 tunnel having cut 3 small stringers of copper ore 1909. Diamond drill boring, planned for 1909, was again planned for 191 with 2 drills.

SHASTA COPPER MINING CO. CALIFORNI

Dead. Formerly at Shasta, Shasta Co., Cal.

SHASTA COUNTY GOLD & COPPER MINING CO. CALIFORNI

Office: Bacon Bldg., Oakland, Cal. Mine office: Kennett, Shasta C Cal. A. J. Hough, president and general manager; Thos. P. Hogan, vice-pre dent; M. C. Hough, secretary; preceding officers, D. A Lyons, R. E. Reev L. Daily and M. A. McGinnis, directors. Organized Sept. 15, 1909, under la of California, with capitalization $500,000, shares $1 par. Annual meeti first Monday in October.

Lands, 6 claims, unpatented, area 110 acres, having several short tunne aggregating about 200′ length, and a considerable number of pits and trench showing copper at 10 different points, with one vein of 50′ estimated aver width, carrying auriferous and argentiferous copper ore. The property sho occasional small bunches of good ore, including malachite, bornite and cha pyrite

SHASTA GOLD & COPPER CO. CALIFORNI

Dead. Was a stockjobbing scheme, promoted by "Baron" W. E. v Johannsen. Formerly at Redding, Shasta Co., Cal. Described Vol. VI.

SHASTA-KENNETT COPPER CO. CALIFORNI

Dead. Formerly at Kennett, Shasta Co., Cal. Described Vol. VIII

SHASTA MAY BLOSSOM COPPER CO., CONSOLIDATED. CALIFORNI

Office: 1009 Mills Bldg., San Francisco, Cal. Mine office: Winthro Shasta Co., Cal. Col Morton Lindley, president; Lucius A. Booth, vice-pre dent; S. Peter, secretary and treasurer; Wm. Bright, superintendent. Or ized 1903, under laws of Arizona, as a reconstruction of the Shasta May Blos Mining & Smelting Co., with capitalization $10,000,000, shares $1 par. T management reports the company entirely free from debt.

Lands, 18 claims, area circa 300 acres, known as the Keith group, 13 mi from a railway and 27 miles northeast of Redding, in the Pittsburg or Copper C district. The property shows prominent outcrops, and is said to have 5 or contact deposits, between porphyritic footwalls and slate hangings. The outcrop, said to be traceable circa 1,500′, shows ore giving assays of 2 to copper, and circa $11.50 per ton in combined gold and silver values. The vein, said to be traceable 1,900′, of 5′ to 40′ width, carries chalcocite, b and chalcopyrite, and is opened by tunnels of 200′, 300′ and 650′, with 1,500′ of workings, said to show a considerable body of sulphide ore of fa age tenor. The West vein, said to be upwards of 100′ in width, has a 10 and 400′ tunnel, showing ore giving assays of 2 to 7% copper and $2 to $ per ton in combined gold and silver values. The mine, as a whole, is re to have about 3,500′ of workings.

Equipment includes a gasoline hoist, air-compressor and electric li power. There is a 20x90′ machine-shop covered with corrugated iron developing, at last accounts.

SHASTA MAY BLOSSOM MINING & SMELTING CO. CALIFO

Dead. Was reorganized, 1903, as Shasta May Blossom Copper Co., C idated. Formerly at Winthrop, Shasta Co., Cal. Fully described Vol. V

ARIZONA COPPER CO. **ARIZONA.**

)uluth, Minn. Mine office: Bisbee, Cochise Co, Ariz. Thos. dent; A. Guthrie, vice-president; Archibald M. Chisholm, secre- urer; Lemuel C. Shattuck, managing director; preceding officers Hill, directors; Norman E. LaMond, assistant secretary; A. B. W. lting engineer; John Olson, superintendent. Organized March r laws of Arizona, with capitalization $3,500,000, shares $10 par, fully issued. Company has about 500 shareholders, with about of stock owned by the directors and Martin Pattison. Company is led, in ownership and management, with the Denn-Arizona Mining dividends July and December, 1910, and a $1 dividend circa Feb- ving total dividend payments, to that date, of $1,050,000. Income, o July 31, 1910, was $1,560,467.02, with outgo of $802,684.63, and 757,782.39, leaving a net surplus, July 31, 1910, of $307,214.36. vmut Bank, Boston, registrar; Old Colony Trust Co., Boston, . Shares are listed on the Boston stock exchange. Annual meet- rday in February.

laims, patented, area 120 acres, bought for $1,022,500, lying in the ortion of the Bisbee camp, about one-half mile from the original ne Copper Queen, and to the north of the Calumet & Arizona. shows Carboniferous limestone, with intrusive porphyry dikes, , covered with a silicious gossan of 30′ to 50′ width. Owing to the aphy of the lands, tunneling is impracticable, neighboring prop- all tunnel-sites, hence development is by shaft. Ores are mainly some sulphides at depth.

is opened by a 935′ three-compartment shaft, 15′x4′ 6″ in size, n the Cuprite shaft of the Copper Queen, on the 800′ level, with ft of the Calumet & Arizona, and also with the workings of the Arizona. Development was begun August, 1904, and ore ship- eptember, 1906, continuing until November, 1907, when the panic ll work, for some months. Production was resumed Dec. 4, 1908. ened by levels at 100′ intervals, from the 500′ to 900′ points, in- re body 6′ to 15′ wide, and 355′ long, carrying high-grade oxidized iderable cuprite, averaging about 18% copper, was opened on the levels, 1910. The 600′ level, which was the principal source of 10, has a body of oxidised ore up to 60′ width, ranging 9 to 17% r, with excess of iron, and for 1910 shipments from this level r than 15% copper. The 700′ level also shows large ore bodies, e, on the 800′ level, is circa 100x300′ in size, showing much high- ding considerable native copper. The 900′ level shows a consid- sulphide ore, of about 4% average tenor.

had 31,457′ of workings Dec. 31, 1910, and mining costs are very body from which the principal stoping has been done is up to 55 requires but little timbering. It was said, June, 1910, that the ere in favor of cutting down the grade of ore shipped, then aver- an 17% copper, holding that too much ore of 4 to 9% copper tenor unstoped, under the system of extraction then used. The com- rves are officially estimated at 70,000 tons of 17% ore, and 600,000 per ore, with less than one-tenth of the territory developed, and ttison estimated, April, 1910, that the mine had 1,000,000 tons . Production was only about 100 tons of ore daily, April, 1911, ty is equipped to produce about 1,000 tons daily.

. p. steam plant has five 150-h. p. boilers. The main hoist is a halmers duplex double-drum engine, working under 125 lbs. , with two drums, each carrying 2,000′ of 1⅛″ round steel cable, dling, continuously, a 15,000-lb. unbalanced load, at a vertical

hoisting speed of 2,000′ per minute. There also are 6x10″ and 10x30″ auxiliary hoists. The air plant includes a 40-drill Sullivan cross-compound air-compressor. Fuel is petroleum, with a normal yearly consumption of about 18,000 barrels.

A 3,300′ aërial tram of 500 tons daily capacity, with average grade of 15°, supported by 14 towers of 12′ to 40′ height, built of 12″ timber, and set on concrete foundations, leads from a 1,000-ton ore-bin near the shaft to a 1,000-ton shipping-bin on the El Paso & Southwestern railway.

There are 10 mine buildings, including a 16x24′ carpenter-shop, 15x30′ smithy, boiler-house, engine-house, warehouse, sawmill, and a changing-house with accommodations for 200 men.

The smelter site, at Douglas, 26 miles from the mine, is just south of the Calumet & Arizona smelter, and west of the Copper Queen works, with water supply available from artesian wells. The company made plans, some years ago, for a 1,000-ton smelter with 2 blast-furnaces, to cost about $400,000, but certain strong interests in the company, being desirous that smelting be done by the Copper Queen, have held up the construction of the plant, though tentative consideration has been given, from time to time, to the building of the proposed smelter.

Production was 2,541,680 lbs. fine copper in 1906; 5,091,542 lbs. in 1907, 301,359 lbs. in 1908; 1,787,649 lbs. in 1909, and 14,751,000 lbs. in 1910. The Shattuck-Arizona was the highest grade producer, in 1910, of any large copper mine of the world, and possibly also was the lowest cost producer in the same year, cost having been said to approximate 5.8 cents per lb. It is questionable, however, if the management is pursuing the correct policy in extracting its highest grade ores, which in 1910 gave the phenomenal average return of about 17% copper, and leaving an immensely greater tonnage of ore of much lower average grade unstoped in the mine. It was rumored, April, 1911, that the Copper Queen was negotiating for the purchase of the Shattuck-Arizona, on the basis of an exchange of stock. The mine, as now developed, is capable of a much larger production than was secured in 1910, and [is a property of great present value, and greater future promise.

SHAW-GIBSON MINING CO. NEW MEXICO.

Dead. Formerly at Lordsburg, Grant Co., N. M.

SHAWMUT CONSOLIDATED COPPER CO. COLORADO & UTAH.

Office: 62-16 State St., Boston, Mass. Company lost its Colorado lands, and, December, 1910, sold its Utah property to the Salida Copper Co. Is practically out of business, having about $6,000 cash assets, and no other property. Formerly at Bingham Canyon, Salt Lake Co., Utah, and Salida, Chaffee Co., Colo. Fully described Vol. VIII.

SHAWMUT GOLD, SILVER & COPPER MINING & MILLING CO. COLORADO.

Dead. Formerly at Bonanza, Saguache Co., Colo. Described Vol. VIII.

SHAWMUT MINING CO. UTAH.

Dead. Was succeeded, 1905, by Shawmut Consolidated Copper Co. Formerly at Bingham Canyon, Salt Lake Co., Utah. Described Vol. III.

SHAWNEE COPPER CO. COLORADO.

Dead. Formerly at McCoy, Eagle Co., Colo. Described Vol. VIII.

SHAWNEE COPPER MINING CO. WYOMING.

Dead. Was merged, 1908, in Shawnee-Wyoming Mining Co. Formerly at Holmes, Albany Co., Wyo. Fully described Vol. VI.

SHAWNEE-WYOMING COPPER MINING CO. WYOMING.

Office: 122½ East Main St., Shawnee, Okla. Mine office: Holmes, Albany Co., Wyo. John H. Aydelotte, president; Hon. G. F. Hinton, first vice-president; A. M. Coffin, secretary and general manager. Organized 1908, as a merger of the Shawnee Copper Mining Co. and Kyhaco Mining Co.

Lands, 10 claims, area 200 acres, 6 miles from the New Rambler mine, in

ek district of the Medicine Bow Mountains, showing fissure veins contact deposits between schist and quartzite, of which one vein der development, has a 115′ two-compartment shaft, showing

any also holds the property formerly owned by Ak-Sar-Ben Copper l a strong gossan capping of hematite and limestone, opened by Company is said to have found some ore giving good assays in nd gold.

t includes a 45-h. p. steam plant and 4 mine buildings. Idle ion, despite repeated announcements that resumption was planned ure.

NTAIN MINING & TUNNEL CO. COLORADO.

ormerly at Crystal, Gunnison Co., Colo.

COLUMBIAN MINE. MICHIGAN.

mine: care of J. H. Rice, Houghton, Houghton Co., Mich. north of the Isle Royale Copper Co. Idle since 1870. Fully I and II.

MINING CO. IDAHO.

e: Murray, Shoshone Co., Idaho. Jos. F. Whelan, secretary; uperintendent. Lands, on Butte Gulch, 3 miles northeast of a 6′ vein carrying silver-lead ore, and an 8′ vein of copper ore said ng assays.

SMELTER. JAPAN.

Furukawa Mining Co.

INE. CALIFORNIA.

: Quincy, Plumas Co., Cal. G. H. Goodhue, owner and man- counts. Lands, 21 claims, on the north bank of Indian Creek, iferous quartz-schist, with nearly vertical dip, having clay-slates porphyry to the east. The schist is estimated to average about ying mainly bornite, with some azurite and malachite near sur- ing in minute sheets and lenses between the much contorted lam- schists. Property has numerous trenches and an 80′ crosscut

COPPER CO. WASHINGTON.

mine: Latah, Spokane Co., Wash. J. O. Adams, secretary; r, J. B. Conard, D. H. Conard, J. H. Stockdale, J. W. Olney, nd Frank Hosier, directors. Organized circa 1908, under laws with capitalization $1,500,000, shares $1 par. No trace of oper-

MINE. NEW MEXICO.

mine: Taos, Taos Co., N. M. Alex. Gusdorf, owner and mana- ounts. Lands, 4 claims, developed by a 175′ shaft, with drifts l 150′ levels, showing an 8′ vein with a 2′ paystreak, carrying to 12 oz. silver and $60 to $80 gold per ton, balance of vein o average 5 to 8% copper, 4 to 5 oz. silver and $10 to $12 gold erty considered promising. Idle several years.

MINING & MILLING CO. IDAHO.

mine: Wallace, Shoshone Co., Idaho. P. F. McGovern, presi- Whelan, secretary; Boyd Hamilton, treasurer; J. J. McMullan, at last accounts. Lands, 6 claims, on Nine Mile Creek, near ; a 160′ shaft with a 400′ drift. Idle since November, 1908.

MOUNTAIN MINING CO. WYOMING.

: Meeteetse, Big Horn Co., Wyo. P. W. Gates, manager, at Lands, on Spar Mountain, show a wide vein, carrying values r-lead, opened by a 560′ tunnel, on the Smuggler claim. Idle

SHOTWELL TRI-MOUNTAIN COPPER CO. **ARIZONA.**

Dead. Was absorbed, Feb. 19, 1907, by Cornelia Copper Co. Formerly at Gila Bend, Pima Co., Ariz. Described Vol. VI.

SHUTTLETON COPPER MINING CO. **AUSTRALIA.**

Dead. Was merged, December, 1906, in Crowl Creek-Shuttleton Mining Co. Formerly at Shuttleton, Mouramba Co., N. S. W., Australia.

SIEGEL CONSOLIDATED MINING CO. **NEVADA.**

Dead. Formerly at Siegel, White Pine Co., Nev. Described Vol. VIII

SIERRA-ALTO COPPER MINING CO. **ARIZONA.**

Dead. Formerly at Phœnix, Maricopa Co., Ariz. Described Vol. II.

SIERRA BLANCA MINING CO. **TEXAS.**

Mine office: Sierra Blanca, El Paso Co., Tex. Lands, in the Quitman Mountains, 4 miles from Ettelyne station, with a wagon-road connecting, show auriferous and argentiferous copper ore, under development, with a small force, at last accounts, July, 1910.

SIERRA CO., LTD. **SPAIN.**

Office: 32 Nicholas Lane, London, E. C., Eng. Mine office: 10 Plaza del General Santacildes, Burgos, Burgos, Spain. W. R. Smith, secretary. Organized Apr. 2, 1898, under laws of Great Britain, with capitalization £400,000, shares £10 par; debentures £482,600 outstanding, at 5%. The company also holds a railway concession. Lands, in the provinces of Burgos and Logroño, Spain, are said to include mines of iron, copper, silver and coal. Idle some years, and apparently moribund.

SIERRA DE COBRE MINE. **MÉXICO.**

Owned by Greene-Cananea Copper Co., at La Cananea, Arizpe, Sonora, Mex.

SIERRA DE OAXACA MINING & MILLING CO. **MÉXICO.**

Office: Nashville, Tenn. Mine office: Ixtlàn de Juàrez, Oaxaca, Mex. Geo. Clark, superintendent, at last accounts. Mine, known as Santa Catarina, has auriferous and argentiferous copper ores, with steam power.

SIERRA DE ORO GOLD MINING & MILLING CO. **ARIZONA.**

Office and mine: Clifton, Graham Co., Ariz. F. T. Eldredge, president; W. H. Waite, secretary and treasurer; L. P. Potter, manager; Benj. M. Crawford, superintendent, at last accounts. Lands, 15 claims, near the Clifton Consolidated, and a 5-acre millsite, on the San Francisco River. Development is by tunnels, showing 4 parallel blind veins. A 550′ crosscut tunnel shows a 10′ vein, giving assay values of 14% copper and up to $10 gold per ton, and a 4′ vein giving assays of 14% copper and $48 gold per ton. Idle some years and apparently moribund.

SIERRA GOLD & COPPER CO. **NEVADA.**

Dead. Formerly at Reno, Washoe Co., Nev. Described Vol. VIII.

SIERRA GOLD & COPPER MINING CO. **CALIFORNIA.**

Dead. Formerly at Loyalton, Sierra Co., Cal.

SIERRA MADRE MINING & DEVELOPMENT CO. **MÉXICO.**

Office: 500 North Sixth St., St. Louis, Mo. Mine office: Choix, Fuerte, Sinaloa, Mex. W. C. Harlan, president; J. S. Harlan, secretary; A. W. Warwick, consulting engineer. Property is said to show high grade argentiferous copper ore.

SIERRA MORENA COPPER MINES, LTD. **SPAIN.**

Office: 18 Ropemaker St., London, E. C., Eng. Letter returned unclaimed from former mine office, Peñaflor, Sevilla, Spain. Arthur S. Plews, chairman; preceding officer, S. R. Adcock and H. O'Reilly, directors; E. T. Evans, secretary; Richard Stanton, mine manager. Organized Apr. 17, 1900, with capitalization £80,000, increased May, 1907, to £110,000, shares £1 par; issued, £80,000. Lands, 215 acres, including La Preciosa and adjoining mines, claimed by the company to have developed ore reserves of 100,000 long tons. Idle several years.

)NYME MINIÈRE ET MÉTALLURGIQUE SPAIN.
.RA NEVADA."
)2 Blvd. du Nord, Brussels, Belgium. Mine office: Guejar a, Spain. Chas. de France, president; preceding officer, Emile :or-Grégoire Bock and E. LeFevre, directors Organized March laws of Belgium, with capitalization 1,500,000 francs, shares 500 00,000 francs 6% preferred and 1,400,000 francs common shares.

\DA COPPER CO. NEVADA.
rmerly at Luning, Esmeralda Co., Nev. Described Vol. VIII.
\DA COPPER MINING CO. IDAHO.
: Wardner, Shoshone Co., Idaho. Idle.
FIC SMELTING CO. MONTANA.
rmerly at Butte, Silver Bow Co., Mont. Fully described Vol. V.
)RA SMELTING CO. MONTANA.
tle was changed, 1903, to Sierra-Pacific Smelting Co., also dead. tte, Silver Bow Co., Mont.
NING & MILLING CO. ARIZONA.
mine: Tucson, Ariz. Gerrit B. Linderman, president; J. P. manager, at last accounts. Mine presumably has but slight Long idle and apparently moribund.
IINERA SIETE AMIGOS. MÉXICO.
rmer office was 4 Great Winchester St., London, E. C., Eng. ice was president and general manager. Lands were 363 hectares)mstock, Galena, Guadalupe, and other properties, carrying auriftiferous-copper and lead ores, developed by shaft, and equipped ver, said to have employed about 50 men. Formerly at Topia, ango, Mex.
TRUCTION & DEVELOPMENT CO. NEW MEXICO.
: Hillsboro, Sierra Co., N. M. A. G. Viegis, manager; Frederperintendent. Lands, known as the Wicks mine, are in Wicks southern slope of the Animas Peak, developed by a 380′ twohaft, cutting a vein of auriferous copper ore at depth of 355′. udes steam power, and property was developing, with a small).
)ER CO. ARIZONA.
is merged, August, 1908, in Clara Consolidated Gold & Copper)rmerly at Planet, Yuma Co., Ariz. Described Vol. VI.
) & COPPER MINING CO. UTAH.
3 Judge Bldg., Salt Lake City, Utah. Letter returned unclaimed ne office, American Fork, Utah Co., Utah. W. H. McConahy, I. Rothwell, vice-president; W. S. Zehring, secretary; W. H. :r; preceding officers and H. A. Hoppaugh, directors. Organized 3, under laws of Utah, with capitalization $75,000, shares 25 sable, with 6 assessments levied, to end of 1910.
laims, in process of patenting, at last accounts, known as the 1 American Fork Cañon, slightly developed by tunnel, showing ad ore. Idle several years.
)OWS COPPER CO. NORTH CAROLINA.
rmerly at Bushnell, Swain Co., N. C. Described Vol. VIII.
& COPPER MINING CO. IDAHO.
all[redacted] Letter returned unclaimed from former mine [redacted] Idaho. Wm. Sites, vice-president; Adolph [redacted]neer. Lands, 11 claims, on the north fork [redacted] of the Monitor mine and about 1½ [redacted] Fork district. The property

has an upper tunnel showing ore assaying up to $12 in gold, and a 140' lower crosscut tunnel showing a 15' vein, with a 4' paystreak giving assays of 4.3 to 20% copper. Idle.

SILVER BAR COPPER MINING CO. NEW MEXICO.

Dead. Property was sold, circa 1902, to Mogollon Gold & Copper Co. Formerly at Cooney, Socorro Co., N. M. Described Vol. II.

SILVER BELL COPPER CO. ARIZONA.

Dead. Title was changed, 1903, to Imperial Copper Co. Formerly at Silver Bell, Pima Co., Ariz. Described Vol. III.

SILVER BELL MINING CO. UTAH.

Office: 25 East North Temple St., Salt Lake City, Utah. Mine office: Park City, Summit Co., Utah. Anton Pederson, president; W. Mont Ferry, vice-president; W. O. Bridgeland, secretary; Martin Staufsen, treasurer; N. W. Sonnedecker, manager. Organized Oct. 28, 1899, under laws of Utah, with capitalization $250,000, increased, circa December, 1906, to $1,000,000, shares $1 par, assessable. Has levied 14 assessments. Lands, 6 claims, patented, in Thaynes cañon, 5 miles from railroad, slightly developed. Idle since circa 1906.

SILVER BOW MINE. MONTANA.

Owned by Anaconda Copper Mining Co., at Butte, Silver Bow Co., Mont.

SILVER BOW MINING CO. MONTANA.

Dead. Formerly at Butte, Silver Bow Co., Mont. Described Vol. VIII.

SILVER CITY COPPER CO. ARIZONA.

Office: Silver City, N. M. Mine office: Santa Rita, Grant Co., N. M. C. C. Shoemaker, president; E. A. Layne, vice-president; A. F. Kerr, secretary and treasurer; preceding officers, O. C. Hinman, Max Schutz, W. B. Walton, Chas. A. Farnsworth and Saml. Allen, directors; Harry Kline, manager. Organized February, 1907, with capitalization $2,500,000, shares $10 par. Lands circa 290 acres, near the Santa Rita mine, having several shafts, showing lead and copper ores. Is said to have a small concentrator. Idle apparently since birth, and presumably moribund.

SILVER CLIFF GOLD & COPPER MINING CO., LTD. IDAHO.

Office: Wallace, Idaho. Letter returned unclaimed from former mine office, Lookout, Nez Perce Co., Idaho. Jas. D. Young, president and general manager; Edw. C. Young, secretary and treasurer. Capitalization $1,500,000, shares $1 par, assessable. Lands, 18 claims, 7 miles from Mullan, well timbered, developed by 4 shallow shafts and 3 tunnels, the lower of 850' and longest of 1,315', showing chalcocite, bornite and chalcopyrite, giving assays up to 43% copper, with some lead, and fair gold values. Equipment includes a Pelton wheel, operating under a head of 240', and an 8-drill air-compressor. Several carloads of ore were shipped 1909, and work was resumed 1910.

SILVER CLIFF MINING CO. UTAH.

Mine office: Brighton, Salt Lake Co., Utah. Chas. A. Selby, president; Herbert S. Wright, vice-president; John W. Carlson, secretary and treasurer. Organized circa January, 1908, under laws of Utah, with capitalization $130,000, shares $1 par. Idle, apparently since birth.

SILVER CREEK GOLD & COPPER MINING CO. WASHINGTON.

Dead. Formerly at Index, Snohomish Co., Wash. Described Vol. VIII.

SILVER CREEK GOLD MINING CO. WASHINGTON.

Office: Everett, Wash. Letter returned unclaimed from former office, Index, Snohomish Co., Wash. A. J. Westland, president; W. B. E. Edwards, secretary. Capitalization $1,000,000, shares $1 par. Lands, 6 claims, circa 10 miles from Index, opened by about 500' of tunnels, said to show a vein of fair size, carrying small copper values and fair gold and silver values. Idle some years and moribund.

SILVER CREEK MINING & MILLING CO. WASHINGTON.

Office: 804 East Washington St., Greensburg, Ind. Mine office: Sil-

R. L. Boyle, president and general manager; Harry A Den-
ıt; Ira J. Hollensbe, secretary and treasurer; John S. Badger,
preceding officers and R. Ray Hamilton, directors. Organized
under laws of Washington, with capitalization $75,000. Com-
onnected with the Keller & Indiana Smelting Co.
ns, patented, area 80 acres, well watered and timbered, includ-
rd mine, in the San Poil district, 5 miles northeast of Keller.
ır by, is capable of producing considerable water power. The
ı fissure vein, in diorite, of 3′ to 8′ width, with a 30″ paystreak,
, azurite, malachite, bornite and chalcopyrite, with quartz
by a 304′ shaft and by tunnels of 130′ and 620′, with tunnels
95′ winze. The management planned installing electric power,
oduction when the Keller & Indiana smelter was blown in, but
ıugh completed 1908, has not been blown in. Idle some years.

N MINING & SMELTING CO. **UTAH.**

ers were E. E. Howard, president; W. F. Sien, secretary;
treasurer. Was organized Apr. 17, 1906, under laws of Utah,
on $600,000, shares $1 par. Office was Salt Lake City, Utah.
laims, showing mainly silver-lead ore. Formerly at Milford,
h.

R MINING CO. **UTAH.**

ned unclaimed from former office, Salt Lake City, Utah. Mine
Juab Co., Utah. N. C. Christensen, president; A. Peterson,
eroy Nelson, secretary and treasurer; preceding officers, C. H.
nnie Peterson, directors. Organized circa July, 1910, under
ıth capitalization $100,000, shares 10 cents par. No trace of
ıd. Idle and presumably moribund.

MINING CO., LTD. **NEVADA.**

olk House, London, E. C., Eng. Mine office: Golconda,
lev. A. Massenet, chairman; preceding officer, M. Massenet,
. Fontaine, directors; J. M. Hamilton, secretary; E. L. Labadie,
Hans Loesch, metallurgist. Organized Dec. 27, 1906, under
tain, as Golconda Consolidated Co., Ltd., and changed name to
uary, 1909, with capitalization £250,000, shares £1 par; issued,
ıid. Balance sheet of Dec. 31, 1908, showed cash £218, debtors
s £4,260, and creditors £10,324.
aims, with a third interest in the Honolulu group, balance of
y the Golconda-Nevada Copper Co., also an option on 5 claims
erty, in the Kennedy and Battle Mountain districts, shows
ıd ores. In 1908 the company planned building a 200-ton
ıonda Cañon, 3 miles from Golconda, but no smelter has been
ıly idle.

RE MINING CO. **MONTANA.**

Broadway, New York, N. Y. Mine office: Polaris, Beaver-
Henry H. Armstead, general manager; Jas. B. Ford, mine
. Wells, smelter superintendent. Property is the Polaris mine,
old and copper ores, latter produced in small quantities as a
uipment includes steam and electric power, and there is a 100-
mine and smelter formerly employing about 100 men. Idle
1907.

MINING & MILLING CO. **UTAH.**

ıines American Fork, Utah Co., Utah. G. H. Pulley, presi-
[illegible] president; J. E. Bennett, secretary; J. H. Clark, treasurer.
[illegible] of Utah, with capitalization $50,000, shares 10 cents
[illegible] claims, unpatented, 14 miles from a railway, in the
[illegible] auriferous and argentiferous copper and lead ores.

Mine, developed by tunnel, shipped a little ore from surface cuts, circa 1899. Idle several years.

SILVER HILL CONSOLIDATED COPPER CO. ARIZONA.

Office: Tucson, Ariz. Mine office: Silver Bell, Pinal Co., Ariz. Col. Wm. Herring, president; T. M. Smith, secretary; preceding officers and John N. Ross, directors. Capitalization $3,000,000, shares $1 par. Lands, 6 patented claims, area 120 acres, in the Silver Bell Mountains, 3 miles from Silver Bell, opened by tunnel, with about 1,000′ of workings, having an extreme depth of 200′, showing copper carbonates and sulphides, apparently occurring as contact deposits between limestone and granite. Idle and presumably moribund.

SILVER HILL MINING CO. NORTH CAROLINA.

Mine office: Silver Hill, Davidson Co., N. C. J. M. Prim, superintendent, at last accounts. Mine has auriferous and argentiferous lead, copper and zinc sulphides. Equipment includes a mill with crusher, rolls and 5 stamps. Idle some years and apparently moribund.

SILVERHORN MINING CO. UTAH.

Dead. Formerly at Minersville, Beaver Co., Utah. Described Vol. IX.

SILVER ISLAND COALITION MINING CO. UTAH.

Office: 227 Judge Bldg., Salt Lake City, Utah. Mine office: Wendover, Tooele Co., Utah. Murray E. King, president; David Morrison, vice-president; Erwin E. Pratt, secretary and treasurer; J. W. Carlton, superintendent. Organized August, 1909, under laws of Utah, with capitalization $100,000, shares 10 cents par; fully issued.

Lands, 17 claims, in 2 contiguous groups, known as the LeRoy and Emancipation groups, one group of 10 claims being held under an 18-month bond and lease, at $50,000. Property, in the Silver Island district, 8 miles from Wendover, shows 2 fissure veins, with 10″ to 30″ paystreaks carrying high-grade silver-lead and silver-copper ores. The LeRoy mine has 2 short tunnels, and the Emancipation mine has 4 short tunnels, all in ore, and the management plans a new tunnel, of 800′, to give an 800′ back. Equipment includes a 20-h. p. engine and air-compressor. To August, 1910, production was 247 tons of ore, taken from shallow workings, giving net smelter returns of $21,485.

SILVER KING GOLD & COPPER MINING CO. IDAHO.

Mine office: Mackay, Custer Co., Idaho. Property is slightly developed by a tunnel and a shallow shaft. Idle.

SILVER LEAF MINING CO. NEVADA.

Mine office: Luning, Esmeralda Co., Nev. Property is said to show high argentiferous copper ores. Employed 12 men, circa 1908. Presumably idle.

SILVERMAN-ALASKA MINING CO. ALASKA.

Dead. Formerly at Ketchikan, Alaska. Described Vol. VIII.

SILVER MOUNTAIN MINE & MILL CO. COLORADO.

Mine office: Empire, Clear Creek Co., Colo. F. G. Bishop, superintendent, at last accounts. Property has auriferous and argentiferous copper ores, with water power and a 25-ton concentrator.

SILVER MOUNTAIN MINING CO. COLORADO.

Dead. Was succeeded by Silver Mountain Mine & Mill Co. Formerly at Empire, Clear Creek Co., Colo. Described Vol. IV.

SILVER MOUNTAIN MINING CO., LTD. IDAHO.

Office: Potlatch, Idaho. Letter returned unclaimed from former mine office, Mullan, Shoshone Co., Idaho. E. B. Wilkins, president; Samuel Tennal, vice-president and manager; W. E. Ponto, secretary; W. E. Hong[illegible] treasurer, preceding officers and G. J. Shaw, directors. Lands, 5 claims, on the Alice mine, on St. Joe Gulch, shortly west of the Morning Mill, near Mullan. The mine has 3 tunnels, lower of 285′, and a 500′ crosscut tunnel intersects a vein carrying ore giving assays of 2% copper, 3 oz. silver and $1.80 gold per ton. Equipment includes an air-compressor. Presumably idle.

K MINING CO. **WASHINGTON.**
ormerly at Chewelah, Stevens Co., Wash. Described Vol. VIII.

EN MINING CO. **ARIZONA.**
46 Pearl St., New York, N. Y. Mine office: Superior, Pinal
m. D. Fisk, general manager; E. F. Kellner, Jr., superintendent,
s. Organized 1880, but inactive until a change in management,
ands, adjoining the Lake Superior & Arizona, are about 8 miles
i and 12 miles north of Ray. The mine has a 650′ shaft, with
300′ and 400′, showing auriferous and argentiferous copper ore,
:counts, a tunnel was being driven, to connect with the shaft.
:ludes steam power. Production was 108,027 lbs. fine copper,
er and 59 oz. gold in 1907. The property formerly was under
ıeen Copper Mining Co., but is now under a bond, expiring Dec.
: Magma Copper Co., and is being developed, with a considerable
ompany.

K MINING CO. **IDAHO.**
mine: Wallace, Shoshone Co., Idaho. V. E. Waltman, pres-
Stoney, secretary; Geo. Austin, manager; preceding officers, T.
ustin and J. D. Caughell, directors. Stock is assessable. Lands,
:ast of the Argentine and west of the Rainbow mine, carrying the
Rainbow veins, in Shield's Gulch, in the vicinity of Osburn, well
atered. The property shows a heavy gossan, carrying gray copper
ne has 4 tunnels, the longest being a working tunnel.

, MINING CO. **MÉXICO.**
urned unclaimed from former office, Los Angeles, Cal. Mine
de Teras, Moctezuma, Sonora, Mex. Fred O. Colsen, lessee and
ıds include El Aguaje mine, 12 miles east of Nacozari. Work was
mpany early 1909. The mine has yielded ore assaying up to 1.5%
oz. silver per metric ton, and up to August, 1909, the company
:k-trains, about $25,000 worth of ore, said to have given smelter
o $90 per ton, and the lessee shipped circa $48,000 worth of ore
7 months of 1910. Property considered promising.

LD MINING & MILLING CO. **UTAH.**
4 McCornick Bldg., Salt Lake City, Utah. Mine office: Bing-
Salt Lake Co., Utah. Henry Cohn, president; Hon. Harry S.
:sident and general manager; H. W. Cram, secretary; preceding
olomon and R. E. Miller, directors; Chas. Pierce, superintendent.
er laws of Utah, with capitalization $300,000, shares $1 par,
ı 27 assessments levied to Dec. 31, 1910. The company paid
ends, prior to 1903. Shares are listed on the Salt Lake stock

merly 240 acres, have been increased, by purchase of adjoining
arly 400 acres. Development is by a 9,280′ tunnel, connected
ith the tunnel of the United States Smelting, Refining & Mining
having electric haulage, with 2 locomotives and 30 cars. The
values mainly in silver-lead, has a 4′ ore body, said to give selected
bout 6% copper, 27 oz. silver and $2.40 gold per ton, also a vein
about 1% copper, 8% lead, 10 oz. silver and $1 gold per ton, with
ıcentrating ore of lower grade in sight. The mine was estimated,
nent, 1909, to have blocked out 15,000 tons of ore assaying about
silver and 60 cents gold per ton.

includes electric power and a 5-drill air-compressor, and the
awmill. An old 15-ton mill, near the mouth of the tunnel, was
to [illegible] daily capacity, and mill tests show a concentration of
1, [illegible] concentrates carrying about 1.5% copper, 35% lead,

16 oz. silver and $1.20 gold per ton. Management plans beginning regular production 1911.

SILVER SPRAY MINE. ARIZONA

Owned by Copper Queen Consolidated Mining Co., at Bisbee, Cochise Co., Ariz.

SILVER SPUR COPPER MINE. AUSTRALIA

Dead. The property, formerly known as the Texas mine, reopened 190[illegible] has a 5′ vein, developed by shaft to shallow depth, giving ore said to average 21% copper. The mine was operated, under tribute, during the latter part of 1907, with production estimated at 150,000 lbs. fine copper for 1907. Formerly at Silver Spur, Clive Co., Queensland, Australia.

SILVER SPUR MINING CO., N. L. AUSTRALIA

Office and mine: Silver Spur, Clive Co., Queensland, Australia. Robt. Thos. Viner, chairman; Edgar Hall, secretary and treasurer and general manager; preceding officers, G. W. Dight, Dr. Watt and Gordon Macansh, directors; Henry Wann, mine superintendent; Wm. Barbour, coal mine superintendent. Organized 1897, under laws of Queensland, with capitalization £24,000, shares £1 par; fully issued, 15s. paid. Paid cash dividends of £22,900, and stock dividends of £3,140 in shares of other companies, to Dec. 31, 1910. Annual meeting, in March.

Lands, 49 claims, leasehold, and a 3-acre millsite, in the Stanthorpe district, 47 miles from the Queensland Government railway. The property shows Gympie beds, with slate and Carboniferous limestone, having 4 fissure veins in slate, carrying lenticular ore bodies of 1′ to 30′ width, the main ore body being 30′ wide on the 300′ level. The ore is an argentiferous and slightly auriferous complex of copper, lead and zinc sulphides, averaging about 1.25% copper, 12% lead, 15% zinc, 26 oz. silver and 2s. gold per ton, with values mainly in silver.

The mine, discovered 1891, opened 1892, and since worked continuously, has shafts of 180′, 420′, 80′ and 80′, with bottom level at 400′. The company also owns a coal mine and coking plant, near Ashford, New South Wales.

Equipment includes a 350-h. p. steam plant, with a hoist and a 3-drill straight-line air-compressor. Fuel is coke and wood, latter costing 12s. per cord. The company also has a sawmill, and a brickyard.

The reduction plant, rebuilt 1908, includes a concentrator and smelter, the former, receiving ore by tramline from the mine, having a Krupp ball mill replacing a Chilean mill, and 2 jigs.

The 35-ton smelter has a Ropp calciner, a 100-ton 42x100″ water-jacket blast-furnace, and a 40-ton reverberatory furnace, with crane for handling slag. The blast-furnace, using semi-pyritic smelting, apparently has given rather indifferent results. The smelter also has a Huntington-Heberlein sintering pot. Product is a matte averaging about 35% copper, 600 oz. silver and 4 oz. gold per ton, sent to Europe for reduction. Bauxite bricks are used for lining the firebox of the reverberatory, and fuel is wood.

Production to end of 1910 was 2,056,320 lbs. fine copper, 2,777,600 lbs. lead, 1,712,507 oz. fine silver and 3,787 oz. fineg old. Production was 176,960 lbs. fine copper in 1907; 107,520 lbs. in 1910. The management plans efforts to save the zinc values, heretofore lost.

SILVER SPUR PROPRIETARY, N. L. AUSTRALIA

Dead. Was a prospecting company that did a limited amount of exploratory work on lands immediately south of the holdings of the Silver Spur Mining Co., N. L., with negative results. Formerly at Silver Spur, Clive Co., Queensland, Australia.

SILVER TIP GOLD MINING CO. WASHINGTON

Dead. Formerly at Maple Falls, Whatcom Co., Wash.

SILVERTON MINING CO. COLORADO

Office: 1612 Ashland Blk., Chicago, Ills. Mine office: Silverton, San

M. F. Levy, president; W. L. Springer, vice-president; Walter
etary; John Makin, treasurer; Thos. R. Henahan, general mana-
ınts. Lands, on Sultan Mountain, include the North Star mine,
›duced about $1,000,000 worth of silver ore, before 1893. De-
y a long tunnel, showing silver-lead and gray copper ores.
udes steam and water power, and there is a 20-stamp mill.
ıcing, November, 1910.

ſINING CO. **WASHINGTON.**
:merly at Silverton, Snohomish Co., Wash. Described Vol. VI.

N COPPER MINES CO. **BRITISH COLUMBIA.**
nerly at Princeton, Boundary district, B. C. Described Vol. VI.

N MINING & SMELTING CO., LTD. **BRITISH COLUMBIA.**
ncouver, B. C. Mine office: Princeton, Boundary district,
scombe, chairman; W. H. Armstrong, managing director; Chas.
ry; preceding officers, E. J. McFealey, and Clarence Marpole,
ld G. Forbes, consulting engineer. Organized Feb. 8, 1906,
ritish Columbia, with capitalization $2,000,000, shares $10 par.
aims, 3 crown-granted, area circa 300 acres, known as the St.
t. George groups, 3 miles from Tulameen City, at the head of
butary of the Tulameen River, in the Similkameen division of the
ct. Lands have a 250-h. p. waterfall, available for power pur-
›ment is by 4 shallow shafts, of circa 50′ depth each, a short
and numerous trenches, showing a strong ore body between
te, with intrusive porphyry dikes. The St. Lawrence mine has
ihowing an 8′ vein of massive cupriferous iron sulphide, giving
f about $10 per ton in copper, silver and gold. The St. George
vein, carrying ore with quartz gangue, giving average assays of
.08 oz. silver and $53 gold per ton. Idle several years.

AIN COPPER CO. **ARIZONA.**
w. Ball was manager. A very limited amount of development
with a small force, circa 1908, but apparently nothing of promise
·merly at Johnson, Cochise Co., Ariz.

› SYNDICATE. **ARABIA.**
perty was idle for 4,500 years, and has been shut down for the
. Formerly at Mt. Samarah, Arabia. Described Vol. VIII.

LORATION CO. **MÉXICO.**
merly at Guadalupe de los Reyes, Cosalá, Sinaloa, Mex.

PPER CO. **ARIZONA.**
ı Angeles, Cal. Mine office: Superior, Pinal Co., Ariz. Wm.
ıager; J. H. McCabe, superintendent, at last accounts. Lands,
he Silver Queen and Lake Superior & Arizona mines, in the
showing ore giving good assays in silver and copper. Presum-

NING CO. **MÉXICO.**
Finch was manager. Lands were 341 pertenencias, area 842
ıe Caridad mine and the Pilares mine of the Moctezuma Copper
rn slope of the same mountain as the Pilares, showing 2 great
carrying 1 to 2% copper, with small silver values, developed by
nels, longest 140′. Formerly at Nacozari, Moctezuma, Sonora,

›PER & GOLD DEVELOPING CO. **CALIFORNIA.**
mer office was Medford, Ore. W. M. Baxter was president;
retary; Chas. Huth, treasurer. Organized Aug. 13, 1908, with
00,000. Lands, 75 miles from a railway, were said to show a
0′ width, giving assays of 4.5% copper and $4.54 gold per ton.
ton, Siskiyou Co., Cal.

SISKIYOU COPPER MINING CO. CALIFORNIA.

Office: Lewiston, Idaho. Mine office: Hutton, Siskiyou Co., Cal. W. E. Oxley, president; Robt. Hall, vice-president; C. E. Monteith, secretary; preceding officers, G. W. Holmes, H. E. Babcock, Robt. E. Kizer and J. F. Reddy directors. Organized Oct. 10, 1905, under laws of Idaho, with capitalization $1,000,000, shares $1 par. Lands, 4 claims, known as the Cook & Green group, near the Blue Ledge mine, in the Upper Applegate district, showing a vein claimed to have a surface width up to 200', developed by 3 tunnels, of 75', 100' and 125', all in copper ore. Idle several years and presumably moribund.

SISKIYOU GOLD & COPPER CO. CALIFORNIA.

Dead. Was a swindle, perpetrated by "Baron" W. E. von Johannsen. Formerly at Rollins, Siskiyou Co., Cal. Described Vol. VII.

SIX EAGLES MINING CO. WASHINGTON.

Dead. Was reorganized, circa 1907, as Little Chopaca Mining Co. Formerly at Loomis, Okanogan Co., Wash. Described Vol. VIII.

SJANGELI MINES. NORWAY & SWEDEN.

Office: Stockholm, Sweden. Mine office: Sjangeli, Nordland, Tromsö, Norway. Lands, circa 30 miles from the coast, with good water power available, include the Sjangeli, Alakats, Valfojokk and Ruopsuokjaure groups, partly in the amt and stift of Tromsö, Norway, but mainly in Swedish Lapland. The property shows hornblendic schists, with narrow strata of limestone, and lenticular bodies of massive gabbro, ore occurring in the schists, as cuprite, chalcocite, bornite and chalcopyrite, assaying 2.5 to 55% copper, with an average tenor estimated at 12.5%, which probably is much too high. Property was under development, 1908-1909, and shipments were begun, over the Swedish-Norwegian railway, from Luleå, on the Baltic, to Narvik on the Atlantic, shipments being made from the station of Vassijaure on the Swedish side of the border. Property considered promising Idle.

SKAGIT QUEEN CONSOLIDATED MINING CO. WASHINGTON.

Office: 1101 Alaska Bldg., Seattle, Alaska. Letter returned unclaimed from former mine office, Marblemount, Skagit Co., Wash. W. W. Shenk, president; Robt. A. Tripple, vice-president; Geo. Senior, secretary; A. M. Richards, treasurer; preceding officers and E. H. Kohlhase, directors; C. D. Grove, superintendent, at last accounts. Organized under laws of Washington, with capitalization $2,000,000, shares $1 par, nonassessable.

Lands, 31 claims, said to be surveyed for patent, at the head of Thunder Creek in Silver Basin, 30 miles from Marblemount, in a district very rugged, difficult of access, and entirely lacking transportation facilities. The property has 3 parallel veins of auriferous and argentiferous copper, lead and zinc sulphides, carrying mainly silver-lead values. The mine is opened by crosscut tunnels, and the management estimates 250,000 tons of ore in sight, though not accessible, averaging $35 per ton in value, mainly in silver and lead, but these figures seem high.

Equipment includes electric power and an air-compressor. There are necessary buildings, and telephone connection. The company voted, July, 1909, to consolidate with the Puget Sound, Chelan & Spokane Consolidated Co., but apparently the merger was not effected. Idle July, 1910, but management hoped to resume work shortly.

AKTIESELSKABET SKANDIA KOBBERGRUBER. NORWAY.

Mine office: Narvik, Nordreisen, Tromsö, Norway. Property includes copper claims at Moskodalen, Tysfjord, Salten and Nordreisen, Tromsö, and pyrite claims at Ofoten, in Norway, and the company also owns copper property at Nautanen, near the Gellivare iron mine, in Swedish Lapland. Presumably idle.

SKINCUTTLE MINING CO. BRITISH COLUMBIA.

Mine office: Jedway, Queen Charlotte Island, B. C. Property is on Moresby Island. Idle.

OPPER CO. **WASHINGTON.**
ırned unclaimed from former office, Philadelphia, Pa. Mine
ım, Kittitas Co., Wash. Geo. Koppen, general manager, at last
k Carpenter, receiver. Organized circa 1902. Lands, 4 miles
ırt, were under development with a considerable force, for several
ıent includes an air-compressor, and management planned a
ırator. The company expended about $75,000. A receiver was
17, 1910, the company having liabilities of $25,000, with no
ıe mine and plant. Idle.

:Y MINING & MILLING CO. **ARIZONA.**
rned unclaimed from former office, Bisbee, Ariz. Mine office:
.vapai Co., Ariz. F. J. McAfee, general manager; C. E. Williams,
ınized circa February, 1910. Lands, 22 claims, held under bond
[. M. Sanders, including the Roosevelt, Bryan and Hearst group
4 miles from Skull Valley, in the foothills of the Copper Basin
ving 2 veins, one of 12′ estimated width. The mine has an 80′
ıt shaft, developing a vein about 3′ wide. Was working with
last accounts.

?PER MINING & MILLING CO. **UTAH.**
s merged, Sept. 1, 1908, in the Utah United Copper Co. For-
l, Beaver Co., Utah. Fully described Vol. VII.

. MINING CO. **ARIZONA.**
merly at Prescott, Yavapai Co., Ariz. Described Vol. V.

. MINING & MILLING CO. **WYOMING.**
merly at Wheatland, Laramie Co., Wyo.

ER MINES CO. **MISSOURI.**
merly, circa 1901, at Eminence, Shannon Co., Mo.

) COPPER CO. **INDIA.**
merly at Sleeminabad, Central Provinces, India. Fully de-
[.

ξ COPPER PROPRIETARY, N. L. **AUSTRALIA.**
eived a £2,000 subvention from the state, and repaid £5 12s.
y reverting to the state. Formerly at Sliding Rock, South

?ER CO. **ARIZONA.**
Phœnix, Maricopa Co., Ariz. John G. Hardin, president and
. Lands, in the Winifred district, 22 miles north of Phœnix,
)′ and 150′, showing ore assaying well in copper, silver and gold.
to have a 10-ton smelter, and company was said, 1908, to plan
ty to 100 tons daily, but should open a mine first.

REFINING COMPANY OF **AUSTRALIA.**
ι (1901), LTD.
succeeded by Australian Smelting Corporation, Ltd. For-
N. S. W., Australia. Described Vol. V.

MINING CO. **MONTANA.**
ıine: Butte, Silver Bow Co., Mont. Bernard Noon, general
:rty includes the Detroit, National and Copper Bottom claims,
ıuse mine, which consists of a city lot, in the heart of Butte. Is
gh ownership of a large majority of stock, by Davis-Daly Copper
y is described under title of latter.

)LD & COPPER MINING CO. **WASHINGTON.**
½ Stark St., Portland, Ore. Mine office: Index, Snohomish
:Kinley Mitchell, president; Samuel Hart, secretary; D. S.
·er; W. J. Walters, general manager, at last accounts. Organ-
nder laws of Washington, with capitalization $1,000,000, shares
300,000. Lands, 19 claims, in the Silver Creek district. Idle.

SMUGGLER MINING CO. UTAH.

Office: 643 South Twelfth East St., Salt Lake City, Utah. Mine office: American Fork, Utah Co., Utah. Jas. H. Beck, president; Benj. F. Pearce, vice-president; Geo. T. Ensign, secretary; Evan Arthur, treasurer. Lands, 4 claims, in American Fork Cañon, showing auriferous and argentiferous copper ore, slightly developed.

SNAKE RIVER CONSOLIDATED MINING CO. COLORADO.

Office: 430 Railway Exchange Bldg., Denver, Colo. Mine office: Steamboat, Routt Co., Colo. L. A. Pease, president, treasurer and general manager; J. Ralph Bailey, secretary; preceding officers are the only directors. Organized July, 1906, under laws of Wyoming, with capitalization $5,000,000, shares $1 par, nonassessable; fully issued, with $2,500,000 stock assigned to a trustee, for the benefit of the treasury. Annual meeting, second Wednesday in July.

Lands, 9 lode claims, patented, area 180 acres, and 520 acres of placer claims, unpatented, in the Three Forks district, 26 miles southwest of Encampment, the nearest rail point. The property shows granite and diorite, reported by management to have veins carrying auriferous galena, with strike of N. 20° W., and veins carrying copper, crossing the lead veins at nearly right angles. The management reports the galena vein to have an extreme width of 120', with length of 4,500', and estimates the galena ore to average 10 to 20% lead, free from zinc, and 8 to 800 oz. silver, with from a trace to very high gold assays. The copper veins are undeveloped, but show a variety of oxidized ores at surface. Development is by numerous pits and shafts, of 10' to 106' depth, and numerous short tunnels, from 30' to 500' in length, nearly all openings showing ore. The management reports 5,000 tons of ore blocked out for stoping, and also claims to have $100,000 worth of ore, which would give an average estimated value of $20 per ton. The management reports no power plant or buildings. The company's advertising is decidedly flamboyant.

SNAKE RIVER MINING CO. IDAHO.

Letter returned unclaimed from former mine office, Heath, Washington Co., Idaho. Was said, 1907, to have opened a 24" vein of ore assaying 40 to 45% copper. Idle and apparently moribund.

SNELSTON COPPER MINE, LTD. ENGLAND.

Office and mine: Snelston, Derbyshire, Eng. E. M. Fox is permanent chairman and governing director, as long as he continues to hold one-tenth of the issued capital. Organized March 3, 1910, under laws of Great Britain, with capitalization £10,000, shares £1 par. Property is mining rights to land at Snelston and Narbury, in Derbyshire. No trace of operations seen.

SNOHOMISH MINE. MONTANA.

Owned by Anaconda Copper Mining Co., at Butte, Silver Bow Co., Mont.

SNOQUALMIE COPPER MINING CO. WASHINGTON.

Dead. Formerly at Skykomish, King Co., Wash. Described Vol. VII.

SNOWBALL COPPER MINING CO., N. L. AUSTRALIA.

Mine office: Gundagai, Wynward Co., N. S. W., Australia. Organized March 18, 1907. Lands, 38 claims, leasehold, on Snowball Hill, 2 miles from Mt. Horeb railway station, and 9 miles from Gundagai, at the head of Snowball Creek, a tributary of the Murrumbidgee River. The mine, discovered [illegible], was worked vigorously from 1876 [illegible] smelting was started, employing up to 400 men. The ore [illegible] 2' to 4' width, was chalcopyrite, opened by a 210' shaft [illegible] at 175', and with laterals of about 30[illegible] 25' shaft. The old smelter, built 1876, [illegible] The company shipped 95 long tons of 6.4% [illegible] 1907. Presumably idle.

SNOW CLIFF COPPER MINING CO., LTD.

Dead. Former office was 719 Bank St., W[illegible]

I. C. Topping, secretary and treasurer; C. A. Burke, manager; s, F. W. Roach, Wm. Vidler, C. A. Burke and O. M. Shaeffer, nized circa 1907, under laws of Idaho, with capitalization vari- s $150,000 and as $500,000, with assessable stock. Lands were nbered, near the Amazon-Dixie mine, about one-half mile from ıerly at Lookout, Nez Perce Co., Idaho.

MINING CO., LTD. MONTANA.

llace, Idaho. Mine office: Saltese, Missoula Co., Mont. Peter orce, W. J. Johnson, W. J. Rhodes and Jas. A. Wayne, directors. under laws of Idaho, with capitalization $1,500,000, shares ;e of operations secured. Idle and apparently moribund.

OPPER MINING CO. MONTANA.

perty was a bond and lease on the First Chance group, on which t of work was done, 1903. Formerly at Canyon Ferry, Broad- ;.

OLD & COPPER MINES, LTD. BRITISH COLUMBIA.

Salisbury House, London, E. C., Eng. Mine office: Phœnix, ;t, B. C. Geo. S. Waterlow, D. L., J. P., chairman; preceding hesterfield and C. G. Pym, directors; Harold W. Batty, secre- sel, manager. Organized Jan. 20, 1901, under laws of Great ɔitalization £250,000, shares £1, par; issued, £98,855. Prop- se to the Consolidated Mining & Smelting Co. of Canada, Ltd. ıims, freehold, area 120 acres, about a quarter-mile from the ; fissure replacements of 25′ to 200′ width, with an average of able 1,000′, carrying chalcopyrite averaging about 1.3% copper er ton, ore occurring occasionally in distinct bodies, somewhat ıly disseminated, in minute particles, through a silicious to ıe, carrying occasional magnetite and specular hematite. De- tunnels of 200′, 250′ and 600′, and shafts of 200′ and 350′, the ıg 3 compartments, but the bulk of the production is secured ɔrkings.

includes a 350-h. p. steam plant, now held in reserve as an auxil- y being operated by commercial electric current from the Bon- ant. There is a 150-h. p. double-drum electric hoist, raising he high-pressure half of a 30-drill Rand Corliss compound con- ɔressor.

as closed down November, 1907, and reopened Sept. 1, 1908. irca 20,000 tons of ore yielding about 750,000 lbs. fine copper, 4,000 tons ore, mined at an average cost of $1.10 per ton, ,600,000 lbs. fine copper, in 1903; 49,002 tons ore, yielding e copper, 16,107 oz. silver and 2,989 oz. gold, in 1906; 125,001 pped to the Greenwood and Trail smelters, yielding circa ıe copper, circa 40,000 oz. silver, and circa 6,000 oz. gold, dry tons of ore, yielding 1,113,536 lbs. fine copper, 16,240 49 oz. gold, giving an average return of approximately 1.2% lver and .055 oz. gold per ton, in 1908; 159,710 tons of ore, 00,000 lbs. fine copper, circa 40,000 oz. silver, and circa 7,000 . The ore is v[illegible] average grade, but exists in large an be mined [illegible] ntly is being made to yield a copper at a low [illegible]

INING CO. IDAHO.

ine: Mullan, [illegible] Hutton, pres- ns, vice-president; [illegible] Paul anager; preceding [illegible] ized September, 1903, [illegible] shares $1 par; assess[illegible]

assessed. Shares are listed on the Spokane stock exchange. Annual meeting first Tuesday in January.

Lands, 8 claims, patented, adjoining the Snowstorm on the east, and supposedly carrying the extension of the Snowstorm ore body, at the head of Genti Annie Gulch, near the top of Snowstorm Mountain, in the Hunter district, on mile from a railway. The property shows Revett quartzite, having an or body carrying disseminated ores, mainly malachite, with some cuprite, azurit and chalcopyrite, giving assays up to 15% copper and circa 8 oz. silver p ton. Development is by crosscut tunnels, one planned to be driven 1,600' The upper workings are under a 3-year lease, expiring 1912, to Geo. L. Huston Equipment includes an air-compressor, and buildings are a power-house, cook house and bunkhouse.

SNOWSLIDE MINING & MILLING CO. IDAHO

Dead. Formerly at Mullan, Shoshone Co., Idaho.

SNOWSTORM APEX MINING CO. IDAHO

Office: Hotel Vallamont, Spokane, Wash. Mine office, Larson, Shosh Co., Idaho. A. B. Babb, president; preceding officer, J. P. Schneider, H. E. Hoadley and F. H. Stewart, directors; W. F. Harnshoe, superintendent. Organized April, 1910, with capitalization $1,500,000, shares $1 par.

Lands, on Snowstorm Mountain, east of Mullan, show 2 veins, opened by shallow shaft and a 130' tunnel, with about 200' of workings. Was develop with a small force, early 1911.

SNOWSTORM EXTENSION COPPER MINING CO. IDAHO

Office: 804 Wright & Callender Bldg., Los Angeles, Cal. Mine offi Mullan, Shoshone Co., Idaho. A. J. Richardson, treasurer; Edw. Ei superintendent. Organized October, 1909, under laws of California, as succe sor of Snowstorm Extension Mining Co., Ltd., with capitalization $1,000,0

Lands, 9 claims, adjoining the Snowstorm on the east, supposedly carryi the extension of the Snowstorm ore zone. Pits and trenches have shown of about 3% copper tenor, markedly similar to that of the Snowstorm. Dev opment is by a drift tunnel, starting from North Fork Creek, that was cir 700' long October, 1909, planned to be driven to secure an eventual back 1,630', on the dip of the vein. This tunnel was said, March, 1911, to be pr gressing at the rate of 50' per month, and was reported to show stringe of copper bromide. Buildings include bunkhouses.

SNOWSTORM EXTENSION MINING CO., LTD. IDAHO

Dead. Was succeeded, October, 1909, by Snowstorm Extension Copp Mining Co. Formerly at Mullan, Shoshone Co., Idaho. Described Vol. VIII

SNOWSTORM GOLD & SILVER MINING & MILLING CO. COLORADO

Mine office: Durango, La Plata Co., Colo. J. E. Downer, manager, a last accounts. Ores are said to carry gold, silver, copper and mercury. Ha water power and a 10-stamp mill. Idle several years and apparently moribund

SNOWSTORM MINING CO. IDAHO

Office and mine: Larson, Shoshone Co., Idaho. Thos. L. Greenough, president; J. Brush Greenough, vice-president; C. A. Mowery, secretary; H. E. Chaney, treasurer; preceding officers, J. P. Hosey, W. H. Heward and J. C. Broad, directors; Thos. Leo. Greenough, manager; Frederick McCormick, superintendent.

Organized July, 1900, under laws of Idaho, with capitalization $1,500,000 shares $1 par, nonassessable, fully issued. For fiscal years ending June 30th earnings were $5,677 net in 1905; $144,322 net in 1906; $875,919 gross and $498,013 net in 1907; $461,071 gross and $243,262 net in 1910. Company reported a surplus of $295,044, June 30, 1909, and $63,322 June 30, 1910. President Greenough stated, November, 1909, that the former lessees paid about $600,000 in dividends, before the property was taken over by the present company, but the profits of lessees have been otherwise estimated at $350,000. D

)00 in 1906; $360,000 in 1907; $150,000 in 1908; $202,000 in 1909 fiscal year ending June 30, 1910, bringing the total dividend o $982,000.

ıerly 11 claims, 17 patented, area circa 220 acres, apparently are 6 patented, area circa 400 acres, with a 2-acre millsite, and 300 or tailings, on Stevens Peak, east of Mullan, in the Hunter dis- [ontana boundary. The company has leased the surface of the : the Fairview Mining Co.

y rock is Revett quartzite, of Algonkian age. The rocks of the istrict were laid down on a granite floor, during a long period , and range, from the base upwards through the Pritchard slate grayish-blue slate, with some quartzose sandstone, through the of thin-bedded greenish-gray fine-grained sericitic quartzites, to ation, a series of white thick-bedded sandstones and quartzites, St. Regis series of purple and green indurated shales and quartz- of pre-Cambrian age. All upper workings of the Snowstorm Revett quartzite, but No. 3 tunnel enters the slaty rocks of the ion, about 100′ south of the ore body passing from a well-defined o Revett quartzite. As the St. Regis is above the Revett, , this is clearly a reverse or thrust-fault, with a throw not , but which cannot be less than 700′, and must cut the ore-bear- hort distance below the tunnel. The fault shows no mineraliza- about 10′ of clay gouge. Aside from the original tilting, result- and faulting, the bedded formations at the Snowstorm have isturbed. A close examination of the Revett formation, for a es, from the southeastern limits of the Snowstorm in a northerly it to be impregnated with malachite, secondary copper minerals , even where the formation is lying flat. The Revett sedimen- are a worked-over sea-beach, some of the sandstone beds being d with copper minerals. Folding and faulting have given the to the southwest. The beds of the Revett series are, normally, , and there are no intrusions of igneous rocks within 3 miles. ie in a series of tilted strata in which the bedding lines are shown rata having a NNW. strike, with SW. dip of about 77°. The ore storm embraces one or more beds of the Revett quartzite series, nations conforming to the bedding of the series, and in places ralization is up to 40′ in width. Apparently there is no litho- between the cupriferous quartzite and the quartzite bed form- rock, and there is no pronounced fissuring along the zone of im- ore occurring as impregnations along jointing planes and small es. Microscopic study, however, shows considerable evidences ıe deposit, as a rule, has no definite walls, though the ore is o the bedding planes of the quartzite. The ore bodies of the ist primarily of disseminations of bornite, chalcocite and chal- e greater part of the sulphides have been oxidized to cuprite Apparently the secondary copper ores, in the form of chalcocite ıstitute the cementing materials between the grains of porous ushed quartzite and sandstone, reconcentration transforming de strata into zones of commercial ore, of 4% copper tenor and ıg 6 to 8 oz. silver per ton, with less than 1.5% iron, in a gangue re silica, averaging above 90% of the entire material. For the g June 30, 1910, ore treated averaged 4.067% copper and 6.908 ı. The ore also is slightly auriferous, having been estimated, y about $2 gold per ton, which figure seems to have been much

The mine has a 200′ shaft, but development is mainly by 4 tunnels. The mine has been estimated, by one of the principal interests to show 300,000 tons of ore in and above No. 3 tunnel level, with an additional ,100,000 tons of material available as ore, at a better price for copper than prevailed 1910. Estimates of ore blocked out, 1909, ranged from 1,000,000 to 3,000,000 tons, which figures were much too high.

No. 1 tunnel cuts the ore body with a back of 250′, and No. 2 tunnel has a back of 700′, showing an ore shoot of about 500′ length. Levels are opened at 100′ intervals, and No. 6 level, 600′ below No. 1 tunnel level, is said to show an ore body 840′ long, carrying ore averaging about 4.5% copper and 6.66 oz. silver per ton, which estimates are slightly high on copper.

No. 3, the main working tunnel, having a back of 1,200′, shows a vein of 25′ to 60′ width, for a length of about 950′, carrying good ore. No ore has been mined below this level, and professional paper No. 62, of the United States Geological Survey, states that it is unlikely that the present ore body can be followed for more than 100′ below No. 3 tunnel level. Diamond drill borings have been made below this level, but results have not been made public.

No. 4 tunnel, 550′ vertically below No. 3, was 3,296′ long, April, 1911, with a back of about 1,750′ on the dip of the vein. At 3,150′ from the portal, this tunnel encountered a fault, apparently identical with the fault in No. 3 tunnel. The east drift of No. 4 tunnel, 1,800′ long, April, 1911, and practically reaching the boundary line of the Pandora mine, showed some patches of chalcocite, but payable ore has not been developed in this tunnel, as yet, and the prospects apparently are not overly bright.

The mine is connected with the railway spur at Larson by a 7,300′ tramline from No. 2 tunnel, and a 3,000′ Riblet aërial tram from No. 3 tunnel.

Electric energy is used throughout, the power installation having 20-drill and 40-drill air-compressors, with direct-connected motors, and there are 5 additional motors and an electric light plant. The company maintains a good system of water-works, water being brought through a 4½-mile pipeline, generating 300 h. p.

Buildings include a 40x50′ office, machine-shop, smithy, changing-house, and a sawmill at the mouth of No. 2 tunnel. There are 2 large 2-story hotels, with accommodations for 300 workmen, these buildings being 52x84′ and 40x200′ in size, the latter having 110 rooms, with hot and cold water in each, steam heat and electric lights, no mine in the northwest having superior accommodations for its workmen. About 110 men were employed, early 1911.

The mill, near the mine, was remodeled and enlarged, 1907, when 3 large leaching tanks were added. The mill, of 300 tons nominal daily capacity, operated by 4 electric motors, includes a 250-ton leaching and precipitation plant, treating carbonate ores averaging 2 to 3% copper and circa 7 oz. silver per ton, which is said to obtain an extraction of about 90% of the assay values. The ore is crushed and then run into 3 agitators, where mixed with a 10% solution of sulphuric acid with calcium chloride, forming a solution of copper chloro sulphate, which goes from the agitators through a series of 6 settling vats, the copper is precipitated on scrap iron, and silver is precipitated as in chloride form, the solution being passed through settling vats and the silver separated from the clear solution by sodium sulphite, then filtered and shipped for refining.

Production, begun 1904, has been decidedly irregular, and the mine is entirely dependent upon outside smelters, which has brought about curtailment and suspension of output on numerous occasions, owing to erratic demands, suspensions of smelting, and other causes, over which the Snowstorm company had no control. Ores have been shipped, at various times, to almost every copper smelter in the northwestern states and British Columbia, including the Washoe Works at Anaconda, the Butte Reduction Works and the Pittsmont smelter at Butte, the Tacoma smelter in Washington, the Greenwood and Great Falls

itish Columbia, and elsewhere, and March, 1911, ores were being
: rates of circa 200 tons daily, to the smelter at Grand Forks, B. C.,
d Kennett smelters in California, and the East Butte smelter in
ipments ranged from 300 to 500 tons of ore and concentrates
greater part of 1910, until September, when production was sus-
gain resumed early 1911. The company's ores are used to a con-
t for converter linings, to which their highly silica content adapts
gly well.
n for fiscal years ending June 30th was 4,950,000 lbs. fine copper
,940 lbs. fine copper in 1906; 87,503 tons of ore, yielding circa
fine copper and 596,000 oz. silver in 1907; 9,335,310 lbs. copper
. silver in 1909; 91,308 tons of ore, yielding circa 8,000,000 lbs.
). The cost of finished copper, delivered, was 13.75 cents per
deducting silver values, was 10.115 cents per lb., in the fiscal
mining cost was $2.41 per ton, for the fiscal year 1910. The
: of present importance, and should be a considerable producer
to come, but apparently the ore body has faulted below the No.

I MOUNTAIN COPPER MINING CO. **IDAHO.**
rmerly at Mullan, Shoshone Co., Idaho.
INING CO. **BRITISH COLUMBIA.**
rmerly at Port Hill, Kootenai Co., Idaho. Described Vol. VIII.
)R COPPER CO. **ALASKA.**
1 Marbridge Bldg., New York, N. Y. Mine office: Valdez,
Sound district, Alaska. Wales J. Watson, president; Alfred G.
dent; Harry L. Earle, secretary and treasurer; preceding officers,
d Wm. A. Cormack, directors. Organized February, 1910, under
, with capitalization $5,000,000, shares $10 par, fully issued.
laims, on Snug Harbor, Knight's Island. The company's pros-
at the title is clear and perfect, and that there are no liens, mort-
ncumbrances against any of the claims, but information from
is to the effect that the lands are held under a bond and lease.
as a vein of circa 7′ width, said to carry ore, estimated by the
erage 6.33% copper, with considerable gold and silver values.
efers to a 900′ tunnel, which apparently is a 40′ tunnel, at an
′ above sea-level, calling this a 900′ tunnel being a novel and
)d of whipping the devil around the stump. The company
nest King, a mining engineer, as stating that there are over
)re above the 900′ level, and if that ore extends down no further
the mine would have 5,130,000 tons additional, or a total of
)f ore above tidewater, which the company estimates should
copper per ton, and, by this process of conjectural estimates of
: reserves, secures the "enormous total" of 747,180,000 lbs.
e tidewater. The official estimator of the company missed a
y by not continuing these hypothetical ore reserves to the center
l thereby securing much larger figures. The company figures
)f 600 tons of ore daily, net yearly profits would be $1,301,400,
net profit of $7.23 per ton, or $42,973,900, from copper alone,
nto consideration the gold or silver values. These figures evi-
:e either by a fool or a faker. Company is considered merely a
eme.
LD CO. **ARIZONA.**
merly at Harrisburg, Yuma Co., Ariz. Described Vol. VIII.
ER MINING CO. **ARIZONA.**
nine: Globe, Gila Co., Ariz. Ignatius Schlinger, president;
:e-president; A. P. Murray, secretary; T. Schlinger, treasurer;

Wm. Howe, superintendent, at last accounts. Organized 1903, under laws of Arizona, with capitalization $500,000, shares $1 par, in $100,000 preferred and $400,000 common shares. Lands, 4 claims, in the Bloody Tank district, circa 8 miles from Globe, showing 4 ore bodies, of 20′ average width, opened by several pits, giving assays of 8% copper and $15 gold per ton. Idle several years and apparently moribund.

MATÍAS SOLÉ. PERÚ.

Mine office: Huarochirí, Lima, Perú. Property is the Venturosa mine, carrying argentiferous lead and copper ores, employing about 25 men. Production, 1908, from 622 metric tons of ore, treated at the Casapalca smelter, was 134,723 lbs. fine copper; 79 metric tons lead and 618 kgs. fine silver.

COMPAÑÍA MINERA LA SOLEDAD. MÉXICO.

Letter returned unclaimed from former office, Ameca, Jalisco, Mex. Mine office: Guachinango, Mascota, Jalisco, Mex. Chris. D. O'Brien, Jr., manager, at last accounts. Lands, 78 hectares, circa 12 miles southwest of Ameca, in the Sierra Tetilla district, including La Soledad and Santa Isabel mines, carrying auriferous and argentiferous copper ore, and free gold, with values mainly in gold, in a 12′ vein, developed by tunnel, with deepest workings, of circa 400′, showing sulphides below the 200′ level, the mine being estimated to have 10,000 tons of ore in sight. Equipment includes steam power, and there is a mill having 10 stamps, 1 Wilfley table and 1 Pender concentrator. Presumably idle.

SOL LUNA MINING CO. COLORADO.

Dead. Formerly at Idaho Springs, Clear Creek Co., Colo. Described Vol. IX.

FÜRSTLICHE SOLMS-BRAUNSFELS'SCHE BERGWERKE GERMANY.

Mine office: Braunsfels, Rheinprovinz, Prussia, Germany. Bergassessor Bellinger, manager, at last accounts. The property carries iron, manganese and copper ores, but is mainly an iron ore producer, and was reported sold, 1907, to the Friederich Krupp Aktiengesellschaft, of Essen, Germany, for 6,000,000 marks.

SOLOMON SPRINGS COPPER MINING CO. ARIZONA.

Office and mine: Naco, Cochise Co., Ariz. Lands, 20 claims, area 400 acres, in the Naco valley, about midway between Bisbee and Naco. Lands show a vein having a gossan of 4′ to 40′ width. Was under bond, circa 1904-1905, to Houghton Development Co. Since idle.

SOMBRERO DEVELOPMENT CO. ARIZONA.

Office: Houghton National Bank Bldg., Houghton, Mich. Mine office: Globe, Gila Co., Ariz. Dr. Lucius L. Hubbard, general manager; Clarence Botsford, superintendent. Company is a syndicate, not incorporated. Lands known as the Umbrella Butte mide, are about 50 miles northwest of Globe, at some distance from the nearest railway. Property is being prospected by a shaft, and has a small steam plant.

SONOMA COPPER MINING CO. NEVADA.

Mine office: Rosebud, Humboldt Co., Nev. B. C. Williams, superintendent, at last accounts. Lands, circa 5 miles east of Rosebud, are opened by tunnel, showing ore giving good assay values in copper, gold and silver. Presumably idle.

SONOMA MINES OF MEXICO, LTD. MEXICO.

Dead. Was dissolved Feb. 26, 1909. Formerly at Avino, San Juan del Rio, Durango, Mex. Described Vol. VIII.

COMPAÑÍA MINERA DE LA SONORA. MEXICO.

Mine office: Cumpas, Moctezuma, Sonora, Mex. Property is the San José mine, carrying auriferous and argentiferous copper-lead ores. Has steam power. Idle several years.

NANZA MINING CO. **MÉXICO.**
as reorganized, 1907, as Superior-Bonanza Mining Co. For-
, Magdalena, Sonora, Mex. Described Vol. VI.

ANEA DEVELOPMENT CO. **MÉXICO.**
merly at La Cananea, Arizpe, Sonora, Mex. Described Vol. VIII.

TRAL MINES CO. **MÉXICO.**
0 Merchants Loan & Trust Bldg., Chicago, Ills. Mine office:
, Mex. Frederick B. Smith, president; Amos P. Ballou, vice-
R. Barnett, secretary; Frederick E. Mills, treasurer; Jas. R.
l manager; preceding officers, Ansley S. Service, Milton H.
dgar B. Tolman, Henry Pelgrim, Guy Guernsey, David L. Wat-
azen, Dr. John L. Jackson, Lawrence D. Ballou, John W. Elliott
gell, directors; Ernest A. Haggott, consulting engineer. Organ-
07, under laws of Arizona, with capitalization $10,000,000, shares
ued. First Trust & Savings Bank, Chicago, registrar. Annual
Saturday in September.

ny ostensibly was a merger of the International Copper & Gold
onora Development Co. and Santa Cruz Mining Co., but appar-
holding company, controlling the corporations named, and other
collateral corporations. The management reports that this
ls, through ownership of nearly all outstanding stock, the South-
elopment Co., International Copper & Gold Co. and Santa Cruz
se subsidiary corporations in turn controlling the San Bernardo
abreretillo Mining Co., S. A., and Santa Fé Copper & Gold Co.,
The company apparently also controls the Montana Copper &
much as the corporate relations between these different subsid-
ndistinctly shown by the official reports of the different com-
n deemed best to describe the various properties, no matter how
lled, under this title.

reported by the company, 1910, to be 4,264 acres, all told.
were reported as 271 claims, area 780 acres, held from the
ment, but 271 Mexican pertenencias have an extreme possible
acres. There also is a 10-acre millsite, and holdings include
gricultural lands, in the Mayo Valley, where the management
ps can be raised yearly. Lands are reported by the company as
Alamos districts of México, but also include holdings in Sinaloa,
ounty, Arizona, and in Madison and Missoula counties, Mon-
e 20 different properties, of which 5 are said to carry copper, 1
l 8 gold.

Domingo mine, which is the principal property, is an antigua,
ie Quintera and Zambona mines, near Alamos. This property
ported as fissure veins in granite and porphyry, and as contact
granite and porphyry, apparently occurring in an ore zone of
and 2,000′ length, carrying shoots of payable ore of 6′ to 18′
90′ length. The Santo Domingo is said to have an ore body
all paystreak of silver-copper glance assaying up to 220 oz. sil-
, and is said to have 7′ of mixed copper and silver ore assaying
on. Development is by a 360′ shaft, with circa 3,000′ of work-
nagement estimates ore reserves, above the 3d level, at 150,000
ting ore, carrying values of $11 to $25 per ton. The consulting
es the Santo Domingo ores to average 24 oz. silver per ton.
h mine, at Alamos, is said to show ore assaying 12% copper and
per ton.
oup of 20 claims, 7 miles from San Bernardo, Alamos, Sonora,
ened by a 300′ tunnel, showing ore giving good assays in cop-
old.

El Pedregal group of 15 hectares, 17 miles from Alamos, has a 200' shaft and a 1,760' tunnel.

La Negra group of 14 hectares, adjoining El Pedregal, has a 100' shaft, with about 1,500' of workings, and is equipped with a 10-stamp mill.

El Niño group of 10 claims, 8 miles east of El Pedregal, and 30 miles south of San Bernardo, has 90' of workings, said to show silver-lead ore.

La Josefita group of 14 claims, circa 30 miles east of Alamos, has about 100' of workings, said to show copper ore.

La Perla group of 5 claims, near Quiriego, Alamos, Sonora, has a 100' shaft and a 250' tunnel.

The Zacatecas group of 10 hectares, near the Trigo gold mine, has 50' of workings, said to show gold ore.

La Higuera group of 8 hectares is said to have a 50' vein, with a 16' paystreak, carrying mainly silver values.

The Santa Ana group of 4 claims has 50' of workings, said to show silver-lead ore.

El Quebradillo group of 4 hectares is said to show copper ore.

The San Pablo group of 10 hectares, in the Altar district of Sonora, is said to be an antigua, with considerable workings.

The Santa Cruz group includes the Marte and Cuiche gold mines, in the Altar district, the Santa Cruz mine having a 380' shaft and 300' tunnel, and the Cuiche mine having a 60' shaft, the group, as a whole, having about 3,000' of workings, with a 10-stamp mill.

El Sombreretillo group of 112 hectares, in the Altar district, has gold ore.

La Australia group of 20 claims, in El Fuerte district of Sinaloa, Mexico, has a 70' shaft, with circa 400' of workings, showing a 12' paystreak of ore giving assays up to 15% copper and 112 oz. silver per ton.

The Evergreen group of 4 claims, in the Ellsworth district, east of Harquahala, Yuma Co., Arizona, has quartz veins of 4' and 5' width, giving average assays of $7 gold per ton, developed by a crosscut tunnel.

The Cholla group of 20 claims, near the Evergreen, but north of Harquahala, is said to have monzonite-porphyry, showing copper outcrops, and is being developed by shaft.

The Ruth group, in Missoula county, Montana, is said to show copper ore and has 100' of workings.

The Stone Creek mines, sometimes known as the Ballarat & Wallede group, area 120 acres, 18 miles from Dillon, Madison Co., Montana, have a 300' two-compartment shaft, with 1,370' of workings, and are said to have shipped some ore to Butte smelters returning 17% copper. This property has been idle some years.

In 1908 the company planned deepening the Santo Domingo mine and building a 100-ton concentrator, and was reported, in the press, late 1910, to have a first-unit concentrator of 60 tons daily capacity in commission, making arrangements for lead-copper concentrates, but the management reported, February, 1911, having completed a 10-stamp mill at the Santo Domingo mine, and still planning the erection of a 100-ton concentrator. About 100 men are employed at the different properties.

The company has some excellent men in its directorate, but the antecedents of the present corporation were poor, and the corporate relations between the company and its subsidiary companies are not entirely clear. The ownership of 20 widely scattered properties can only be considered a source of weakness rather than of strength, but the company is reported to have adopted the policy of the elimination of weak holdings, which is the only correct policy for a developing company to follow.

SONORA CHIEF MINING CO.

Office: 220 Argyle Bldg., Kansas City, Mo. Mine office: [illegible]

Sonora, Mex. I. D. Waggener, president; Dr. Moses T. Runnels, and treasurer; P. F. Covington, secretary; preceding officers, I. E. Crosby and R. A. Bruns, directors. Organized July 18, ws of Arizona, and protocolized, October, 1905, under laws of capitalization $1,500,000, shares $1 par.

2 groups, known as the Phœnix and Lakeside, area 464 acres, 8 Suaqui de Batuc. The property shows granite-porphyry, diorite , with several large, continuous ore bodies, of which 4, of 5′ to 6′ , carry ores said to give average assays of 15.8% copper, 10 to 80 $25 to $49 gold per ton, which figures seem too high. Company 10% of production is auriferous and argentiferous whitneyite. is by shafts of 95′ and 125′, and by tunnels of 25′, 754′ and 248′, 00′ of workings. Development is mainly at the Phœnix group. also owns the DeWet and Kruger placer grounds, of about 75 the Yaqui River, with an available waterfall on that stream, estible of generating 440 h. p. Idle several years.

NSOLIDATED GOLD MINES CO., LTD. **MÉXICO.**

2 Broadway, New York, N. Y. Mine office: Quiriego, Alamos, Theo. Douglas, manager; E. W. Hockley, superintendent, at Capitalization $3,000,000, shares $5 par. Is controlled, through ip, by the Douglas Copper Co. Lands, circa 140 acres, known as p, including El Trigo, La Dura, Zacatecas, Consolidated and Oro me of these being said to be antiguas, having extensive workings. ll steam plant. Idle.

NSOLIDATED MINES CO. **MÉXICO.**

ormerly at Hermosillo, Sonora, Mex. Described Vol. IX.

PPER CO. **MÉXICO.**

24 Scarritt Bldg., Kansas City, Mo. Mine office: Noria, nora, Mex. A. M. Conard, president; J. M. Lowe, first vice- S. Stone, second vice-president; C. E. Kroh, secretary; W. R. rer; preceding officers, F. E. Reed and E. E. Axline, directors. hrough ownership of half the stock issue, by the Sonora Copper and property is described under title of latter.

PPER COMPANY OF MÉXICO. **MÉXICO.**

ssets, consisting of a lawsuit, were sold to Puertecito Copper Co. a Cananea, Arizpe, Sonora, Mex. Described Vol. III.

PPER SMELTING CO. **MÉXICO.**

24 Scarritt Bldg., Kansas City, Mo. Mine office: Noria, nora, Mex. A. M. Conard, president and general manager; ce-president; C. E. Kroh, secretary; W. R. Moore, treasurer; pre- R. S. Stone, F. E. Reed, E. E. Axline, J. E. Kramer and Allen rs; Philip Ferguson, superintendent. Organized June 25, 1908, Arizona, with capitalization $3,000,000, shares $10 par. Comosed to have been organized as successor of the Sonora Copper ently owns only a 50% stock interest in the Sonora Copper Co., Mexican property is held in the name of the International Copper n, which is controlled, in some manner, by this company, the ions not being sufficiently clear to be entirely satisfactory. Anhird Tuesday in December.

ca 500 acres, with miscellaneous holdings of approximately valley land, on both sides of the railway, including the townsite mineral lands, east of Noria, include the Cobre Grande, Creston [illegible], Wedge and Extension de la Washington properties. [illegible] acres, circa 5 miles east of Noria, is the principal [illegible] on a large ore body on the Extension [illegible]′ width, and traceable 3 miles on

the company's lands, carrying cuprite, melaconite, azurite and malachite near surface, succeeded by chalcocite, chrysocolla, tetrahedrite and galena, with some chalcopyrite in the deepest workings, ores giving assays of 2 to 40% copper, 5 to 25 oz. silver and $2.50 to $30 gold per ton, and being claimed to average about 6% copper and $5 per ton in combined silver and gold values. Development is by 7 shafts of 53′ to 260′ depth, and by tunnels of 50′, 200′, 560′, 950′ and 2,150′, the latter being the main working tunnel, cutting the main vein to give a back of 650′, and having winzes of 155′ and 275′. The mine has upwards of 6,000′ of workings, estimated by the management to show 140,000 tons of ore, and the company plans continuing development in the sulphide zone.

Equipment includes a steam plant with three 60-h. p. boilers, 50-h. p. and 100-h. p. engines, 20 and 75-kw. generators, a 4-drill Sullivan air-compressor, a 25-h. p. gasoline hoist at No. 2 shaft, and electric hoists of 25 and 30 h. p. at the main tunnel winzes. The mine and camp are lighted by electricity. There are necessary mine buildings, and the company maintains a hotel and general store.

A 3,500′ Leschen automatic aërial tramway, with drop of 450′, is being built to connect the portal of the main tunnel with the smelter. A mill may be built later, adjoining the smelter. The 100-ton smelter, planned to be increased eventually, to 500 tons, is being built under a 20-year concession granting exemption from all state and municipal taxes. Equipment includes a 44x80″ water-jacket blast-furnace, to make matte only, three 60-h. p. boilers, 50 and 80-h. p. engines, a Connersville blower, and a 10-kw. electric generator. Water is secured from wells.

SONORA DEVELOPMENT CO. MÉXICO

Office: 603 New Ridge Bldg., Kansas City, Mo. Mine office: Montezuma, Sonora, Mex. Alfred Blaker, president; Chas. M. Williams, vice-president; Col. Geo. M. Bowie, vice-president; John W. Amerman, secretary; W. A. Rule, treasurer; preceding officers, R. N. Richmond, A. A. Potter and A. D. Fetterold, directors; E. H. De Vore, consulting engineer. Organized under laws of Arizona, with capitalization $1,000,000. Company absorbed the Goodlander Mining & Milling Co.

Lands, 98 hectares, including the Nacozari Copper Queen, Wostenholm, Conformé, Goodlander, Don Genaro y Anexas, Cuauhtemoc and La Verde groups, carrying auriferous and argentiferous copper and lead sulphides. The Nacozari Copper Queen mine, area 65 acres, lying between the Pilares de Nacozari and Belle Unión mines of the Moctezuma Copper Co., has given assaying up to 58% copper. The property is developed by shafts and tunnels apparently somewhat at random. The Goodlander has a 10-stamp mill. The company operated in a very languid way, for some time, but has been idle several years.

SONORA EXPLORATION CO. MÉXICO

Mine office: Estación Yzabal, Arizpe, Sonora, Mex. Henry C. Cox, manager. Lands, formerly held by the Florida Copper Co., in the vicinity of the El Tigre mine, include El Temblor, Last Chance, Texas and other properties, carrying auriferous and argentiferous copper ore, developed by shafts. Equipment includes steam power and an air-compressor.

SONORA & KANSAS CITY DEVELOPMENT CO. MÉXICO

Dead. Formerly at Suaqui de Batuc, Ures, Sonora, Mex.

SONORA MINING CO. MÉXICO

Dead. Was succeeded, circa 1906, by Antigua Copper Co. Formerly at Aguacaliente de Baca, Fuerte, Sinaloa, Mex. Fully described Vol. VI.

SONORA MINING & DEVELOPMENT CO. MÉXICO

Office: 207 Spitzer Bldg., Toledo, Ohio. Mine office: San Antonio de la Huerta, Ures, Sonora, Mex. A. E. Klauser, president; H. R. Klauser, vice-president and general manager; H. C. Gerber, secretary and treasurer; preceding officers and A. V. Baumann, directors; P. L. Marston, smelter superintendent.

onsulting metallurgist. Organized 1901, under laws of Arizona, ion $5,000,000, shares $1 par. Company operates in México of the Yaqui Smelting & Refining Co., S. A., which is organized of México, with capitalization 100,000 pesos. Company is payment of property tax for 20 years, and also enjoys a 50% ıe state tax for 20 years. International Trust Co., Boston, rick R. Tibbetts, Boston, transfer agent.

54 hectares of mineral property, and circa 1,000 acres of miscel- ıcluding a smelter site and townsite. Property is served by a outhern Pacific railway, and the company has a government nstruction of an aërial tramline of 40 kilometers length. Lands Hermosillo and Sahuaripa districts.

l lands include numerous claims in the municipalities of San ıerta, San Javier and San Onavos, about 80 miles east of Torres s below Campo Santo Niño. The principal property is the Veta out 10 miles from the smelter, said to show a 40′ gossan, out- quarter-mile. Property also includes the Almeda, Plomosa, ıma, San Francisco, Caballos, Ferruginosa, Independencia and carrying mainly auriferous and argentiferous copper ores, with ilver-lead ore.

n works include a sampler, smelter and power plant, with nec- The works are on a hillside on the west bank of the Yaqui s the only custom plant in a rich district, greatly hampered c of adequate rail facilities, and much troubled by the depreda- ıi Indians.

ampling mill is 30x50′ in size, 2 stories high, equipped with a sher, 5x8″ Allis-Chalmers gyratory crusher, 12x12½″ Allis- d a 10x12″ engine.

of 150 tons nominal daily capacity, has a 40x60′ blast-furnace ″ circular Allis-Chalmers blast-furnace, for use interchangeably r ores, and a smaller furnace for copper only. Fuel formerly was e, both unsatisfactory, but imported coke is now available by eratory building is 20x45′ in size, with a reverberatory furnace n size, formerly burning wood. The power plant includes a se, with two 80-h. p. water-tube boilers, and there are 2 en- h-speed engine being belted to a 25-kw. generator for light and a No. 7 Connersville blower, for furnace blast. The lead is 46x92′, equipped with a softening furnace, refining furnace g kettles, operating on the Parks process. The silver refining , with 2 cupel furnaces, with blast attachments, 1 bullion fur- nace, and necessary pots and moulds, with a bullion vault.

he works include a 30x36′ laboratory, a machine-shop, smithy, l and an ice plant. At last accounts, May, 1911, the manage- wing in the smelter shortly, after being idle from 1905.

G & INVESTMENT CO. **MÉXICO.**

ıer office was 839 Majestic Bldg., Detroit, Mich. E. R. Boul ward G. Carter, secretary and treasurer; Harvey Finch, gen- ganized June, 1905, under laws of Arizona, with capitalization $1 par. Lands included Las Salas mine, circa 60 miles north- ompany was reported, in the press, 1906, to be paying divi- at Santa Ana, Magdalena, Sonora, Mex.

G & MILLING CO. **MÉXICO.**

succeeded, Feb. 15, 1906, by Juáres Mining Co. Formerly ar, Sonora, Mex. Described Vol. V.

THWESTERN MINES CO. **MÉXICO.**

on Bldg., Columbus, Ohio. Mine office: Ures, Sonora, Mex.

Chas. W. Bolen, manager, at last accounts. Organized circa January, 190[illegible] Property supposedly is in the vicinity of Ures. No trace of operations secured and presumably moribund.

SONORENSE PROSPECTING & DEVELOPING CO. MÉXICO.

Dead. Formerly at Ures, Sonora, Mex. Described Vol. VI.

COMPANHIA MINEIRA DE SOTIEL-CORONADA. SPAIN.

Office: Rua dos Sapateiros 22, Lisbon, Portugal. Mine office: Calañas, Huelva, Spain. Senhor Dom Agusto Fuschini, chairman; Thos. Morrison & Co., agents. Lands, 666 hectares, including 34 old mines, carrying cupriferous pyrites. Property is operated under lease by the United Alkali Co., Ltd., and produces cupriferous pyrite and cement copper equivalent to an annual output of about 1,000,000 lbs. fine copper.

MINAS DE SOTO. SPAIN.

Office: 32 Muelle, Santander, Spain. Mine office: Reinosa, Santander, Spain. Lands, owned by Sociedad Anonima Minas de Soto, are held, on perpetual lease, with option of purchase, by Enrique G. W. Romer. Property, which is the most important copper mine in the north of Spain, shows veins carrying high grade chalcopyrite, and about 250 tons of 28% ore were shipped latter half of 1906 and first half of 1907. Has steam power and a small mill. Production, 1907, estimated at 125,000 lbs. fine copper. Presumably idle.

SOCIEDAD ANONIMA MINAS DE SOTO. SPAIN.

Office: Bilbao, Spain. Mine office: Reinosa, Santander, Spain. Lands under perpetual lease to Enrique G. W. Romer, with option of purchase, as described under title Minas de Soto.

SOUTH AFRICAN COPPER TRUST, LTD. RHODESIA & PORTUGUESE EAST AFRICA.

Office: Austin Friars, London, E. C., Eng. Operating office: Bulawayo, Rhodesia. Dr. Hans Sauer, chairman; preceding officer, J. F. Walker, A. Sharwood, J. E. H. Lomas and J. R. Mason, directors; W. M. Gower, secretary. Organized Sept. 23, 1910, under laws of Great Britain, as a reconstruction of the Consolidated African Copper Trust, Ltd., which went into liquidation Oct. 1910, with capitalisation £375,000, shares 5s. par; issued, £214,500, fully paid. Stockholders of the old company took 558,000 shares, of 5s. par, in exchange for a similar number of £1 shares. Apparently the London & Johannesburg Trust guaranteed 75% of the new capital, to acquire control. The old company had the Edmundian Copper Mining Co., Ltd., Aug. 7, 1907, and advanced considerable money thereto, repayable in cash or shares, Aug. 16, 1910, and holds a large share interest in that company, amounting to £35,000, at last accounts.

Lands are 236 claims in the Lomagunda district; 930 claims in the Victoria district; 20 claims in the Umtali district; 70 claims in the Tuli district; 380 claims and a 20% interest in 190 claims additional, in the Kafue district; 23 claims in the Gwelo district; 60 claims in the Bechuanaland protectorate; 2 farms of 1,500 morgen each, in the Lomagunda district; 2 coal areas in the Victoria district, and the right to locate 430 claims north of the Zambesi River. The company also owns a half interest in a syndicate holding copper claims in Namaqualand, Cape Colony, and a share interest in the North Zambesia Coal Syndicate, Ltd.

The Alaska mine, 90 miles northwest of Salisbury, in the Lomagunda district, shows the largest ancient workings in Rhodesia, these having an extreme width of 600′, and extending for about 1,700′ in length, with an extreme depth of 70′. The ore bodies are estimated at 150′ width and 1,700′ length, which estimate seems high. Diamond drill borings have shown copper ore to depths of 200′ to 800′, and the company estimates that 150,000 tons of cupriferous ore of 3% copper tenor are exposed above the water-level, and Mr. Speak[illegible] that the property shows about 200,000 tons of copper ore, at and [illegible] The ore is mainly malachite, disseminated through siliceous [illegible]

old company expended £13,011 on the exploration of the Alaska as been idle some years.
ondo mine, 10 miles west of the Subeni River, and about 115 miles a by wagon-road, shows remains of ancient workings inferior only : Alaska mine, extending for a length of about 1,500′, and with an of 300′, and there are some open pits of 60′ depth, with occasional , from which ore has been stoped to the water-level. The copper in the form of malachite and azurite, as seams and incrustations y shales and sandstones, overlying an older granite, apparently ;, and intersected by numerous dolerite dikes, the copper appar- been introduced into these beds along zones of fracture. The been tested extensively by diamond drilling, cores giving average 9% copper, and several shafts have been sunk, showing 2 veins, r oxidized zone. To June 30, 1907, the old company expended velopment at the Umkondo, and the management estimates the inage at 81,000 long tons of 8.5% copper ore.
gement plans putting the Alaska and Umkondo mines into shape ınd has further extensive tracts of mineral lands of prospective

CAN GOLD & COPPER SYNDICATE, LTD. **TRANSVAAL.**
'as dissolved Feb. 25, 1910. Formerly at Pietersburg, Zoutpans- ıl. Described Vol. VIII.

RICAN COPPER SYNDICATE. **VENEZUELA.**
Broad Street Place, London, E. C., Eng. Mine office: Aroa, a. E. Edwards, chairman; Chas. D. Comrie, secretary; W. J. C. : manager. Organized March 27, 1907, under laws of Great apitalization £7,500, shares £1 par.
miles west of Puerto Caballo, known as the Aroa or Quebrada oduced about 60,000 tons fine copper, and were operated exten- 94, by the Quebrada Land & Copper Co., yielding 271,770 long ore, valued at about £1,250,000. Property includes the Titiara vein of 2′ to 25′ width, the San Antonio mine with a vein of 3′ to the Aroa mine, having a vein of 50′ to 75′ width, of 2,000′ known ınknown depth, from which the oxidized ores have been mined, body of sulphide ore, averaging possibly 4 to 6% copper, in the . The property was reopened, 1907, by the present company, epared for production.

RICAN DEVELOPMENT CO. **PERÚ.**
as succeeded, circa 1903, by Cerro de Pasco Mining Co. For- de Pasco, Junín, Perú.

SYNDICATE. **AUSTRALIA.**
: Cobar, Robinson Co., N. S. W., Australia. Organized 1906, New South Wales, with capitalization £25,000, shares 5s. par. ıth of the Queen Bee Mine, have a shallow shaft, showing copper

HAM MINING CO. **UTAH.**
Commercial Bldg., Salt Lake City, Utah. Letter returned ı former mine office, Bingham Canyon, Salt Lake Co., Utah. ›resident and secretary. Organized 1899, under laws of Utah, ion $50,000, shares 10 cents par, assessable. Lands, 4 claims, s from Lark, opened by shafts and tunnel, with about a quarter- s, showing silver-lead ore. Idle.

:E COPPER MINING & TOWNSITE **ARIZONA.**
MENT CO.
ıs wound up, 1904, and lands sold to Lake Superior & Pittsburg ›rmerly at Bisbee, Cochise Co., Ariz. Described Vol. II.

SOUTH BUTTE COPPER MINING CO. **MONTANA**

Dead. Formerly at Butte, Silver Bow Co., Mont. Fully described Vol. VIII.

SOUTH BUTTE MINING CO. **MONTANA**

Office: 1911-42 Broadway, New York, N. Y. Letter returned unclaimed from former mine office, Butte, Silver Bow Co., Mont. John G. Williams, M. [illegible] Riley and Arthur Howell, directors. Organized May 25, 1906, under laws of Minnesota, with capitalization $500,000, shares $100 par. This company was organized by the Great Northern Railway interests, and is controlled by the General Development Co. The company has had much litigation, with various individuals and corporations, these including the Butte Central Copper Co., East Butte Mining Co., P. D. Morgan and others, winning practically all of the suits. Property was leased to the Montana Consolidated Mining Co., but nothing of particular value was developed, and the latter-named company was liquidated.

Lands include the Surprise placer claim, which was in litigation with T. D. Thomas, who maintained that the existence of a vein was known at the time of the placer location, 1881, but the company won this suit also. Property is mainly mineral rights to a narrow strip along the Great Northern right-of-way. Idle.

SOUTH BUTTE ZONE MINING CO. **MONTANA**

Dead. Formerly at Butte, Silver Bow Co., Mont. Described Vol. VIII.

SOUTH CANANEA COPPER MINING CO., S. A. **MÉXICO**

Dead. Was the Mexican incorporation of the Pennsylvania & Cananea Copper Co., which was merged, circa December, 1909, in the Duluth & Sonora Mining Co. Formerly at La Cananea, Arizpe, Sonora, Mex.

SOUTH CANNINDAH SYNDICATE, LTD. **AUSTRALIA**

Mine office: Mount Cannindah, Bowen Co., Queensland, Australia. Lands, 1 to 2 miles south of the Mount Cannindah mine, are supposed to carry about one-third mile of the extension of the Apple Tree ore body. The mine has 2 shafts, one a 75′ underlay shaft, showing a vein of 7′ to 8′ width, and management plans sinking 2 additional underlay shafts. Shipments, December, 1906, to April, 1907, of about 25 tons of hand-selected ore, gave average returns of circa 9.7% copper, 1.4 oz. silver and 2 dwts. gold per long ton. Idle since 1907, and apparently moribund.

SOUTH COLUMBUS CONSOLIDATED MINING CO. **UTAH**

Office: 518 Herald Bldg., Salt Lake City, Utah. Mine office: Alta, Salt Lake Co., Utah. Geo. H. Watson, president; Arthur Magoun, secretary and treasurer; preceding officers, W. P. Davis, T. Tobiason, E. Storer and A. [illegible] Elggren, directors. Organized Nov. 12, 1906, under laws of Utah, as successor of South Columbus Mining Co., which was the successor of the Centennial Bingham Mining Co., with capitalization $2,500,000, shares $5 par, assessment levied a 2-cent assessment circa March, 1910. The company absorbed the Superior & Montana Mining Co. and the Columbus Wedge Mining Co., Oct. [illegible] 1908. Shares are listed on the Salt Lake stock exchange.

Lands, 373 acres, mainly patented, including the Wedge group, showing good silver-lead values, and the Alta-Quincy group, opposite the Columbus Consolidated, carrying auriferous and argentiferous copper and lead ores. The property as a whole has about 3 miles of workings, including the Dwyer tunnel of 1,800′, and the 2,500′ Alta-Quincy tunnel, latter cutting a 25′ [illegible] having a hanging-wall paystreak of ore assaying up to 11% copper, 10 oz. silver and $2.80 gold per ton. In November, 1908, a crosscut on the 600′ level [illegible] ore assaying 10% copper, 5.5% lead and 25 oz. silver per ton.

Equipment includes an electric plant, taking power from the Columbus Consolidated, and an air-compressor. There are several mine buildings. The property has made irregular shipments, those of 1900 netting $[illegible]

planned merging, 1911, with the Alta-Hecla Mining Co., under Hecla Mining Co., giving 1 share of South Hecla for 5 shares of us Consolidated, but the minority interests in the South Columbus pposed to this merger, having grown extremely tired of repeated s and mergers, in which their holdings were subjected first to ext to squeezing out the water, by virtue of which processes the ho invested real money have seen their proportionate interests l.

MBUS MINING CO. **UTAH.**

as reconstructed Nov. 12, 1906, as South Columbus Consolidated ully described Vol. VIII.

TY, LTD. **ENGLAND.**

Broad Street Place, London, E. C., Eng. Mine office: Carn ., Cornwall, Eng. Francis Allen, chairman; preceding officer, eyerstein and Hon. J. R. de C. Boscawen, directors; T. W. Evans, ah Paull, manager. Organized July 18, 1906, under laws of as successor of South Wheal Crofty Mining Co., with capitali- shares £1 par.

ade the South Wheal Crofty and Cook's Kitchen mines, carrying ores, near Illogan. Equipment includes a 60-stamp mill, having ation and slimes plants. The company secures a very small pro- er as a by-product.

RIZONA SMELTING CO. **ARIZONA.**

Pine St., New York, N. Y. Operating office: Tombstone, ffice: Silver Bell, Pima Co., Ariz. E. B. Gage, president; W. F. president and general manager; A. N. Gage, secretary and treas- officers, Selwyn Eddy, V. L. Mason, F. M. Murphy and H. M. tors; Meade Goodlow, superintendent. Organized Aug. 10, 's of Arizona, with capitalization $1,500,000, shares $100 par. rough ownership of entire stock issue, by Imperial Copper Co. sent an investment of about $500,000.

iles south of Red Rock and 12 miles from the Imperial mine, ade haul, include the 110-acre townsite of Sasco, with 400 lots,

on plant, known as the Sasco smelter, includes a sampling mill, ilding, converter building, power-house, boiler-house, machine- , all of steel frames, with dwellings, a store, office and miscel- s. All of the principal buildings are planned so that they can be directions, giving an almost unlimited capacity for expansion. wn in Feb. 1, 1908, and blown out circa August, 1910, did a usiness, but treated mainly ore from the Imperial mine. The 750 tons nominal daily capacity.

ng mill is small, but fully equipped. Ore is received from the teel-bottom dump-cars, discharging into 4,000-ton storage bins. building has two 300-ton blast-furnaces, one of which, under en an actual duty of nearly or quite 400 tons daily. Charging led by locomotives on tracks of 36″ gauge. The settlers are which are of low copper tenor, skimming into 10-ton slag-trucks, locomotives on a standard-gauge track. The 100x350′ dust- a 175′ stack of 12′ diameter.

er department has a 50-ton electric traveling crane, of 45′ span. 120[illegible] shells, rotated hydraulically, and hoods from the converter [illegible] dust-chamber and stack. Product is blister [illegible] small quantities of silver and gold.

[illegible] ing crane and a 650-kw. electric There are 2 Nordberg Corliss

condensing engines, direct-connected to No. 9 Connersville blowers, and [illegible] berg cross-compound Corliss condensing air-compressor having 15" and [illegible] steam cylinders, with two 36" air cylinders and 42" stroke. The boiler-[illegible] has 4 Morrison marine boilers. Water is secured from wells in the Santa Cru[illegible] valley, by an 8" pipeline.

SOUTHERN COPPER CO. **NORTH CAROLINA**

Mine office: Gold Hill, Rowan Co., N. C. A. M. A. Richardson, presid[illegible] Otto Germer, vice-president; W. M. Richardson, secretary; Walter Ge[illegible] Newman, manager. Organized circa May, 1906, with capitalization $3,000,0[illegible] Presumably is some relation to the Gold Hill Copper Co., which has had a [illegible] checkered career, under various titles. No trace of operations secured, and pr[illegible]sumably moribund.

SOUTHERN COPPER MINING CO. **UTAH**

Letters returned unclaimed from former office, Salt Lake City, Utah. Mi[illegible] office: Milford, Beaver Co., Utah. J. K. Persons, president; B. J. Pers[illegible] vice-president; J. M. Reynolds, secretary, treasurer and general manager; [illegible] Mills, superintendent, at last accounts. Organized May, 1905, under laws [illegible] Utah, with capitalization $300,000, shares $1 par. Lands, 5 claims, area [illegible] acres, surveyed for patents, known as the Brooklyn group, 12 miles north [illegible] Milford, adjoining the Wahsatch King. Development is by a 60' shaft and [illegible] tunnel, latter cutting a vein carrying fair values in copper, silver and [illegible] Idle several years and presumably moribund.

SOUTHERN CROSS COPPER MINE CO., LTD. **BRITISH COLUMBIA**

Office: 8 Broad Street Ave., London, E. C., Eng. Letter returned [illegible] claimed from former office, Alberni, Vancouver Island, B. C. T. D. Co[illegible] chairman and managing director; M. Russell Simpson, secretary. Organ[illegible] March 6, 1905, under laws of British Columbia, with capitalization $750,0[illegible] shares $5 par.

Lands, 5 claims, crown-granted, area 250 acres, with an option over [illegible] acres adjoining, on the northern side of Uchucklesit Harbor, showing a vein [illegible] 12' to 20' with estimated average of 15' width, traceable some distance, develo[illegible] by an opencut and a 370' tunnel, showing chalcopyrite assaying up to 18% [illegible] and $11 gold per ton. Is said to plan a smelter. Shipped, 1906, circa 100 [illegible] of ore. Idle several years and apparently moribund.

SOUTHERN NEVADA COPPER CO. **NEVADA**

Letter returned unclaimed from former office, Blackfoot, Idaho. Mi[illegible] office: Gold Butte, Lincoln Co., Nev. Hardy Bennetts, president; Jul[illegible] Jones, secretary and treasurer; Orange W. Earle, manager, at last acco[illegible] Capitalization $750,000, shares $1 par. Lands, 6 claims, showing a big [illegible] blossom carrying copper carbonates and sulphides, said to exist in pay[illegible] quantities, opened by a 185' tunnel. Was developing, with a small for[illegible] last accounts, late 1910.

SOUTHERN NEVADA GOLD & COPPER MINING CO. **NEVADA**

Dead. Formerly at Luning, Esmeralda Co., Nev. Described Vol. [illegible]

SOUTHERN NEVADA REDUCTION & SMELTING CO. **ARIZONA**

Works office: Tucson, Ariz. H. J. Thompson, manager. The co[illegible] was reported, in the press, early 1911, to have contracted for large sup[illegible] custom ores. Apparently the assets of the company consist almost solely [illegible] idea of building a smelter, variously reported as of 30 to 300 tons daily [illegible] in the vicinity of Tucson.

SOUTHERN OREGON CO. **CALIFORNIA**

Mine office: Hutton, Siskiyou Co., Cal. Horace Monroe, [illegible] last accounts. Develo[illegible] of circa 400', showing [illegible] vein of 7' to 10' [illegible] copper, 5 oz. silv[illegible]

PACIFIC GOLD & COPPER MINING & G CO. **UTAH.**

39 North Capitol Ave., Salt Lake City, Utah. Letter returned om former mine office, Ogden, Weber Co., Utah. T. S. Freeney, m. Pough, vice-president; J. W. Burnham, treasurer and general rganized July 20, 1903, under laws of Utah, with capitalization ıares $1 par; assessable; issued, $798,910. Shares are listed on the ck exchange.

2 claims, unpatented, area 240 acres, 3 miles from a railway and north of Ogden, in the Sierra Madre district, reported to carry 25 ainly contact deposits between quartzite and gneiss, of which 3, pment, are of 3′ to 200′ estimated average width. Apparently ı is up to 50′ in actual width, showing some oxidized ores, but rous sulphides, including covellite, bornite and chalcopyrite, with enite, in a 6′ vein. Development is by a 50′ incline shaft on the showing a 2′ vein of high-grade copper ore, and 8 tunnels, longest h about 700′ of workings, at last accounts, said to show consider- g average assays of 3.5% copper and circa 3 oz. silver per ton, with h gold values.

SMELTING & REFINING CO. **TEXAS.**

Was abortive. Formerly at El Paso, El Paso Co., Tex. Described

SONORA DEVELOPMENT CO. **MÉXICO.**

920 Merchants Loan & Trust Bldg., Chicago, Ills. Mine office: ra, Mex. Frederick E. Mills, president; Lucius W. Winchester, ; Lawrence D. Ballou, secretary; Amos P. Ballou, treasurer and ger; preceding officers, F. B. Smith and John W. Elliott, directors; superintendent. Organized July 1, 1904, under laws of Arizona, ation $1,000,000, shares $1 par. Is controlled, through ownership utstanding stock, by the Sonora Central Mines Co., and in turn an Bernardo Mining Co., through stock ownership. Property is r title of Sonora Central Mines Co.

SWANSEA MINING CO. **UTAH.**

8 South State St., Salt Lake City, Utah. Mine office: Silver ., Utah. Geo. Jones, president; A. T. Sanford, vice-president; epard, secretary and treasurer; E. R. Higginson, superintendent. 6, under laws of Utah, with capitalization $10,000, shares 1 cent re listed on the Salt Lake stock exchange.

claims, unpatented, area 80 acres, south of the Swansea mine and rry an extension of the Swansea vein, showing porphyry, quartz- ving a fissure vein of 12′ estimated average width, traceable circa g auriferous and argentiferous oxidized and sulphide ores of copper loped by a 150′ shaft.

SULPHUR ORE CO. **ALABAMA.**

urned unclaimed from former office, Atlanta, Ga. Mine office: Co., Ala. W. T. Williams, superintendent, at last accounts. ine carrying cupriferous and slightly auriferous and argentiferous Equipment includes a steam plant. Presumably idle.

ZINC & COPPER MINING CO. **ARKANSAS.**

rmerly at Gillham, Sevier Co., Ark. Described Vol. VI.

VACE CREEK COPPER CO. **CALIFORNIA.**

rmerly at Greenwater, Inyo Co., Cal. Described Vol. VIII.

E DEVELOPMENT CO. **ARIZONA.**

rmerly at Globe, Gila Co., Ariz. Described Vol. VIII.

NWATER COPPER CO. **CALIFORNIA.**

at Greenwater, Inyo Co., Cal. Described Vol. VIII.

SOUTH HECLA MINING CO. UTAH.

Office: Herald Bldg., Salt Lake City, Utah. Mine office: Alta, Salt Lake Co., Utah. Geo. H. Watson, president and general manager; Herman Bamberger, vice-president; Arthur Magoun, secretary and treasurer; preceding officers, E. C. Ashton, H. L. Pratt and L. P. Palmer, directors; Thos. Forsha, smelter superintendent; Robt. Gorlinski, engineer. Organized Sept. 14, 1910, under laws of Utah, with capitalization $500,000, shares $1 par, assessable; issued, $210,000. Company was organized as a merger of the Columbus Consolidated Mining Co., and Alta-Hecla Mining Co., and holds properties formerly held by the Bingham-Centennial, Alta-Quincy, Alta-Hecla, Columbus Wedge, Ivanhoe and Lilburn mining companies. Company exchanged stock on the basis of 1 share of South Hecla for 5 shares of South Columbus, and 1 share of South Hecla for 5 shares of Alta-Hecla. Shares are listed on the Salt Lake stock exchange. Annual meeting, second Wednesday in September.

Lands, 40 claims, partly patented, and partly with patents applied for; area circa 550 acres, in the Little Cottonwood district. The property carries 2 ore bodies, occurring as fissure veins in granite and limestone, and as contact deposits between limestone with granite and quartsite. Two ore bodies under development are reported by the management to average about 4′ in width, but apparently these are the paystreaks of wider veins, up to 30′ in width. The 2 ore bodies under development carry malachite, azurite and tetrahedrite in the surface zone, succeeded by chalcopyrite, galena and sphalerite, estimated by the management to average 5% copper, 20% lead, 5% zinc, 22 oz. silver and 68 cents gold per ton.

The property includes a considerable number of different old mines, with rather extensive workings, including No. 1 shaft of 100′ depth, No. 2 of 117′, No. 3 of 160′, No. 4, of 90′, No. 5 of 125′, No. 6 of 110′, and No. 7 of 155′. Principal development is by 7 tunnels, as follows: The Dwyer of 2,000′; the Alta-Quincy of 1,800′, the South Columbus of 1,400′; the Rustler of 1,200′; the South of 1,700′; the Neversweat of 150′ and the White of 700′. The mine as a whole has about 20,000′ of workings, and the management estimates 25,000 tons of ore blocked out for stoping. The first work was done 1872, and the mines were closed 1893, owing to the low price of silver, and reopened 1903.

Equipment includes a 75-h. p. hydro-electric plant, with a 10-h. p. hoist good for 200′ depth, and a 5-drill Ingersoll air-compressor. Buildings, partly destroyed by snowslides, 1908–1909, have been replaced, and there are now structures, including a 40x130′ shop building of wood frame, covered with corrugated iron, housing a machine-shop, smithy and carpenter-shop, with a boarding-house and 5 dwellings. The mill has 3 jigs and 1 concentrating table. Management plans driving about 5,000′ of drifts and crosscuts, 1911.

SOUTH KANGIARA MINING CO. AUSTRALIA.

Mine office: Yass, King Co., N. S. W., Australia. The mine, on [illegible] Bourke, has a 110′ shaft, showing argentiferous and auriferous bornite and chalcopyrite, and argentiferous galena, all giving good assays. Was developed with a small force, at last accounts, 1910.

SOUTH KEARSARGE MINE. MICHIGAN.

Owned by Osceola Consolidated Mining Co., at Calumet, Houghton Co., Mich.

SOUTH LAKE MINING CO. MICHIGAN.

Office: 68 Devonshire St., Boston, Mass. Mine office: [illegible] Ontonagon Co., Mich. John C. Watson, president; Arthur C. Palm[illegible] and treasurer; preceding officers, Chas. E. Adam[illegible] P. W. Scott, directors; Dr. Lucius L. Hubbard, [illegible] Feb. 25, 1880, under laws of Michigan, with [illegible] $25 par, as the Aztec Copper Co., and reissued present title, with capitalization increased [illegible]

:e extended for 30 years from Feb. 25, 1910; issued, $1,500,000. shares of the old company were $4.50 paid in. Of the issued stock, s were put out at $2 each, August, 1909, to shareholders of record, he balance sheet of Dec. 31, 1910, gave a cash balance of $7,444.82, s of $26,791.51 from a loan account, which presumably represents that amount. American Trust Co., Boston, registrar; Federal oston, transfer agent. Annual meeting, first Tuesday in March.

34 acres of mineral property, being the W. ½ of Sec. 31, T. 51 N., he company also has certain rights in and to the NE. ¼, SE. ¼ and c. 10, T. 50 N., R. 38 W., and unless the differences regarding these icably adjusted, their nature and extent will have to be determined f equity. The company also holds 1,214 acres of agricultural and , in the NE. ¼, SE. ¼ and SW. ¼ of Sec. 10, T. 50 N., R. 38 W. is connected with the main line of the Copper Range railway by a

as begun on the property in 1862, or rather the beginning of his- dates from 1862, as the original name of Aztec was taken because s of extensive workings by a prehistoric race, thought, in those days, the Aztecs. A 16-lb. stone hammer was taken from the old work- ine had a stampmill in early days, and produced 756,853 lbs. fine ich 100 tons were secured in a single mass. Exploratory work was 906, on the Knowlton bed of the Evergreen belt, by the Aztec- velopment Co., and diamond drill borings were begun September, ing until March, 1911, when suspended by reason of adverse finan- is. Borings were begun at the base of Evergreen Bluff, near the vergreen belt, thence working southward toward the eastern sand- t drill holes were put down, at various points on the property, and, standpipe holes were put down, to test the depth of the overburden, oints having a comparatively shallow capping of drift. Standpipe d an overburden of homogeneous clay, of 272′ average thickness, in of drill holes Nos. 3 and 7, and, from the comparative ease with ipes were driven through the overburden, and from the material would appear that the overburden of the South Lake, varying 300′ in thickness, is almost entirely argillaceous, and contains very

e, driven in the north central part of the property, was unproductive o. 2 hole, bored close to the eastern, and about 1,000′ north of the ndary, cut at depth of a little more than 1,800′, what is supposed to amygdaloidal bed, and was bottomed, at circa 2,400′ depth, in a thought to be identical with that underlying the Lake bed on the . No. 3 hole cut copper ground at 748′, and again at 878′ both copper. At still greater depth 2 other amygdaloidal beds, without enetrated, and the hole penetrated a conglomerate bed at a depth of and was bottomed at 1,953′. No. 4 drill hole cut the first cuprifer- th of 824′, the first 1,300′ carrying copper, and at 50′ greater depth priferous bed was cut, this carrying copper for 30′. At depth of his hole cut a third amygdaloidal bed, carrying fair copper values and the hole was stoped at a depth of 1,235′. No 5 hole yielded identical with those from No. 4, except that the fourth or bottom riferous series carried very little copper. No. 6 hole first cut cop- 00′ depth, in a bed of about 20′ thickness, having 5′ of extremely und, 5′ of fair copper ground, and 10′ of ground ranging from lean en.

. 3, 4, 5 and 6 [illegible] quare of about 200′, near the [illegible] the north and south lines [illegible] neral strike of the for-

mation to be N. 70° W. at this point, with a dip of about 56° S. This series of holes has disclosed 4 copper-bearing beds, one lying immediately above the ophite stratum, and one below, with 2 other cupriferous beds at distances of circa 30′ and 60′. The borings of the South Lake have been carefully correlated with the underground work at the Lake mine adjoining, and results of the diamond drill borings on a number of other properties in the same district, as a result of which Dr. Hubbard is of the opinion that the South Lake carries the western extension of the amygdaloidal stratum first opened in the Lake mine. The apparently irreconcilable difference of 70° in the strike of the Lake bed, in the Lake mine, and the supposed Lake bed in the South Lake mine, being accounted for by the hypothesis that there is a flexure in the Lake bed and parallel strata by which the northerly continuation of the Lake bedded series is deflected from a practically NS. strike in the main workings of the Lake mine, to a strike of N. 70° W., where cut by drill holes Nos. 3, 4, 5 and 6, on the eastern border of the South Lake tract, with a further flexure to the west of this point on the South Lake property, giving an ultimate strike practically parallel with that of the bedded series of the Evergreen belt, shortly to the northward. Strong evidence of the correctness of this hypothesis is furnished by the marked westerly deflection of the Lake bed in the extreme northern workings of the Lake mine opened early 1911. The most confusing feature of the situation, at present, is the southerly dip of the 4 copper-bearing beds and parallel strata, as shown by drill holes Nos. 3 to 6 of the South Lake, the southerly dip of these strata being opposed, at an angle of nearly 90°, to the northerly dip of the strata of the Evergreen belt, shortly to the northward. It is obvious that the Keweenawan formation, in the vicinity of the Lake mine, has far greater aberrations, and far more puzzling geological conditions, than have been found elsewhere in the entire Lake Superior copper district, during 70 years of development and exploitation. The final word regarding the geology of this district remains to be written, but the evidence at hand is strongly to the effect that the South Lake actually is the westerly continuation of the very rich Lake amygdaloid of the Lake Copper Co., and the South Lake is considered a decidedly promising property.

SOUTH MOUNTAIN COPPER MINING CO. MARYLAND.

Mine office: Smithsburg, Washington Co., Md. Warren H. Gotwald, manager, at last accounts. Organized 1907, under laws of Delaware, with capitalization $1,000,000, shares $1 par. Lands, 80 acres, 3 miles southeast of Smithsburg, on the flank of South Mountain. Property, under development by tunnel, is said to carry native copper, and has secured good copper assays with fair gold and silver values, and the precious metals are said to exist in sufficient quantities to give copper without cost, which claim is not credited. Presumably idle.

SOUTH MOUNT LYELL MINING CO., LTD. TASMANIA.

Dead. Formerly at Gormanston, Montagu Co., Tasmania. Described Vol. VI.

SOUTH MURRAY-BALFOUR COPPER CO. TASMANIA.

Office: 450 Collins St., Melbourne, Australia. Mine office: Mt. Balfour, Russell Co., Tasmania. H. T. Barrett, chairman; preceding officers T. B. Birbeck, A. G. Lester, R. S. Couche, P. J. Deely and H. Harvey, directors. John Macmelkan, manager. Organized 1909, with capitalization £9,000, £10 par. Property is a prospect in the Mount Balfour field. Presumably idle.

SOUTH NAMAQUA SYNDICATE. CAPE COLONY.

Dead. Was merged, circa March, 1908, in Insiawa Nickel & Copper Developing Co., Ltd. Formerly at Kokstad, East Griqualand, Cape Colony.

SOUTH NEVADA COPPER SYNDICATE. NEVADA.

Dead. Was a stockjobbing scheme, put out by Sidney Flower, and alias of Parmeter Kent. Formerly at [illegible], Esmeralda Co. Described Vol. VIII.

KER MINING CO. **IDAHO.**
Challis, Idaho. Mine office: Ivers, Custer Co., Idaho. E. G. lent; C. W. Hanson, vice-president; Geo. E. Keyes, secretary; asurer and manager; preceding officers, M. A. Brown and W. D. ctors. Capitalization $500,000, shares $1 par. Lands are in the t Packer mine, in the Loon Creek and Yankee Fork districts.

KER MINING & SMELTING CO. **IDAHO.**
Former office was 1102 Newhouse Bldg., Salt Lake City, Utah. chett was president and treasurer; J. A. Czizek, vice-president; secretary. Organized circa April, 1909, under laws of Utah, with $300,000, shares $1 par, nonassessable. Lands, 15 claims, unmiles from railroad, near the Lost Packer mine, slightly developed wing auriferous and argentiferous copper ore. Formerly at Ivers, laho.

COCK MINING CO. **IDAHO.**
8 State St., Boston, Mass. Letter returned unclaimed from for-e, Weiser, Washington Co., Idaho. Thos. S. Wentworth, presi-Pratt, secretary. Capitalization, $500,000. Has a shaft showing some years and apparently moribund.

NCY COPPER CO. **MICHIGAN.**
ormer office was 42 Broad St., New York, N. Y. Organized 1910, under laws of Michigan, with capitalization $5,000,000, . The company was promoted by the firm of B. H. Scheftels ame to grief with the postal authorities, 1910, through fraudulent ils. The company was based upon options on the Montezuma, South Side tracts, area circa 750 acres, immediately west of d the company never had any title whatever to these lands. A orable nature, on the possibilities of these 3 properties, made by he Copper Handbook for Mr. Chas. S. Herzig, E. M., was used by I. Scheftels in promoting the sale of this stock, until such use was threat of proceedings. The property is good, but the company lulent nature, from its inception. Mr. B. H. Scheftels stated, that the firm was redeeming the certificates of the company, as d, but some certificates were outstanding when Scheftels & Co. f business by the postal authorities, shortly later. As the comned any property, and its sponsors are under indictment and out of ock is worthless. Formerly at Houghton, Houghton Co., Mich.

GE MINING CO. **MICHIGAN.**
99 Washington St., Boston, Mass. Mine office: Houghton, , Mich. John W. Belches, president; Irving J. Sturgis, vicehur E. Coe, secretary and treasurer; preceding officers, John C. e H. Stevens and Rufus R. Goodell, directors; Frederick W. Nichgent. Organized Nov. 12, 1899, under laws of Michigan, with $2,500,000, shares $25 par, fully paid; issued, $2,370,000. Annual Wednesday in June. Lands are 7,000 acres of undeveloped mining mainly between the Globe and Lake mines, in Houghton and nties, Michigan, and so effectually scattered that future mining ned out of new territory in that district will require more or less South Range Mining Co. to secure regular tracts.

XAVIER COPPER CO. **ARIZONA.**
Tucson, Pima Co., Ariz. S. M. Franklin, manager.
between limestone and porphyry, with a good gos-
a 30" paystreak of sulphide ore assaying up
opened by a two-compartment shaft of
returned 13.5 to 20% copper, with
a small force at last accounts.

SOUTH SIDE MINING CO. MICHIGAN.

Office: 14-68 Devonshire St., Boston, Mass. Mine office: Leopard Bldg., Houghton, Houghton Co., Mich. John C. Watson, president; Arthur C. Paine, secretary and treasurer; preceding officers, Harry F. Fay, Ashley Watson and D. C. Forbes, directors; Frederick W. Nichols, agent. Organized 1866, under laws of Michigan, and reincorporated Nov. 2, 1898, with capitalization $1,000,000, shares $25 par; fully issued, $9.70 paid in. On March 6, 1911, the shareholders authorized an increase of capitalization to $2,500,000, and amended articles of association were executed by the president and secretary July 7, 1910, but the amended articles have not been filed. The old company levied assessments of about $90,000, to 1872. The company has about 50 shareholders. Shares are listed on the Boston stock exchange. Annual meeting, first Monday in March.

Lands, circa 200 acres, lying west of the Dacotah and north of the Naumkeag, immediately west of Houghton, with one-half mile frontage on Portage Lake. Property is the S. ½ of the SE. ¼, and lots Nos. 5 and 6 of Sec. 24, T. 54 N., R. 34 W. Exploratory work was done, many years ago, but the property has been idle since circa 1873. The lands were under option, 1910, to the South Quincy Copper Co., at $200,000, but a deed in escrow was not taken up by the South Quincy. The management plans exploratory work when financial conditions warrant. Property considered promising, but should be joined with lands either east, south or west, in order to secure a property of larger size.

SOUTH SWANSEA MINING CO. UTAH.

Dead. Was merged, June, 1908, in the Swansea Consolidated Mining Co. Formerly at Silver City, Juab Co., Utah. Described Vol. VIII.

SOUTH THARSIS MINING CO., N. L. TASMANIA.

Dead. Property was sold, for £45,000, to Mount Lyell Mining & Railway Co., Ltd. Formerly at Gormanston, Montagu Co., Tasmania

SOUTH UTAH MINES & SMELTERS. UTAH.

Office: 930-165 Broadway, New York, N. Y. Operating office: Newhouse Bldg., Salt Lake City, Utah. Mine office: Newhouse, Beaver Co., Utah. Samuel Newhouse, president; Alvin Untermeyer, vice-president; John Josten, secretary and treasurer; Emil H. Lundquist, manager; Robt. Maden, superintendent; R. W. Bruner, mill superintendent. Organized Feb. 28, 1910, under laws of Maine, as successor of Newhouse Mines & Smelters, with capitalization $4,300,000, shares $5 par. Debentures, $1,300,000 of 6% 20-year income bonds, convertible into stock at par, remaining from a $1,500,000 bond issue put out by the Newhouse Mines & Smelters. Interest on bonds is said to be payable annually, but only if and when earned, and then out of net profits of the year's operations. The old company defaulted in interest on its bonds, and the property was bought for $500,000, under foreclosure, old shareholders being given stock, share for share, plus a payment of $1 per share for new stock. The reorganization brought about $600,000 into the treasury, of which all but about $200,000 was required to liquidate the floating debt of the old company. The debt to the United Metals Selling Co., approximating $144,000, inherited by the company, is said to have been settled in full. The company began business with treasury cash variously reported as $200,000 to $350,000, and was said to have about $160,000 cash assets, April, 1911. Has circa 3,000 shareholders. The company's stock, to the extent of 526,992 shares, is admitted to quotation on the unlisted department of the Boston stock exchange. Annual meeting, third Monday in October.

A dividend of 50 cents per share, amounting to $300,000, was paid, Aug. 31, 1907, by the Newhouse Mines & Smelters, and was termed a first quarterly dividend, but had no successor, there being no profits to divide, and the management should have known, when declaring this dividend, in July, 1907, that conditions were such, marketwise and physically, that a continuation of the

possible. Apparently the action of the management in declaring
and calling it the first quarterly dividend, was for market effect
hly censurable. For the fiscal year ending June 30, 1908, the
le net earnings of $79,921, against which was bond interest of
ing a small net loss on the year's operations.
3 claims, patented, area 201 acres, with miscellaneous holdings,
Midvale placer of 168 acres area, water-rights at Wah Wah Springs,
sites and grazing lands, giving total holdings of 7,882 acres.
ral property carries about one mile of the strike of the Cactus
ctus mine, operated in a small way, and unsuccessfully, by several
rs, shows monzonite-porphyry country rock, near a limestone
re is essentially an irregular mass of brecciated monzonite, carrying
nations, including some oxidized ores in the upper workings, but
ly chalcopyrite, associated with pyrite, both slightly argentif-
ferous, ranging 20 to 35 cents per ton in combined gold and silver
actically without lead or zinc. Previous to 1905 the Cactus ores
e averaged about 1% copper only, and December, 1909, and Jan-
erage extraction was reported at 1.25% copper, with small gold
es. Although the average grade of ore is very low, there is some
phide ore, mainly chalcopyrite, assaying up to 15 and even 20%
r, but the quantity of such ore is comparatively small. The mine
of great size, ranging up to 200′ in width and 600′ in length, and
ly reported its main ore body as 175′ wide, 700′ long and 600′ deep
ke and vertical dip. Reserves were estimated, early 1908, by
nt, at 4,332,023 tons, averaging 2.5% copper above the 700′
estimated, October, 1910, at above 3,000,000 tons of 3% average
onnage perhaps may exist, by including the low grade ores, but
ade is estimated very much too high. A recent inspection of the
an estimate of 1,127,083 tons of ore in sight, averaging 1.8%
000 tons of 2% ore, partly developed and probable, and an
0,000 tons of partly developed ore, averaging 1 to 1.25% copper,
figures are much more nearly correct than the former estimates,
ly also too high on average copper tenor.
is developed by 600′ and 900′ three-compartment working shafts,
00′ intervals, connected on the 600′ level with a 6,300′ main haul-
ing a grade of 5%, laid with 30-lb. steel rails. Tramming is done
comotives, each hauling trains of 21 cars. The tunnel, which is
throughout, cut several cupriferous veins before reaching the
The mine has upwards of 3 miles of workings, and, for the fiscal
e 3,025′ of new workings. The system of mining has been changed
back-stoping, by which it is claimed that 250 men at the mine and
roduction formerly requiring a force of 400 men, under the old
ing by square sets. Principal developments are between the 300′
and the 600′ level, giving the principal showing of ore, was said,
have an ore body of 30′ width and about 100′ length, carrying
copper tenor. Mining was resumed September, 1910, after a
The mine had some trouble, 1908, from caving, and the man-
hen said to plan operating the mine on the caving syste n. A
ised for stripping, can handle about 1,000 tons of material daily.
ning the portal of the main tunnel, the electric trains pass over a
n ore-house, where 7 cars at a time are run into a great steel tube,
lly rotated, and the ore dumped from the cars upon grizzlies,
to Blake crushers that reduce it to lumps of 1″ size and smaller,
ed ore going to 800-ton storage bins, whence the ore is loaded into
nd taken to the mill.

The mine has a 200-h. p. steam plant, with a 150-h. p. hoist good for 400', and a 40-drill Ingersoll-Sergeant air-compressor, both hoist and compressor being operated electrically. There also is an auxiliary electric hoist on the second level. Power formerly was furnished the mine from the central plant, by compressed air, piped through a line 13,000' long, this operating steam-shovels and hoists, water for steaming purposes not being available at the mine.

The mine and mill are connected by the Newhouse, Copper Gulch & Sevier Lake Railroad, 2.3 miles in length, of standard gauge, owned by the company, which connects with the San Pedro & Salt Lake railway, equipment including a Shay mountain-climbing locomotive and five 50-ton dump-cars.

The 1,000-ton mill is 100x400' in size, in two 500-ton duplicate sections designed on the unit plan, to allow for future expansion. The western section, which is the concentrator proper, is of structural steel, with corrugated iron sides and roof, having a 15-ton Whiting traveling crane, while the power plant, under the same roof, is of structural steel and brick. Equipment includes three 10x24" Blake crushers, 4 sets of rolls, 1 Huntington mill, 22 Hartz jigs, 48 Wilfley tables, 10 Johnston tables, 8 Wilfley slimers, 16 Callow tanks and Sherman settling tanks and classifiers. Ore is received in 1,000-ton steel bins, whence it is drawn by belt-conveyors, equipped with plunger feed, and transferred to elevators, of which there are 2 for each section, one for dry and one for wet ore. The mill was overhauled and additional machinery installed, 1908, and this was claimed to have brought the mill up to its rated capacity of 1,000 tons daily, and the mill was then claimed to be putting about 8 into 1, effecting a saving of about 80% of assay values, but the mill was again overhauled and practically rebuilt, 1909, at a cost of about $70,000, going into commission September, 1910, after which the mill was again claimed to have been given an increased efficiency of 50%, and was claimed to have been so improved that it was extracting 75% of the assay values, as compared with the average extraction of about 50%, hence it is obvious that some very untruthful claims have been put out, from time to time, regarding this mill, and, in consequence, present claims are to be accepted with due allowance for the exaggerated claims made in the past. Concentration formerly was said to be about 8 into 1, and is now said to be 10 to 12 into 1. The mill was reported, April, 1911, to be treating between 500 and 600 tons of ore daily, and securing an extraction of 65% of assay values, and concentrates were said, February, 1911, to average about 10.46% copper. The mill product is sent, under a 5-year contract, calling for 1,000 tons of concentrates monthly, to the Tooele smelter of the International Smelting & Refining Co. Concentrates formerly were reported to carry 10 to 25% excess of iron, commanding a premium of about 10 cents per unit. In connection with the mill there is a 4-ton experimental lixiviation plant, with certain features patented by Mr. D. F. Waterbury, planned to leach the Cactus oxidized ores, claimed to average 2% copper, with small gold and silver values, but nothing has been heard of this for several years, and presumably the experiments did not prove successful.

The power plant includes a boiler-room having five 350-h. p. Babcock & Wilcox boilers, a Green fuel economizer and a 165' self-supporting steel smoke-stack of 8' diameter. The steam plant is held in reserve, machinery being operated by electric energy, brought 50 miles over the lines of the Telluride Power Co. There are two 500-h. p. Westinghouse-Parsons steel turbines, making 3,600 revolutions per minute, formerly direct-connected to two 400-kw. generators that furnished all power, except compressed air, used in the mine and mill.

Water is brought 8½ miles from 6 large springs, at Wah Wah, through a line of 12" and 14" riveted steel pipe, laid across Preuss Valley, discharging into a cement reservoir of 300,000 gallons capacity, located on high ground above the mill and townsite, the springs having a flow of about 1,000 gallons per minute.

The property formerly included an antiquated old smelter, put up by a French company that once owned the Cactus mine, but this smelter was

e reorganization. Experiments made with the Fink process, in ere given much notoriety in the press, and excessive claims were ew process, which seems to have some merit, though vastly over- e when the old company was sorely in need of favorable news.
ings of the company include a 30x50′ brick machine-shop, 30x40′ , smithy, bunkhouse and boarding-house. There also is a saw- n ice plant, the latter being necessary in summer, as the prop- dge of the Escalante desert.
e called Newhouse has been platted near the mill, and the com- ein 47 dwellings, a club-house and a brick hotel with accommoda- n. From the profits of the club-house and clubs, sufficient money build a small theatre, which is much appreciated by the work- ne and mill were employing about 250 men, February, 1911.
n, for fiscal years ending June 30th, was 5,670,993 lbs. fine copper, er and 2,272 oz. gold in 1906, and was 7,244,179 lbs. copper, r and 1,721 oz. gold for 1908, secured from 176,766 tons of ore, of ns were smelting ore, and 19,367 tons of concentrates, giving an action of about 20.5 lbs. fine copper, 15 cents silver and 20 cents Mining costs have been estimated at 90 cents, and milling costs ton, but, after allowance for smelting costs, the margin of profit, ingly narrow, on 12-cent copper, and present extraction is probably er and 35 cents per ton in combined gold and silver values. It the Cactus is an exceedingly low grade mine, and will require very g to earn any profits. The untruthfulness of the old company, management, also reflects upon the present corporation.

AFRICA CO., LTD. GERMAN SOUTHWEST AFRICA.

Laurence Pountney Hill, Cannon St., London, E. C., Eng., and len 35, Berlin, Germany. E. Davis, chairman; C. Launspach, . Tönnesen, African manager. Organized Aug. 18, 1892, with 2,000,000, shares £1 par; issued, £1,200,000. Property is min- covering 22,000 square miles, including nearly 4,500 square miles Damaraland, and mining rights to 23,000 square miles in Ovam- oldings including 40,000 square miles of freehold, with mining 000 square miles additional, also sundry railroad concessions. olds a large share interest in the Otavi Minen- und Eisenbahn- d has about £1,200,000 in cash and choice securities. Accounts, o December, 1908, showed profits of £102,053, from which a 5% nting to £82,500, was paid May 3, 1909, and a dividend of 7½%, s paid May, 1910.

CONSOLIDATED MINING & MILLING CO. UTAH.

rmerly at Farmington, Davis Co., Utah. Described Vol. IX.

ERN CONSOLIDATED SMELTING CO. CALIFORNIA.

as a stockjobbing scheme, put out by Kaye, De Wolfe & Co. tcher, San Bernardino Co., Cal. Described Vol. VIII.

ERN COPPER CO. TEXAS.

rmerly at Sierra Blanca, El Paso Co., Tex. Described Vol. VIII.

ERN COPPER & IRON CO. NEW MEXICO.

nds were sold, May, 1906, to Burro Mountain Copper Co. For- d, Grant Co., N. M.

ERN DEVELOPMENT CO. MÉXICO.

s a bit of stockjobbery, put out by M. C. Barnard & Co. For- uma, Sonora, Mex. Described Vol. IX.

ERN DEVELOPMENT & IMPROVEMENT CO. ARIZONA.

Clifton, Graham Co., Ariz. Property is the Polaris mine, and lease, from Polaris Mining & Milling Co., and the property er title of the owner.

SOUTHWESTERN GOLD & COPPER CO. ARIZONA.
Dead. Formerly at Douglas, Cochise Co., Ariz. Described Vol. V.

SOUTHWESTERN MINE & SMELTING CO. ARIZONA.
Dead. Was organized, 1903, to build a custom smelter at Gleeson, Cochise Co., Ariz., but never even begun work. W. R. Fagan, of El Paso, Tex., was general manager.

SOUTHWESTERN MINING CO. MEXICO.
Dead. Was merged, circa August, 1908, in Kansas-Cananea Copper Co. Formerly at La Cananea, Arizpe, Sonora, Mex. Fully described Vol. VI.

SOUTHWESTERN SMELTING CO. CALIFORNIA.
Dead. Formerly at Letcher, San Bernardino Co., Cal. Described Vol. V.

SOUTHWESTERN SMELTING & REFINING CO. ARIZONA.
Dead. Property was sold, Sept. 15, 1906, by sheriff, under execution to Walter L. Wilie. Formerly at Benson, Cochise Co., Ariz. Described Vol. V.

SOUTH WEST SMELTING & REFINING CO. NEW MEXICO.
Dead. Property was sold by receiver, Jan. 6, 1909, and reorganized as Orogrande Smelting Co. Formerly at Orogrande, Otero Co., N. M. Very fully described Vol. VIII.

SOUTH WHEAL CROFTY CO. ENGLAND.
Dead. Was succeeded, July 18, 1906, by South Crofty, Ltd. Formerly at Carn Brea, R. S. O., Cornwall, Eng. Described Vol. VIII.

SOUTH YALE COPPER CO., LTD. BRITISH COLUMBIA.
Dead. Formerly at Grand Forks, Boundary district, B. C. Described Vol. VIII.

SOUTH YUBA MINING & SMELTING CO. CALIFORNIA.
Dead. Sold lands, 1905. Formerly at French Corral, Nevada Co., Cal.

SOVEREIGN CONSOLIDATED COPPER CO. OREGON.
Office: Baker City, Ore. Letter returned unclaimed from former mine office, Sparta, Baker Co., Ore. W. G. Gladding, president; John Arthur, vice-president; Kenneth O. McEwen, secretary; J. W. Patterson, treasurer; personal officers and John Ramb, directors. Organized Dec. 5, 1907, under laws of Oregon, with capitalization $2,000,000. Lands, 12 claims, area circa 200 acres, Coin Creek, in the foothills of the Eagle Mountains, showing a mineralized zone of about 200′ width, traceable 6,000′ on the company's lands. Idle.

SOVEREIGN COPPER MINING CO. WYOMING.
Dead. Formerly at Battle, Carbon Co., Wyo.

SPANISH-AMERICAN FEDERAL SMELTING & REFINING CO. ARIZONA.
Office: 11 Buckler Bldg., El Paso, Tex. Letter returned unclaimed from former alleged works office, Nogales, Santa Cruz Co., Ariz. J. B. Smith, president; F. A. Schneider, general manager; J. P. Stapleton, attorney. Organized circa January, 1908. Property consisted of some neatly lithographed stock and the alleged idea of building a 1,200-ton smelter at Nogales. Company apparently is a replica of the Pan-American Smelting & Refining Co., and regarded as a mere stockjobbing scheme. Presumably moribund.

SPANISH COPPER CO., LTD. SPAIN.
Office: 2 Tokenhouse Bldgs., London, E. C., Eng. Mine office, San Vicente, Palmogo, Huelva, Spain. F. T. Fisher, chairman; Miguel [illegible], managing director. Organized June 8, 1883, with capitalization £150,000, £1 par; issued, £110,000, fully paid. Property was sold, 1907, to the Anglo-Spanish Copper Co., Ltd., and property of this company was supposed to be sold of shares in the Anglo-Spanish Copper Co., Ltd., but the latter was [illegible] compulsorily, and apparently has been reconstructed under the title of Anglo-Copper Co., Ltd., and the property is described under the latter head in this volume.

INERALS DEVELOPMENT, LTD. **SPAIN.**
Vas succeeded, Feb. 14, 1908, by Esperanza Copper & Sulphur Co., y at Almonáster, Huelva, Spain. Described Vol. VI.

:OSPECTING CO., LTD. **SPAIN.**
Vas liquidated 1909. Formerly at Zalamea La Real, Huelva, ibed Vol. IX.

ER MINES & TUNNEL CO. **COLORADO.**
ormerly at Whitepine, Gunnison Co., Colo. Described Vol. VIII.

& COPPER CO. **ARIZONA.**
ands were sold, circa 1908, to Pocahontas Copper Queen Mining r at Mayer, Yavapai Co., Ariz.

ING & DEVELOPMENT CO. **OREGON.**
ormerly at Sparta, Baker Co., Ore. Described Vol. VIII.

)PPER MINE, LTD. **SIBERIA.**
0 London Wall, London. E. C., Eng. Mine office: Spassky insk, Siberia. Arthur Fell, M. P., chairman; Ernest Carnot, preceding officers, F. H. Hamilton, Jean B. Depelley, Kenneth Robellaz and H. A. Scott, directors; John A. Clark, secretary; olmer, resident manager; C. Farmer, mine superintendent; R. M. ne superintendent; F. C. Knight, smelter superintendent; E. T. sulting engineer.

July 9, 1904, under laws of Great Britain, with capitalization es £1 par, increased March, 1908, to £500,000, shares £1 par; 55, fully paid. Debentures, £300,000 authorized and issued, at 1, 1918, redeemable at 105 after Jan. 1, 1912, on 6 months notice pany, and convertible into full paid shares at £3; outstanding, nsiderable part of the bonds having been converted into shares. of 2s. 6d., or 12½%, was paid Nov. 10, 1910. Fiscal year ends d company's reports are very late, being given to shareholders r in arrears. For fiscal year 1908, operations showed a loss of a net profit of £9,573 in 1909, and net profit of £28,239 in 1910. comparatively small earnings, the wisdom of dividends seems open

0 square miles, on the Ishim River, an affluent of the Irtish, in ppe. Holdings include about 25 square miles of coal lands, carry- bituminous coal, said to be of excellent grade, and the lands also and limestone, and include the Yuspensski mine and the Spassky

ensski mine was opened 1864, closed 1884, reopened 1896 and sent company, 1904. Original development was by a pit, once long since caved in.

nsski mine has a network of veins, at and near the contact of slate dstone, in sedimentaries of Permian age. The 2 main veins, Annenski and Vladimir, or Yuspenski, are about 200′ apart, and arallel, and it is thought they may join at depth. Principal devel- e Annenski vein, which is 10′ to 60′ in width, carrying a hanging- of massive chalcocite, succeeded by bornite, largely massive, angue, followed by small quantities of chalcopyrite and occasional e vein growing gradually leaner in copper toward the footwall, fectly defined, and carries low-grade copper impregnations. The ly quartz and barite, and the ore is estimated, by the company, o 20% in copper tenor, which estimate perhaps is too high, though tionably is very rich. The upper workings show some native azurite and malachite. The mine was gouged for rich ore by the who left a large amount of low-grade material unstoped, and it though proper policy called for the immediate installation of a

modern concentrator, to utilize values now remaining untouched, and elim... the further use of barren fluxing material. The mine has been tested by ... mond drill borings to a depth of only 475′, ore in the bottom of the holes ... up to 67% copper, but further prospecting is said to be planned.

The old workings, archaic and in extremely bad condition, include ... shafts, mainly shallow. The mining practice of the former owners was ... most primitive nature, with timbering costs averaging $1.25 per ton ... mined, and the timbering was subject to frequent crushes, owing to bad ... after which new timbers were installed inside of the old, with the result of ... ually reducing the mine openings to impassable dimensions.

The new development, by the present company, includes 6 shafts, ... to 490′ depth. The 490′ Annenski main shaft is sunk in the foot, and ... with the vein by crosscuts. The 350′ level shows a vein of 15′ ... extreme width, carrying ore of 10 to 40% copper tenor, with an ... smelting returns, of 21.77%. There are 3 shafts each on the Annenski ... penski veins, and the Annenski vein was claimed to show, in a ... 300′ level, in addition to the main vein above referred to, 65′ ... matter, carrying gradually declining copper values, the crosscut ending ... rial of about 1% copper tenor only, hence it is thought that the ... materially wider than heretofore worked. At one point the former ... said to have extracted chalcopyrite, leaving a wall showing ... they are said to have considered slate, but which, upon investigation ... present management, proved to be a massive chalcocite. It seems ... believe that the former owners could have been guilty of such a ... mining and smelting practice were so wonderfully poor that the ... true. The 490′ level of the Annenski shaft shows ore of 14 to 20% ... and the mine was estimated, 1908, to have developed about ... of ore, of circa 15% average copper tenor.

Equipment at the mine includes a 700-h. p. steam plant, ... hoist, good for 1,000′ depth, and a 10-drill straight-line air-compressor. ... is a small test mill, with crushing and Elmore vacuum oil ... Buildings include a 50x100′ stone machine-shop and a ... number of other mine structures, and numerous dwellings for workmen, ... a small town, in which the company maintains schools, hospital, ... church, for employés and their families.

The Karagandy coal mine, 24 miles northwest of the smelter, ... 60″ and 65″ thickness, and is said to yield about 60,000 long tons ... supplying the company's requirements, in addition to furnishing ... production for sale. The mine is said to be producing coal for ... at the pit's mouth. There is a small coking plant, with beehive ... colliery.

The company has a 26-mile private railway, known as the Karagandy line, of 600-mm. gauge, equipped with 5 locomotives and ... connecting the smelter and coal mine. The copper mine is ... the nearest point on the Trans-Siberian railway, with a ... vening, and transportation is by camels in winter, and horses ... average freight charge of about £3 per ton. The smelter is ... of the mine, and, under the old management, ore was carted ... much ore was lost in transit that the line became emblazoned ... bornite, visible for several miles. The Russian government ... considering, for several years, an extension of the Orenburg-Petropalatinsk railway, to pass near the Spassky property, and ... to have given consideration to the plan of constructing a ... build a railway, badly needed, to connect the mine and ...

The old smelting plant, which was poorly designed, ... markably inefficient, has been pushed up and improved, ...

capacity is reported, by the management, as 80 to 100 tons daily.
cludes 8 small Raschette blast-furnaces and seven 5-ton reverber-
, the works being designed for a capacity of 300 long tons fine cop-
The converter department has a 20-ton electric traveling crane
, with shells of the Anaconda type, treating matte of 58% copper
ning out blister copper averaging 99% copper, 20 to 40 oz. silver
d per ton. There is an electrically driven quartz mill for pugging
igs.
er power plant has a 700-h. p. steam installation, 150-h. p. electric
50-h. p. air plant having 2 Connersville blowers and a Bessemer
e.
ble trouble was had with labor, in the inception of the enterprise,
e changed, 1907. In 1909 the mine employed 668 men, of whom
rground workmen, in addition to the forces at the coal mine and

n was 1,865,690 lbs. fine copper in 1906; 3,552,570 lbs. in 1907;
in 1908 and 5,540,160 lbs. in 1910, showing a substantial growth
ne company was claimed to have made a profit of £33,000 on oper-
rst 15 months, but was compelled, a little later, to raise additional
would indicate that the profits were secured mainly by some sys-
eping. The actual cost of copper produced, August, 1909, was
ton, but the cost has been claimed, by the company, to have been
on since that date. Presumably this figure is for copper at the
Kirghiz Steppes, rather than for copper laid down in the market.
s one of very great promise, but the mine is not adequately de-
nelter is 74 miles from the mine, without rail connection, and the
is hundreds of miles from the nearest railway. Better transpor-
are a necessity, and a mill also should be built, if the mine is to be
producer and profit-payer that its merits would seem to warrant.

MENT GOLD MINING CO. **COLORADO.**

26 Majestic Bldg., Denver, Colo. Mine office: Idaho Springs,
o., Colo. Wm. E. Renshaw, general manager; A. E. Simpson,
. The mine, developed by a tunnel about one-half mile long,
ous and argentiferous copper ores, with values mainly in gold.
ludes an electric power plant, and air-compressor, and there is a

MINE. **MONTANA.**

North Butte Mining Co., at Butte, Silver Bow Co., Mont.

MINING CO. **MONTANA.**

utte, Mont. Mine office: Clinton, Missoula Co., Mont. John
president; John Dougherty, vice-president and general manager.
Clinton, includes the Black Hawk group, and options on adjoining
ack Hawk is developed through the Cape Nome shaft, which this
200′, to the 500′ level. The company was said, 1909, to have
ddin mine, near Clinton. Company formerly owned the Specu-
Butte, sold, 1905, to the North Butte Mining Co. Presumably
holdings, now owned by the North Butte, were fully described

COPPER CO. **ARIZONA.**

as [illegible]dle, promoted by Dr. R. C. Flower. Was succeeded by
y [illegible] Co., also dead. Formerly at Duncan, Graham Co.,

OREGON.

[illegible]ine Co., Ore. Dr. Jas. Spence, general
[illegible] Lands, 11 claims, area 220 acres, 40
[illegible]d porphyry, carrying 4 veins, under

development, estimated at 4′ to 100′ width, opened by 7 tunnels, of 40′ to 80′ length, showing cuprite, melaconite, malachite, azurite and chalcopyrite, mainly the latter, giving assays of 3 to 20% copper, 1 to 6 oz. silver and $1 to $10 gold per ton. The Edelweiss claim shows some native copper, with fair gold values. The property has been developed slowly, with a small force, for some years, but has been kept out of debt.

SPENCE MINERAL CO. CALIFORNIA

Office: 528 Mills Bldg., San Francisco, Cal. Mine office: Spenceville, Nevada Co., Cal. Emma Shafter Howard, president. Property is an old mine, operated 1875–1903, the shaft caving in the latter year, and property was bought by the present company, 1897. Ore is mainly auriferous and argentiferous chalcopyrite, associated with pyrite, ranging 2 to 20%, with an average of circa 5% copper tenor, and 45 to 50% sulphur, occurring in irregular fissure veins of 15′ to 50′, near the contact of diorite and granodiorite. The mine has yielded about 12,000,000 lbs. fine copper, and, owing to the large ore bodies, and good average values in copper, gold and silver, as well as the exceptionally good sulphur values, would seem worthy of further development. There is a leaching plant, at San Francisco. Idle since circa 1903.

SPENCER MOUNTAIN TUNNEL CO. COLORADO

Office: Boulder, Colo. Mine office: Eldora, Boulder Co., Colo. Wm. E. Allbright, president; J. A. Gilfillan, vice-president and general manager; W. B. Hayes, secretary and treasurer; preceding officers, J. T. Odell, Geo. F. Randall and Chas. Mackey, directors. Organized February, 1906, under laws of Colorado, with capitalization $1,250,000, shares $1 par, nonassessable, in $250,000 preferred and $1,000,000 common stock; issued, $1,088,000.

Lands, 8 fractional claims, area 25 acres, with 2 millsites and a 10-acre dumping site, in the Grand Island district. The property carries 50 fissure veins in gneiss, of which 12, of 1′ to 10′ estimated average width are under development, carrying sylvanite, petzite, and a copper telluride first discovered on this property, estimated by the management to average about 10% copper, with traces of silver, and $5 to $50,000 gold per ton. The mine also has free gold. Development includes shafts of 110′, 60′, 40′ and 25′ and 90′, but is mainly by a 6,000′ drainage and transportation tunnel, the mine having about 7,000′ of workings.

Equipment includes 100-h. p. steam plant, with a 5-drill air-compressor, and there are 3 buildings. The property has been idle since 1907, owing to the low grade of ore developed, but the management contemplates a consolidation of the different mines drained, and resumption of work, 1911.

SPESSARTER KUPFERGRUBEN. GERMANY

Mine office: Sommerkahl, Bavaria, Germany. Heinrich Fischer, general manager. Lands include lead, copper, silver and cobalt claims, under lease, opened by shafts and trenches, the Segengottes shaft being equipped with machinery. Idle, but resumption said to be planned.

SPIRIT LAKE POWER & MINING CO. WASHINGTON

Office and mine: Chehalis, Lewis Co., Wash. R. C. Lange, secretary and general manager; E. W. Pohl, superintendent. Lands show auriferous and argentiferous copper ores, under development with a small force at last accounts.

SPITZEE GOLD MINES, LTD. BRITISH COLUMBIA

Dead. Was reconstructed August, 1905, as Spitzee Mining Co., Ltd. Formerly at Rossland, Yale district, B. C. Described Vol. V.

SPITZEE MINING CO., LTD. BRITISH COLUMBIA

Mine office: Rossland, Yale district, B. C. Organized 1906, under laws of British Columbia, as a reconstruction of Spitzee Gold Mines, Ltd. Capitalization $350,000, shares $5 par. Lands, 110 claims, area circa [illegible]. The mine produced, to September, 1905, about 5,000 tons of ore, averaging $12 per ton in values, and was said, at that time, to have about [illegible]

e Roi Mining Co., Ltd., and a little 8.

ALASKA.

rned unclaimed from former mine n, president and general manager. se, including the Sanford group, at opper ore. Idle.

WASHINGTON.

as Co., Wash.

LING CO. **MONTANA.**

office, Spokane, Wash. Mine office: rganized circa 1907, under laws of ichael Luxemburger, W. McCracken erous and argentiferous copper sul-

WASHINGTON.

office, Spokane, Wash. Mine office: hlaegel, manager, at last accounts. vein carrying copper, gold and silver ncl, but apparently has rested from

AUSTRALIA.

outh Australia. Lands, 11 claims, ose, on the northern flank of Mount of clay-slate and sandstone, giving a ding cuprite, azurite and malachite hy, being mainly cuprite, malachite d a general sample of ore from the ment is by a 140′ shaft and a tunnel. rable ore in early days, and a smelter oduction, 1907, was 70 long tons of ly idle.

OREGON.

)re. Property was being developed l apparently moribund.

ING CO., LTD. **IDAHO.**

. Letter returned unclaimed from Idaho. O. E. Anderson, president; fuchs, secretary and treasurer; pre- elig, Frank Hess and Christopher ntendent. Capitalization $100,000, claims, patented, area 80 acres, well on mines, at the head of Champion rict, 3 miles south of Mullan. The opyrite assaying up to 33% copper, 35′ crosscut, showing, at 1,400′ from low commercial tenor. Small ship- nts.

MÉXICO.

field, Ills. Mine office: Unión de , president; Geo. M. Morgan, S. McElvain, treasurer; ain, Robt. Johns, A. F. , directors; Gerald laws of Arizona,

with capitalization $500,000, shares $1 par, nonassessable. Annual meeting third Tuesday in May.

Lands, 25 hectares, 6 miles south of Ayutla, and 40 miles from the Mex Central railway, including the Concepción mine, an antigua, closed 1821 and reopened 1901. The property shows porphyritic rocks, with 3 ore bodies, which 2, under development, are estimated by the management to averag in width, traceable 1 mile, carrying malachite, azurite, bornite and chalcopyr formerly reported to average 7% copper and 12 oz. silver per ton, and repor 1908, to average 5% copper and 10 oz. silver per ton. The mine was repor formerly to have 6 shafts, of 220', 58', 86', 25', 100' and 175' depth, but these h shrunk, November, 1908, to only 3 shafts, of 270', 80' and 60', with tunnels 275', 375', 110', 60', 45', 86' and 25', the mine then being reported to have 1,8 of workings, estimated by the management to show 30,000 tons of ore, w 15,000 tons blocked out for stoping.

Equipment includes a 90-h. p. steam plant, with a 12-h. p. hoist, and th are 5 mine buildings. Idle.

SPRING GULCH GOLD MINING CO. COLORADO

Mine office: Idaho Springs, Clear Creek Co., Colo. J. B. MacFarla superintendent, at last accounts. Property is the Banty group, carrying s erous and cupriferous silver-lead ores. Has gasoline power. Idle some ye

SPRUCE MOUNTAIN COPPER CO. NEVADA

Mine office: Sprucemont, via Wells, Elko Co., Nev. P. A. Cole, le Lands, adjoining the Latham mine, about 35 miles south of Wells, carry au iferous copper and lead ores. The mine has steam power. Production w 1,338,198 lbs. fine copper in 1907. Presumably idle.

SQUARE DEAL MINING & DEVELOPMENT CO. COLORADO

Office: Winnebago, Ills. Mine office: Frisco, Summit Co., Colo. J. Roberts, president; J. C. McEvoy, first vice-president; J. E. Compton, sec vice-president; Geo. F. Bunn, treasurer; H. G. Allen, secretary; Edw. B manager. The mine carries auriferous and argentiferous lead and copper o and is equipped with electric power and air-compressor. The company adv tised, May, 1907, that an investor could not gamble on the Square Deal M & Development Company's stock, and it seems that this statement was re though perhaps not in the sense meant to be inferred, as the company is in d and idle since 1909, with every prospect of making a total smash.

SQUARE DEAL MINING & MILLING CO. ARIZONA

Dead. Formerly at Cave Creek, Maricopa Co., Ariz. Described Vol. I

SQUIRREL VALLEY COPPER MINE, LTD. NORWAY

Office: 80 Coleman St., London, E. C., Eng. Mine office: Risör, Ch tiansand, Norway. W. W. Macalister, D. A. Onslow and J. H. Hosking, dir ors. Organized Oct. 28, 1909, under laws of Great Britain, with capitali £35,000, shares £1 par. Property is the Ekorndalen mine, near Risör. P sumably idle.

STADTBERGER HÜTTE ACTIEN GESELLSCHAFT. GERMANY

Office: Postscheckkonto No. 1450, Köln, Germany. Mine office: Ne Marsberg, Westfalen, Germany. Otto Meurer, chairman; preceding ch Anton Hamers and Herr Kupertz, executive committee; Erich Meu August Kleffner, managers; Herr Speiss, superintendent. Organized under laws of Germany, with capitalization 2,250,000 marks, shares 600 par, as a reconstruction of the Stadtberger Gewerkschaft, which began tions A. D. 1150. Paid dividends of 112,500 marks to Dec. 31, 1907, dividends of 2% in 1908; nothing in 1909, and 1% in 1910.

The mine is very ancient, having been discovered circa A. D. 800, a been worked, with few idle intervals, since A. D. 1150. The property i the Mina, Friederika and Oscar mines, the latter idle, all 3 opened by ne

are malachite, chalcocite and bornite, estimated by the manage-
ge about 1.6% copper.
t includes a 400-h. p. steam plant, and a 60-h. p. water plant,
tric power.
tion works include a concentrator, smelter and one ton electro-
atter treating argentiferous copper precipitate, as ore is reduced
hing. Forces average about 500 men, with a yearly production
metric tons of ore. Production was 1,609,358 lbs. fine copper in
lbs. in 1906; 1,322,760 lbs. in 1907; 1,432,990 lbs. in 1909.

ONSOLIDATED COPPER CO. **ARIZONA.**

Wall St., New York, N. Y. Mine office: Metcalf, Graham Co.,
Erskine, Jr., president; Wm. H. Sweny, secretary and treasurer;
rs, John F. Brooks, Alfred M. Erskine and Smith Lent, directors;
, manager. Organized Dec. 12, 1903, under laws of Maine, with
1,500,000, shares $10 par; issued, $1,040,960. In addition to its
the company controls various subsidiary corporations through
), such holdings including $292,515, or 58%, of the capital stock
l Copper Mines; $700,000, or 70%, of the capital stock of the
Mines, Ltd., and $261,070, or 26%, of the capital stock of the
ng Co., which is controlled by the Shannon Copper Co.
ned and controlled by the company, are 5 to 6 miles north of
ndard mine being in the center, flanked by the Clifton and San
perty also including the Los Angeles group.
sé group, 3 claims, patented, area 48 acres, lies west of the Stand-
f the King mine of the Arizona Copper Co., Ltd., about 1 mile
Development is by the 732′ Thompson tunnel, and the Carlos
andoned January, 1910, as the ore was too pockety. This mine
er.
geles group of 4 claims, area 80 acres, about 2 miles from the San
near Morenci, is developed by a 110′ shaft and a 225′ tunnel.
n the San José, Clifton and Standard mines is taken to the Cor-
y a 3,200′ Leschen aërial tram, with shipping-bins at the lower

was 78,097 lbs. fine copper and 4,717 oz. silver in 1907; 154,271
3,242 oz. silver in 1908; 137,727 lbs. copper and 2,154 oz. silver
lbs. copper and 3,347 oz. silver in 1910. Balance sheet of June
a profit of $654.92 on operations for the year.

ONSOLIDATED MINES CO. **OREGON.**

ned unclaimed from former office, Sumpter, Ore. Mine office:
t Co., Ore. D. M. Campbell, president; Edw. W. Mueller,
Wade, treasurer; H. H. Nicholson, manager, at last accounts.
1903, under laws of Arizona, with capitalization $5,000,000,

aims, area circa 500 acres, on both sides of Dixie Creek, in the
ict, showing auriferous ores of copper, nickel and cobalt. The
ve about 2 miles of workings, and equipment includes a 50-ton
ome ore was shipped, 1906. Idle several years.

ONSOLIDATED MINING CO. **UTAH.**

Dooly Blk., Salt Lake City, Utah. Letter returned unclaimed
e office, Cedar City, Iron Co., Utah. A. H. Kelly, president;
e-president; Geo. F. Schultz, secretary and treasurer; J. R.
er; preceding officers, J. W. Williamson and Monroe Clark,
. Porter, consulting engineer. Organized October, 1909, under
h capitalization $250,000, shares 25 cents par.
aims, well timbered, near Sand Springs, above the heads of
ide cañons, in the Little Tintic district of the Antelope range,

having a vein that is claimed to be 194′ in width between walls, but which actually is of about 4′ average width, carrying auriferous and argentiferous copper and lead sulphides, claimed to give surface ores averaging 3 to 8% copper, 8 to 33% lead and $1 to $9 gold per ton, which claims are considered exclusive. Development is by an incline shaft and a crosscut tunnel. About 25 men were employed April, 1910. Presumably idle.

STANDARD COPPER CO. ARIZONA.

Dead. Property was 7 claims, near the Silver Reef mine, about 13 miles from Casa Grande. Former office was at 219 North Fourth St., St. Louis, Mo. Formerly at Casa Grande, Pinal Co., Ariz.

STANDARD COPPER CO. UTAH.

Dead. Name was changed, 1906, to Bingham Standard Copper Co. Formerly at Bingham Canyon, Salt Lake Co., Utah.

STANDARD COPPER MINES. ARIZONA.

Office: 52 Wall St., New York, N. Y. Mine office: Metcalf, Graham Co., Ariz. John K. Erskine, Jr., president; Wm. H. Sweny, secretary; G. H. Duffield, manager. Organized Feb. 21, 1901, under laws of Arizona, with capitalization $500,000, shares $1 par; issued, $425,000. Is controlled, through ownership of $292,515 of issued stock, by the Standard Consolidated Copper Co. Paid dividends of $52,500 in 1903, and $17,000 in 1905, a total of $69,500, dividends having been paid before the disbursements were warranted. The company's balance sheet of June 30, 1910, showed a loss, during 9 preceding months, of $20,531.28, with assets, exclusive of the mine, of $41,834.19, and liabilities of $34,358.04.

Lands, 12 claims, mainly fractional, patented, area 99 acres, about 3 miles north of Clifton. The mine, developed mainly opencast, has upwards of a mile of underground workings, on a vein of 2′ to 4′ width, carrying ore of 3 to 4% assay tenor in copper, with an average smelter return of about 20% from selected ore. The upper levels apparently are worked out, with the exception of some 3% silicious sulphide ore, and no mining was in progress above the 4th level, at last accounts.

Buildings include an engine-house with a gasoline hoist, smithy, office, laboratory, boarding-house, general store, stable and several dwellings. The mine is connected with the Coronado railway by a 3,200′ Leschen aërial tram having a drop of 800′, with shipping bins at the terminal on the railroad track. This transports ore at an average cost of about 5 cents per ton, comparing with a previous cost of $2 per ton, for ore shipped by burros.

The mine has been producing continuously since March, 1902. Product was 1,088,952 lbs. fine copper in 1905; 497,286 lbs. in 1907; 398,143 lbs. in 1908; 459,794 lbs. in 1909; 270,540 lbs. in 1910.

STANDARD COPPER MINES CO. ALASKA.

Office: 68 William St., New York, N. Y. Mine office: Landlock, Alaska. Employs circa 15 men. Morris B. Mead, president; John L. Steele, vice-president and engineer; E. F. Bourke, secretary; J. O. Molander, treasurer; Jas. Bourke, general manager; preceding officers, Thos. R. Manley and Chas. Williams, directors. Organized Feb. 2, 1906, under laws of New Jersey, with capitalization $300,000, shares $100 par; issued, $220,000. Bonds, $300,000. Is operated as a close corporation. Annual meeting, third Saturday in December.

Lands, 13 claims, at Thorn Arm, on Landlock Bay, in the Prince William Sound district. The lands, which are very precipitious, show country rock greenstone, reported to carry 17 fissure veins, of which 4, under development, carry lenticular shoots of slightly auriferous and argentiferous chalcopyrite of good grade, estimated to average 6% copper, 1 oz. silver and 90 cents gold per ton. Development is by a shaft, and tunnels of 260′, 80′ and 460′, with about 3,000′ of workings, estimated, 1908, to show 20,000 tons of ore, with 12,000 tons blocked out for stoping.

s connected with 500-ton ore-bunkers on a wharf at tidewater
al tram, in two sections, one of 912′ and one of 2,526′ length.
7, was circa 1,000 tons of 6% ore, yielding 120,000 lbs. fine cop-
is said to have shipped about 3,200 tons of ore to end of 1910.

OPPER MINING CO. **WASHINGTON.**

: Bolster, Okanogan Co., Wash. J. W. McBride, Jas. Caugh-
elch, E. Garlinger and Fred N. Freer, directors. Lands are on
in, in the Myers Creek district. Idle.

OPPER MINING CO. **WYOMING.**

17 Nicholas Bldg., Toledo, Ohio. Mine office: Encampment,
yo. Geo. P. Waldorf, president; Alphonse Mennell, vice-presi-
Spencer, secretary and treasurer; Chas. E. Winter, managing
ling officers, Fred O. Paddock, Harvey M. Cook, John H. Lloyd,
and John A. Scott, directors; O. B. Cothern, superintendent.
ıst, 1903, under laws of Wyoming, with capitalization $1,500,000,

claims, including the Cothern group of 5 claims, added Decem-
the Susquehanna group of 6 patented claims, area 120 acres,
mile east of the Itmay mine, carrying contact and fissure veins of
verage width, with one vein, of 40′ claimed width, developed by pits
0′ to 200′ depth, showing azurite, malachite, chalcocite, bornite
te, giving assays up to 18% copper and $2 gold per ton, with
lues. Equipment includes a hoist good for 500′, and there are 5
. Property was idle from Dec. 15, 1905, until August, 1910,
ping with a small force at last accounts.

COPPER MINING & REDUCTION CO. **MONTANA.**

ormerly at Divide, Silver Bow Co., Mont. Described Vol. VIII.

COPPER PYRITES CO. **ALABAMA.**

309 Brown-Marx Bldg., Birmingham, Ala. Mine office: Pyri-
Ala. Robt. Ross Zell, president; J. C. Clark, vice-president;
easurer; J. D. Stagg, secretary. Capitalization, $50,000. Lands
dy of cupriferous pyrite, giving assays up to 6% copper and 42 to
It is probable that copper values will decrease at slight depth,
ty seems valuable for its sulphur ores alone.

DEVELOPMENT CO. **COLORADO & CALIFORNIA.**

20–84 Van Buren St., Chicago, Ills. Mine office:
. J. M. Dearing, president; C. F. Taylor, vice-presid
tary; Geo. Lill, treasurer; preceding officers,
limon P. Donnelly, Wm. E. Cloyes and C. M.
er laws of Arizona, with capitalization $10,000,
ols, or did control, through stock ownership,
Co. and Mt. Zirkel Copper Mining Co., of
of which are dead. Company also control
& Development Co., of Idaho, title to
Lands are the Jennie "group," of 20
o., California. Company was promoted
entire management was changed, 1910, and
who invested real money, and who are endeavo
rgain.

OLD & COPPER MINING CO.

s absorbed, 1903, by Standard Consolidated
ay, Grant Co., Ore. Described Vol. III.

AGDALENA MINES CO.

rmerly at Nogales, Magdalena, Sonora, Mex.

INES CO. **CALI**

3 Grant Bldg., Los A office: Cima

nardino Co., Cal. John W. Kemp, president; Frank S. Adams, secretary; preceding officers and R. R. Patterson, directors. Lands, 11 full and several fractional claims, 10 miles north of Cima, having a 356′ shaft, with circa 2,000′ of workings, showing carbonate ores near surface, with melaconite and sulphide copper ores on the 100′ level. Shipped, 1906, to a Salt Lake smelter, 81 carloads of ore, returning an average of circa 10% copper, 5 oz. silver and $2 gold per ton. Production is estimated at 250,000 lbs. fine copper for 1906. Idle, apparently since 1907.

STANDARD MINING CO. IDAHO.

Mine office: Silver City, Owyhee Co., Idaho. F. M. Clemens, superintendent, at last accounts. Has lead and copper ores, presumably argentiferous, with steam power.

STANDARD PYRITIC SMELTING CO., LTD. BRITISH COLUMBIA.

Dead. Formerly at Greenwood, Boundary district, B. C.

STANDARD REDUCTION & DEVELOPMENT CO. WASHINGTON.

Office: Seattle, Wash. Letter returned unclaimed from former mine office, Marblemount, Skagit Co., Wash. F. M. Clark, E. H. Gammon, B. J. Neare, Arthur Julian, J. M. Hill, W. O. Browning, J. K. Dyer and Fred J. Robert, directors. Lands, 520 acres, adjoining the properties of the Skagit Queen and Thunder Creek mining companies, said to show 9 parallel veins, carrying mainly silver-lead values, slightly developed by a crosscut tunnel. Idle.

STANLEY BUTTE CONSOLIDATED COPPER CO. ARIZONA.

Office: 601–17 State St., New York, N. Y. Mine office: San Carlos, Gila Co., Ariz. Jas. E. Carpenter, general manager; Harry Pryor, superintendent, at last accounts. Lands, 60 claims, held under bond and lease, having a 125′ tunnel. Idle.

STANLEY MINES CO. COLORADO.

Office: 305 Colorado Bldg., Denver, Colo. Mine office: Idaho Springs, Clear Creek Co., Colo. Arthur G. Brownlee, president and general manager; Henry J. Wolf, superintendent. Organized, circa 1906, as successor of the Consolidated Stanley Mining & Milling Co. Lands, circa 90 claims, showing auriferous and argentiferous lead and copper ores. Has steam and water power. The reduction plant has 10 stamps, and a tube-mill.

STAR CONSOLIDATED MINING CO. UTAH.

Dead. Was merged, 1907, in Black Jack Consolidated Mining Co. Formerly at Park City, Summit Co., Utah.

STAR COPPER MINING CO. MICHIGAN.

Dead. Property was sold, 1906, to Keweenaw Copper Co. Formerly at Copper Harbor, Keweenaw Co., Mich. Described Vol. VIII.

STARLUS COPPER & GOLD MINING CO. UTAH.

Dead. Former office was 215 Dearborn St., Chicago, Ills. Lands, known as the Starlus group, were sold to Col. Enos A. Wall, circa 1903. Formerly at Bingham Canyon, Salt Lake Co., Utah.

STARLUS MINE. UTAH.

Owned by Col. Enos A. Wall, at Bingham Canyon, Salt Lake Co., Utah.

STAR SILVER-LEAD MINING CO. IDAHO.

Dead. Former office was Silver Bow Blk., Butte, Mont. Officers were Chas. F. Booth, president; W. H. Nichols, vice-president; E. S. Sizmara, secretary and treasurer; preceding officers, Norman Ebbley and E. F. Booth, directors. Organized under laws of Montana, with capitalization $1,000,000, shares $1 par, nonassessable. Lands, 14 claims, unpatented, area 280 acres, [illegible] miles north of Mullan, in the Hunter district, said to carry 8 veins, developed by a 175′ tunnel. Formerly at Mullan, Shoshone Co., Idaho.

STATE COMMERCIAL DEVELOPMENT CO. MONT.

Dead. Formerly at Butte, Silver Bow Co., Mont.

E COPPER MINING CO. **WYOMING.**
Was reorganized, circa 1904, as State Line Mining Co. Formerly
ent, Carbon Co., Wyo. Described Vol. IV.

E MINING CO. **WYOMING.**
Formerly at Encampment, Carbon Co., Wyo. Described Vol. VIII.

CHEMICAL CO. **CALIFORNIA.**
San Francisco, Cal. Mine offices: Kennett, Shasta Co., Cal.,
, Alameda Co., Cal. Chas. E. Kunze, manager; Geo. F. Graves,
nt.
a mine, area 80 acres, in the outskirts of Oakland, has 600′ of tun-
ing a lens of cupriferous pyrite between serpentine and metamor-
, in an ore zone of circa 3,000′ traceable length, assaying 1.5 to
up to 50% sulphur, and up to $2.50 gold per ton.
ita county lands are 30 claims, unpatented, including the Summit,
orth Mammoth groups, on the eastern slope of Bohematosh Moun-
the north and south forks of Little Backbone Creek, adjoining the
ne on the northwest. The Summit mine is owned outright, having
from the Phœnix Securities Co. for $80,000, and is developed by
h about a quarter-mile of workings. No. 2, the main tunnel, of
ngth, shows a vein of 35′ estimated width, carrying sulphide ore
) 14.5% copper. The 400′ No. 3 tunnel follows a rhyolite and por-
t. Equipment includes a 4-drill air-compressor.
/ also holds, under bond, the Tarantula group, west of Iron Moun-
; mainly gold ore, equipped with a 10-stamp mill. In 1909 the
t a one-year bond on the Oro Fino mine, in Shasta County, but
his has been surrendered.

T MINING CO. **UTAH.**
ce: Brighton, Salt Lake Co., Utah. Lands, at the head of Snake
he Big Cottonwood divide, are slightly developed by tunnel.
cluded steam power and an air-compressor. Idle since circa 1903,
y moribund.

T MINING & MILLING CO. **COLORADO.**
ce: Steamboat Springs, Routt Co., Colo. Lands, in the Copper
, show a 30′ vein, carrying a narrow paystreak of high grade
Presumably idle.

PPER CO. **CALIFORNIA.**
ce: Calzona, San Bernardino Co., Cal. H. E. Steece, president
anager. Lands, adjoining the Calzona Mines Co., about 2 miles
olorado River, carry auriferous copper ore. The mine has a 400′
tunnel, with circa 3,000′ of workings, blocking out some ore, and
gun February, 1911, with a force of about 20 men, in the expecta-
g shipments shortly. Equipment includes a 15-h. p. gasoline

INGS COAL & POWER CO. **WYOMING.**
5 High St., Oshkosh, Wis. Letters returned unclaimed from
nd works office, Copperton, Carbon Co., Wyo. E. E. Meeleus,
ry L. Larsen, vice-president; H. O. Granberg, secretary, treasurer
nager; preceding officers, J. S. Armstrong and Fred W. Heddle,
ry C. Beeler, consulting engineer; John F. Binger, mine superin-
t accounts. Organized Nov. 21, 1905, under laws of Wyoming,
tion $250,000, shares $1 par, nonassessable; issued, $237,976.
laims, patented, area 120 acres, including a smelter-site, with 640
nds additional, in the Battle Lake district. The copper property
ein between quartzite and diorite, traceable circa 3,000′, having
igers of 3″ to 12″ width, carrying chalcopyrite assaying about 12%
nall quantities of nickel and [illegible] and traces of gold and silver.

tank, thence to five 24″ Callow 60-mesh screens, oversize going back to Huntington mills for regrinding, and being returned thence to screen, undersize, together with the overflow from the dewatering tanks, going to a set of 5 V-boxes. The spigot product of the V-boxes goes to 19 Wilfley tables, and the overflow to 10 Callow settling tanks, thickened pulp from which is fed to 20 Wilfley tables, the Wilfleys treating the spigot and overflow products, making finished concentrates, tailings and middlings, latter retreated, those of the first series of tables going to 8 Callow tanks, on the vanner floor, giving a pulp treated by eight 6x16′ Frue vanners making concentrates, concentrates from the second set of Wilfleys going to 8 Callow tanks, thickened product from which is treated by a second set of eight 6x16′ Frue vanners. Overflow from the third Wilfley settling tanks together with that from the first and second vanner tanks, goes to a series of 5 tanks for final settlement, these tanks giving a product which passes to a third set of eight 6x16′ Frue vanners. Concentrates from the Wilfley tables and vanners go to 2 tanks, 28′ in diameter and 6′ deep, water draining until tanks are filled. Beneath the tanks are railroad tracks, and concentrates are discharged into cars, the tanks being filled and unfilled alternately. Concentrates are handled throughout the mill by sluicing through launders, and are collected in tanks and removed therefrom by Blaisdell excavators. Overflow from the mill goes to slum-ponds for settling.

The company plans the erection of a slime plant, which is expected to effect the saving of about 15% of the original assay values contained in the ore. Slimeing is obviated, to a considerable extent, by very careful screening and crushing to 2-mm. size, before and jigging is attempted, as the ore treated is friable and slimes easily. The mill is effecting a saving of 70 to 75% of assay values.

Water is secured from Duck Creek, which has an average flow of 8,000 gallons per minute, water being collected in the hills, in reservoirs and brought by gravity, for 9 miles, through a 32″ iron-stayed wooden pipeline, and delivered at the highest point of the works under a pressure of 10 to 20 lbs. per square inch. There also is an auxiliary pumping plant, in Steptoe Valley, below the works.

The smelter is about one-half mile from the concentrator, and is connected therewith by a standard gauge railway line. The works have about 12 miles of railway track, equipped with 8 small locomotives, a switch-engine and 50 cars.

The smelter includes separate buildings for calcining, reverberatory smelting, blast-furnace smelting and conversion, all of steel frame, with corrugated iron sheathing. The smelting plant was designed by Walter G. Perkins, and constructed under his supervision. Each group of furnaces has independent flues and chimneys.

The roaster building, 228′ in length, has 4 floors, with sixteen 40-ton six-hearth McDougal roasters, set in 2 rows. Concentrates are delivered to the calcining building in 8-ton standard gauge cars, entering over a trestle built of 12x12″ timbers, the feed-floor being on a level with the railway trestle. Each roaster has 2 hoppers, and 14 of the roasters have air-cooled rabbling arms, and 2 have water-cooled rabbles. The roasters are driven by 10 and 30 h. p. electric motors. Limestone for fluxing is added before roasting, and hot calcine carrying 7.5 to 10% sulphur, are discharged into hoppers beneath the roasters and trammed directly to the reverberatories, or to nine 150-ton calcine storage bins, built of brick and steel, which serve as a balance-wheel between the roasting and smelting departments. Each roaster discharges through two 32″ flues to a brick flue running between the 2 rows. The brick dust-chamber discharges fumes into the main flue, which is in 2 parts, each of 300′ square cross-section and 500′ long, permitting either to be cut out for cleaning. The flue is 1,070′ long and 35′ wide, including the dust-chamber which is 150x50x30′, and leads to a brick stack 250′ high and of 18′ internal diameter at the top. Dust from the chamber is piped to the ground floor, for loading into cars, and for about 500′ the

nel underneath, permitting the collection of dust from steel hoppers
ı are hauled by a small locomotive.
erberatory building has five 250-ton furnaces, each 19x111′, with
and ashes are sluiced to a cinder plant, similar to that of the
s, for recovery of partly burned carbonaceous fuel. The reverbera-
ved on the ends with 10″ I-beams and on the sides with 12″ I-beams,
amination of the charge being had at each side, by iron doors,
hted and worked in slides. At the firebox end of each furnace is
rates for coal. Each furnace has 2 charge-hoppers, each with 3 holes
etween the 2 charge-hoppers there is a 15″ pipe, through which hot
g may be charged. The ore lacking lime, a charge of calcines is
to 10% of limestone carrying 51% of calcium oxide, the charge
l from the hoppers to a deep bed of molten ore, so that it goes into
tial fusion almost immediately. Matte is tapped and sent through
steel launder, to matte-cars, so constructed that they may be either
the converters, or tipped and poured. These cars have a capacity
ıatte, which averages about 45% in copper tenor. Slag is skimmed
ıift, the skimmings being sent to a cast-iron box leading to a lined
ıich a jet of water granulates the slag and washes it to the dump.
) to 45% silica, 6 to 12% calcium oxide, 40 to 30% iron oxide and
Furnaces Nos. 4 and 5 have oil burners, and the balance are to be
larly. Each reverberatory consumes an average of about 250 bbls.
ıd petroleum is to be used later for the calciners and power plant.
ıtory building has a flue of 300 sq. ft. section, 200′ long, doubling
a dust-chamber of 1,000′ square section, 200′ long, leading to a
ıney 15′ in diameter. Each reverberatory has two 400-h. p. boilers,
ıarallel, instead of tandem, with suitable by-passes, to utilize waste-
uction of steam.
-furnace building, located between the reverberatory and conver-
ıts, has a single blast-furnace, 42x240″ at the tuyeres, and 84x240″
with a capacity of 300 to 500 tons of charge per day, used for
nverter slags, and a small quantity of raw ore, the furnace being
at it can be enlarged, if desired, to 4x80′ in size. The furnace is
ground-level, with a height of 16′ from the tuyeres to the charging
ıg with a 10′ column charge, and 40 oz. blast pressure. There are 4
ckets on each side, and one at each end, and each side has 24 four-
10 inches apart, receiving blast from a 30″ bustle-pipe. The water-
ıave separate blast-boxes, and independent air and water connec-
any jacket may be removed by breaking three simple connections.
ne by cars dumped pneumatically, and matte is tapped into ladles
ılags are granulated and sluiced, as in the reverberatory building.
ge through a 108″ downtake to a 12x15x250′ brick flue, terminating
ıaster flue.
erter building, 120x170′ in size, is about 600′ from the reverbera-
and matte is brought in cars over a track behind and above the
ıich are charged through a launder, while the shells remain in posi-
and silicious ores are charged into shells on the same plan as molten
ɔuilding has two 60-ton 5-motor Shaw electric cranes, one for hand-
l one for shells. There are 4 stands, with 8-ton 96x150″ shells of
Each converter has fourteen 1″ tuyeres, taking an 18-lb. blast.
ɔur into 10-ton ladles, and are tipped by 40-h. p. geared electric
les are carried by crane to the pouring stand, where a hydraulic
ladle in position, and tips it. Blister copper is poured into moulds
r-belt, casting ingots of about 200 lbs. weight, which are dropped
ınveyor running on an incline, which takes the pigs through a cool-
loading platform on the shipping floor, above which are air-hoists

on a monorail system, for handling the pigs. Converter product is blister copper averaging 99.2% in copper tenor. Slag is poured into a casting machine, and slag-bricks delivered to a bin, whence taken to the blast-furnace for remelting; and slag skulls are broken in a 12x24″ Blake crusher, before sent to the blast-furnace slag-bin. The hoods from the converters lead to a flue of 100′ square section, 200′ long, running to a stack 100′ high, of 10′ inside diameter. The shells are lined with silicious ore from the Copper Flat mine of the Nevada Consolidated, such ore being received at the converter building in bins feeding three 6′ Allis Chalmers pug-mills for grinding, the lining mixture being composed of one part of clay to six parts of ore. Linings are tamped into the shells by Ingersoll-Rand piston drills, shod with 12″ shoes.

The power plant has a 55x240′ boiler-house, of steel frame and corrugated iron sheathing, containing 4 batteries of two 400-h. p. Babcock & Wilcox water-tube boilers, and 2 Foster internal superheaters with a separate Foster superheater for the steam supplied by the 8 boilers in the reverberatory building, the latter consisting of one battery of Babcock & Wilcox boilers, and 3 batteries of Stirling water-tube boilers. During a single month the boilers fired by waste gases supplied steam equivalent to the normal steam production from 2,400 tons of coal, equal to a saving of 80 tons of coal daily, and furnishing about 64% of the total steam consumed. Steam is generated at 150 lbs. pressure. The boilers in the boiler-room are fired by hand, coal being brought in 1,200-lb. buckets by an overhead crab, from the coal pile outside. Each double battery of boilers has a 9x40′ steel stack with induced draught, furnished by 2 Sturtevant fans, each connected to a 30-h. p. Sturtevant slide-valve engine, running at 150 to 175 r. p. m.

The engine-room is 60x360′ in size, of steel and brick with concrete floor, and adjoins the boiler-house. The main floor contains the generating engines, blowers, 3 exciters and a switchboard, and the basement contains condensers, air-pumps and oil filters. The electrical equipment consists of two 1,100-h. p. 22x48x48″ Allis-Chalmers Corliss cross-compound engines, with 800-kw. Bullock a. c. generators mounted on the shafts, and two 2,000-h. p. 31x66x60″ Nordberg Corliss cross-compound engines with 1,500-kw. Bullock a. c. generators mounted on the shafts. Current is generated at 600 volts, and carried to a concrete transformer station, equipped with four 200-kw. Bullock water-cooled transformers, stepping the current up to 40,000 volts, for transmission to the mines; four 750-kw. Westinghouse water-cooled transformers, stepping current up to 13,200 volts for transmission to the mills; three 40,000-volt choke coils; one 13,000-volt lightning arrester, and three 40,000-volt lightning arresters.

The pneumatic plant, in the engine-house, includes a 350-h. p. 14x26x18″ Nordberg tandem-compound engine direct-connected to a No. 10 Connersville blower, with capacity of 300 cu. ft. of air per revolution, making 120 r. p. m., and a 750-h. p. 26x56x48″ Nordberg Corliss cross-compound engine tandem-connected to 54x54″ air cylinders, with capacity to compress 18,000 cu. ft. of air per minute to 18 lbs. pressure, for the converters. To prevent shock to the air compressors, in case of sudden stoppage of air discharge at the converters, a device has been installed consisting of an iron cylinder 12″ in diameter, supplied with a close-fitting plunger, the cylinder having 12 ports, of 2¼″ diameter each, which are covered by the plunger, under normal conditions, the plunger being removed by a small piston, responsive to a pressure of only 8 oz., which raises and uncovers the ports under increased pressure in the discharge pipe. This engine has a Wheeler surface condenser, and a Wheeler & Edwards vacuum pump. A 150-h. p. 11x21x21″ Laidlaw-Dunn-Gordon cross-compound engine is tandem-connected to a 52x52″ air-compressor, with capacity of 980 cu. ft. of air per minute, compressed to 100 lbs. pressure per square inch, used for the tamping machines in the lining department, and for pneumatic tools.

In connection with the works are a number of thoroughly appointed shops

ıg a 75x160′ car-shop, doing general repairing for the Nevada North-
a machine-shop of steel and concrete blocks, a carpenter-shop,
ehouse, roundhouse and various minor shops.
ıinistration buildings are arranged in a semicircle, facing west,
ral office in the center, supported by a large assay office and labo-
anked by a messhouse and dwellings for the heads of departments,
ent being both practical and pleasing.
toe works were started on a test run in April, and the first shipment
pper was made in August, 1908. Nearly 1,500 men are employed
which is one of the very largest and most complete in the world, a
ı plan and equipment to its designers, and a high credit in its
hose in charge.

COPPER CO. **ARIZONA.**
ohn F. Elliott was superintendent. Lands, in the vicinity of Dos
e slightly developed, 1909, by a tunnel, following a limestone-
tact, showing copper ore. Formerly at Dos Cabezos, Cochise Co.,

COPPER CO. **ARIZONA.**
ormerly at Clifton, Graham Co., Ariz. Described Vol. III.

LE & JALISCO MINING CO. **MÉXICO.**
Steubenville, Ohio. Letter returned unclaimed from former mine
paquillo, Ahualulco, Jalisco, Mex. Daniel McConville, president;
-president; Robt. Cox, secretary and treasurer. Organized 1906,
Arizona, with capitalization $1,000,000. No trace of operations
pparently moribund.

OPPER CO. **ARIZONA.**
Bridgeport, Conn. Mine office: Clifton, Graham Co., Ariz.
president; Chas. D. Hawley, vice-president; Fred Enos, secretary;
unt, treasurer; Isaac N. Stevens, manager; Chas. E. Stevens,
t, at last accounts. Lands, 39 claims, area 780 acres, about 2
tcalf, showing granite, overlaid by Cambrian quartzite and Silurian
h much faulting, and intrusive porphyritic dikes, with ore bodies
lines. The mine shipped a little ore of 12 to 30% copper tenor to
smelter, early 1906. Equipment includes a small steam plant.
ars, except for annual assessment work.

AK COPPER MINING CO. **IDAHO.**
ormerly at Mullan, Shoshone Co., Idaho.

IISH & SULTAN MINING CO. **WASHINGTON.**
rmerly at Silverton, Snohomish Co., Wash. Described Vol. VIII.

OPPER MINING CO. **WYOMING.**
ormerly at Encampment, Carbon Co., Wyo.

ING CO. **ONTARIO.**
ormerly at Desbarats, Algoma, Ont. Described Vol. VIII.

COPPER, LTD. **TRANSVAAL.**
rmerly at Turffontein, Pretoria, Transvaal. Described Vol. VIII.

COPPER MINING CO. **CALIFORNIA.**
ormerly at Burney, Shasta Co., Cal. Described Vol. VI.

COPPER MINING CO. **COLORADO.**
ormerly at Salida, Chaffee Co., Colo. Described Vol. VIII.

COPPER MINING CO. **MONTANA.**
ormerly at Radersburg, Broadwater Co., Mont. Described

COPPER CO. **ARIZONA.**
as succeeded, January, 1906, by Stoddard Mines Co. Formerly
avapai Co., Ariz. Fully described Vol. VI.

STODDARD MINES CO. ARIZONA.

Office: 225 Fifth Ave., New York, N. Y. Mine office: Stoddard, Yavapai Co., Ariz. W. H. Reynolds, president; Hon. Isaac T. Stoddard, vice-president; C. M. Stoddard, secretary and treasurer; J. S. Murphy, general manager. Organized January, 1906, under laws of Arizona, as successor of Stoddard Copper Co., with capitalization $100,000, shares $1 par; fully issued. Annual meeting, in January.

Lands, 6 claims, patented, area 105 acres, known as the Binghamton mine, some distance from a railway, showing fissure veins in schist, opened by a 900' tunnel and shafts of 600' and 190', with circa 4,000' of workings. Mine was discovered 1882, and reopened, June, 1906, by present company.

Equipment includes a 50-h. p. steam plant, with 2 hoists and a 2-drill air-compressor, and there are 6 mine buildings. Company reported that good ore bodies were being developed on the 600' level. Idle several years.

KUPFERBERZBERGWERK STOLZENBURG. LUXEMBURG.

Mine office: Stolzenburg bei Diekirch, Luxemburg. Presumably idle.

STONE CREEK COPPER MINING & MILLING CO. MONTANA.

Dead. Formerly at Dillon, Beaverhead Co., Mont. Described Vol. V.

STONEWALL COPPER CO. ARIZONA.

Dead. Was a swindle, perpetrated by the notorious Wm. F. Wernse [illegible] of St. Louis. Formerly at Pima, Graham Co., Ariz.

STORA KOPPARBERGS BERSLAGS AKTIEBOLAG. SWEDEN.

Office, mines and works: Falun, Kopparbergslän, Sweden. E. J. Ljungberg, director; Lars Yngström, assistant director and general manager; P. A. Johnson, engineer and superintendent leaching plant. Organized under laws of Sweden, with capitalization 9,600,000 kronor, shares 1,000 kronor par. Net earnings were 2,377,987 kronor, 1907.

This company conducts extensive industrial operations, owning and operating iron and steel plants, a pulp-mill, paper-mill, acid-plants and a sawmill, and has an extensive water-power on the Dala River. Copper production at present is only an incident of minor importance in the company's operations, but the Falun mine was one of the greatest copper producers of the world, for several centuries.

Lands, 5 claims, 3 patented and 2 unpatented, area 43 hectares. The mine was worked as early as A. D. 1288, and presumably earlier, oldest privilege to the present company dating from Feb. 24, 1347.

Lands include several mines and numerous ore bodies, the largest being the Storrgruf van deposit, 370 meters long, 220 meters wide, and about 320 meters deep, mainly mined out, leaving an open pit of circa 220' depth. The larger ore bodies are stocks of pyrite, of conical form, with points downward, the largest of these stocks ceasing at a depth of 332 meters. Ore is chalcopyrite, associated with pyrite, containing selenium and bismuth, estimated to have averaged about 10% copper in olden days, but decreasing in copper values, with depth, to an average tenor of only about 1% copper, the better grade of ore now mined giving average returns of 2.7 to 3% copper, 10 to 15 grams silver and 2 to 3 grams gold per metric ton. The old workings are very extensive, but the bottom openings are filled, and many of the old workings are inaccessible. The mines have 14 shafts, with aggregate depth of 3,800 meters, deepest being 600 meters, with about 33 kilometers of tunnels, the Falun mine having 15 levels of workings. This property is estimated by Prof. Hjalmar Sjögren to have been the largest copper producer of the world, until toward the end of the Eighteenth Century, with an estimated production of 500,000 tons of refined copper, 1,000 tons of silver and 1 ton of gold. The copper mines of the company employ about 100 men, yielding about 45,000 tons of crude ore yearly, which after roasting and bing, gives about 15,000 tons of leaching ore.

The system of reduction has been changed materially from [illegible]

ich included roast-stalls and a leaching plant, roasted ore having with salt, reroasted and leached with dilute sulphuric acid, in tanks, ation of copper on scrap iron. The present process of reduction is n a water-jacket blast-furnace to matte of about 55% copper tenor, ced to blister copper in a reverberatory, the copper then being dis- phuric acid, yielding bluestone, silver and gold. The production mine, 1910, was 47,000 tons of crude ore, yielding about 24,000 f pyrite, averaging about 40% sulphur, employed partly in sulphite nd partly in the sulphuric acid plants belonging to the company, of only about 1,600 metric tons of ore averaging about 3% copper, uction of only about 100,000 lbs. fine copper in 1910, compared with 650,000 lbs. in 1907. The present production of copper is very ll continue such until a better price for the metal warrants more ex- tions. This company is one of the best managed and most suc- rial enterprises of Sweden.

FA MINE. **SWEDEN.**

y Stora Kopparbergs Berslags Aktiebolag, at Falun, Kopparbergs-

GOLD & COPPER MINING CO. **COLORADO.**

Salida, Colo. Mine office: Turret, Chaffee Co., Colo. R. F. ident; F. S. Green, vice-president; Dr. J. F. Roe, secretary; Geo. surer; preceding officers and W. E. Stratton, directors. Organ- 1909, under laws of Colorado, with capitalization $500,000, as a n of the Stratton Gold & Copper Mining & Milling Co., part of the hich was set aside under title of Hecla-Granite Mining Co. Lands, ea 220 acres, in the Badger Creek district of Frémont county, levelopment, at last accounts, was by a 1,400′ crosscut tunnel, with ′, showing ore giving assays up to 46% copper. Presumably idle.

GOLD & COPPER MINING & MILLING CO. **COLORADO.**

Was split, 1909, into the Stratton Gold & Copper Mining Co., a-Granite Mining Co. Formerly at Turret, Chaffee Co., Colo. . VIII.

-MONTEZUMA MINING CO. **UTAH.**

Former office was Salt Lake City, Utah. W. J. Strickley was operty carried auriferous copper ore, slightly developed by a shaft rca 1903. Equipment included a small steam plant. Formerly anyon, Salt Lake Co., Utah.

)PPER CLAIMS CO. **OREGON.**

ands were sold, circa 1901, to Waldo Smelting & Mining Co. For- do, Josephine Co., Ore. Described Vol. III.

)PPER MINING CO. **WYOMING.**

210 Grant Ave., Laramie, Wyo. Mine office: Leslie, Albany Co., Corthell, president; M. E. Stickney, vice-president; E. P. Baker, tendent, at last accounts. Organized Jan. 17, 1903, under laws with capitalization $1,000,000, shares $1 par; issued, $837,959. ng, first Wednesday in January.

6 claims, unpatented, area 260 acres, circa 14 miles northeast of rted to show a fissure vein in pegmatite, which perhaps is a pegma- 1 [redacted] limestone and granite, latter, of 7′ [redacted] chalcocite, bornite, chalcopyrite, [redacted] copper, 5 oz. silver [redacted] The mine has about [redacted] of workings, esti- [redacted] chalcopyrite, with [redacted] of concentrat-

Equipment consists of an 80-h. p. steam plant, with a 25-h. p. hoist and a 3-drill Nordberg air-compressor. There are 6 mine buildings. The company planned a concentrator, but Dr. I. R. Swigart, the former secretary, treasurer and general manager, died early 1909, and at last accounts the company was pressed for funds, and in imminent danger of losing its lands, through failure to do annual assessment work. Idle and apparently moribund.

DAVID A. STUART. PERÚ.

Office and mine: Quicachaca, Yauyos, Lima, Perú. Property, near the coast, in the first mountain range back of Lima, carries argentiferous copper and lead ores, also coal. Presumably idle.

SUBENI COPPERS (NATAL), LTD. NATAL.

Dead. Was liquidated compulsorily, by order of the Natal Supreme Court. Formerly at Vryheid, Zululand, Natal. Described Vol. VIII.

SUBENI RIVER (TRANSVAAL) MINING SYNDICATE, LTD. NATAL.

Dead. Former office was 109 Victoria St., London, S. W., Eng. C. W. Hartung, A. Einwald, A. J. Phillips, A. Fischer, C. C. Kral and K. F. W. von Donat were directors; John B. Davis, secretary. Organized Sept. 29, 1[illegible] under laws of Great Britain, with capitalization £28,000, shares £1 par, £24,000 "A" shares and £4,000 "B" shares. Formerly at Vryheid, Zululand, Natal.

SUCCESS COPPER MINING CO. ARIZONA.

Dead. Formerly at Quartzite, Yuma Co., Ariz. Fully described Vol. VI.

SUCCESS LEASING & MILLING CO. COLORADO.

Mine office: Red Cliff, Eagle Co., Colo. J. M. Dismant, manager; [illegible] Dismant, superintendent. Property is the Rocky Point mine, carrying auriferous and argentiferous copper ores, with a deep shaft, reported as 1,500'. Equipment includes steam and gasoline power, and an air-compressor.

SUCCESS MINING CO. ARIZONA.

Mine office: Quartzite, Yuma Co., Ariz. Chas. Eichelberger, manager. Lands, 6 claims, area 120 acres, formerly owned by the Success Copper Mining Co., in the Plomosa district. The mine was opened 1863, when known as the Apache Chief, and shipped some ore via the Colorado River. The property is said to have 5 contact veins, two, of 12' average width, carrying oxidized ores claimed by the former management to give average assays of 15% copper, 40 oz. silver and $3 gold per ton, which figures probably were too high. The present company, circa 1906, had shafts of 60', 75', 115' and 250', and a 300' tunnel, with 1,700' of workings, developing oxidized ores, and the bottom workings also a little chalcocite. Equipment includes a steam plant. The company has shipped several carloads of high-grade argentiferous chalcocite to El Paso smelter, ore being hauled by wagons to Vicksburg, some shipments assaying circa 40% copper and 65 oz. silver per ton.

SUCCESS MINING CO. COLORADO.

Mine office: Alma, Park Co., Colo. Jas. Moynahan, manager. Lands known as the Orphan Boy group, carry auriferous copper and zinc sulphides, developed by a 450' tunnel. Equipment includes a small steam plant, with air-compressor. Mine was under development, with a small force, [illegible] accounts.

SUCCESS MINING CO. WASHINGTON.

Dead. Formerly at Conconully, Okanogan Co., Wash.

SUDBURY MINING CO. BRITISH COLUMBIA.

Letter returned unclaimed from former office, Spokane, Wash. Mine at Deadwood, Boundary district, B. C. Jas. Schiewe, president; [illegible] J. D. Whitels, A. S. Elder, W. C. Reeder and W. O. Lewis, directors. Organized April, 1907, under laws of Washington, with capitalization $250,000. One-half mile from the Sunset mine of the New Dominion Copper Co. Two shafts, one, of 60', being said to [illegible]

ıcludes electric power. Idle several years and presumably mori-

NING CO., S. A. **MÉXICO.**
ormerly at La Cananea, Arizpe, Sonora, Mex. Described Vol. VIII.
.F MINING CO. **SOUTH DAKOTA.**
'ormerly at Custer, Custer Co., S. D. Described Vol. VI.
AKTIEBOLAG. **NORWAY.**
d works: Helsingborg, Malmöhus Län, Sweden. Mine office: ordland, Tromsö, Norway. Employs circa 1,500 men. Lord-rnerhjelm, president and first managing director; Consul Nils -president and second managing director; Consul C. Ingelsson, assistant managing director; preceding officers, Hon. Albert Berg . M. B. Schjölberg, Prof. Hjalmar Sjögren, Consul Sture Person r Person Henning; Vice-Consul Lloyd Lundström and Prof. Carl irectors; Holm Holmsen, mining manager; Fr. Carlson, mine super-Kjölseth, mill superintendent; J. Westly, smelter superintendent; , engineer. Organized 1890, under laws of Sweden, with capitali-)0 kronor, increased, 1906, to 6,000,000 kronor, and again increased ,000 kronor, shares 500 kroner par; issued, 7,021,000 kronor.. Paid l, amounting to 360,000 kronor, 1907, and has paid total dividends, , of 2,460,000 kronor. Annual meeting, in May.

53 claims, area 55 acres, with a 1¼-acre millsite, and 193 square llaneous lands, more or less extensively mineralized, mainly in the sion of the Fauske district of Nordland, Tromsö. Lands include , Carlotta, Giken and Altens groups of mines. The company also lasguisa mine, in the Oksfjorddalen, in Skjervö and Kvaenangen addasguisa being the largest and best ore deposit so far known in ıalen.

jelma, discovered 1875 and opened 1887, which has become the er mine of Norway, shows mica-schist of lower Silurian age, with of greenstone conformable with the schists. Ore bodies occur as s, very persistent in strike and depth, on the contact of schists phosed amphibolite and olivine gabbro, lenses having a generally trike, with dip of 10° to 45° with the horizon. There are 17 known which 15, under development, range 4′ to 30′ in width, traceable deepest proven to depth of 3,000′, carrying exclusively cupriferous ng 2.9% copper, 44% sulphur and 0.5 oz. silver per metric ton.

ıent is mainly by tunnel, there being one shaft of 280′ depth and 9 ınes and number of feet of workings of the latter, at end of 1905, s: Ny-Sulitelma, 8,940′; Hanka-Bakken, 1,640′; Giken, 15,800′;)0′; Måns-Petter, 2,450′; Bursi, 700′; Koch, 2,740′; Tornerhjelm, ne, 2,160′. The mine has total openings of about 12 miles, and)00 metric tons of ore, with 953,000 tons blocked out for stoping, n sight was estimated, 1910, at circa 1,800,000 metric tons. Elec-nd haulage is used exclusively, with 2 kilometers of track in the

ined, are divided into two classes, the first or smelting grade 3% copper, while the second or export grade carries 1.5 to 4% average of 45% sulphur, the average tenor of all ores mined being opper and 45% in sulphur. Of the sulphur ore exported, about nd 10% lumps, shipped to various points in Norway, Sweden, at Britain and the continent.

ipment includes a 970-h. p. hydraulic plant, 1,220-h. p. electric pneumatic plant and 10-h. p. gasoline plant, with 427-h. p. elec-p. hydraulic power utilized at the mine, 305 electric h. p and 550 he mill, and 1,000 electric h. p. and 500 water h. p. at the smelter.

Equipment includes 17 hoists, of 5 to 30 h. p. each, good for depths to [illegible] There are 5 air-compressors, 3 at the mines and 2 at the smelter, these being Pokorny & Wittekind, Fraser & Chalmers, Ingersoll-Sergeant, Burchard and Franklin engines. The mine has 36 pneumatic air-drills, one Temple electric drill, and a number of pneumatic hammer drills.

Mine buildings are of wood, the machine-shop having an area of 1,[illegible] square feet, carpenter-shop 1,291 square feet, and smithy 1,722 square feet. There are 3 sawmills, a general store, 3 schools, a church and a Good Templars' lodge, with a large number of dwellings for employés, the company owning a total of 320 buildings.

There is an extensive system of aërial tramways, with 15 stations and [illegible] power stations, the tram system including a 4-mile line to the Jakobsbakken mine, which is to be operated more extensively in the future.

The frame concentrator, of 36,300 sq. ft. area, is equipped with 3 Hadfields and five 13x24″ Krupp Grusonwerk crushers, 11 sets of rolls, 76 Hartz jigs, [illegible] Ferrari concentrating tables, 1 slime table and 62 buddles.

There is a separate mill of 12,800 sq. ft. area, containing an Elmore vacuum oil flotation plant, formerly having 12 units, but being enlarged, late 1910, to 18 units, and which will be, when completed, the largest Elmore plant in the world, with a productive capacity of about 25,000 tons of 6.5% copper concentrates yearly. The Elmore plant went into commission April, 1909, and for the first year of operation produced about 8,000 tons of 6.75% copper concentrates, making a concentrate remarkably free from gangue, consisting almost entirely of clean copper pyrites, with an extraction of better than 80% of assay values. This Elmore plant is of decided interest, not only because it is the largest installation in existence, but also because it has given perfect satisfaction, redeeming all promises. Many small Elmore units, installed at other copper mines, in various parts of the world, have proven unsuccessful, for which lack of success many different reasons have been assigned, but the high saving and low costs of the Elmore plant at the Sulitelma show that the process under suitable conditions, is a commercial as well as a technical success. The Elmore people state that the plant is operating at minimum working costs, and is consuming, for each ton of ore treated, only 2.7 lbs. of the cheapest kind of common fuel oil, and no acid. Practically the entire production of the Elmore plant at the Sulitelma is from tailings that were wasted before the installation of this process.

The 160-ton smelter, at Fagerlid, 2 to 5 miles from the various mines, [illegible] ing ore therefrom by aërial trams, has a 50-ton water-jacket blast-furnace, [illegible] reverberatory furnace, two 50-ton pyritic smelting converters of the [illegible] type, and one converter stand, with 10 shells of the Manhes type, taking [illegible] metric ton charges. First-fusion product is a matte of 30 to 40% copper [illegible] and final product is blister copper assaying 99.2% in tenor, sent, for refining, to the Helsingborg Kopparverks Aktiebolag, at Helsingborg, Sweden, where there is a leaching plant, in connection with the works. Ores smelted average [illegible] 8% copper, 32 to 34% sulphur, 34 to 36% iron and 2 to 4.5% alumina, [illegible] traces of lime and magnesia.

The smelter employs the Knudsen discontinuous pyritic process, [illegible] largely utilizes the calorific value of the sulphur, and requires a minimum [illegible] consumption, effecting a very considerable saving in fuel cost. Pyritic [illegible] chloritic ores are smelted, the former yielding a fusible slag, the viscosity [illegible] which is much increased by the addition of the chloritic ore, for which [illegible] is run into the forehearth, and allowed to settle for 90 minutes, [illegible] pyritic fines are added. The Knudsen furnaces, of 20 tons [illegible] lined with magnesite blocks, set close together and [illegible] nesite mortar and tar, applied hot. The [illegible] of the furnace, up to 30″ to 50″ above the [illegible]

rnaces having run for 179 to 459 charges, before linings required Two men are sufficient to work a furnace, two others attending to rth, each forehearth sufficing for 2 or 3 furnaces. The loss in smelting res amounts to 10% only, slags running only 0.2 to 0.3% copper, as rmer loss of about 15% of assay values, and the cost of smelting under n process is given as 3s. per ton of ore, this covering wages, transpor- e to the smelter, and cost of fuel. Converter costs are said to be under ric ton. During 1910-1911 part of the concentrates were smelted, ported, but, beginning 1912, all will be smelted at Fagerlid, as the be enlarged, and, beginning 1912, will have a maximum capacity of ic tons of Bessemer copper yearly. Costs for 1909 were given, by yt, as 9.7 kronor for smelting, and 2.8 kronor for bessemerizing. laneous enterprises of the Sulitelma include the ownership and opera- amers, 2 tugs, 40 barges, and a 13-kilometer private railway system, he Sulitjelmabanen, of 750-mm. gauge, equipped with 3 locomotives ght-cars.

tion was 605 metric tons fine copper and 90,000 tons cupriferous orted, containing 2,442 metric tons fine copper, giving a total pro- ,614,688 lbs. fine copper, in 1904; 10,479 tons of ore smelted, yielding e copper and cupriferous pyrites exported giving a total output of s. fine copper in 1905; 589 metric tons fine copper and circa 2,800 per contained in cupriferous pyrites exported, equivalent to circa s. fine copper, in 1906; 1,384,486 lbs. fine copper from ores smelted, metric tons of cupriferous pyrites exported, averaging 3% copper, ss production of 8,140,562 lbs. fine copper, in 1907; 120,000 metric riferous pyrites exported, 18,000 tons of copper ore and 8,000 tons ncentrates smelted, yielding 1,100 metric tons of Bessemer copper, copper contents equal to circa 9,000,000 lbs. fine copper, in 1910. lma has by no means reached the limits of its productive capacity, ar the largest copper producer of Norway, and one of the richest s of Europe. The management is progressive and competent, and high degree of technical ability in the successful utilization of the stem of discontinuous pyritic smelting, and the Elmore vacuum oil cess.

COPPER DEVELOPMENT CO. **ARIZONA.**

Duluth, Minn. Mine office: Paradise, Cochise Co., Ariz. Geo. anager. Lands are claims, partly patented, adjoining the holdings attan Development Co., in the Chiricahua Mountains. Idle several t for annual assessment work.

GOLD & COPPER MINING CO. **MONTANA.**

fice: Kalispell, Flathead Co., Mont. Idle some years.

COPPER CO. **COLORADO.**

P. O. Box 358, Denver, Colo. Letter returned unclaimed from office, Crested Butte, Gunnison Co., Colo. J. C. Lewis, president; e, vice-president; Geo. S. Ryan, secretary; Geo. N. Wheeler, race Miller, manager, at last accounts. Lands, in the Rock Creek e 75′ and 170′ tunnels, in argentiferous copper ore. Idle many parently moribund.

MOUNTAIN MINING & MILLING CO. **WASHINGTON.**

Formerly at Orient, Ferry Co., Wash. Described Vol. VIII.

RIZONA COPPER CO. **ARIZONA.**

Was reorganized, circa May, 1910, as Kelvin-Sultana Copper Co. Kelvin, Pinal Co., Ariz. Fully described Vol. VIII.

NING CO. **WASHINGTON.**

ce: Sumas, W[illegible] W. Jones, president; Mrs.

M. Record, secretary. Lands, near the head of Swamp Creek, show auriferous copper ores. Idle some years and apparently moribund.

SUMITOMO COPPER CO. JAPAN.

Office: 36 Unagidani Minamiku, Osaka, Japan. Mine office: Niihama, Iyo, Shikoku, Japan. Works office: Shisakajima-Ochigun, Iyo, Shikoku, Japan. Kichizaemon Sumitomo, proprietor; M. Suzuki, director-in-chief; Munio Kubo, manager; preceding officers, Kinkichi Nakada, and K. Yukawa, directors; S. Maki and J. Matsumoto, sub-managers; K. Arai, mine superintendent; Keijiro Nakamura, smelter superintendent.

Lands, 3 claims, area 6,353 acres, also a 5-acre millsite, 33,452 acres timber lands and 575 acres miscellaneous lands, in the Besshi district. The Besshi mine proper, on Besshi Mountain, 4,400′ in height, has an area of 209 acres. The timber lands carry large plantations of fir, set out yearly, since 1879, which have become available for mine timber, 15 to 20 years growth being required. Water supply is taken from the Kokuriu River.

The Besshi mine shows quartz-sericite and chloritic schists, of Archean age, carrying a bedded deposit of 4′ to 10′ thickness, with an average of 7′, having a strike of N. 30° E. and average dip of 49° N., traceable 9,000′ and proven to depth of 2,142′, with workings exceeding 5,000′ in length. The bedded vein occurs in alternate layers of chloritic and graphitic schist, each enveloped in a quartz-schist known as "habu," with interstratification of piedmontite schist. Step-faults, running east and west, and nearly parallel, giving frequent throws of 10′ to 20′, with a maximum throw of 50′. The ore is an intimate mixture of chalcopyrite and pyrite, sometimes occurring as partial segregations in pyrite, banded with schist, averaging, as mined, 4% copper, brought up, by dressing, to an average copper tenor of about 5.5%.

The Besshi mine, near Kobe, in the northwestern part of the island of Shikoku, has been in the ownership of the Sumitomo family since its opening, A. D. 1691, and was making more than 3,000,000 lbs. fine copper yearly at the close of the Seventeenth Century, being, at that time, perhaps the largest copper producer of the world. The mine is opened by the Toyen shaft of 1,742′ depth, sunk at an incline of 49°, other shafts being No. 1, of 399′; No. 2, of 382′; No. 4E., of 550′; No. 4W, of 567′; No. 6E, of 367′; No. 6W, of 379′; Miyako, of 2[illegible]; No. 2W, of 361′. There also are crosscut tunnels of 3,378′, 6,000′, 15,000′, 4,300′, the main shaft connecting, on the 8th level, at depth of 1,300′, with the new Tonaru crosscut tunnel, of 15,000′ length. The mine has 9 main levels, with largest production from the 6th and 7th levels. There is a system of natural ventilation, by which warm air from the valley, entering through the Tonaru tunnel, escapes through the mouth of the Toyen shaft, near the crest of the mountain, the air current being regulated by brattices. The mine has 61,268′ of workings, with circa 2,500,000 tons of ore blocked out for stoping. The mine is well timbered, with a tramline on each level, and ore is extracted by overhand stoping, explosives being mainly guncotton, with a little dynamite and occasional gunpowder. Electric pumps fork water from the lower workings to a large sump on the 8th level, whence it is discharged through the Toyen tunnel, which is lighted throughout by electricity, and has the terminal station of an aërial tram at its portal.

Mining equipment includes a 1,000-h. p. electric installation, [illegible] 200-h. p. electric hoists, good for 1,200′ depth each, with three [illegible] two 120-h. p. and one 75-h. p. Leyner, and one 50-h. p. Schram[illegible]. Owing to ore extraction being mainly through the tunnel[illegible] powerful machinery is required.

As the mine, mill and works lie on successive le[illegible] vantage is taken of gravity throughout, effecting

The concentrator, of wood, built 1906, at th[illegible]

s daily capacity, equipment including 2 Blake crushers, 4 belt-
l 4 trommels, ore being assorted mainly by hand-labor.
complaints by farmers of damage from copper-laden waters, a
lant was installed several years ago, and considerable copper is
n scrap iron, the production of cement copper amounting to up-
ons yearly.
ıeter Bleichert aërial tram leads from the mill and tunnel to Ha-
ing a longest span of 600 meters, with an hourly capacity of 90
erage speed of 2.5′ per second. At Hateba is the terminus of a
ıg to Niihama, the nearest port. The connections between the
ping wharf include the 15,000′ Tonaru tunnel, circa 2 miles of
d 5½ miles of railway, a total of about 11 miles. The mine has 3
f 2,276′, 5,200′ and 5,178′ lengths, respectively.
any owns 2 private railways, of 9.73 miles aggregate length, with
ing stock including 10 locomotives, 10 box-cars and 184 ore-cars.
any owns 3 electric plants, 2 operated by steam and one by water.
nt at the mine and the hydro-electric plant at Otoshi, on the Ko-
listribute electric energy to the mine, mill and shops, while the
plant at Shisaka furnishes power to the smelter.
ral shops, at Niihama, about midway between the mine and
le a foundry making castings up to 5 tons in weight, extensive
s, machine-shops, boiler-shops and smithies, these works not
rdinary repairs, but turning out a large part of the machinery
sed at the mines, works and smelter.
i smelter formerly was at Niihama, but, owing to serious damage
; farmers from smelter fumes, the entire plant was transferred,
sland of Shisakajima, 12 miles from Niihama, only the general
ıg at the old smelter-site.
Shisakajima smelter, 20 miles from the mine, built at a cost of
0 yen, is thoroughly modern in design and equipment. Ore is
ërial trams and a private railway, by land, and on lighters towed
a, latter being unloaded by a 20-ton crane, into cars operated in
, on an incline leading to the top of the works, which are laid out
avity being used throughout for the flow of material.
er, of 600 metric tons daily capacity, has 308 open stalls for roast-
) similar stalls for roasting matte, these being of about 30 tons
an average of 30 days being required for roasting raw ore. The
ected with a central high chimney. The furnace building has
)x192″ blast-furnaces, of partial water-jacket type for ordinary
lting, and a 400-ton 48x288′ blast furnace for pyritic smelting.
37-metric ton circular blast-furnaces, each with a corresponding
ory forehearth, with blast, for smelting roasted matte and making
There are two 15 metric ton reverberatories for refining, one
spare, and 4 sets of Mabuki hearths, using an old Japanese proc-
by the Sumitomo company, for the conversion of matte, these
capacity of 32 tons of roasted matte each, one being held as a
quartz pebbles are used for fluxing, no silicious ore being avail-
urpose. No custom smelting is done. The product is blister
ing 99.8% in copper tenor, carrying traces of silver and gold.
the product is sent to the Osaka rolling mill, owned by the Sumi-
and the greater part of the [illegible] to Kobe, whence
ly to Europe.
er power plant [illegible] blowers, and
x24′ pyritic fur[illegible] direct-
turbo-blower [illegible]
1.24 atmosp[illegible]

1.34 atmospheres. Steam for the turbo-blower is furnished at 200 lbs. initial pressure by a Babcock & Wilcox boiler. There is an air-compressor for converter blast.

Fuel is coal at the mine, and coal, coke and waste-gases from coke-ovens at the smelter, coal being used for the reverberatories and reverberatory furnace hearths, with coal and wood employed for the roast-stalls. Fuel costs are [illegible] to 4.7 yen per long ton for coal, according to grade, and 8.46 to 21 yen for coke, yearly fuel consumption being estimated by the management to average [illegible] long tons of coal and coke. The company has a coking plant, at Niihama, with 72 brick kilns, having a daily capacity of about 55 tons, using coal from the Keeki mine, at Kiushiu.

The company owns a very extensive fleet of vessels, including 2 steamers for passengers and package freight, 1 steamer for carriage of coal, and 81 sailing vessels, with 20 sailing vessels held under charter. The company operates a passenger line, with a steamer, plying between Niihama and Kobe, a distance of 125 miles.

The Besshi mine employed an average of 3,477 persons in 1908, and the various enterprises of the company employ about 6,000 hands. The miscellaneous enterprises in connection with the Besshi mine are very extensive, including a large number of warehouses and stores, and there is a branch of the Sumitomo bank at Niihama. The company maintains a main hospital, with 4 branches, and supports 5 elementary schools, for the children of employés.

Production of the Besshi mine was 11,973,833 lbs. fine copper in [illegible] 11,781,824 lbs. in 1907; 11,476,519 lbs. in 1908, and 14,725,305 lbs. in 1910, production for the latter year having been secured from 206,868 long tons of [illegible] smelted, at an estimated cost of between 9 and 10 cents per pound for finished copper.

The Nishinokawa mine is at Oboki-mura, Nii-gori, Iyo, Japan. The property shows quartz-schists, with lenses of 3′ to 12′ width carrying chalcopyrite, of 3 to 4% copper tenor, associated with sphalerite, pyrite, magnetite and hematite, with quartz gangue. The mine employed an average of 225 [illegible] 1908. Production of the Nishinokawa mine was 183,415 lbs. fine copper in [illegible] 242,215 lbs. in 1903; 166,156 lbs. in 1907; 194,707 lbs. in 1908.

Production of the company as a whole was 11,947,980 lbs. fine copper in 1907; 11,671,226 lbs. in 1908, and circa 15,000,000 lbs. in 1910. The Besshi mine is a very valuable property, and has a thoroughly modern mining and smelting equipment, with a highly progressive and efficient management.

SUMMIT COPPER CO. ARIZONA.

Office: 708 Lonsdale Bldg., Duluth, Minn. Mine office: Bellevue [illegible] Co., Ariz. Wm. A. Eaton, president; Thos. W. Hamilton, vice-president and general manager; A. O. Rabideau, secretary; H. L. Palmer, [illegible] preceding officers, Geo. H. Mance and H. B. Fryberger, directors; [illegible] superintendent; Pritchett & Hamilton, consulting engineers. [illegible] 22, 1910, under laws of Minnesota, with capitalization [illegible] nonassessable; issued, $570,000. The Cactus Copper [illegible] in the Summit. Shares are called on the unlisted department [illegible] exchange. Annual meeting, third Thursday in July [illegible]

The property was taken over from the Gibson [illegible] $442,375, with $30,000 for an initial payment, and [illegible] terly, ending December, 1911, followed by installments [illegible] thereafter, until June 18, 1914, giving total payments of [illegible] final balance of $351,375 payable June 18, 1914. The [illegible] of net smelter returns, during the first eighteen months, [illegible] final payment, after which 10% of net smelter returns [illegible] final payment.

Lands, 16 adjoining claims, 5 patented [illegible]

west of Globe, with a good wagon road connection. The property
ummit, Pasquale, Reynolds and one additional group, of 4 claims
mmit, Pasquale and Reynolds were worked in a very small way,
vners, 1900–1906, when taken over by the Gibson Copper Co., and
e worked continuously, until June, 1910.

ry rock is Pinal schist, with occasional trachite, diorite and quarts-
contact deposits between schist and porphyritic rocks, and 5
parallel fissure veins, having a NE. strike, of which the Summit,
and Pasquale are the principal veins, the main vein, of 4′ to 7′
raceable for the entire length of the property, a distance of 1¼
mmit and Pasquale veins are about 250′ apart, opposite the ver-
ich is near the Intermediate vein, about 75′ east of the Pasquale.
sibility that these veins may unite at depth. Ore occurs in the
'asquale veins in well-defined shoots, pitching to the south at 40°
parently lenticular character of these shoots being due, in many
ely to faulting and shearing along the vein, and not representing
m of the ore body. Owing to the faulting and shearing, barren
in the vein, with good ore above and below. Ore is exclusively
ly massive chalcopyrite, with considerable massive bornite of
grade, latter frequently coated with chalcocite, and ranging 20
per tenor, for selected ore. Gangue is mainly quarts, with some
all quantities of specular hematite and gypsum. Two veins show
, and more or less low grade ore has been developed in 5 veins.
vein, undeveloped, shows a strong outcrop.

n mine was opened by Messrs. Gibson and Henderson, with a capi-
and a team of horses, but, on that extremely limited capital, not
ay, but earned good profits from grass-roots.

has 3 shafts and 5 tunnels, of which 2 shafts and 4 tunnels are of
The Pasquale tunnel, driven on the Pasquale vein, is about 200′
r of the incline shaft, and cut some ore, May, 1910. The Rey-
bout 1,000′ long, at last accounts, formerly planned to be driven
sect the vertical shaft at depth of 500′, is on the Summit vein,
mbs tunnel, which is 100′ vertically above the Reynolds, and the
, which is 210′ above the Reynolds.

e shaft, 600′ deep, with 6 levels opened, is sunk on the Summit
s the Pasquale vein by a 200′ crosscut on the 3d level. The Sum-
strike of N. 21° E., with dip of 56° WN., carrying a well-defined
ade ore, with numerous small stringers, of 2″ to 20″ width, assay-
pper, not including the main paystreak of high grade ore, fre-
5″ wide, carrying ore assaying 30 to 30% copper. This shaft has
ngs on the Summit vein, with 2,130′ of upraises and circa 2,600′
ving 1,800′ of drifts on the 3d level, 1,200′ on the 4th level, 800′
el, and 800′ on the [illegible] the 3d and 4th
g to the Pasquale [illegible] vein, which
p on surface. The [illegible] a total length of

ent by the present [illegible] shaft,
mpartments, each 4x6′ [illegible] the
Co., and deepened by [illegible]
he 7th level of the old incline
e vein, cuts that vein at depth [illegible]
d the Summit vein at circa 500′.
drifts on the 3d and 4th levels, with [illegible]
e end of 1910. The Pasquale vein [illegible]
ross the bedding of the schist, instead of [illegible]
the Summ[illegible]rike of N. 20° E., w[illegible]

Apparently the Pasquale vein is better defined, more continuous and stron[illegible] than the Summit, the fissure being of 5′ to 10′ width, carrying a paystreak, [illegible] a few inches to 3′ in width, of ore assaying up to 33% copper. Ore occurs in [illegible] Pasquale vein in shoots pitching to the south, similar to the ore occurrence of [illegible] Summit. A 425′ drift on the 4th level of the Pasquale, April, 1911, showed [illegible] vein of 8′ to 9′ width, carrying chalcopyrite of 7 to 8% average copper [illegible] The Intermediate vein, having drifts of 225′ length on the 3d and 4th levels, [illegible] a strike of 12° E., with dip of 52° N W., and is only about 8″ wide, with firm [illegible] and, as developed, is not of great importance, but has possibilities. The [illegible] as a whole, had about 2 miles of workings, early 1911. The ground is [illegible] and treacherous, requiring timbering for practically every foot of drifting [illegible] concrete posts are used. Messrs. Pritchett & Hamilton estimated the develop[illegible] ore reserves, at the end of 1910, excluding all high grade ore, and omitting [illegible] able ore between the 3d and 4th levels on the Pasquale vein, as 33,011 tons [illegible] ore, averaging 4.36% copper, on the Summit vein; 17,062 tons of 3% copper ore in the Summit filling; 39,860 tons of 2% ore on the Summit dump, and [illegible] tons of 6.51% copper ore developed in the Pasquale vein.

Equipment at the incline shaft includes two 250-h. p. boilers, a [illegible] hoist and a 6-drill Sullivan air-compressor. The plant at the vertical [illegible] includes two 200-h. p. Stirling water-tube boilers, a 16x20″ Hendrie & [illegible] double-drum hoist, good for 1,000′ depth and a 10-drill Sullivan cross-compound air-compressor, with a 132′ steel smokestack of 42″ diameter. The [illegible] shaft has pumps with capacity of 500,000 gallons daily.

Buildings, about 30 in number, include an engine-house, boiler-house, [illegible] penter and machine-shop, smithy, warehouse, office, laboratory, general [illegible] schoolhouse, boarding-house, with accommodations for about 100 men, and [illegible] smaller buildings. Forces averaged 55 men, February, 1911.

Plans have been drawn for a 200-ton mill, but the situation is complicated by scarcity of water, and some experiments have been made in dry concentration.

The gross value of ore produced by the Gibson Copper Co., 1906-[illegible] is estimated by Messrs. Pritchett & Hamilton at $1,250,000. This ore [illegible] shipped to the Old Dominion smelter, a distance of about 18 miles, by 10-[illegible] teams, and required very careful selection, owing to the extremely high [illegible] transportation, ore so shipped returning an average of better than 20% copper. Production was 1,106,100 lbs. fine copper in 1906; 3,340,777 lbs. in [illegible] 1,270,211 lbs. copper and 2,000 oz. silver in 1908; 667,405 lbs. copper in 1909. [illegible] present company has made irregular shipments to the El Paso smelter, [illegible] its sixth carload April, 1911, preceding shipments having averaged 26% [illegible] and a few ounces of silver per ton. The Summit is one of the very few [illegible] copper mines that has paid from grass-roots, but must be operated in the [illegible] along different lines from those of the past, in order to utilize its full ore [illegible] rather than the selected ore only. Property considered promising.

SUMMIT GOLD & COPPER MINING CO. WASHING[illegible]

Dead. Former office was Spokane, Wash. N. T. Johnson was [illegible] and general manager; Stephen Tanner, secretary and treasurer. [illegible] groups, known as the Summit and Railroad, the Summit group of [illegible] having a 110′ tunnel, crosscutting a vein of 25′ estimated average [illegible] also carrying a 7′ vein, said to average $10 gold per ton. The Railroad [illegible] between Rockcut and Laurier, has a vein of 25′ estimated average width [illegible] ing a 4′ to 5′ paystreak of chalcopyrite, said to be of smelting grade [illegible] of the vein being said to be of concentrating grade, opened by a [illegible] shaft. Formerly at Rockcut, Ferry Co., Wash.

SUMMIT MINING & MILLING CO. WASHI[illegible]

Office: Davenport, Wash. Mine [illegible] Neal, president; C. A. Gray, secretary [illegible] hundred feet of workings, showing [illegible]

d to give assays of about $60 per ton. Idle some years and
oribund.

MELTER. **OREGON.**

Northwest Smelting & Refining Co., at Sumpter, Baker Co., Ore.

R COPPER MINING CO. **WYOMING.**

e: Encampment, Carbon Co., Wyo. L. W. Tennant, president;
nn, secretary and treasurer. Capitalization $1,000,000. Lands,
60 acres, on Green Mountain, near the Moon-Anchor. Idle
d apparently moribund.

COLECTIVA C. y J. SUNDHEIM. **SPAIN.**

Huelva, Spain. Mine office: Puebla de Guzmán, Huelva, Spain.
ated copartnership between Don Carlos Sundheim de la Cueva
a Sundheim de la Cueva. Wm. Guthrie Bowie, manager; Jorge
superintendent. Property includes the Cabezas del Pasto,
Sierracilla del Tamujoso and Malagón mines, the two former
the United Alkalai Co., Ltd., and described under title of that
e Sierracilla del Tamujoso was a small producer, under former
the ore is complex, requiring special treatment, and the property
or some years. The Malagón is a group of government conces-
good outcrops, with numerous old workings, but also has been
.

S. **RUSSIA.**

e: Evlach, Zangezhur, Transcaucasia, Russia. Lands, 30 miles
n the Tiflis & Baku railway, near the Persian line, carry a system
ault fissures, of 7″ to 4′ width, cutting andesite and diabase,
ly chalcopyrite, with occasional bornite, both auriferous and
and a little native copper, ore averaging about 7% in copper
. Development is mainly by tunnel, with 2 shafts, and workings
ve nature, deepest being only about 130′, at last accounts. Aver-
9, were 55 men, of whom 45 were underground workmen. Pro-
9,667 poods of copper ore, estimated to have yielded circa
copper, in 1909.

INING CO. **ARIZONA.**

as merged in Great Belcher of Arizona Co. Formerly at Provi-
Co., Ariz.

INING & MILLING CO. **COLORADO.**

operty was the Morning Star and Evening Star mines, carrying
rgentiferous copper and lead ores, with M. T. Jones as manager,
as Transit House, Union Stock Yards, Chicago, Ills. Formerly
Juan Co., Colo.

MINING & MILLING CO. **COLORADO.**

as succeeded by Sol Luna Mining Co. Formerly at Idaho Springs,
., Colo. Described Vol. VIII.

MINES DE SUNNY CORNER. **AUSTRALIA.**

rned unclaimed from former office, Brussels, Belgium. Mine
Corner, Wynward Co., N. S. W., Australia. Reuben Gubbay,
, Graf Claude-Marcel d'Abnour, P. M. Bols and J. K. Charles-
committee. Organized circa 1909, under laws of Belgium, by
glish capital, with capitalization f4,000,000, shares f100 par, in
ed, issued to the Banque Parisienne de Fonds Publics, R. Gubbay,
, and f3,500,000 common [illegible] the Sunny Corner Silver
the pro[illegible]
r Ryda[illegible] known as the Nevada
rim[illegible] tiferous ore, with
[illegible] a carrier in
[illegible] ceed 680

long tons of ore, smelted at the mine, yielding 110 long tons of copper matte and production, under former ownership, when working, was about 75,000 fine copper yearly, with a considerable silver output. The property was some years, under the former ownership, and apparently no work has been by the present company.

SUNNY CORNER SILVER MINING CO. AUSTRALIA.

Dead. Was succeeded, circa 1909, by Société des Mines de Sunny Corner. Formerly at Sunny Corner, Wynward Co., N. S. W., Australia. Described Vol. VIII.

SUNNYSIDE COPPER MINING CO. AUSTRALIA.

Mine office: Marodian, Lennox Co., Queensland, Australia. Mine has shafts of 60′ and 90′ and an opencut, and in 1907 shipped 12 long tons of ore giving average smelter returns of £17 7s. 6d. per ton, of which 2 tons returned 14% copper. Idle several years.

SUNNYSIDE GOLD & COPPER MINING CO. ARIZONA.

Office: 91 City National Bank Bldg., Utica, N. Y. Letter returned unclaimed from former mine office, Bisbee, Cochise Co., Ariz. Benj. Smith, president and general manager; O. W. Zane, superintendent, at last account. Company is closely related, in ownership and management, to the Boston & Bisbee Mining Co. Lands, near the Modern mine, about 7 miles northwest of Bisbee, show auriferous and argentiferous lead and copper ores, presumably in narrow veins, and development is by a 40′ shaft and a tunnel, showing low grade ore. Idle.

SUNNYSIDE MINE. MONTANA.

Owned by Anaconda Copper Mining Co., at Butte, Silver Bow Co., Mont.

SUNRISE COPPER CO. WYOMING.

Mine office: Sunrise, Laramie Co., Wyo. O. L. Vincent, president; E. Jarrad, secretary. Organized, September, 1902, under laws of Wyoming. Lands, about 11 miles from Sunrise, were worked originally for iron ore. The copper ores carry gold and silver values. Mine produced, 1881-1893, ores valued at $209,282. Idle several years and presumably moribund.

SUNRISE GOLD & COPPER CO. CALIFORNIA.

Letter returned unclaimed from former office, Los Angeles, Cal. Mine office: Vontrigger, San Bernardino Co., Cal. Allen Davison, superintendent, at last accounts. Lands, 15 claims, in the Signal district, 8 miles east of Vontrigger, and about 40 miles northwest of Needles, said to show tungsten. Idle since circa 1907, and presumably moribund.

SUNRISE MINING CO. CALIFORNIA.

Office: Cosmopolis, Wash. Mine office: Genesee, Plumas Co., Cal. W. S. Mason, president, secretary and general manager; L. B. Hogan, three preceding officers and J. C. Cross, directors. Organized November, 1909, under laws of Arizona, with capitalization $1,000,000, shares $1 par, none issued, $400,000. Annual meeting, Dec. 1st, each year.

Lands, 5 claims, unpatented, area 70 acres, 21 miles from [illegible] point on the Western Pacific line, showing porphyry and schist, with [illegible] occurring as fissure veins in porphyry [illegible] phyry contact, estimated to av[illegible] slightly tested, by pits of 17′, [illegible] and chalcopyrite, estimated [illegible] silver and $4.20 gold per ton. [illegible] consist of a 12x14′ carpenter-[illegible] sinking No. 1 shaft to 300′, and [illegible]

SUNSET COPPER CO.

Dead. Formerly at Mayer, Yav[illegible]

SUNSET COPPER CO., LTD.

Dead. Formerly at Princeton, Brit[illegible]

PER MINING CO. **WASHINGTON.**
as a bad egg. Property was sold, by receiver, March 30, 1909, l and W. W. Black, for $40,000. Formerly at Index, Snohomish xhaustively described Vol. IV, and fully described with later Vols. V to VIII.

ING & DEVELOPMENT CO. **WASHINGTON.**
: Northport, Stevens Co., Wash. H. W. Working, president nager. Lands carry auriferous and argentiferous copper ore, 400′ main shaft, with about 1,400′ of workings. Diamond drill rom the 400′ level, showed 5 veins, of 14″, 18″, 30″, 4′ and 4′ ge widths, in a distance of 350′, carrying chalcopyrite, associated . Equipment includes steam power, with a hoist and air-com-

ING & MILLING CO. **ARIZONA.**
27 Majestic Bldg., Detroit, Mich. Letters returned unclaimed ne office, Dos Cabezos, Cochise Co., Ariz. Eugene F. Bradt, m. Beck, vice-president; Frank A. Rasch, secretary; Hon. Carl r; preceding officers, Frederick C. Deinzer, Oscar B. Marx, Geo. as. A. Maurer and Frederick Knorr, directors. Organized July laws of Arizona, with capitalization $1,000,000, shares $1 par, n $350,000 preferred and $650,000 common stock, of which rred and $618,484 of common stock were issued, Feb. 6, 1911. , first Tuesday after first Wednesday in January.
aims, unpatented, area 160 acres, circa 10 miles from Willcox, 76′, 50′ and 60′, and crosscut tunnels of 75′, 125′, 100′ and 17′, erous copper ore. The company plans patenting its land before ning work.

ONAL MINING CO. **MONTANA.**
icago, Ills. Mine office: Homestake, Jefferson Co., Mont. resident; W. A. Beatty, secretary; R. L. Stevens, manager, at Capitalization $500,000, shares $1 par. Lands, 8 claims, 2 25 acres, in 2 groups, one adjoining the Lion Gulch mine, 4 miles ake and about 8 miles east of Butte. Development is by the 120′, the Sunset shaft of 165′, and a 250′ tunnel. The National ow a vein of 3′ to 14′ width, carrying a paystreak of ore averag- pper, up to 12 oz. silver and $3.40 gold per ton.

TA MINING CO. **UTAH.**
t Lake City, Utah. Letter returned unclaimed from former , Salt Lake Co., Utah. A. J. Jacobson, president; L. A. Jeffs, Walter L. Maas, secretary and manager. Capitalization $1 par. Idle some years.

NANZA MINING CO. **MÉXICO.**
umet, Mich. Mine office: Imuris, Magdalena, Sonora, Mex. man; R. E. Lopez, secretary; Wm. Gmahling, treasurer; John onsulting engineer; Chas. Hanley, superintendent. Organized th [illegible] par, as successor of Sonora Bonanza Mining Co. sed[illegible] [illegible] extensive holdings of miscella- [illegible] prominent gossan [illegible] uniform assays [illegible] showing a [illegible] with [illegible] bet- old. [illegible] 2 [illegible] carrying 3 to 5 [illegible] has a broken formation.

Equipment includes a steam plant with 3 boilers, 2 hoists, 2 pumps, air compressor and an electric light plant. Water is secured from a well, and stored in a reservoir. Improvements include a general store, dwellings for employés, a mill, kiln and a small brick plant, and there is a small concentrator. Property considered promising. Idle since circa 1907.

SUPERIOR & BOSTON COPPER CO. ARIZONA.

Office: Houghton, Mich. Mine office: Globe, Gila Co., Ariz. Wm. L. Rice, president; John H. Rice, vice-president; John R. Pimlott, secretary and treasurer; preceding officers, Hon. Norman W. Haire and George R. Fearn, directors; John D. Wanvig, superintendent; Frank H. Probert, consulting engineer.

Organized Nov. 23, 1906, under laws of Arizona, with capitalization $1,500,000, shares $10 par, increased, Sept. 5, 1908, to $2,000,000, and again increased Apr. 22, 1909, to $2,500,000; fully issued, in $150,000 of full paid shares and $2,350,000 stock $4.50 paid. Company has levied 4 assessments, last a 4th assessment, January, 1911. Balance sheet of fiscal year ending Sept. 30, 1910, showed an income of $103,711.69, of which $101,066.41 was from ore sales, with expenditures of $366,578.47, practically all for development, construction and equipment, with a cash balance on hand of $136,294.24, and accounts payable of $27,309.61. Fiscal year ends Sept. 30th. Shares are listed on the Boston stock exchange. State Street Trust Co., Boston, registrar; Boston Safe Deposit & Trust Co., transfer agent.

Lands, 54 claims, area 785 acres, of which 28 claims, area 388 acres, are patented. The Globe & Arizona tract of 22 claims was bought for $320,000, an adjoining group of 21 claims was bought for $46,000, and the Collins-Doyle group of 5 claims was bought for $150,416.35, giving a total cost of $516,416 for lands. The Collins-Doyle group, added 1909, adjoins the former holdings on the north, carrying the extension of the Old Dominion fault, and being well located with respect to the Great Eastern vein. The property, as now constituted, is a compact tract next east of the Arizona Commercial, and east of the Old Dominion. Lands are about 4,200′ above sea-level, and circa 800′ above Pinal Creek, at Globe, hence the mine should not be very wet at depth, as was the case with the Old Dominion. The property carries ample limestone and iron ore fluxes, and is reached by the Arizona Commercial and Arizona Eastern railways, both connecting with the main line at Globe.

The property shows members of the Apache group, in which the diabase is considered the main intrusive rock, cutting its way through circa 600′ of quartzite, which, in turn, is covered conformably by Globe limestone up to 1,000′ in depth. The property shows large areas of diabase, and well defined areas of diabase and quartzite, but the mineral values as found are in fissures. The property shows 2 dominant lines of faulting, the main series including, from east to south, the Old Dominion, Great Eastern or Black Hawk, Limestone, Vadis, Black Oxide and Iron King faults, or veins, these being intersected at nearly right angles, by another series of faults, of later age, apparently slightly mineralized. Of the veins named, 3 show ore in commercial quantity. The average strike of the faults is N. 70° E., with average dip of 60° N. The oxidized zone is very deep, having been proven to more than 800′, ore opened on the 8th level including cuprite, native copper and chalcocite, and some mixed ore is shown in the workings above.

Work was begun January, 1907, and Oct. 31, 1908, the mine had 15,842′ of workings, exclusive of stopes, increased to 15,842′ of workings [illegible]. New openings, for fiscal years ending Sept. 30th, were 4,[illegible]0′, 4,267′ in 1910, those of the latter year being 3,138′ of workings in the McGaw shaft, and 1,173′ made from the Gardner shaft, with [illegible] drilling in addition. Assessment work has been done along [illegible] planned lines, by sinking 2-compartment shafts, well timbered, [illegible]

djoining claims, or, wherever possible, at the intersection of 4
securing results of actual value for expenditures usually of a purely
nature. It is planned ultimately to connect the workings on all
n crosscuts, between the 2 working shafts, driving crosscuts at ver-
s of 200′, to serve as the main transportation avenues for ore devel-
cheap extraction, and providing for handling a heavy tonnage.
ment is by 4 shafts, known as the McGaw, Great Eastern, Lime-
ardner, and there is one tunnel. Preliminary work was done
Great Eastern shaft, sunk vertically to 444′ depth, this being an old
s cut down, but being poorly located, it has been replaced by the
, to the north.
Gaw shaft is 986′ deep, with 3 compartments, one of 5x7′ and two of
The 10th level is opened at 970′, this depth corresponding with
th level of the Arizona Commercial mine, next west. The McGaw
rth of the Great Eastern shaft, and 1,350′ east of the Arizona Com-
er, is sunk between the Old Dominion fault on the north and the
n vein on the south, and was planned to intersect the Great Eastern
tical depth of practically 1,000′. Water is cared for by a 3,000-
on the 10th level. This is the main working shaft of the mine, and
heavy duty. The shaft has a 65′ wooden headgear, built of 16x16′

ere opened at 100′ 300′ and 400′ depths in the Great Eastern
per levels showing leached ore, of little importance, but the 400′
oot of commercial ore 230′ long, from the eastern boundary of the
mercial, beyond which the vein carried, at that depth, small lenses
ore, at irregular intervals for 361′ in length, while on the sub-level,
e ore shoot was 320′ long, a gain of more than one-third in 56′ depth,
the ore shoot raked eastward on the Superior & Boston, making
ly at depth. On the sub-level, at 456′, considerable chalcocite
both the foot and hanging walls, chalcocite increasing with depth.
awkwardness and general inadequacy of the Great Eastern shaft,
anned originally for purely exploratory purposes, it was deemed
management, to stop work therein, after ore had been stoped
everal millions of pounds of copper, and open the mine systematic-
ughly from the McGaw shaft. The average width of the Great
ody, on the 400′ level and 456′ sub-level, was 20′, all shipping ore
10% copper. The leached zone carried mainly carbonate ores.
t Eastern vein shows, on the 6th level of the McGaw shaft, an ore
3′ width, for about 150′ length, carrying 4 to 18% copper. The
ed, March, 1911, an ore shoot of about 200′ length, but the zone of
merly supposed to be 500′ to 600′ in depth, continues below the
el, the workings on this level showing ore carrying less copper car-
iore iron, but quite thoroughly leached. The Great Eastern vein
el has a width of 37′, of which about 23′ is mineralized, a horse of
ling the vein. The 10th level was being opened July, 1911, show-
It is the plan of the management to prospect the Great Eastern
e 10th level by diamond drilling.
t on the 10th level, from the McGaw shaft, is driven north, to cut
ion vein, and south to cut the Great [illegible] and Great
ich crosscut is to be approximat[ely] [illegible]
ted until 1912, after which co[nnection] [illegible]
ent veins by drifts. The Old [Dominion] [illegible]
McGaw shaft, on the 4th and 6[th levels]
material, quite thoroughly leached
ise of ore at greater depth.

The Limestone shaft is 318′ deep, with levels at 100′, 200′ and 300′, the latter showing a 4′ footwall paystreak of commercial ore, with improvement on the successive levels, in both width and grade of ore, giving promise of good ore bodies at greater depth.

The Gardner vertical shaft, started Apr. 4, 1908, at the southern end of the property, on the Black Oxide vein, has 3 compartments, one of 5x7′ and two of 5x4′ 6″ each, framed with 10x10″ timber, and is 435′ deep, no sinking having been done since 1908. During the fiscal year 1910 new openings made from the Gardner shaft were 1,173′. The Black Oxide vein apparently is a continuation of the Buckeye fault, on which the Old Dominion has opened mines on the Buckeye, Carrie and True Blue claims. Equipment of the Gardner shaft is temporary, but adequate for present purposes.

The 1,054′ Black Oxide tunnel has its portal about 1,000′ southwest of the Limestone shaft, this tunnel cutting the Black Oxide vein at 670′, giving a 400′ back, drifts on this level showing a vein carrying mainly micaceous hematite with small quantities of copper, and a small shoot of smelting ore, from which lessees extracted a small ore production averaging about 7% copper, with excess of iron, 1910. Indications are favorable to the existence of good bodies of high grade sulphide ore at greater depth. The Black Oxide is 280′ east of the True Blue mine of the Old Dominion, from which lessees have shipped small quantities of high grade ore for several years past.

The Iron King vein, parallel with the other 4 faults of the property, shows a good gossan, and has an old 70′ shaft, in leached vein material similar to that in the other faults, at similar depth.

Equipment includes hoists at each shaft, equipments aggregating 1,260 h. p. The main plant, at the McGaw shaft, has four 250-h. p. Stirling water-tube boilers, a 14x14x28″ hoist good for depth of 1,600′, and a Nordberg cross-compound air-compressor, there being an auxiliary compressor at another shaft. The mine has a 1,000-gallon Prescott pump.

The company owns 38 buildings, including a 40x40′ machine-shop, 32x[illegible] smithy, 40x60′ carpenter-shop, 40x60′ office and warehouse, and other mine structures, with a considerable number of dwellings for employés, mine buildings being of wood frame, covered with corrugated iron. The shops are well equipped and the smithy has a Word drill sharpener. The changing-house at the McGaw shaft has steamheated lockers, shower baths and drying racks. Buildings are lighted by electricity, current being taken from the Arizona Commercial. Fuel is mainly petroleum, with 5,000-gallon and 12,000-gallon storage tanks.

Forces were about 135 men May, 1910, and circa 60 men March, 1911.

To the end of 1910, total production was 3,846,402 lbs. fine copper and 94,698 oz. silver, from 27 126 tons of dry ore, all coming from the Great Eastern vein above the 6th level west of the McGaw shaft, with the exception of 6[illegible] tons extracted by lessees from the Black Oxide workings, 1910. The ore production gave an average yield of about 7.35% copper and 3½ oz. silver per ton. Production was suspended August, 1910. Production was 129,937 lbs. fine copper in 1907; 1,143,864 lbs. copper and 27,080 oz. silver in 1908; 745,501 lbs. copper and 20,414 oz. silver in 1909; 7,545 dry tons of ore, averaging 7.42% copper, yielding 1,827,100 lbs. fine copper and circa 30,000 oz. silver, in 1910.

It has taken a great deal more money than was anticipated to bring the Superior & Boston to its present point of development, and it is obvious that not only has a great deal more been taken than was expected at the beginning, but that at least two years more will be required to thoroughly demonstrate the possibilities of the 5 different veins of the property. The prospects of opening a good body of high-grade ore in the Great Eastern vein, at and below a depth of 1,000′, are excellent, and several of the other veins have given strongly promising indications. Property considered promising and management good.

OPPER CO. **ARIZONA.**
ormerly at Tucson, Pima Co., Ariz. Described Vol. VI.

OPPER CO. **MICHIGAN.**
2 Ashburton Place, Boston, Mass. Operating office: Calumet, office: Houghton, Houghton Co., Mich. Employs about 200 A. Shaw, president; Rodolphe L. Agassiz, vice-president; Geo. A. y and treasurer; Jas. MacNaughton, general manager; preceding is L. Higginson and Francis W. Hunnewell, directors; Jas. Bis- ıtendent; Ocha Potter, assistant superintendent.

July 23, 1904, under laws of Michigan, with capitalization ares $25 par; fully issued, and $1 paid. Is controlled, through 50,100 shares, bought Dec. 31, 1906, by the Calumet & Hecla 'or fiscal years, the company had cash assets of $155,231 with total ,846 in 1908; a surplus balance of $149,385 in 1909 and cash assets and liabilities of $211,202.19, giving a deficit of $17,751.08 in are listed on the Boston stock exchange. Old Colony Trust Co., ar; American Trust Co., Boston, transfer agent. Annual meeting, y in June.

) acres, in Section 15, T. 54 N., R. 34 W., between the Baltic and nes, and just east of the Section 16 mine of the Atlantic. The es circa 6,000′ of the strike of the Baltic amygdaloidal bed, 3 or 4 shafts, and has a light overburden, the bed being proven intervals of 1,000′, these showing an amygdaloid of 35′ to 40′ having extensive carbonate stains, due to weathering, with a er near surface. The property has been trenched to the eastern

is opened by 2 shafts, both sunk in the footwall, insuring solid essitating reaching the bed by short crosscuts at each level, and, eat width of the copper-bearing stratum, it is necessary to cross- d at 100′ intervals. As a rule, the drifts, 7x8′ in size, are carried in the center of the bed, with a view to obtaining a fair average of is ample evidence that the Superior mine is opened on the north- f the Baltic amygdaloidal bed, though some authorities insist on Superior lode, not being fully satisfied of the identity. The Baltic ned in the Superior mine, carries copper impregnations in the s an evidence of strong mineralization, and there is a conglomer- he foot that carries a small amount of copper. The stamp-rock eceptive in appearance, as the copper oxidizes readily, and, after eeks, the rock is of little promise to the eye, unless broken, when show good quantities of fine copper. The mine has shown a ement with depth. Owing to a triangular tract of land, owned by intervening between shafts Nos. 1 and 2, they cannot be con- e 12th level. The mine had about 3 miles of workings, May, 1911. t, located about 1,200′ south of the northern boundary of the ,700′ deep, May, 1911. There is an 18′ horse of trap on the 5th appears on the level below, and the bed has an extreme width of of the 10th level. Improved values have been encountered with workings of No. 1 shaft give a good showing, with the exception that ran into a series of faults north of the shaft, some of which d through one of the faults, and are again in good ground. The shaft, especially in the upper levels, is very treacherous, and attention and close timbering.

t has a frame shaft-rockhouse, of the same type as at Nos. 17 Osceola mine of the Calumet & Hecla, equipment including a ngine and 2 crushers. The hoist, good for a depth of circa n from No. 20 shaft of the Calumet & Hecla.

650′ level was driven 233′ in hard diabase, developing nothing of value. The mine makes about 5,000 gallons of water daily.

Underground work was discontinued for diamond drilling, about June, 1910, a 350′ horizontal and a 600′ vertical hole being bored from the bottom of the shaft, and work was confined to diamond drilling, with a force of 5 men, March, 1911.

Equipment includes a 100-h. p. gasoline plant having a 60-h. p. Fairbanks-Morse hoist good for 1,000′ depth, and a 3-drill gasoline air-compressor. There are 5 buildings, including a 14x22′ carpenter-shop, engine-house, office and dwelling.

SUPERIOR MINING CO. NEW MEXICO

Dead. Formerly at Lordsburg, Grant Co., N. M. Described Vol. VIII.

SUPERIOR MINING CO. NEW MEXICO

Dead. Formerly at Cerillos, Santa Fé Co., N. M.

SUPERIOR MINING CO. UTAH

Dead. Jas. E. Dow was manager. Capitalization was $100,000. Lands, 8 claims, adjoining the St. Joe and southeast of the Telegraph mine, had workings said to show ore assaying 2% copper, 35.5% lead, 29.6 oz. silver and 60 cents gold per ton, undoubtedly from carefully selected specimens. The management planned sinking a shaft on the Lark side of the mountain. Formerly at Bingham Canyon, Salt Lake Co., Utah.

SUPERIOR MINING CO. WASHINGTON

Office: 407 Truax Bldg., Superior, Wis. Letters returned unclaimed from former mine office, Berlin, King Co., Wash. J. P. Simon, president and treasurer; B. A. Baerlocher, secretary and superintendent; preceding officers and W. D. Dwyer, directors. Organized 1902, under laws of Washington, with capitalization $2,000,000, shares $1 par. Lands, 4 claims, area 80 acres, and a mill 4 miles south of Berlin, in the Miller River district, opened by a 140′ tunnel showing a 5′ to 8′ fissure vein, carrying some oxidized copper ores, but mainly auriferous, argentiferous and cupriferous pyrite, and galena with talcose gangue, assaying circa 6% copper, 7 oz. silver and $1 to $30 gold per ton. Idle several years, except for annual assessment work.

SUPERIOR-MONTANA COPPER MINING CO. MONTANA

Dead. Formerly at Superior, Missoula Co., Mont. Fully described Vol. VIII.

SUPERIOR & MONTANA MINING CO. UTAH

Dead. Was merged, circa September, 1908, in South Columbus Consolidated Mining Co. Formerly at Alta, Salt Lake Co., Utah. Fully described Vol. VIII.

SUPERIOR & NEVADA GOLD MINING CO. NEVADA

Office: 219 Truax Bldg., Superior, Wis. Mine office: Searchlight, Clark Co., Nev. Wm. H. Crumpton, president; C. W. Aust, vice-president; Hon. W. E. Hailey, secretary; preceding officers and Martin Dillon, director; John Paden, general manager. Organized July 31, 1906, under laws of Arizona, with capitalization $1,500,000, shares $1 par, nonassessable; issued, $900,000. Annual meeting, fourth Monday in May.

Lands, 12 claims, unpatented, area circa 240 acres, in the Searchlight and Crescent districts. Four claims, area 80 acres, known as the King Solomon group, at Searchlight, show a 5′ vein carrying argentiferous and auriferous copper and lead sulphides, with silicious gangue, giving assays of circa 7% copper and 8 oz. gold per ton, slightly developed by tunnel. There also is a group of 4 claims, area 80 acres, at Crescent, slightly developed. Idle.

SUPERIOR & PITTSBURG COPPER CO. ARIZONA

Office: Calumet, Mich. Mine office: Warren, Cochise Co., Ariz. Employs circa 750 men. Chas. Briggs, president; Capt. Jas. Hoatson, first vice-president; Capt. Thos. Hoatson, second vice-president; Gordon R. Campbell,

r Ruppe, treasurer; John C. Greenway, general manager; pre-
Thos. F. Cole, Geo. E. Tener, Chas. d'Autremont, Jr., Chester A.
lenry R. Rea, directors; Henry B. Paull, auditor; W. B. Gohring,
ndent; W. E. McKee, mechanical superintendent; J. E. Curry,
A. Peterson, purchasing agent.

June 30, 1907, under laws of Minnesota, with capitalization
ares $10 par; issued, $15,000,000. The company was a merger of
: Pittsburg Mining Co., Lake Superior & Pittsburg Mining Co.,
uluth Mining Co. and Junction Mining Co. This company and
s have expended about $12,000,000 on lands, development and
he company ended 1907 with a balance of liabilities of $759,150.50
,000,000 to the Calumet & Arizona Mining Co., and ended 1910
of assets of $1,349,642. A dividend of 86 cents was paid, April,

) claims, largely fractional, patented, area 1,354 acres, including
629 acres, formerly held by Lake Superior & Pittsburg; 21 claims,
ormerly held by Calumet & Pittsburg; 17 claims, area 215 acres,
y Pittsburg & Duluth, and 18 claims, area 185 acres, formerly
nction. The major portion of the Junction tract is covered by
erate, flanked by porphyry and limestone.

rty shows extensive areas of leached material, predicating large
re at depth, as in the adjoining Calumet & Arizona and Copper
The Superior & Pittsburg has many large and promising ore
ch barren ground, but early efforts were partially mistaken, as
ore has been shown in the upper workings, though fine ore has
siderably deeper than anticipated. The mine is developed exten-
nings having been 23,332′ in 1907, 26,027′ in 1909, and 27,847′
age of about 5 miles of new openings yearly. Mining operations
luded prospecting mainly on the 1,200′, 1,300′ and 1,400′ levels,
oming from the 1,000′ and 1,100′ levels in the northern end of the
mine has developed large bodies of copper ore carrying good
d silver values, the sulphide ore bodies on the 1,500′ level of the
veraging about $2.20 per ton in combined gold and silver values.
nt in the mine is reflected in average copper returns from ore
were 5.10% in 1908; 5.49% in 1909, and 5.76% in 1910.

has 7 shafts, of which 5 are of present importance, and the
are connected with each other, and the mine is connected with
the Calumet & Arizona.

e Superior & Pittsburg shaft is a relic, left by former owners,
present use, being of small size and shallow depth.

e Superior & Pittsburg shaft, 1,000′ deep, on the Uncle Sam
the Cole shaft, has been idle several years.

haft, formerly known as No. 2 Lake Superior & Pittsburg, sunk
y the former owners, was cut down to three-compartment size,
measurement, and retimbered, the work being done simultane-
ls, in record-breaking time. This shaft was the principal avenue
n from that part of the mine known formerly as the Pittsburg &
Cole shaft shows considerable ore bodies on the 900′, 1,000′ and
re improving with depth, and an ore body has been developed
150x150′ on the 900′ level. The Cole shaft has Prescott and
n pumps, caring for a flow of 225 gallons of water per minute, and
Sept. 25, 1910, in the interests of economy and curtailment of

shaft equipment includes an 800-h. p. steam plant, burning
a 16-drill air-compressor. There is a 16x42″ Nordberg quadru-
line-frame double-drum hoist, capable of raising 12-ton loads

from a half-mile depth, hoisting 3-deck cages carrying 3-ton cars, operating in balance, or singly, and the engine can be altered to hoist from a depth of 2,500'. Buildings at the Cole shaft include a framing-mill, smithy, office and changing-house.

The Briggs shaft, 1,500' deep, is about 2,000' south of the Junction shaft and circa 3,000' east of the Lowell shaft of the Copper Queen. The Briggs shaft shows tremendous bodies of leached ore, of a sort that has been found capping the big commercial ore bodies of adjoining mines. The first level, at 910', shows 600' of good ore, and low-grade sulphide ore carrying up to 4%, but averaging about 2% copper, was cut at depth of 1,265', continuing to the bottom of the shaft. Another body of low-grade sulphide ore, of 3 to 4% copper tenor, was developed for upwards of 75', without reaching the end. The Briggs shaft has an 8" airline, and two 12" water-columns, with 3 pumps, but is no longer used for hoisting, ore going to the Hoatson shaft.

Equipment at the Briggs shaft includes a steel gallows-frame. The power-plant has 7 boilers, 5 of 250 h. p. each, burning crude petroleum, with a power-hoist, and an 18-drill Sullivan straight-line air-compressor.

The Hoatson shaft, on the Del Norte claim, circa 2,500' from the Briggs, with collar 150' higher than the Junction shaft, has 4 compartments, and was 1,530' deep, Dec. 31, 1910. This shaft shows tremendous bodies of leached ore and a very large tonnage of low-grade sulphides is being developed at depth. The 12th level shows some oxidized ores, including cuprite, and the lower workings also carry high-grade oxides and sulphides, similar to those in the Lowell shaft of the Copper Queen. The big body of oxidized ore has been opened for a length of 700' and width of 100' on the 1,200' level, and is about 120x700' in size on the 1,300' level, and 90x175' on the 1,400' level, and extends at least 200' below the 1,400' level, but has not been found on the 1,500' level. This shaft has a 1,000-gallon pump on the 1,300' level, and cares for the ore from the Briggs shaft also.

Equipment at the Hoatson shaft includes a new steel headgear, installed 1910, and a double-drum hoist, good for 1,500' depth. The power plant has 5 boilers, and there is a framing mill, duplicating that at the Oliver shaft of the Calumet & Arizona.

The Congdon shaft, developing the Pittsburg & Duluth tract, on the Bear claim, only 650' from the Calumet & Arizona mine, is 1,267' deep, but has been out of commission several years, as the territory can be worked to better advantage through the Cole shaft. The Congdon shaft has a 1,000-gallon pump on the 1,000' level. Surface equipment includes a 300-h. p. steam plant, with 12x36" double-drum hoist and a 5-drill straight-line air-compressor.

The Powell shaft was started 1908, on the line of the Hope and Wolverine claims of the Calumet & Arizona, on ground formerly owned by the Pittsburg & Duluth. Equipment includes a Hendrie & Bolthoff double-drum hoist, a Sullivan air-compressor and two 75-h. p Atlas boilers.

The Junction shaft, sunk on the boundary line of the Calumet & Pittsburg and Junction tracts, has 4 compartments, and was 1,800' deep April, 1911, the deepest, by nearly 200', of any shaft in the Bisbee district. The 1,750' shows considerable ore assaying up to 9% copper, and the 1,400' level is averaging about 11% copper, apparently a continuation of the ore body on the 1,300' level of the Hoatson shaft. At depth of 1,750' the Junction shaft is in low-grade sulphides. The big developments of the Junction shaft are in the south drifts of the 1,300', 1,400' and 1,500' levels, where, on the Congdon, there has been developed what is perhaps the richest body of sulphide ore found in the Bisbee camp. This ore body is proven for an average of 250' and length of 415' on the 1,300' level, with a width of 15' to 40' on the 1,400' level, and for width of 55' to 100' and length of 575' on the 1,500' level, the body averaging about 10% copper, and

At 1,700′ depth the Junction develops a shoot of sulphide ore of
a vertical height of about 25′.
ction shaft drains the entire mine, and also, owing to its location
as to assist in draining both the Calumet & Arizona and Copper
igs. A station on the 1,200′ level has a pump of 2,000 gallons capac-
e. A pumping station on the 1,500′ level, completed 1908, has a
Prescott pump, transferred thereto from the 1,200′ level, and an
pumping equipment is to be installed on the 1,700′ level, having
s. The depth at which the principal ore bodies of this mine are
d with the exceeding wetness of the ground, have compelled the
ittsburg to expend literally millions of dollars for pumping equip-
ial pumping charges, and so great was the burden, for many years,
a management of tremendous financial resources and dogged cour-
ve withstood the strain. During 1910 the water pumped was
gallons from the Junction shaft, 110,692,350 gallons from the
and 50,818,040 gallons from the Cole shaft, a total of 1,516,014,750
er forked from the various mines of the Superior & Pittsburg, from
pth of nearly a quarter-mile. The tremendous flow of water from
Pittsburg is not entirely wasted, as this flow, averaging 4,317,848
for every day of the year 1910, is utilized largely in the irrigation of
rt lands, on the flat toward Naco, south of the mine.
nt of the Junction shaft includes a 75′ steel headgear, planned for 5
. The power plant has a 16x42″ Nordberg 4-cylinder incline
hoist, good for 1,500′ depth, which is a duplicate of that at the Cole
re are 12x14″ and 12x15″ auxiliary hoists. There are 2 cross-com-
pressors, of 12 drills aggregate capacity, and a new air-compressor,
mber, 1910, having capacity to compress 5,975 cu. ft. of free air per
ressure of 70 pounds per square inch. The boiler plant includes
narine boilers, and there are three 5,000-gallon oil tanks, for the
oleum. There also is a large machine-shop at this shaft.
erty is served by the El Paso & Southwestern Railway, reaching
al shafts and shops.
f the Superior & Pittsburg has been smelted by the Calumet &
ng Co. The value of precious metals recovered was equal to
of finished copper in 1906, and $6.90 per ton of finished copper
luction was 9,084,875 lbs. fine copper, 32,564 oz. silver and 143 oz.
,691,405 lbs. copper and 55,464 oz. silver in 1907; 21,924,359 lbs.
3 oz. silver and 1,267 oz. gold in 1908; 24,325,667 lbs. copper,
er and 3,856 oz. gold in 1909, and 26,183,146 lbs. copper in 1910.
ons of the Superior & Pittsburg with the Calumet & Arizona
emely close, from the inception of the enterprise, both companies
ally the same directorate, and very largely the same shareholders.
ng and helping hand of the Calumet & Arizona, the Superior &
ely could have been made a success. The circumstances of both
ned to render a consolidation advisable, each having elements of
d by the other, the Calumet & Arizona possessing a smelter and
urces, but lacking the extensive ore reserves of the Superior &
e the latter had large ore reserves, with every prospect of develop-
er quantities of ore in the future, but lacked the smelter and the
th of the Calumet & Arizona. The plans for merging these
given very careful thought, and the physical valuation was made
Douglas and Dr. L. D. Ricketts, both thoroughly acquainted with
, but personally disinterested. That the plans for consolidation
ust was demonstrated by the reception given them by the share-
companies, there being no complaint from either side, the share-
voting overwhelmingly in favor of the merger. The plan of con-

solidation called for the giving of 3½ shares of Superior & Pittsburg for 1 share of the new consolidated Calumet & Arizona stock, after the previous payment, by the Superior & Pittsburg, of a dividend equal to 2 1-7 times the amount of all dividends paid by the Calumet & Arizona between Aug. 1, 1910, and Apr. 1, 1911, in the consummation of which plan a dividend of 86 cents per share was paid by the Superior & Pittsburg. Considerably more than a majority of the Superior & Pittsburg stock had been deposited, April, 1911, for conversion into the stock of the Calumet & Arizona, at the ratio of 3½ to 1, and the Superior & Pittsburg Copper Co. will be fully merged in the Calumet & Arizona Mining Co., and the company wound up as soon as may be thereafter.

SUPERSTITION MOUNTAIN MINING CO. ARIZONA.

Mine office: Florence, Pinal Co., Ariz. F. S. Hoyt, superintendent. Lands, 30 claims, circa 30 miles north of Florence, in the Superstition Mountains, showing promising copper outcrops, developed by shaft. Part of the property was under lease, 1910, and lessees extracted some high-grade ore. Equipment includes a small mill, having a second-hand milling equipment, including a Huntington mill, taken, 1909, from a property in the Cave Creek district. The mill was put in commission circa May, 1910, and the first test shipments of concentrates assayed 26% copper, 39.6% lead, 502 oz. silver and $6 gold per ton.

SURE THING GOLD-COPPER MINING & SMELTING CO. WASHINGTON.

Dead. Was succeeded, circa 1905, by Clipper Mining Co. Formerly at North Bend, King Co., Wash. Described Vol. V.

SURPRISE EAGLE MINING CO. MONTANA.

Dead. Formerly at Boulder, Jefferson Co., Mont. Described Vol. VIII

SUTTON CONSOLIDATED MINING CO. NEW MEXICO.

Office: Elgin, Ills. Mine office: Lordsburg, Grant Co., N. M. Robt. F. Fitz, general manager. Lands include the Last Chance, Clara Sutton, James Thomas and Olivia properties, in the Pyramid district, showing 3 veins, the principal, of 7' width, carrying gray copper ore having good silver values in the upper workings, with copper increasing at depth. Development is by the 700' Last Chance shaft. Equipment includes steam power.

SVANO COPPER & SULPHUR MINE (NORWAY), LTD. NORWAY.

Dead. Former office has Gresham House, Old Broad St., London, E. C. Eng. Organized June 22, 1907, under laws of Great Britain, with capitalization £15,000, shares 10s. par in £12,500 preferred and £2,500 deferred stock. Company was organized to acquire a mining concession on the island of Svano on the southwestern coast of Norway, but no trace of operations was seen. Formerly at Lyngdal, Mandal, Christiansand, Norway.

SWAKOPMUNDER MINEN-GESELLSCHAFT. GERMAN SOUTHWEST AFRICA.

Office: Schellingstrasse 4, Berlin, W9, Germany. Mine office: Care via Swakopmund, German Southwest Africa. Organized under laws of Germany, with capitalization 36,000 marks, to take over the Gorob mine and other rights of the Deutscher Kolonialgesellschaft of the Southwest Africa Co. in the Guisib district. Property is but slightly developed. Idle some years, apparently moribund.

SWANSEA CONSOLIDATED MINING CO. UTAH.

Office: Provo, Utah. Mine office: Silver City, Juab Co., Utah. J. Knight, president; J. M. Wheeler, vice-president; R. E. Allen, secretary; ing officers, W. Lester Mangum and L. E. Riter, directors; Wm. Mathews intendent. Organized circa June, 1908, under laws of Utah, with capitalization $1,000,000, shares $1 par, assessable; fully issued. The company was formed a merger of the Swansea Mining Co. and South Swansea Mining Co., both ing paid dividends of $169,460 [illegible] listed on the Salt Lake Stock change.

12 claims, patented. The mines are opened to a depth of at least
two 2-compartment shafts, and are quite wet in the bottom work-
properties were considerable producers formerly, carrying values
ver and lead, but the South Swansea had auriferous and argentiferous
so, with values mainly in silver. The later ore shipments of the old
e very low in average grade.
ent includes steam power and an air-compressor, with 2 hoists.
lectric pump on the 700′ level. Production of the old Swansea was
f ore, 1907.

EXTENSION MINING CO. **UTAH.**

turned unclaimed from former office, Salt Lake City, Utah. Mine
r City, Juab Co., Utah. A. L. Thomas, president; Hon. O. W.
president; Heber M. Wells, secretary and treasurer. Organized
nder laws of Utah, with capitalization $100,000, shares 10 cents
next north of the Swansea Consolidated, supposed to carry an
the Swansea ore body, are developed by a tunnel, showing a little
od grade.

MINING CO. **MÉXICO.**

Lands were sold, September, 1905, to Ronquillo Copper Co. For-
Cananea, Arizpe, Sonora, Mex.

MINING CO. **UTAH.**

Was merged, circa June, 1908, in Swansea Consolidated Mining Co.
Silver City, Juab Co., Utah.

SMELTER. **ARIZONA.**

y Clara Consolidated Gold & Copper Mining Co., at Swansea,
iz.

ORE CONSOLIDATED MINING CO. **COLORADO.**

517 New Haydon Bldg., Columbus, Ohio. Mine office: Eldora,
Colo. Chas. B. Galbreath, president; Harvey Hanes, vice-presi-
arpenter, secretary; Paul Barriclow, treasurer; H. H. Carpenter,
ger. Organized July, 1907, under laws of Colorado, as a merger
more Copper Co. and Enterprise Mining Co., with capitalization
ares $1 par.

7 claims, 11 patented, area circa 60 acres, in the Grand Island
t of Boulder and Gilpin counties. Property includes the Golden
aving 2 ore bodies under development, one, of 8′ estimated average
ig auriferous and argentiferous chalcopyrite, calaverite and syl-
pper ores being estimated to average 3 to 5% copper and 3 to 4 oz.
r gold values. Milling ore is estimated to carry $10.84 and smelt-
r ton, in average metallic values. Development is by 5 shafts,
nd by tunnels of 800′, 1,000′ and 2,000′, estimated circa 1908, to
ns of ore blocked out for stoping.
t includes 2 small steam plants, one having a 60-h. p. hoist and
ompressor. There is a small concentrator with a 50-ton chlorina-
4 new mine buildings. Presumably idle.

RE COPPER CO. **COLORADO.**

as merged, circa 1907, in Swarthmore Consolidated Mining Co.
dora, Boulder Co., Colo.

OPPER CO. **ARIZONA.**

ormerly at Jerome, Yavapai Co., Ariz. Described Vol. VIII.

OPPER MINING CO., LTD. **MONTANA.**

allace, Idaho. Mine office: Carter, Missoula Co., Mont.
esident and manager; J. W. MacDonald, vice-president; Geo. E.
tary; Thos. N. Marlowe, treasurer. Organized July, 1907, under
na, with capitalization $150,000, shares 10 cents par, fully issued.

Lands, formerly 10 claims, unpatented, apparently have shrunk to 4 claims, area 80 acres, and a 5-acre millsite. The property, well timbered, near the King and Queen mine, and about 2 miles west of Carter, shows 2 parallel veins, of 6′ to 8″ width, said to be traceable one-half mile, having 2″ to 4″ paystreaks carrying malachite, bornite and chalcopyrite, said to give assays of 17 to 32.5% copper, 1 to 2 oz. silver, and from a trace to $6.40 gold per ton, and estimated, by the company, to average 35% copper, 112 oz. silver and $6.40 gold per ton, which figures are very much too high, and must represent maximum rather than average assays. Test smelter shipments are said to have returned about 25% copper, with fair gold and silver values. Development is by 12 trenches, and tunnels of 60′, 200′ and 270′.

Equipment includes necessary mine buildings. Work was suspended, early 1910, but was under way again at the end of the year.

SWASTIKA COPPER & SILVER MINING CO. ARIZONA.

Office and mine: Tucson, Pima Co., Ariz. W. K. Royce, president and general manager. D. H. Cochran, vice-president; J. S. Hopley, secretary; J. M. Ormsby, treasurer. Capitalization $1,500,000, shares $1 par. Lands, unpatented, include the Swastika group of 14 claims and the Calendar group of 10 claims, circa 3 miles south of Olive camp. The Swastika group carries silver-lead ores, and the Calendar group has silver-copper ores. The property also includes the Pioneer and Alice mines. The property has 360′ of workings, and was said, January, 1911, to have made a good strike of copper ore. Equipment includes a small steam plant.

SWEDEN COPPER CO. WASHINGTON.

Dead. Was merged, circa 1903, in Mt. St. Helens Consolidated Mining Co. Formerly at Spirit Lake, Skamania Co., Wash. Described Vol. III.

SWISHELM DEVELOPMENT CO. ARIZONA.

Dead. Was reorganized, circa November, 1909, as Swishelm Mining & Reduction Co. Formerly at Courtland, Cochise Co., Ariz.

SWISHELM MINING & REDUCTION CO. ARIZONA.

Mine office: Benson, Cochise Co., Ariz. M. S. Peysert, president and general manager; H. S. Tallman, secretary and treasurer. Organized in November, 1909, as a reconstruction of the Swishelm Development Co., with capitalization $2,000,000, shares $1 par. Lands, 28 claims, about 7 miles from the Heffern, 7 miles from a railway, and 16 miles northeast of Courtland, in the Swishelm Mountains. The property is said to have an ore zone of 40′ width carrying auriferous and argentiferous cuprite and chalcopyrite, with copper values decreasing with depth, also a little lead, developed by an 80′ shaft.

SWISS GIRL MINING CO. ARIZONA.

Dead. Lands were sold, circa 1901, to Baumann Copper Co. Formerly at Dewey, Yavapai Co., Ariz.

SYCAMORE MINING, SMELTING & DEVELOPMENT CO. ARIZONA.

Letter returned unclaimed from former office, Fort Worth, Tex. Mine office: Jerome, Yavapai Co., Ariz. C. G. Stover, president and general manager; H. Martin, vice-president and superintendent; C. H. Plumb, secretary and treasurer; preceding officers, Henry O'Toole, J. S. Staitie, C. R. Knutson & W. B. Lockwood, directors. Organized under laws of Arizona, with capitalization $1,000,000, shares $1 par.

Lands, on the Verde River, are distant 4 miles from Jerome, in an air-line and 13 miles by wagon-road. The mine has a 325′ two-compartment shaft bottomed in low-grade chalcopyrite, assaying 1 to 4% copper, abandoned by reason of trouble from gases and foul air, showing ore assaying 7% copper, 3 oz. silver and $18 gold per ton. Equipment includes necessary mine buildings, a good steam plant. Was discontinued drilling at last accounts, 1909. Presently idle.

GOLD & COPPER MINING & MILLING CO. **WYOMING.**
Formerly at Centennial, Albany Co., Wyo.

GOLD-SILVER-COPPER MINING CO. **NEVADA.**
Goldfield, Nev. Mine office: Lida, Esmeralda Co., Nev. R. N. ıt; C. H. Beesley, vice-president; L. E. Campbell, secretary, treas- ·ral manager; preceding officers, F. A. Campbell and E. P. O'Leary,)rganized June 3, 1910, under laws of Nevada, as successor of Nevada Mining & Milling Co., with capitalization $1,000,000, r, nonassessable; issued, $799,700. Annual meeting, first Mon- ry.
'2 claims, unpatented, area 400 acres, with 120 acres in mill and 10 miles from a railway, in the Lida district. Property shows ale and quartz-porphyry, reported by the management to carry 12 ·its, of which 4, under development, are of 12′ to 50′ claimed width, :a 4,000′, carrying cuprite, azurite, malachite and chrysocolla in zone, succeeded, at shallow depth, by a sulphide complex, said by ;ive assays of 8.7% copper, 17 to 19% lead, 12% zinc, 4 oz. silver l per ton. Development is by 9 shafts, of 31′ to 112′ depth, and by 12′ to 140′ length. Owing to lack of rail transportation, the com- f the ore, and the low price of copper, the company is devoting inly to the development of auriferous quartz veins.
ınt includes a 15-h. p. gasoline hoist, and there are 5 mine buildings. ıent plans deepening the main shaft to 500′.

MINING CO., LTD. **MONTANA.**
)ffice was Wallace, Idaho. H. C. Topping was president; Alfred resident; Geo. Miner, secretary and treasurer; preceding officers, ·d and Thos. Loughran, directors. Organized 1906, with capital-),000, shares $1 par. Lands, 6 claims, adjoining the Bryan mine)out 6 miles northwest of Saltese, showing 3 veins, tested by trench- ıl short tunnels. Formerly at Saltese, Missoula Co., Mont.

MINING & EXPLORATION CO. **IDAHO.**
Wardner, Idaho. Letter returned unclaimed from former mine ·, Shoshone Co., Idaho. Jos. Shields, president; F. M. Barker, ıpitalization $1,500,000, shares $1 par. Lands, 6 claims, showing, 15′ fissure vein in slate, opened by a 325′ tunnel, developing ore ssays in silver, lead and copper. Idle.

MINING, MILLING & SMELTING CO. **IDAHO.**
urned unclaimed from former office, Spokane, Wash. Mine office: ıington Co., Idaho. Louis A. Blunck, manager. Lands, 3 claims, ıe Snake River, about 25 miles from a railway, having a contact ·stimated average width, between limestone and granite, carrying ıalcopyrite, giving assays of 12 to 17% copper, with small gold ues, developed, at last accounts, by a 55′ tunnel, with some sur- Idle.

SYNDICAT MINIER. **ALGERIA.**
0 Rue St. Lazare, Paris, France. Mine office: La Calle, Algeria. ı la Fremoire, chairman. Organized May 3, 1906, under laws h capitalization f2,500,000, increased, 1907, to f6,000,000, and d, 1907, to f10,000,000, shares f100 par.
lude zinc properties at Santander, Spain, various zinc mines in ıe Kef-oum-Theboul mine, 11 kilometers southeast of La Calle. ·ned 1848, has a strong vein, traversing schists and limestone, ·erous pyrite, argentiferous galena and sphalerite, with schistose ıg ore that, after selection, contained 2.5 to 14% copper and 14 per metric ton. The construction of a washing plant was under 1908. The Kef-oum-Theboul mine is idle.

TABATACACHI MINING CO. MÉXICO.

Mine office: Nacozari, Moctezuma, Sonora, Mex. J. L. Fife, president; A. M. Doheny, secretary; L. B. Vickery, treasurer; R. O. Fife, superintendent, at last accounts. Lands, 3 hectares, having about 1,500′ of workings, developing argentiferous copper and lead ores. Equipment includes a 25-h. p. gasoline engine. Idle.

TABLAS-FINANA COPPER CO., LTD. SPAIN.

Dead. Was wound up, voluntarily, December, 1901. Formerly at Tablas, Granada, Spain, and Finana, Almería, Spain. Described Vol. III.

TABLE MOUNTAIN COPPER CO. ARIZONA.

Letter returned unclaimed from former mine office, Kelvin, Pinal Co., Ariz. Is controlled by Arimex Consolidated Copper Co., through ownership of 85% of stock issue. Lands, 27 claims, in the Bunker Hill district. Idle some years and of small promise.

COMPAÑÍA MINERA EL TABOR y ANEXAS. MÉXICO.

Letter returned from former office, México, D. F. Mine office: Asientos, Ocampo, Aguascalientes, Mex. Antonio Morfín, president; Bruno Newman, manager, at last accounts. Property shows ore giving assays up to 43% copper with good gold and silver values. Presumably idle.

SOCIEDAD BENEFICIADORA DE METALES DE TACNA. CHILE.

Works office: Tacna, Tacna, Chile. Organized Jan. 10, 1901, under laws of Chile, with capitalization 68,250 pesos, shares 250 pesos par. Property is a smelter, which, in 1903, treated 4,066 metric tons of ore, producing therefrom 731,960 kilograms of ejes averaging about 50% copper tenor, carrying 806 oz. lbs. fine copper. Presumably idle.

TACOMA CO. BRITISH COLUMBIA & WASHINGTON.

Office: Provident Bldg., Tacoma, Wash. Mine offices: Van Anda, Texada Island, B. C., and Darrington, Snohomish Co., Wash. Joshua Pierce, president; E. M. Shelton, vice-president; A. Y. Eastman, secretary, treasurer and general manager; Alex. Grant, superintendent. Organized with capitalization $5,000,000, reduced later to $3,000,000. Paid a $35,000 dividend, Apr. 2, 1900.

Lands include a property at Darrington, carrying auriferous copper ores, idle for some years, 4,000 acres of lands carrying coke and coal in Washington; 208 acres of iron ore lands on Redonda Island, British Columbia, and the Marble Bay mine, area 640 acres, crown-granted, which was bought for $150,000 and profits from the mine are said to have paid for the property in 3 years. The property, near Marble Bay Harbor, at the northern end of Texada Island, includes a townsite.

The Marble Bay mine, about one-fourth mile from the Cornell and Copper Queen mines, has ore of similar nature, occurring as lenticular shoots of auriferous chalcopyrite, with some bornite, having a garnetiferous gangue, in a contact zone between diorite and limestone, latter almost completely marmorized. The mine is developed by an 1,160′ three-compartment shaft, showing, on the 10th level, a vein of 18′ width, carrying ore of good grade, including considerable bornite, the copper values apparently remaining unchanged, or slightly increasing, and gold values gaining with depth. Ore is reported, by the British Columbian government, to average 4.3% copper, 23 oz. silver and $14 gold per ton, this doubtless being for selected ore, as the garnetiferous gangue would interfere with wet concentration and ore is hand-picked, there being no concentrator. A shafthouse, 40x90′ on the ground, and 90′ high, is equipped with grizzlies, sorting tables.

Equipment includes steam and electric power, with a double-drum [illegible] wood hoist, and 5-drill Ingersoll-Rand and 10-drill Allis-Chalmers air-compressors. [illegible] include a power-house, machine-shop and [illegible] structures, [illegible] wharf, on Marble Bay, having large ore-bins [illegible] wood-tram. In connection with the [illegible]

quarry, and 4 kilns, with daily capacity of 300 bbls. of lime. are employed.
n, shipped mainly to the Tacoma smelter, was 6,237 tons of ore, 9 lbs. fine copper in 1907; 11,438 tons of ore, estimated to have ,250,000 lbs. fine copper, in 1909. Mine considered valuable nt good.

ELTING CO. **WASHINGTON.**

55 Broadway, New York, N. Y. Works office: Tacoma, sh. Employs circa 675 men. W. R. Rust, president, treasurer anager; Edw. Brush, vice-president; F. W. Clark, manager; assistant manager; preceding officers and Eugene B. Braden,). Craig, secretary; R. F. McElvenny, superintendent; T. R. nery superintendent; Roger Taylor, assistant superintendent. er laws of Nevada, with capitalization $500,000, shares $1 par. hrough stock ownership, by American Smelters Securities Co. a 52-acre smelter-site, 6 miles from Tacoma, located on Puget al flats are being reclaimed by filling in with slag. The property or receipt and dispatch of materials, and has extensive wharves, s and automatic devices for unloading cargoes, the wharves being all departments of the works by an electric tramline.
r, originally of 300 tons capacity, built for lead ores only, has to 1,200 tons daily capacity, and now treats lead matte, copper, gold ores, and concentrates, from the entire western coast of and even a considerable tonnage of South American ores. The aid, late 1910, to plan extensive improvements, to cost about

r has three 60-ton mechanical roasters, and two 10-ton hand- ition to which a limited amount of ore is heap-roasted. There aces, including four 100-ton stacks for lead ores, and a 400-ton ast-furnace for copper, 42x160″ at the tuyeres, with forehearth and 4′ high, holding 60 tons of molten matte. A 36″ cupola ace, with outside settler, can treat 75 tons of 50% matte daily. lar slag-casting machine, having 144 tilting molds. The rever- s are of 350 tons daily capacity. The 1,000′ dust-flues of the eratory furnaces lead to a 306′ stack, of reinforced concrete.
ter department, equipped with a 30-ton electric traveling crane, six 72x100″ shells, of barrel type.
lytic plant, increased from 35 to 50 tons daily capacity, has a raveling crane, for handling anodes and cathodes.
ver is used mainly, received at 40,000 volts, and stepped down to , the works requiring about 2,000 h. p. There are 3 Conners- iven by a 200-h. p. Westinghouse induction motor, furnishing d furnaces. Fuel is petroleum, brought in tank steamers from outhern California.
a smelter is one of the most important custom plants on the ie management is progressive, and the metallurgical practice

JAPAN.

: **Tada-mura**, Kawanobe-gori, Settsu, Japan. Tojuro Hori, as slightly plumbiferous copper ore. Production was 42,378 in. 1908.

ALGERIA.

[illegible], Philippeville, Algeria. Stora, Fietta et Cie., owners. [illegible] southwest of Bougie, show a number of veins, in schist ng [illegible] copper and oxidized copper ores. The mine, slightly [illegible] several times, owing to flooding. In 1906 a

force of 3 men secured 150 tons of ore, sent to St. Louis de Rhône, France, for smelting. Idle several years.

SUCESIÓN RUIZ TAGLE. CHILE

Mine office: Naltagua, Melipilla, Santiago, Chile. Property includes the Trinidad smelter, having a 54″ cylindrical water-jacket blast-furnace, and a [illegible] h. p. engine. Matte produced is exported to Europe. Production, 1908, circa 500,000 lbs. fine copper, secured from 3,840 metric tons of 6.5% copper ore smelted. Was idle 1909.

TAKAMASA MINE. JAPAN

Owned by Osaka Mining Co.

TAKANE MINE. JAPAN

Mine office: Takane-mura, Masuda-gori, Hida, Japan. Sauemon Asa owner. Equipment includes a 67-h. p. plant, and forces averaged 227 hands 1908. Production was 142,100 lbs. fine copper in 1903; 231,838 lbs. in 1904, 314,098 lbs. copper and 118,069 momme silver in 1908.

TAKARA MINE. JAPAN

Owned by Mitsu Bishi Goshi-Kwaisha.

TAKAURA MINE. JAPAN

Mine office: Misaki-mura, Nishi-Uwa-gori, Iyo, Japan. Kamezo Fujino, owner. Mine, in the vicinity of the Nishinokawa, has no power plant. Production, 1908, was 437,711 kwan copper ore, valued at 14,356 yen, sent with average force of 35 hands.

TAKAYAMA MINE. JAPAN

Mine office: Ariho-mura, Takata-gori, Aki, Japan. Production, 1907, 62,903 lbs. fine copper. Presumably idle.

TAKILMA SMELTING CO. OREGON

Office: P. O. Box 1487, Colorado Springs, Colo. Works office: Takilma, Josephine Co., Ore. Mrs. Josephine T. Tutt, president; Chas. L. Tutt, vice-president; J. A. Hull, secretary and treasurer; C. E. Tucker, superintendent. Organized under laws of Colorado, with capitalization $250,000, shares $10.

Lands, 175 acres, 160 acres patented, and a 160-acre smelter-site, total holdings of 335 acres, in the Waldo district, including the Queen of Bronze mine, showing diorite and serpentine, carrying several veins, with NS. strike, which 3 are more or less developed. The company has a sawmill.

The Queen of Bronze mine carries heavy auriferous copper sulphides, which by a former management, to assay 12 to 60% copper, which figures undoubtedly would be cut heavily by the present owners. Development is by a 150′ shaft and tunnels of 200′, 640′ and 150′, with several thousand feet of workings, estimated, 1906, to show circa 20,000 tons of oxidized and sulphide ores, [illegible] average assays of circa 8% copper and $2.50 gold per ton, with some ore [illegible] 50% in copper tenor.

The smelter, at Takilma, receiving ore by wagon and tramline [illegible] 125-ton water-jacket blast-furnace, making matte, when in blast, averaging copper, 2.5 oz. silver and $2.50 gold per ton, shipped to the Tacoma smelter for conversion. The fuel supply is somewhat uncertain, and in 1907 the [illegible] imported Japanese coke, packed in 100-lb. bags. Owing to the heavy cost [illegible] winter, causing impassable roads, the smelter was worked only [illegible] nearest rail point is Grants Pass, 42 miles distant, and, when [illegible] [illegible] 60 teams, hauling out matte and hauling [illegible]

[illegible] ore smelted, yielding 1,563 tons of matte, [illegible] an average return of 8% copper [illegible] 000 lbs. fine copper in 1905, [illegible] works being idle since January [illegible] 04.

MINING CO. **UTAH.**
Was merged October, 1908, in Cedar Talisman Consolidated Mines
ly at Milford, Beaver Co., Utah. Described Vol. VIII.

SA COPPER MINES. **GEORGIA.**
Was succeeded, Jan. 24, 1905, by Georgia & Tennessee Copper Co.
Temple, Haralson Co., Ga.

DE MINAS i BENEFICIADORA DE TALTAL. **CHILE.**
Valparaiso, Chile. Mine office: Taltal, Antofagasta, Chile. Or-
31, 1902, under laws of Chile, with capitalization 500,000 pesos,
os par. Presumably idle.

COPPER MINES, LTD. **WALES.**
5 Great Winchester St., London, E. C., Eng. Mine office: Nant-
rsarn, Carnarvon, Wales. T. W. Druitt, F. Hughes and H. J.
ors; G. Addison Scott, secretary; Merricks, Crane & Co., consult-
Organized Feb. 23, 1907, under laws of Great Britain, with capi-
,000, shares £1 par. Debentures, £8,000, issued 1909, at a dis-
)0, or 37½%. No trace of mining operations secured.

:. **CORSICA.**
ce: Bastia, Corsica. In 1906 produced 385 tons of sulphide
ipped to Great Britain for reduction. Presumably idle.

JUNIOR MINE. **MICHIGAN.**
y Osceola Consolidated Mining Co., at Calumet, Houghton Co.,

MINING CO. **MICHIGAN.**
2 Ashburton Place, Boston, Mass. Mine office: Calumet,
s office: Hubbell, Houghton Co., Mich. Employs circa 1,600
he L. Agassiz, president; Quincy A. Shaw, vice-president; Jas.
, general manager; Geo. A. Flagg, secretary and treasurer; pre-
, Francis W. Hunnewell, Francis L. Higginson and Thos. N.
or; Clarence H. Bissell, assistant secretary and treasurer; John T.
endent; Chas. D. Hohl, chief engineer; John T. Reeder, general
chasing agent; Wm. Harris, chief clerk; A. Lincoln Burgan, mill
t; E. J. Waters, chief mining captain; John Rowe and Wm. Rose-
aptains.
1882, under laws of Michigan, with capitalization $1,500,000.
ar. Dividends, begun 1888, were 43 in number, aggregating
end of 1910, last dividend having been $4, July 23, 1907. The
ts Cliff lands, January, 1910, for $680,000, to the Cliff Mining Co.,
eeds to liquidate the floating debt, interest on which was equiva-
s per share, 1909. Balance sheet of Dec. 31, 1910, gave assets,
ining equipment, of $1,979,716.08, with liabilities of $527,293.62,
ce of assets of $1,052,422.46. Operations since 1907 have given net
amounting to $249,277 in 1907 and $172,246.72 in 1910. Is con-
h ownerships of 19,400 shares of outstanding stock, by the Calu-
ining Co. State Street Trust Co., Boston, registrar; Old Colony
ton, transfer agent Annual meeting, first Wednesday in April.
20 acres, in Sections 10, 11, 14 and 15, T. 56 N., R. 33 W., with a
ch Lake, miscellaneous timber lands and other realty giving total
s of 8,746 acres, from which the Cliff mine was sold, 1910.
rack mine proper is a tract of very irregular outline, bounded
lands of the Calumet & Hecla, and the mine is opened on the
e Calumet conglomerate and Osceola amygdaloidal beds. The
ned by the late Capt. John Daniell, who conceived the idea of
derlay of the conglomerate by a deep vertical shaft. The actual
No. 1 shaft began 1882, and the conglomerate was cut, three and

a half years later, in 1885, at a depth only 10′ greater than the estimate of Capt. Daniell, made before the first sod was removed.

The mine is opened by 5 shafts, Nos. 1 and 2 being known as the South Tamarack, and Nos. 3 and 4 as the North Tamarack, with No. 5, the newest shaft, about midway between the north and south workings. Nos. 3 and 5 shafts are connected on a level that is the 16th in No. 3 and the 38th in No. 5, and all shafts have been connected underground to give improved ventilation, notwithstanding which the atmospheric conditions are bad, and the ventilation in shafts Nos. 3 and 5 is particularly bad, many miners refusing to work in such poor air. The mine records show that the efficiency of miners, measured in tons of rock broken per man per diem, is only two-thirds as great in the Tamarack as in the adjoining Calumet & Hecla mine, having better ventilation.

The entire system of mining was changed, several years ago, and stopes are now left with light timbering, permitting the workings to cave after extraction of ore, and sub-levels are opened to save excessive use of timber, with stope-drifts opened 12x12′ in size, rock-chutes being used also, saving considerable timber. New openings average about one mile yearly, having been 6,221′ in 1907 and 5 501′ in 1910. The mine employs, normally, about 75 power drills. The mine is opened on both the Calumet conglomerate and the Osceola amygdaloid, but operations on the Osceola bed were discontinued, 1910, owing to the poor average grade of rock, and the low price of copper.

As the Tamarack lands carry the outcrop of neither of the cupriferous beds worked, both are opened on the underlay, all shafts being vertical, and in consequence all levels, except those happening at the actual points of intersections of shafts and beds, must be opened by crosscuts, and some of them at great depth are very long, having a maximum length of nearly one-third mile.

The mine is dry, though there was an increase in the inflow of water after the earthquake of 1905. A concrete dam has been built on the 34th level to increase the storage capacity for water underground. The lowest level of the mine shows only a slight seepage of water, extremely bitter to the taste, shown by analysis to carry sodium and magnesium chlorides and bromides. The rock temperature, at a vertical depth of 5,000′, is approximately 90° F., which is reduced somewhat by ventilation.

No. 1 shaft, permanently bottomed, some years ago, at 3,409′, cuts the Calumet conglomerate at depth of 2,270′, and the Osceola amygdaloid at about 1,000′ greater depth. This shaft was on fire January, 1906, until August, 1907, a period of 19 months, the fire doing about $200,000 damage and necessitating the retimbering of the shaft. This shaft, formerly having a normal productive capacity of about 400 tons of rock daily, is now used exclusively for hoisting water, raising approximately 29,000,000 gallons per month, all water being diverted to this shaft from the other shafts, below which depths the amount of seepage is trivial. Two Nordberg direct-connected duplex pumps on the 6th and 9th levels, having Corliss steam-ends, each are of capacity to lift 600 gallons per minute from the 9th level. Equipment at No. 1 includes a powerful hoist.

No. 2 shaft, a short distance northeast of No. 1, is bottomed at 4,35[illegible] [illegible] not been deepened for some years. This shaft was straightened [illegible] [illegible]red, 1904, being given a double lining, with the inner wall [illegible] [illegible] the outer by timbers of varying lengths, which can be transferred [illegible] [illegible] time to [illegible] partially overcoming the trouble caused [illegible] Th[illegible] beginning to show signs of crushing [illegible] [illegible] fire, 1906-1907, caused [illegible] The conglomerate ground [illegible] [illegible] to and including the 2[illegible] [illegible] [illegible]ll to be stoped. The [illegible]

glomerate is very great, requiring the installation of timber pillars, keep the drifts open. No. 2 shaft has a powerful hoist.

shaft, nearly a mile north of No. 1, is the deepest in the world. is 5,253′ deep, and below this depth of only 27′ less than 1 mile, is l shaft, sinking on the dip of the bed at the end of an 800′ crosscut, ther deepening of the main shaft, and the crosscuts of constantly length that would be necessitated by deepening No. 3 shaft ver- he incline blind shaft has a single track, with collars at the 19th, 1st levels, and has a hoist, actuated by compressed air, on the 18th h raises all rock to that point. The incline shaft was bottomed)10, at 5,368′ vertical depth below surface. The 18th level drift ntinued for exploratory purposes, but has shown only fair copper o. 3 shaft cuts the Calumet conglomerate at a vertical depth of re the bed is 20′ to 25′ wide, but irregular in values, and far from h payable as a rule. No. 3 shaft is connected with the Calumet ıe on the 17th level south and 39th level north, and has mechanical the 15th, 16th, 17th, 31st, 32d and 35th levels, engines actuated sed air operating endless ropes. The normal productive capacity ıft is about 1,000 tons daily.

ıaft has an Allis-Chalmers hoist, formerly having a double conical ′ 6″ diameter at either end and 36′ 9″ diameter in the center, the ng over specially built-up runs of steel, affixed to the surface of vhich worked in counterbalance. A new drum replaced the old, scarded drum being nearly worn out. About 20,000 rivets were replacing the drum, as the old drum had to be raised, and the hubs nd the shaft, weighing 65 tons, also had to be raised. The new ır to that at No. 5 shaft, is semi-conical, with 18′ maximum diam-)ld hoist raised, on test, a 10-ton load, vertically, at a speed of 55 ur, and, running at that rate, the cage was stopped in a distance re is a 32x72″ Nordberg auxiliary hoist, with an 18′ 6″ drum hav- ned grooves for coiling the cable, this hoist being used for lowering men and timber in No. 4. Equipment at No. 3 shaft includes a , 10′ in diameter, with blades 3′ 6″ wide, capable of supplying ic feet of free air per minute, to the depth of the shaft, not only he mine, but also aiding in reducing the temperature, which other-)e nearly 90°F., in the bottom levels.

ıaft, 600′ northeast of No. 3, is 4,450′ in depth, and has not been ce bottomed, 1895. Connection is had with No. 3, for ventilation Occasional good ground is shown, but the shaft, as a whole, is shaft is used exclusively for hoisting water, lowering and raising purposes of ventilation and safety. A new concrete lining was 1904, for the old wooden timbering through the overburden. The e was replaced, 1908, by a new frame structure, and a large venti- s taken from No. 1 and installed at No. 4.

ıft, circa 3,300′ southwest of No. 4, and about midway between the c and North Tamarack workings, is the newest and largest shaft and is the only shaft that has been deepened for several years, vith a vertical depth of 5,281′, or a mile and a foot. While No. 3 s deeper openings, No. 5 is the deepest continuous shaft sunk any- earth's crust. Sinking was begun Aug. 2, 1895, and the conglom- Dec. 20, 1901, at a vertical depth of 4,062′, the late Capt. Wm. E. g foretold the depth within 12′, and the time required within 11 ıe work was started, more than 6 years previously. No. 5 is con- ground with the workings both north and south, and is bottomed e point of intersection with the Osceola amygdaloidal bed. This cte[illegible]th the Calumet & Hecla on the 31st level north.

No. 5 shaft is 7x29′, inside measurement, with 5 compartments in a row. The three central compartments, 5′x7′ 2″ each, are used for cages. One of the end compartments, also used for a cage, is 7′ 2″x5′ 4″, the extra 4′ being allowed for timber strain, while on the other side of the shaft there is a 3′x7′ 2′ compartment for ladders, pipes and wires. The 10x14″ wall-plates of this shaft are 29′ 2″ long, and the 5x7″ runners, serving as guides for the cages, are 16′ to 22′ in length. Instead of lag-screws being countersunk, the runners have a central groove, 2″ wide and 1½″ deep, running from top to bottom on both sides of each of the 4 hoisting compartments, these grooves providing for the escape of loosened lag-screws, without damage to cages or runners. The shaft openings have automatic covers that lift for passage of the cages. In sinking this shaft 83 separate trap, amygdaloidal and conglomerate strata, all barren, were cut before the Calumet conglomerate was reached. The north drifts, on the 35th, 36th and 37th levels, have been carried to the Calumet & Hecla boundary, and the shaft is bottomed on the 41st level. Openings on the 38½ sub-level and 40th level are in good copper ground, the showing on the 39th level being rather indefinite. The Osceola amygdaloidal bed, in which the shaft is bottomed, shows no copper values, except in a small streak along the hanging-wall. This shaft has power haulage on the 37th level. The ground tributary to No. 5 on the conglomerate bed is limited, and recent developments have shown no improvement in values, except at the extreme southern end of the workings. The conglomerate is of good average width, but low in grade, and constantly decreasing in copper contents with depth.

The shafthouse and rockhouse at No. 5, built by the Wisconsin Bridge & Iron Co., at a cost of nearly $100,000, are on separate foundations and are separately framed and braced, although apparently standing as one building 56x120′ on the ground, with an extreme height of 131′. The foundations are exceptionally heavy, and the girders and framing are of unusual strength to withstand the great strains caused by hoisting heavy cages, and the operation of powerful rock-breaking machinery. These buildings contain about 700 tons of steel and 100 tons of corrugated iron siding, and, although 10 carloads of lumber were used in the building, no wood is exposed, except in the floors, asbestos sheathing-paper being used elsewhere to protect the wood, thus rendering the building practically fireproof. The rockhouse has 3 Portage Lake crushers, of the reciprocating jaw type, with room for 5 more.

Surface equipment at No. 5 is the most extensive at any shaft, including the engine-house, boiler-house and compressor buildings of redstone, with steel truss roofs. The engine-house has 2 duplicate 6,500-h. p. Nordberg hoists, each with four 36″ high-pressure cylinders, having 72″ stroke. The drums were 24′ in diameter, in the center, tapering to 16′ at the ends, each half carrying 6,500′ of 1½″ steel cable, the hoists, operating in counterbalance, being capable of raising, from 6,000′ depth, a net load of 6 tons of rock, this having a gross weight, with cage and cable, of about 12 tons. The hoists cost $60,000 and $90,000 respectively, and one hoist was changed over, circa 1910, being given a 30′ Nordberg drum, weighing upwards of 30 tons. The boiler-house has six 200-h. p. Burt boilers, with 84″ shells, and two 115′ brick-lined self-supporting steel smokestacks. Coal is delivered to the boiler-room from a railway trestle.

The 50x75′ redstone compressor-house at No. 5 shaft has a 35-drill 18x31x36″ Ingersoll-Sergeant 2-stage cross-compound air-compressor, and a 100-drill triple-expansion Nordberg compressor having 19x53x48″ steam cylinders and 18x27x48″ two-stage air-cylinders.

The electric plant at No. 5 shaft has a 150-kw. generator, transmitting current to all branches of the mine. There is a large machine-shop, and miscellaneous structures including a smithy and stone changing-house. There is an extensive timber-yard, on ground filled and graded for the purpose, the site having been a swamp originally.

0′ pumping station, of steel frame, covered with brick, nearly 5 miles
of the mine, on the shore of Lake Superior, houses two 1,250,000-
ps that take water from a 40′ well, on the lake shore, connecting with
ven 425′ under the bed of the lake, with intake about 35′ below water-
se pumps raise water against a static and frictional head of nearly
ring it into 2 steel tanks of 42′ and 65′ diameter, standing on the
ınd at the mine, and water is distributed through mains to the Tama-
ceola mine locations, from these tanks, which have a combined stor-
′ of 200,000 gallons.
npaLy owns and maintains a hospital, 60x60′ in size, with 2 stories,
nd attic, basement and first floor being of selected Lake Superior
ıd upper story and attic of wood, with interior finish of selected
ed Georgia pine. The building has a sun-veranda, elevators and
ım heating. There is a staff of physicians, surgeons and nurses in
with the hospital, and employés and their families are furnished
surgical attendance at a nominal monthly charge.
s a private branch telephone exchange, with instruments at the
mp stations in the mine, and in the various offices, shops and mills.
marack has 2 stampmills, on Torch Lake, a little more than a mile
: Calumet & Hecla mills, these having 5 compound heads and 2
, the latter being idle, as the 5 compound heads are capable of caring
:rushed at present. The mills have a combined daily capacity of
ons of conglomerate rock, which is materially greater than any pos-
tive capacity of the mine. The stamp-heads are fitted with 8″
s, opening into ¼″ mesh revolving screens, with Parnall-Krause hy-
arges. The stamps have Nordberg crushing rolls, to care for rag.
ıe mortars, these rolls having rigid journals, with independent wash
Finisher jigs were replaced by Wilfley tables. Mineral is dressed
han formerly, now averaging only about 50% copper. All mineral
d from mills to smelter in hopper-cars, saving the former cost of

ill has 5 Allis heads, 3 of which are compounded, and has a steel
ach. No. 1 boiler-house has four 200-h. p. Pratt boilers, operated
:essure of 150 lbs. per square inch.
ill has 2 Allis-Chalmers steeple-compound stamps and is equipped
ling crane. The boiler-house at No. 2 mill has seven 200-h. p.

ıt pumphouse of the Tamarack and Osceola mines has two
ıllon pumps and one 15,000,000-gallon pump. The two larger
ı are duplicates, have triple-expansion steam ends, with 22″, 40″
ders of 52″ stroke, and the water end of each has three 30″ plungers
ıcharge pipe. The foundation for the newest large pump is 25′
sandstone.
s have a 30x90′ machine-shop, of sand-lime brick, with steel roof,
a number of dwellings for employés at the millsite.
narack and Osceola mines have joint wharves, and steel coal
: steel unloading towers, at Dollar Bay, on Portage Lake, these
the most extensive in the district.
n production was 20,222,529 lbs. fine copper in 1897. Recent pro-
een: 657,920 tons of rock stamped, yielding 15,286,093 lbs. fine
an average return of 23.2 lbs. per ton, in 1903; 642,320 tons rock
lin[illegible] 961,885 lbs. copper, an average of 23.3 lbs. per ton, in 1904;
ro[illegible]ped, yielding 15,824,008 lbs. copper, an average of 21.1
a [illegible] tons rock stamped, yielding 9,832,644 lbs. copper,
[illegible] in 1905; 533,600 tons rock stamped, yielding
[illegible] of 20.8 lbs. per ton, in 1907; 655,897 tons

rock stamped, yielding 12,806,127 lbs. copper, an average of 19.6 lbs. per ton in 1908; 689,099 tons rock stamped, yielding 13,533,207 lbs. copper, an average of 19.6 lbs. per ton, in 1909; 525,554 tons rock stamped, yielding 11,063,000 lbs. copper, an average of 21.1 lbs. per ton, in 1910.

Gross costs of mining and stamping per ton of rock, and gross cost of finished copper per pound, have been as follows: 9.1166 cents per pound in 190[illegible] $2.32 per ton and 11.5 cents per pound in 1903; $2.42 per ton and 12.98 cents per pound in 1904; $2.39 per ton and 13.37 cents per pound in 1905; $3.62 per ton and 14.37 cents per pound in 1906; $3.28 per ton and 15.82 cents per pound in 1907; $2.57 per ton and 15.24 cents per pound in 1908; $2.44 per ton and 14[illegible] cents per pound in 1909; $2.67 per ton and 14.70 cents per pound in 1910. The Tamarack always has been an expensive mine to work, and unavoidably must continue such, with expenses increasing, by reason of depth and decreased mineral values. As it stands, the Tamarack mine saw its best years before the opening of the Twentieth Century.

It was proposed, January, 1911, by the management of the Calumet & Hecla, to merge the Tamarack in a new Calumet & Hecla Mining Co. to have an increased capitalization of $10,000,000, shares $25 par, giving shareholders of the Tamarack twenty-two one-hundredths shares of new stock for each share of Tamarack, and the owners of 47,386 shares, or upwards of 75%, voted for in May, 1911, in favor of the proposed consolidation. Further particulars of the proposed merger are given in the article descriptive of the Calumet & Hecla.

COMPAÑÍA MINERA DE COBRES EN TAMAULIPAS, S. A. MÉX.

Dead. Was organized Feb. 25, 1893, under laws of México, with capitalization 50,000 pesos. Property was the San Carlos and San José mines, formerly at San Carlos, Centro, Tamaulipas, Mex.

SOCIEDAD ANONIMA DEL MINERAL DE TAMAYA.

Mine office: Tamaya, Ovalle, Coquimbo, Chile. Organized circa [illegible] under laws of Chile, with capitalization 3,000,000 pesos, shares 20 pesos. The company gave 1,360,000 pesos in shares for the property, and [illegible] 1,240,000 pesos stock for capital, holding 400,000 shares in the treasury reserve.

Lands, 206 hectares, on the Cerro Tamaya, 8 kilometers from the station San José. The property shows a main vein having a NS. strike, with [illegible] about 45°, of variable width, said to have a paystreak averaging about 6 [illegible] carrying ore up to 60% copper, but probably both width of vein and [illegible] ore are very much lower than reported. The property includes a [illegible] small, old and idle mines, which have secured considerable copper produc[illegible] the past, these mines having about 3,000 meters of workings, deepest [illegible] meters depth, all requiring unwatering. Development is mainly by the [illegible] Lecaros, of 2,250 meters length, in bad shape, requiring reopening. [illegible] the management planned a very complete electric plant, to include [illegible] hoists, traction engines, pumps and lights. The mine is considered [illegible] and, if reopened and developed intelligently, and on a modern scale, [illegible] quate capital, the property is believed to be capable of making a good [illegible]

TAMBILLOS SMELTING & MINING SYNDICATE.

Mine office: Peñon, La Serena, Coquimbo, Chile. Capitalization [illegible] shares £100 par. Property is the San Felipe mine, area 2½ hectares, [illegible] eters from Peñon, having a 3' vein, opened to depth of 50 meters and [illegible] of 250 meters, carrying chalcopyrite, associated with iron oxides, ores [illegible] mainly for flux. The smelter, at Tambillos, completed 1908, receiving [illegible] the mine at a freight charge of 2 pesos per metric ton, has a 45" circular jacket blast furnace, 16-h. p. boiler, 20-h. p. engine and No. 4 Co[illegible] [illegible] 25 men are employed, normally. Production was [illegible] [illegible] 6.75% copper, estimated to have yielded 550,[illegible]

1908. The smelter was out of blast, 1909, but at last accounts, 1910, ment hoped to resume production shortly.

)N DE TAMBORAQUE. **PERÚ.**

by Lizandro A. Proaño, at Pacococha, Lima, Perú.

IANTER MINING CO., LTD. **IDAHO.**

returned unclaimed from former office, Spokane, Wash. Mine office: oshone Co., Idaho. John H. Wourms, president; David C. Coates, Edw. Eisman, manager; preceding officers, P. J. Dills and Chas. rectors. Capitalization $1,000,000, shares $1 par.

7 claims, between the Chester and Vortex groups, and near the , in the Evolution district, circa 1½ miles south of Osburn, the near- t. The property shows a vein of 5′ to 12′ surface width, traced circa umerous pits and trenches, carrying highly argentiferous gray copper me silver-lead, some ore shipped having returned up to 750 oz. silver)evelopment is by a 50′ shaft, showing an 18′ vein, and there are 2 10′ drift tunnel showing a little gray copper ore, assaying up to 18% 200 oz. silver per ton. The main tunnel, 200′ lower, is a crosscut,)ng.

IKA CONCESSIONS, LTD. BELGIAN CONGO & RHODESIA.

Friars House, New Broad St., London, E. C., Eng. Mine offices: Katanga, Belgian Congo, and Kansanshi, Northwestern Rhodesia; iite, chairman; Robt. Williams, managing director; preceding officers, Broomhead, Lord Arthur Butler, T. P. Heyvaert, Thos. Honey, eave and C. F. Rowsell, directors; L. Scotland, secretary; Robt. Co., managers and engineers; Allan Gibb, chief engineer; Thos. neer; John G. Watson, assistant engineer; F. E. Studt, geologist; ı, Rhodesian agent; A. A. Thomson, mine superintendent; W. S. elter superintendent.

ıed Jan. 20, 1899, under laws of Great Britain, with capitalization ıcreased, December, 1901, to £184,000; again increased, 1902, to gain increased, 1903, to £264,600; again increased, April, 1905, to gain increased, July, 1905, to £525,000; again increased, November,)00,000, shares £1 par; issued, £808,581, Dec. 16, 1910. Debentures ıuthorized, at 5%, in denominations of £8; outstanding, £2,530,000, terest account, Dec. 16, 1910. Col. Sir Howard Melliss, K. C. S.I., rthur Stanley, M. P., are trustees for the debenture holders. The ıre redeemable at par, Jan. 1, 1917, or at option of the company on ıotice, after Dec. 31, 1911. Debentures are convertible, until Dec. the basis of 1 share of fully-paid stock, of £1 par, for each £8 deben- e company has the right, until Dec. 31, 1911, to pay the interest)entures in debentures.

d that the late King Leopold of Belgium gave the concession, upon)mpany is based, to the Countess of Warwick, who turned the con- to the late Cecil Rhodes, but this may be a fairy tale. The com- ıted its original holdings right and left by the formation of numerous and also has diluted its holdings by a special agreement with Mr. ms, to be referred to later. The property of the company, June 30, ted of a 45% share interest in the Compagnie Union Minière du ga, amounting to 50,000 shares of f100 par and 38,000 dividend % share interest in the issued stock of the Rhodesia-Katanga ilway & Mineral Co., Ltd., amounting to 500,750 ordinary £1 0 "B" one-shilling shares, with £178,000 first-mortgage debentures, Kansanshi copper mine having been sold to this company; a share ıe Compagnie du Chemin Fer du Congo Supérieur aux Grands Lacs ganized under the laws of Belgium, with main office in Brussels, which ebruary, 1910, proposed a new issue of shares of f25,000,000, all the

subsidiaries of this prolific corporation having wonderful fecundity in the issue of shares and debentures; 1,600 shares of £250 par in the Compagnie du Chemin de Fer du Katanga; £2,700,000 stock in the Companhia do Caminho de Ferro de Benguella; 3,250 shares of £100 par and 500 founders' shares of the Intertropical Anglo-Belgian Trading Co., 51,353 shares of fully-paid £1 shares and 19,996 shares of £1 par, 1s. paid, of the North Zambezia Concessions, Ltd., and £5,000 of the 3% debentures of the Rhodesia Railways, Ltd. In March, 1911, it was planned to promote a company to exploit the diamonds that are said to exist on the property of this company, or some subsidiary corporation under the domination of this company.

The Tanganyika Concessions, Ltd., has an arrangement with the Zambesia Exploring Co., Ltd., by which the latter is supposed to finance the former, until such time as copper is produced, and the Zambesia Exploring Co., Ltd., having practically the same officers as the Tanganyika Concessions, Ltd., floated the latter, the former having a capitalization of £700,000, shares £1 par, with 666,855 shares issued, fully paid, and having authorized a debenture issue of £1,250,000, secured by 100,000 shares of Tanganyika. The Zambesia Exploring Co., Ltd., paid a 100% dividend Feb. 7, 1896, and for the year ending June 30, 1910, showed a profit of £57,057. The exact financial and fiduciary arrangements between the Zambesia Exploring Co., Ltd., and the Tanganyika Concessions, Ltd., are not so thoroughly understandable as might be desired, the reports of the Tanganyika Concessions, Ltd. combining considerable prolixity with a marked paucity of actual information of real value to shareholders.

The company has a contract with Mr. Robt. Williams, as managing director, approved 1905, securing to him 10% of the net profits, to Dec. 31, 1911, or in lieu thereof 10% of the assets representing the profits, thus further diluting the company's already diluted interests, and further agreeing that if the contemplated Central African Association was not formed, during the period of the agreement, the emoluments previously contracted by the company to Mr. Williams, amounting to a 10% interest, should be paid to Mr. Williams for it; but, unfortunately, Mr. Williams and the company forgot to provide for the contingency of his death, hence the matter was brought up, and adjusted, at the ordinary general meeting of Dec. 16, 1910, the Central African Association having fallen through. It seems that the 10% interest promised Mr. Williams had been subdivided by Mr. Williams, who agreed to give interests in this interest to the Zambesia Exploring Co., Ltd., and Mr. Geo. Gray, thus diluting this dilution. Mr. Gray was afraid that Mr. Williams might be killed, and insisted upon his own interest being secured, but Mr. Gray, himself, was killed by a lion, and died shortly afterward.

The last annual statement of the company is filled with figures that are both exhaustive and exhausting, yet which are singularly unilluminating, for apparently it is the policy of the management to bewilder its shareholders with a mass of figures, rather than to give them a thoroughly summarized and readily understandable statement of the company's actual fiscal position. The figures are rendered exceedingly muddy, to ordinary vision, by reason of the complex enterprise including wheels within wheels, guarantees and reguarantees, by which apparently each of the component factors guarantees each other, shares of different sorts, bond issues of different varieties, and all sorts of agreements of and between the different companies' directors and managing directors, the contractural relations of this company and its affiliated corporations being of extremely complicated nature. The fiscal year ends June 30th, yet the management has found great difficulty in presenting a report as early as the December, hence desired the fiscal year to end in September, and the annual meeting to be changed to spring. The company's auditors, Messrs. [illegible] Bros. & Co., of 11 Gresham St., Mansion House, E. C., remarked in their report of the accounts for the year ending June 30, 1910, that they [illegible]

a the inventories, but the management explained that this was due to ate fire in the Lubumbashi office, which had destroyed the invento- difficult to understand why this company's inventories should be kept of another company, the Union Minière du Haut-Katanga. The ther stated that they had no evidence of the stock of copper listed in y's assets, nor of the steamship "Cecil Rhodes," nor the barge in hodesia. Apparently the company has expended about £2,000,000 ill require further considerable expenditures. Apparently also, in holdings, the company has pledged about anything and everything edgable.

originally were 2,000 square miles, north of the Kafue and Zambesi the Belgian Congo boundary, in the Katanga district of north- odesia, also 2,000 acres for railroad and steamship terminals, at the d of Lake Tanganyika, and a concession, that expired 1905, to ex- ive areas of the Belgian Congo, and to work any mine discovered 30 years, with the option of extending the period of working to 99

Rhodesian property was secured from the British South African Tanganyika Concessions, Ltd., holds other concessions, and large operty from the Chartered Company, subject to a 35% interest re- e latter. The Tanganyika also secured, from the Comité Special du nineral concession to 60,000 square miles in the Belgian Congo, pro- ears exploration, with the right to work any mines for 30 years, with 89 years, which extension has been secured since, for a consideration n fully-paid shares, but the Comité Special du Katanga retains a of the profits. In the Belgian Congo, 72 large mining concessions , the company estimating, circa 1908, that 5 of these claims showed ons of 4% copper ore, most of which could be extracted opencast, other group the company estimated 1,500,000 tons of ore in sight, er tenor.

ganyika Concessions, Ltd., being in urgent and continuous need of organisation, has set off its various mining properties as rapidly as e developed to a point warranting new flotations, retaining share rein, by reason of which the present property of the Tanganyika are interests in various subsidiary corporations, holding direct title g properties, and large areas of mineral lands, slightly explored, a include partially developed mines. By reason of the dovetailing with various subsidiary corporations, it is impossible to give a w of the interests of this company except by describing, under this hat actually are owned by subsidiary corporations, and in the fol- ptions of the different mines, it must be borne in mind that the ein of the Tanganyika Concessions, Ltd., are confined, in most in- inority holdings of shares.

pany formerly was said to have mineral prospecting rights, expiring 120,000 square miles in Angola, on the western coast of Africa, but work has been done in Angola.

erties in the Katanga district are in a rolling country, claimed to limate for equatorial Africa, but actually infested with the sleeping good water and an abundance of wood. These lands lie 4,000' e sea-level, the elevation greatly modifying the climate, the topog- rolling, with low hills. The principal landed holdings are in the , the Kansanshi mine being the only property of importance owned n Rhodesia. Of the mines, the Star of the Congo is at the eastern at the western end, the Kansanshi being owned by the Rhodesia- ion Railway & Mineral Co., Ltd., and the Star of the Congo by the e du Haut Katanga.

In addition to its copper mines, the company owns various other miner deposits, and is developing coal beds in the Luano Valley, southeast of Broke Hill, in the northwestern part of Rhodesia, where there is said to be a lar tonnage of coal, of good quality. The company also holds tin deposits, south Lake Cabele, which have been claimed to carry 20,000 tons of tin, it being weakness of this company to tell, not what grade or tonnage of ore it posses but how much metal might be produced therefrom. Apparently no attenti is being paid to this tin deposit. The company also has, or did have, a g mine, but this apparently has turned out to be merely what Mr. Williams call speck of gold in a bit of sandstone.

The formation of the Katanga copper belt consists of a series of sedimen ries, including sandstone, arenaceous schist and dolomitic limestone, carry copper ores, occurring mainly as carbonates and silicates in sandstone bed 90′ claimed average thickness. The ores average about 60% silica, requi very heavy fluxing, and it is not quite apparent where the flux is to come fro as apparently there are no iron ores available for fluxing, except at great d tances. It has been hinted, in the press, apparently in inspired articles, this company has a wet process, for handling silicious ores, that will butter th for the smelter, but practical metallurgists are suspicious of all secret proce that are to revolutionize existing systems of ore reduction. The diamond has been used extensively, proving the existence of large ore bodies, and M Williams estimated, circa 1908, that the average tenor of ore of all mine about 10% copper, with some mines carrying ores averaging up to 20% co but these figures necessarily rest under suspicion because of the secretive n of the management, which gives round figures, as estimates. Notwithstan its great output of literature, and the large amount of apparently inspired ter appearing in the press, the company is strangely silent regarding the r of actual mining development, and there is a suspicious lack of specific f regarding depths of shafts, lengths of tunnels, widths of veins, assays, and information of an exact nature that most mining companies having real are glad to give to their shareholders and the public. The mines show some grade outcrops, but apparently none have been opened to more than abou depth, at any point. The different properties in which this company is ested have been claimed to have up to 300,000,000 tons of ore in sight. "estimate" is merely a wild guess, and apparently a deliberate falsehood a

The principal copper mines, in various stages of development, in which company is interested, are the Kansanshi, Star of the Congo, Kambove, Ka lela, Kakanda, Likasye, Fungurume, Star of the Congo, Kwatabala and Mu said to have immense tonnages developed, which tonnages seem, in mo to be hypothetical, rather than proven. Mr. Allan Gibb is quoted a that the Star of the Congo and Kambove mines, jointly, have develope 200,000 tons of copper, but it would be far better for Mr. Gibb, and cerned, for him to state how much ore these mines have developed, for th that these mines have not and cannot develop copper, the material these copper ore, and not copper, hence claims of copper developed not only thetical, but also are in exceedingly bad taste, and strongly censurable engineering standpoint.

The Kansanshi mine, disposed of early 1909, to the Rhodesia Junction Railway & Mineral Co., Ltd., lies at an elevation of about miles south of the Congo-Zambesia divide, which is the boundary Rhodesia and the Belgian Congo. This property shows extensive ancient opencast workings, there being trenches and pits for a distance 6,000′, these formerly claimed to vary from 1′ to 75′ in width, and to 1,200′ in length, with an extreme depth of 50′, there actually being lines of workings, ranging from 1′ to 30′ in width, 5′ to 30′ in dep to 1,300′ in length.

ıtry rock of the Kansanshi is sandstone, overlying limestone and
ndstone being micaceous and fissile in places, elsewhere soft and
gh partial decomposition, the sandstone being more or less charged
.e, occurring as speiss, the upper portions carrying malachite and
vith occasional occurrences of azurite and melaconite, and some
silicious gangue, carrying considerable manganese dioxide in the
:tions. The ferruginous matter in the gangue is chiefly limonite,
vhat ochrous, but occasionally hard and compact. Surface ores
ılachite, said by Mr. John R. Farrell to show no evidence of having
alteration of sulphides in place, the results leading him to the
he malachite was deposited from hot solutions, coursing in fissures.
ghly silicious, requiring heavy fluxing, for which purpose iron ore
, were said, 1904, to be available not far distant, though this seems
.

sanshi mine has 5 shafts, sunk in old trenches, on ore bodies of 1′
The main shaft, of 300′ depth, is on "D" reef, of 8′ to 10′ average
l for a distance of circa 1,000′, on the 85′ level, ore being massive,
mpregnations in sandstone for 5′ to 10′ on either side of the vein,
ıly malachite, with an average sampling of 18.7% copper and circa
ng ton. The deeper workings show a little chalcocite and chal-
ciated with limited quantities of pyrite, but the base zone has not
and the depth of the oxidized zone is unknown, as yet. A second
ı opened in this shaft, at depth of 134′. In the Kansanshi mine,
2′ to 3′ width, has been opened for circa 500′ distance, on the 85′
ther reef, of about 4′ width, has been opened for nearly 500′ on the
ıis mine is said to show, on the 200′ level, an 8′ vein, between
s, carrying ore assaying 10.5%, both walls being reported as clearly
ng a pleasure to find something that is clearly defined about any
hich the Tanganyika Concessions, Ltd., has an interest.
sanshi mine has a smelter, the material for which cost £80 per ton
o the ground. This smelter, blown in January, 1908, was said,
08, to be making 90 tons of copper per month, at a claimed cost of
hich production it was claimed would be increased to 200 tons of
nth, within 2 years, but 2 years later than the latter named date, in
10, the Kansanshi smelter was reported, in the press, to have on
0 lbs. of blister copper, and was reported, in the balance sheet of
ca Concessions, Ltd., to have had on hand about 900 long tons of
30, 1910, this apparently representing the entire production of a
s of 29 months, or at the rate of about 30 tons of copper monthly,
third the claimed rate of initial production, and at an average
r month of less than one-sixth the production that it was claimed
ed by the end of 1910. If the other mines develop as rapidly as
, the Tanganyika Concessions, Ltd., will become a fairly important
re the close of the Twenty-First Century, or, at latest, in the
d or Twenty-Third Centuries, provided the ratio of gain can be
til then.
e information is to be had regarding any of the alleged mines in
pany is interested, with the exception of the Kansanshi and Star
both of which are owned by other companies. The report for the
oncessions, Ltd., for the year ending June 30, 1910, is a large and
ment, filled with intricate and extensive tables of figures, and hav-
of pages devoted to the situation and development of the com-
, yet, strange to say, the only mines mentioned by name in this
re the Star of the Congo copper mine and the Ruwe gold mine,
another company, the Union Minière du Haut Katanga, and the
ansanshi mine appears in a single line on the balance sheet, refer-

ring to a loan on the 900 tons of copper said to be lying at that mine. Rarely has any large mining corporation given to its shareholders an annual report containing so little real information, and the paltry evasions of the management, in the report, and the pitifully small amount of real information contained are in sad contrast to the inflated general claims put forth for the company.

The Kolwezi mine has a shaft, and diamond drill borings are said to have shown a continuation of the copper beds to considerable depth. This property is said to have a small test smelter, presumably idle, and no copper production has been heard of.

It is claimed that the Kambove mine of the Union Minière du Haut Katanga is capable of developing 5,000 tons of ore daily, for many years, which statement might be swallowed, by the ordinarily credulous, were it backed by any figures except this bold "estimate." Kambove No. 2 mine at last accounts, circa 1907, had 2 shafts, "H" and "I," of about 100′ depth each, with crosscuts said to prove an ore body nearly 200′ wide, and since has been reported to have a lenticular ore body 340′ to 400′ wide and 3,000′ long. The Kambove was claimed, 1907, to have 2,000,000 tons of 12% ore developed, and the Kambove No. 2 also is claimed to carry 10,000,000 tons of 15% copper ore for each 100′ of depth. These figures are palpably mere guesses, inflated to the bursting point. Detailed figures would be interesting, and it is possible that some of the crosscuts have been given added length by the simple device of drifting diagonally across the width of the ore body. An outright lie is preferable to figures secured by deliberately deceptive methods of development.

The Fungurume mine had 4 short tunnels, at last accounts, one of which was said to have penetrated 191′ of ore. This mine was claimed, 1907, to have developed 1,250,000 tons of 7% ore, which figures seem based upon the scanty of data. All of the "mines" of the Tanganyika Concessions, Ltd., have the strange capacity of always developing ore of exactly even assay tenor, in exactly even amounts, no odd figures or fractional amounts ever appearing. In this respect the Tanganyika is absolutely unlike every copper property in the world that actually produces copper. The Tanganyika seems sui generis, in all respects.

The Likasye mine, or what is called a mine, is said to be slightly developed by tunnel, and apparently no work has been done thereon for several years. Figures regarding openings, copper percentages and ore tonnages developed in a number of other "mines" claimed by this company are lacking entirely.

The Star of the Congo mine, owned by the Union Minière du Haut Katanga, has a few shallow shafts, but is developed mainly by tunnels, and it is said some of the latter have been driven diagonally across the ore body, giving exaggerated ideas of width. The main ore body is claimed to be 550′ wide and [illegible] long, with a paystreak of 28′ claimed estimated average width, carrying [illegible] 14% or better in copper tenor, but apparently only one-third of the ore [illegible] able for smelting. This mine was estimated, June, 1908, to have [illegible] of 320,000 metric tons averaging 15% copper, and 900,000 metric tons [illegible] 6.5% copper, but one year previously the high grade ore was estimated [illegible] 8% average copper tenor. These figures are so extremely high, and [illegible] such exceedingly scanty data regarding openings and assays, that [illegible] regarded with strong suspicion. It was claimed, circa 1907, that with [illegible] the ore from the Star of the Congo would be self-fluxing, but apparently [illegible] [illegible]se. Rail connection was secured September, 1910, and about [illegible] [illegible] to be employed at the mine and works, early 1911.

[illegible] the Star of the Congo seems a very elusive property [illegible] [illegible] company actually is constructing some [illegible] [illegible] on the Lubumbashi River. This [illegible] sup[illegible] [illegible] daily capacity, and construction [illegible] posed [illegible] [illegible]ently did not start until [illegible]

The company gave a definite promise that this smelter would be in 1911, but this was like other promises made by the company, and, this flat promise, the date of blowing in has been set ahead until the notwithstanding the railway having reached Elizabethville Septem- The shipment of machinery for this smelter is said to have been mber, 1910, and it was stated by Mr. Williams that "our blast- signed to run 2 furnaces, each capable of producing 1,000 tons of nonth," which is a decidedly foggy statement. Perhaps such talk dered good form, in certain circles, but conservative engineers are d favorably. If Mr. Williams and his associates mean business, e trying to develop copper mines, and are not devoting their efforts cing stock and debentures, it would be well for them to give their and the public a few simple items of information, including such gures as the dimensions of the blast-furnace. The Tanganyika is smelter, not by how much ore it can treat, but by what amount of xpected to produce, which is in keeping with the other claims and the company, and has a decidedly suspicious appearance. The second blast-furnace, which is constantly referred to in the press smelter," apparently has been purchased, but at last accounts had ed on its way to darkest Africa. At last accounts this "mammoth being built by hand-labor, each native carrying 10 bricks at a stance of one mile, which the management cheerfully refers to as " This is the smelter that is to treat the ore from the mine that is er so cheaply, and in such large quantities, that all other copper world are to be in imminent danger of being closed down. There greater danger to the holders of "Tanks" than to the owners of copper mines. The coal from the Luano colliery is non-coking, and e costs £10 per ton, delivered in Katanga, which is a simply pro- . The company's mysterious reduction process does not seem pressive to engineers, who have heard of such things before, and d the invariable outcome of such secret processes, so industriously section of the press that sells its news columns to the highest

er mines of this company have a 2,200-mile rail-haul, under unfa- conditions, but can obtain a 1,200-mile rail-haul, by merely build- f that length, through equatorial Africa, to Lobito Bay, on the west enguella railway was supposed to be 330 kilometers long, in 1908, reached 323 kilometers of construction in October, 1909. By gures of income of this line in Portuguese reis, a favorable showing company's annual report, 1,000 reis being equivalent to four shill- money. The annual report of the company refers eloquently to t illumination in store for the municipalities of Benguella and rough the projected construction of an electric light plant. The s planned to cost about £4,000,000 complete, but apparently is rogress.

sheet omitting all figures, but covering the past performances, ion and future promise of the Tanganyika Concessions, Ltd., the credit side extensive holdings of land, including a number of lea of actual promise, and the possession of railway concessions built railway of considerable potential value. The debit side of uld contain a much greater number of items. To start, only a fter protracted labor, could determine the actual proportion properties named. Lands are held sub- ective profits, and although this was her diluted its original diluted hich have taken

over the only mineral properties that can be termed mines. Furthermore, the diluted dilution has been further diluted by agreements with Mr. Robt. Williams for the payment of 10% of profits to be earned. Taking all of these successive dilutions into consideration, the actual interests of the Tanganyika shareholders must be highly fractional. There also is a promotion company, that pays dividends. Mr. R. J. Frecheville made an examination of this property, 1907, but strange to say, his report never was printed. Mr. Frecheville, by the way, is not a promoter, but an engineer of worldwide reputation, who does not lend his name, under any consideration, to overdrawn statements.

Both transportation and labor conditions are exceedingly unfavorable. The cost of coke is practically prohibitory, fluxing material apparently is lacking, and the ores of the Star of the Congo are not readily amenable to treatment. The Kansanshi mine, which begun smelting January, 1908, was reported to have 900 long tons of blister copper at the mine June 30, 1910, a production at the rate of only about 30 tons of finished copper monthly, for this period. Apparently this mountain labored to bring forth a mouse.

The district in which the properties of the Tanganyika Concessions, Ltd., are located is scourged by the tsetse fly, which is fatal to transport animals, and the sleeping sickness, which is fatal to man.

The estimates of probable costs are ridiculously inadequate, and the estimates of ore tonnage developed are ridiculously high, and both are based on suspiciously inadequate figures. Mr. Farrell's original estimate of cost was only £12 per ton of finished copper, in Katanga. Mr. Robt. Williams estimated, 1907, that, with copper at £50 per long ton, the Katanga mines had £100,000 in values developed, which was equivalent to claiming that the mines had developed that was capable of turning out 400,000 long tons of finished copper, and estimated the cost of production and delivery of finished copper at [illegible] per long ton, which figure is absolutely impossible of realization, and [illegible] his other claims to be regarded with suspicion. Mr. Williams is quoted as stating that the output probably would be increased to 100,000 tons of finished copper yearly, at the Star of the Congo mine, and that this production "could be duplicated" at the west end, which was a brazen claim to make for a mine that had no production, and which at the time was building a tinpot smelter, with the aid of negroes, carrying 10 bricks at a time, for a distance of a mile.

None of the past promises of the company have been made good; the tonnages of ore developed have been grossly inflated; the cost of copper production has been flagrantly underestimated; transportation troubles have been [illegible] over lightly; bad labor conditions have been ignored, and metallurgical difficulties of a serious nature have been glozed over with a few soft words, and [illegible] the press that some undefined but revolutionary new process would be [illegible] to turn refractory ores into material that would smelt easily.

This company apparently has done its mining in the stock market [illegible] than on the ground. The shares went up to £12 each, and then [illegible] but recovered later to about £7. The financial, mining and daily press [illegible] systematically "worked," with articles laudatory of this company. [illegible] have been fed with promises, and glittering generalities, and those [illegible] who endeavored to acquire definite information have been shut off, [illegible] buttered words, or scant courtesy. Apparently the company's financing is no means finished, notwithstanding the enormous sums already [illegible] taking into consideration the millions of pounds that have been [illegible] company in 12 years time, the showing is pitifully poor. The [illegible] Concessions, Ltd., is regarded with much suspicion, and shareholders [illegible] well to remember [illegible] tanks are explosive.

[illegible] PASS[illegible] [illegible]ED MINING CO.

[illegible] office: Salome, Yuma [illegible]

[illegible]nager; Ward Smith [illegible]

erley, secretary and treasurer; Dick Wick Hall, superintendent. ca November, 1909, with capitalization $3,000,000, shares $10 par. ıtrols the Alvin Development Co. through stock ownership, and property of the Cobralla Copper Co. circa March, 1910.
nown as the Ultimatum or Cobralla group, adjoin the Alvin, in the Harcúvar Mountains, in the Ellsworth district, about 10 miles Salome. The property carries about 4,500′ of the strike of various owing a series of diabase dikes cutting limestone, the ore bodies ly bornite and chalcopyrite, estimated to average 3 to 5% copper, r and $1 to $8 gold per ton, with occasional paystreaks and masses ore. Development is by the 150′ Carbonate Hill shaft, and a 200′ ipment includes a gasoline hoist. Presumably idle.

NT MINING CO. **UTAH.**

Formerly at Park City, Summit Co., Utah. Described Vol. IX.

MINERA TARAPACÁ DE COLLAHUASI. **CHILE.**

Valparaiso, Chile. Mine office: Collahuasi, Tarapacá, Chile. t. 10, 1906, under laws of Chile, with capitalization £50,000, shares trace secured of mining operations.

TARAPAQUENA DE CHAÑARAL. **CHILE.**

ce: Angostura, Chañaral, Atacama, Chile. Lands, 22 hectares, ral railway, 10 kilometers north of Angostura, with a good wagon- ng with station. Equipment includes a number of wooden dwell- nen. Employed a small force at last accounts.

GOLD MINING & SMELTING CO. **NEW ZEALAND,**

urned unclaimed from former mine office, Otago, Otago Co., N. Z. onsulting engineer. Capitalization £25,000, and company is said d business with £10,000 working capital. Lands, on Preservation veral ore bodies, said to average about 4% copper, with combined r values in excess of the copper. A smelter, planned to do custom dition to treating the ores of the company, was nearing completion, esumably idle.

TD. **AUSTRALIA.**

London Bank Chambers, Creek St., Brisbane, Queensland, Aus- office: Chillagoe, Lynd Co., Queensland, Australia. H. M. an; G. S. Murphy, auditor; E. Austin Bell, secretary. Organized Queensland, with capitalization £120,000, shares 5s. par. Lands, ehold, on the Walsh River, circa 30 miles northwest of Chillagoe, deposits of auriferous and argentiferous copper oxides and car- mall parcel of hand-selected ore returned 15% copper. Idle

MSTOCK CONSOLIDATED MINING CO. **TASMANIA.**

e: Queenstown, Montagu Co., Tasmania. P. Briggs, manager, s. Lands, on the western slope of Mount Lyell, have 3 tunnels, a green schist carrying copper ore of fair grade. In 1906 shipped ious ore to London, for special treatment. Idle several years.

CROWN LYELL EXTENDED MINES, N. L. **TASMANIA.**

Queen St., Melbourne, Australia. British office: Palmerston , E. C., Eng. Mine office: North Mount Lyell, Montagu Co., C. Dunster, chairman; preceding officers, W. Coleman, Moss Savage and Isaac Herman, directors; John Brandon, secretary; n, London secretary; Edw. Carter, mine manager. Organized 7, under laws of Victoria, as a reconstruction of the Tasman & lining Corporation, N. L., with capitalization £75,000 in 300,000 ar, fully paid, increased, May, 1910, to £90,000 in 300,000 shares hares are listed on the London, Melbourne, Hobart and Laun- xchanges. Half yearly meetings are April and October.

Lands, 3 leases, area 236 acres in the North Mt. Lyell district, carrying ch copyrite and occasional bornite, galena and sphalerite, occurring as impregnatio in schist, near a conglomerate contact. The silver-lead ores, badly mixed, low grade, and apparently of small promise, are succeeded by copper ores greater depth. An 8′ vein shows a little native copper, near surface. The m agement estimated ore reserves at 48,000 tons in 1909, and at 20,000 long to Apr. 11, 1911, estimated to average 3% copper, 26% lead, 18% zinc, 16 oz. silv and 17 grains gold per long ton. Development is by a 120′ shaft, and tunnels 170′, 380′ and 1,700′, the latter giving a vertical back of 220′. A little lead c has been shipped.

A 100-ton concentrator is being built, 6 miles from a railway, and it is ant ipated, by the management, that the mill will be completed and in commis by the end of 1911.

TASMAN & CROWN LYELL EXTENDED MINING CORPORATION, N. L. TASMAN

Dead. Was reorganized, March 21, 1907, as Tasman & Crown Ly Extended Mines, N. L. Formerly at North Lyell, Montagu Co., Tasman Described Vol. VIII.

TASMANIA COPPER MINING & MILLING CO. COLORAD

Office: 603 Provident Bldg., Philadelphia, Pa. Mine office: Winfi Chaffee Co., Colo. D. B. Dance, vice-president; G. Albert Smyth, secreta Edw. O. McHenry, treasurer. Organized Apr. 20, 1898, under laws of Colora with capitalization $1,000,000, shares $1 par. Lands, 13 claims, area circa acres, in the La Plata district, with about one-half mile of underground open estimated to show 750,000 tons of auriferous and argentiferous galena, sphal and chalcopyrite, which is too much. Has a 25-ton pyritic smelter. Idle years and apparently moribund.

TASMANIAN BALFOUR PROSPECTING ASSOCIATION. TASMA

Mine office: Mt. Balfour, Russell Co., Tasmania. Dr. Fritz Noe chairman; C. P. Smith, consulting engineer. Capitalization £3,000, shares par. Lands, 3 blocks, leasehold, area 200 acres, showing a gossan carrying 1.2% copper, with traces of gold and silver, succeeded by a vein of 80′ claimed width, carrying ore assaying up to 12% copper, 10 dwts. silver a trace of gold. Was developing, with a small force, at last accounts.

TASMANIAN COPPER CO., LTD. AUSTRA

Office: 348 Winchester House, London, E. C., Eng. Operating 15 Patterson St., Launceston, Tasmania. Mine office: Rosebery, Co., Tasmania. Hon. J. S. Clemons, chairman; preceding officer, E. M and J. Barclay, directors; F. L. Cox, chairman; T. W. Crowther and F. C members London board; August Simson, secretary; J. G. Coldwell, secretary; G. Barker, mine manager. Organized Jan. 13, 1897, with tion £325,000, shares £1 par, fully issued and fully paid. Debentures authorized, at 10%, redeemable at 150; issued, £24,730. Accounts to 1909, showed a loss of £5,168, increasing the debit balance to £21,18

Lands, 386 acres, on Mt. Black Bear, near the Stitt River, in Dundas district, including the Rosebery and Ring River mines, and smelter-site. The Rosebery mine has an ore body that apparently ment deposit, with a schistose footwall, along a line of fault forming body, formerly estimated to average 24′ in width, and 3,000′ in l paystreak of 6″ to 5′ width, for a length of circa 500′, is now reported in width, carrying up to 22′ of solid ore, which is an argentiferous sulphide complex, assaying up to 8.76% copper, but averaging only copper, values being mainly in lead, gold and silver, with a limited of zinc ore, from hand selection. Development is by tunnels, ore reserves were estimated by the company, 1905, at 158,400 long

imated, 1909, to have 250,000 long tons of ore blocked out. There
0 tons of slag, possibly amenable to resmelting.
ıpany took over the Blinman mine, and about 50 other small mines
s, in the Blinman and Yudnamutana districts of South Australia,
ed operations at the Blinman, 1907, and has sold or abandoned all
ıstralian property.
on smelter, under construction, 1911, apparently belongs to the
Metals Extraction Co., which has contracted for the entire ore pro-
ıe Tasmanian Copper Co., agreeing to pay for lead, silver and gold
l also the copper, if above one-half per cent., but intends to reserve
es. A little sphalerite was exported, 1910.

N METALS EXTRACTION CO. **TASMANIA.**

12 Ashley Place, London, S. W., Eng. Works office: Rosebery,
)., Tasmania. Sir Edw. Durand, Bart., chairman; H. Oakley
ary. Organized June 26, 1908, under laws of Tasmania, with capi-
50,000, shares £1 par; issued, £285,264, fully paid. Property is a
ction plant, planned to treat the ore of the Tasmanian Copper Co.,
s a sulphide complex of auriferous and argentiferous lead, zinc and
e contract calls for payment for silver, gold and lead recovered, and
above one-half per cent., but this company hopes to save the zinc

YELL COPPER CO., LTD. **TASMANIA.**

Was absorbed, March, 1903, by Lyell-Comstock Consolidated
Ltd. Formerly at North Mt. Lyell, Montagu Co., Tasmania.
)l. IV.

YELL PROSPECTING ASSOCIATION, N. L. **TASMANIA.**

Property was 293 acres, leasehold, in the North Mt. Lyell district,
)ry operations were carried on between 1891 and 1897. Formerly
. Lyell, Montagu Co., Tasmania.

INING & SMELTING CO., LTD. **BRITISH COLUMBIA.**

ice: Judway, Queen Charlotte Island, B. C. Lands, 17 claims,
0 acres, including a townsite on the harbor. The property shows
ops of magnetite, carrying chalcopyrite and pyrite. There are
uts, and a short tunnel, the latter showing a fairly solid body of
rrying numerous small stringers of chalcopyrite and pyrite, assay-
er, with traces of gold and silver. Employed 12 men, at last ac-

NE. **JAPAN.**

fice: Nosakagawa-mura, Yoshino-gori, Yamato, Japan. The
vs alternating beds of clay-slate and sandstone, carrying ore deposits
odies, sometimes of 20′ to 30′ in width, but soon thinning out, and
tion is broken by 3 nearly parallel faults. Ore is an intimate mix-
)pyrite and pyrite. Production was circa 40,000 lbs. fine copper,
mably idle.

) LAKE COPPER CO. **BRITISH COLUMBIA.**

Spokane, Wash. Mine office: Tatlayoco Lake, Lilloet, B. C.;
d, secretary; A. M. Riley, treasurer; A. H. Shepard, manager;
ey, attorney; preceding officers and F. P. Greene, trustees. Organ-
7, with capitalization $5,000,000, shares $1 par. Lands, 3 groups,
s, in the vicinity of Tatlayoco Lake, circa 160 miles northwest of
ear the British Columbia border. One group is said to show a
upriferous pyrite, averaging 1% copper, with combined gold and
f $1.50 per ton, and another group is said to have a vein 75′ to 200′
le 3,000′, with a 20′ paystreak, said to average 5% copper and $2
bined gold and silver values, opened by a 110′ tunnel. Property is
ow ores of iron and antimony. Presumably idle.

TAYLOR COPPER MINES CO., LTD. ONTARI

Office: care of Robt. H. Taylor, president, Sault Ste. Marie, Mich. Mi office: Sault Ste. Marie, Algoma, Ont. H. P. Taylor, secretary. Lands, of Sault Ste. Marie, are slightly developed, about $30,000 having been expe in exploratory work. Idle since circa 1903.

TAYLOR MOUNTAIN MINING CO. COLORAD

Office: 609 New York Life Bldg., Omaha, Neb. Operating office: Sa Colo. Mine office: Garfield, Chaffee Co., Colo. W. F. Norway, presi C. S. Montgomery, secretary; Geo. H. Purmort, superintendent. Orga October, 1905, under laws of Colorado, with capitalization $600,000, shares par. Annual meeting, in November.

Lands, 7 claims, area 65 acres, known as the Lily mine, opened 1888, in Monarch district, 1½ miles from Garfield and 19 miles from Salida. The pr erty shows a nearly vertical contact vein with NS. strike, between granite limestone, carrying auriferous and argentiferous lead and copper ores, and mine shows a little argentiferous and auriferous lead carbonate ore assaying lead, 75 to 180 oz. silver and $6 gold per ton. The management estimates copper ores to average 10% copper, 8 oz. silver and $1 gold per ton, and 2 loads of 12% copper ore were shipped. The mine also has shipped some iferous iron ore for fluxing. Development is by a 280′ main shaft, with of workings.

Equipment includes an electric power plant with a 16-h. p. hoist and h. p. General Electric air-compressor. Buildings include an engine-h 12x18′ smithy, 12x20′ carpenter-shop and several other structures. The employs about 25 men.

TAYLOR'S COPPER, LTD. UTA

Office: 221 Herald Bldg., Salt Lake City, Utah. Letter returned un from former mine office, Moab, Grand Co., Utah. W. D. Bohm, manager, ceding officer, W. B. Taylor, J. R. Lobb, Edmund M. Slatter and C. F. Dr directors. Organized Nov. 20, 1906, under laws of Montana, with capital $2,500,000, shares $5 par. Property is the Big Indian mine. Idle.

TECOLOTE COPPER CO. NEW MEX

Dead. Was succeeded by Las Vegas Copper Co. Formerly at Las V San Miguel Co., N. M.

TECUMSEH COPPER CO. MICHIG

Dead. Property was sold, May 14, 1910, to La Salle Copper Co. $1,648,700, and corporation wound up. Formerly at Calumet, Houghton Mich. Fully described Vol. VIII.

TEDDY MINING & MILLING CO., LTD. IDA

Office and mine: Kellogg, Shoshone Co., Idaho. J. B. Cox, John Pelkes, superintendent; J. L. Safford, consulting engineer. Cap tion $1,000,000, shares $1 par. Lands, 7 claims and a millsite, 1 mile Kellogg, showing 2 veins, one, of about 15′ width, carrying copper quartz gangue, and one, of about 12′ to 35′ width, carrying silver-lead assays up to 12% lead and 30 oz. silver per ton. Development is by tunnels of 100′ and 550′, latter planned to be driven to 700′, to cut a a back of 400′. There are several mine buildings.

TEHAMA MINING CO. CALIFO

Dead. Formerly at Ingot, Shasta Co., Cal. Described Vol. VI

COMPAÑIA EXPLORADORA DE TEJAMÉN. MEX

Mine office: Tejamén, Durango, Mex. Ulysses Matthey, age, at last accounts. Property, carrying auriferous and argentif ores, was under [illegible] 1909, with a small force.

[illegible] & SMELTING CO., LTD. NORW

[illegible] St., London, E. C. Eng. [illegible] Christiansand, Norway. Chr

ıan; preceding officer, Col. R. G. Sharman Crawford, F. J. Burgon
[ax Roubine, directors; P. D. Leake, receiver; Herbert McCully,
r, at last accounts. Organized May 21, 1906, under laws of Great
capitalization £100,000, shares £1 par, fully issued and fully paid.
£10,000, at 6%. A 7½% dividend was paid, March 15, 1907.
of Apr. 30, 1909, showed a debit balance of £19,745, and a receiver
d June 23, 1910.
is the Aamdal mine, an old mine opened, circa A. D. 1600, which
rable producer for nearly three centuries. The property was under
1903, to the Tharsis Sulphur & Copper Co., Ltd., but was not taken
eins formerly worked were narrow but rich, and the mine shows
ow-grade ore. Diamond drill borings, 1907, are said to have given
depth of 1,400'. The principal ore is low-grade chalcopyrite and
ging about 2.5% copper, with a gangue of mica-schist and quartz.
employed about 50 men, previous to suspension.
nill, destroyed 1907, was replaced by a new mill, in 3 parts, stand-
waste-dump at the mount of the main tunnel, the new plant having
se, 75-ton Ferrari ball mill and an Elmore vacuum oil concentra-
roduction was 240 long tons fine copper, under former ownership,
vas circa 7,000 metric tons of ore, estimated to have yielded circa
ne copper in 1909. The company came to grief through the low
: of ore, heavy freight rates, high taxes, strikes by workmen for
es, and low price of copper, this being a combination that might
: stoutest heart. Reorganization is planned.

COPPER CO., LTD. **SPAIN.**
Title was changed, June, 1907, to General Company of Spanish
Formerly at Cortegana, Huelva, Spain. Described Vol. VI.

INES, LTD. **BRITISH COLUMBIA.**
Formerly at Aldermere, Skeena division, Cassiar district, B. C.
. VIII.

INING, MILLING & **BRITISH COLUMBIA.**
PMENT CO.
Formerly at Aldermere, Skeena division, Cassiar district, B. C.
. VIII.

NING & MILLING CO. **COLORADO.**
e: Idaho Springs, Clear Creek Co., Colo. John Owen, manager,
ts. Ores carry gold, silver, lead and copper. Had a small steam
nd apparently moribund.

COPPER CO. **ONTARIO.**
Formerly at Temagami, Nipissing, Ont. Described Vol. VIII.

INING & SMELTING CO. **OREGON.**
The property carried auriferous and argentiferous copper ore, and
with electric power and a 20-ton smelter, employing circa 25 men,
rly at Alamo, Umatilla Co., Ore.

TEMPLEMAN, LTD. **CHILE.**
Was liquidated voluntarily, July, 1902. Formerly at Antofagasta,
ibed Vol. III.

NING CO., LTD. **IDAHO.**
Wallace, Idaho. Mine office: Burke, Shoshone Co., Idaho.
s, president; John Stambaugh, vice-president; Geo. Edmiston,
os. Scott, general manager. Stock is assessable. The company
by David Gross. Lands, near the Great Western mine, are devel-
nels, the lower showing lead and copper ores, with quartz gangue,
up to 20% copper.

ME MINING CO. **ARIZONA.**
Mine office: Patagonia, Santa Cruz Co.,

Ariz. T. E. Mumme, president; Chas. A. Gabriel, secretary. Lands, 7 claim known as the Wieland group, carrying fissure veins. Development is by a 3 shaft, showing a 3′ vein of ore, said to give average assays of circa 21% copp 20 oz. silver and $4.50 gold per ton, which estimate seems high. There are tunnels, one of 280′ giving ore claimed to average 11.5% copper, with silver an gold values, and a second tunnel is being run to cut the vein opened in the shaf A little ore was shipped, 1910.

TENABO MINING & SMELTING CO. NEVADA

Office: 105 Mercantile Blk., Salt Lake City, Utah. Letter returned u claimed from former mine office, Tenabo, Lander Co., Nev. W. Mont Ferry president; John Pingree, vice-president; John Janney, secretary; E. O. Howar treasurer; preceding officers and Benner X. Smith, directors; Duncan MacVich consulting engineer; J. N. Shultes, manager. Organized circa 1909, under la of Nevada, with capitalization $3,000,000, shares $3 par; issued, $1,850,00 Annual meeting, second Monday in February. Union Trust Co., New Yo registrar; Windsor Trust Co., New York, transfer agent; Walker Bros. Ba Salt Lake City, depositary. Stock is listed on the unqualified departmen the Boston Curb.

Company bought, circa 1909, the property of the Gem Consolidated Mi ing Co., at Tenabo, which in turn took over the property of the Reliance Mini & Milling Co., the Tenabo Mining & Smelting Co. giving 450,000 shares of st to the Gem Consolidated for the lands. Sundry stockholders of the Gem C solidated alleged that Hyrum Tyree, president, had secured possession of th stock, and issued it to himself, and the Gem Consolidated was thrown in bankruptcy, April, 1910.

Lands originally were 19 claims, 2 fractional, area 355 acres, and are re 223 acres of mineral lands and an 80-acre mill and smelter site, giving to holdings of 303 acres. Lands are in 4 groups, all with more or less developme work.

The principal group shows a deposit of low-grade copper ore, stated company to average 300′ in width, outcropping for nearly a mile, with indicatio according to the management, of making a mine similar to that of the U Copper Co., at Bingham. The management estimates the ore on this group run about 3% copper, with small gold and silver values.

The Little Gem mine, about 1 mile from Tenabo, has a contact dep between rhyolite and sedimentary rocks, carrying auriferous and argent copper carbonates and chalcopyrite, with quartz gangue, a 250′ shaft, the very flat angle of 22°, showing an ore body ranging from a few inches in width, giving assays up to 31.1% copper, 122 oz. silver and $9.60 gold p Ore is estimated to average about $18 per ton in combined values.

Another property has a 450′ incline shaft, in a wide vein, apparently in ing in width with depth. A fourth group has 5 parallel veins in a cross of about 600′.

The property as a whole has about 3,000′ of workings, and about $1 has been expended in development and equipment. Capt. MacVichie est $479,000 worth of ore blocked out in the mines, and that the expenditu few thousand dollars additional would increase this amount of develop $1,840,000 in value. Company shipped 23 cars of ore, from developme in the Little Gem mine, with gross smelter returns of $23,774, and net returns, after deducting freight, sampling and smelting charges, of $17,

Equipment includes steam power and a 50-ton chlorination plant, and plans erecting a mill, 1911. About 35 men are employed, when

[illegible]

[illegible] CO. NEV

[illegible] Lander Co., Nev. Described Vol. VIII

)T MINING CO. **WYOMING.**
'ormerly at Douglas, Converse Co., Wyo. Described Vol. VII.
EL TENIENTE. **CHILE.**
' Braden Copper Co.
MINING CO. **CALIFORNIA.**
mine: Edgewood, Siskiyou Co., Cal. Lands, 9 claims, unpat-
ter-rights, on Mt. Eddy, circa 9 miles west of Edgewood, carrying
re veins in gabbro, and 2 transverse veins, former showing ore.
s by a short tunnel and a 12′ pit, the latter showing auriferous
)us chalcopyrite, giving assays of 11 to 30% copper, 2.5 to 15 oz.
) $28 gold per ton. Property shows some carbonate copper ore,
ıngue. Presumably idle.
COPPER CO. **TENNESSEE.**
4-11 Broadway, New York, N. Y. Mine and works office:
k Co., Tenn. Employs 1,500 men. Frederick Lewisohn, presi-
ips, Jr., vice-president; E. H. Westlake, second vice-president;
lt, secretary; Walter Lewisohn, treasurer; preceding officers,
, J. Parke Channing, Sidney Riddlestorffer and O. B. Van Sant,
Emmons, general manager; H. F. Wierum, consulting engineer;
ine superintendent; Albert J. Bone, smelter superintendent; D.
works superintendent; W. T. Foster, railway superintendent;
, mechanical engineer.
Apr. 16, 1899, under laws of New Jersey, with capitalization
es $25 par. Debentures, $1,500,000 in first-mortgage 6%
denomination, dated Dec. 1, 1910, due, in various amounts,
1, to Dec. 1, 1917. A former $350,000 first-mortgage 5% bond
, and $600,000 of 6% gold notes were paid, with the proceeds
)nd issue. Trust Company of America, New York, and State
Boston, registrars. National City Bank, New York, and Old
)., Boston, transfer agents. Shares are listed on New York,
lon stock exchanges. Annual meeting, last Thursday in Feb-

ınd dividends have been as follows, the first figure being the
t the dividends for each year: $417,565 and $218,750 in 1903;
8,750 in 1904; $452,106 and $218,750 in 1905; $824,231 and
$800,634 and $650,000 in 1907; $324,768 and $500,000 in 1908;
0,000 in 1909; $445,387 profits, without dividends, in 1910,
$1.50 per share, amounting to $300,000, declared December,
ı. 26, 1911. Total dividends to Dec. 31, 1910, were $2,306,250.
ed 1910 with a net surplus of $1,284,179.
30 acres of mineral property, and 11,000 acres of miscellaneous
ctown district. Ore was first discovered, and mining begun,
e mines were operated regularly, by a New York company,
il War, and, during the earlier part of the war, the mines were
pulsion, by the Confederate Government, to supply copper
ar. Lands include the Burra Burra, London, Polk County,
ssee mines. The Eureka formerly was operated under lease,
Virginia Iron, Coal & Coke Co., yielding 39,498 long tons

shows pre-Cambrian metamorphosed mica-schist, carrying 6
ore bodies, of which 4, under development, show extensive
having a little oxidized ore near surface, which was mined out,
ses range 30′ to 70′ in width, and 500′ to 2,000′ in length, and
th, carrying chalcopyrite, associated with pyrite and pyrrho-
ne, ore ranging in tenor from 2 to 4% copper, circa 40% iron,
5% silica, with very small quantities of gold and silver. As

zinc and other refractory elements are lacking, the ore is excellently adapted to smelting, giving very clean slags.

The mines are extensively developed, there having been made 2,026′ of new openings and 15,050′ of diamond drill borings, in 1907, and for 1910 there were opened 2,898′ of new workings, and 5,058′ of diamond drilling was done. Levels are spaced 100′ apart. In order to conserve the sulphur value of the ore, which is valuable for acid making, the company's old mines were worked on a smaller scale than usual, 1910.

Ore reserves, Dec. 31, 1910, included 3,183,671 tons of available developed ore, with 1,380,000 tons of probable ore, giving a total of 4,563,671 tons. These figures are conservative, as no ore below the bottom working levels has been taken into consideration, and ore included in reserves is only ore actually opened by drifts, or proven by diamond drill borings.

The Burra Burra mine, which is the principal property, is operated through an 800′ main central, sunk at 75° in the footwall, having its first level 170′ below the collar, with succeeding levels at 100′ intervals, the mine ending 1910 with 6 producing levels, the 7th level under development, and the shaft sinking for the ninth level.

The main ore body of the Burra Burra is 1,200′ long, and averages 60′ wide on the 3d level. There also is the north or McPherson ore body, developed by drift from the 3d level of the main shaft, connecting with the old McPherson shaft, 2,200′ northeast of the main shaft, the McPherson ore body being about 900′ long, with an average width of circa 25′. The McPherson shaft has been sunk to the 6th level, and should be connected, on the 6th level, with the main shaft, 1911. The Hiwassee shaft, 900′ southwest of the main Burra shaft, sunk to the 3d level, this shaft showing a comparitively small ore body, of about 200′ length and 12′ average width. The ore reserves of the Burra Burra mine, Jan. 1, 1911, were 2,738,000 tons of available ore, developed above the 6th level, no estimate being made of ore developed below that level.

The London mine has a 588′ shaft, sunk at an incline of 75°, with 5 levels opened, developing an ore body of 25′ to 75′ width and about 600′ length, ranging 2 to 4% in copper tenor. The London is producing at the rate of about 90,000 tons of ore yearly.

The Polk County mine has a 485′ vertical shaft, with 5 levels opened, developing an ore body of very irregular shape, up to 120′ maximum width, about 2% average copper tenor. Production of the Polk County mine [illegible] 91,000 tons of ore, 1910.

The Eureka mine, now idle, has a shaft, sunk, 1910, to depth of [illegible] which point the first level will be opened. Diamond drill borings have shown ore body of 20′ to 165′ width, by about 1,000′ length, and it is estimated [illegible] this mine will develop, above the 230′ level, circa 1,320,000 tons of sulphide [illegible] of good average tenor, comparing favorably with the ore of the Burra [illegible] Equipment of the Eureka includes a small boiler and hoist, with a headgear [illegible] it is not the intention of the company to operate this mine at present, [illegible] sufficient ore developed in the other mines for immediate needs. The [illegible] from the Burra Burra has averaged about 2% in copper tenor. The [illegible] worked by underhand stoping until recent years, when back-stoping [illegible] and at the end of 1910 there were but two underhand stopes remaining [illegible] other extraction faces being back-stopes. The Burra Burra mine [illegible] [illegible] tons of ore, 1910.

[illegible] has a combination shafthouse and crusher building [illegible] plant. Equipment includes an [illegible] belt-conveyor, used as a picking [illegible] tons capacity, and, as far as [illegible] by hand-picking. [illegible] the plant having [illegible]

sorting capacity of circa 2,000 tons, ore being reduced to 4″ size.
ar shaft-rockhouses at the London and Polk County mines.
power plant at the Burra Burra includes four 150-h. p. Babcock &
having Murphy automatic stokers. An 18x42″ Nordberg first-
oist has two conical drums, each of 7′ minimum and 9′ maximum
′ face, raising 5-ton skips with 1⅛″ steel cables. There also is a
to those of the Lake Superior district. There are two Nordberg
pressors, each capable of reducing 2,000 cu. ft. of free air per
. initial pressure. A small plant furnishes electric light for the
l London mines.
at the London mine consists of two 250-h. p. National water-
h Murphy automatic stokers, a 14x28″ Nordberg second-motion
-compressor. The shaft-rockhouse is similarly equipped to that
rra mine. The London mine also has an office, smithy, and a
ouse.
t the Polk County mine is an old equipment, consisting of 3
, with a hoist and air-compressors. There is a shaft-rockhouse,
l picking belt, and a changing-house.
al mine buildings at the Burra Burra include a general office,
house, machine-shop, pipe-shop, smithy and a large changing-
town, close to the mines, there are about 180 dwellings for
large commissary, and a Y. M. C. A. building, owned by the
aintained for the physical and moral welfare of employés.
50x100′ in size and 3 stories high, containing a 50x50′ gymna-
eys, library, reading rooms, etc. The company owns a fine
general manager, with large and commodious houses for chiefs
nd good dwellings for workmen, there being over 400 houses
The company maintains a 20-room hospital, having 2 physi-
d nurses, all expenses of which are paid by the company, with-
the men. The company also owns a club house, which is used
Club, a social organization composed mainly of employés.
's private railway connects all of the mines with the works, and
Copperhill, with the Louisville & Nashville railway, where
ard for interchange of traffic. The track is of standard gauge,
main line and 4½ miles of sidings and spurs, formerly laid
ut these have been replaced by 90-lb. rails, in and about the
plant, and the balance of the main line is being relaid with
pment includes four 105,000-lb. Schenectady locomotives,
rs ballast ore-cars, 10 gondolas and 11 miscellaneous cars.
a repair shop for locomotives and cars, fully equipped for
o standard rolling stock, and capable of completely rebuilding
This line, in 1910, handled 551,436 net tons in the company's
ns in foreign cars, with a total movement of 27,094 cars, hand-

Copperhill, a little north of the Tennessee mine, and 1 to 5
mines of the company, does a small amount of custom smelt-
signed and built by Mr. J. Parke Channing, and materially
mirably planned, material being handled by gravity through-
level are the ore-bins, having storage capacity for 10,000
of coke, and necessary fluxes and furnace products requiring
ges are drawn from the bins into cars of 44 cu. ft. capacity,
ocomotives, there being scales for weighing charges, and 4
er the bins and circle around the furnaces, so that a train
may go to any furnace, and return to the bins.
system of the Messiter type was completed and put in
his has belts that receive ore from the railway

tons yearly, with actual capacity somewhat greater. The plant ran during th latter half of 1908 at the rate of only about 4,000 tons of acid monthly, but pr duction was 12,175 tons in December, 1910, and 15,300 tons in March, 191 The foundations of the acid plant required 84,400 cu. yds. of earth excavatio and 12,000 cu. yds. of reinforced concrete, and the superstructure requir 7,220,000 lbs. of structural steel and iron, 900,000 sq. ft. of lumber, 140,000 ft. of roofing, 50,000 sq. ft. of asphaltum, 7,355 tons of quartz, 550,000 lbs. asbestos, 7,830,000 lbs. of lead, 270,000 fire-brick, 1,346,000 mechanical brid and 2,210,000 red brick.

As the furnace gases contain sulphur dioxide, sulphur trioxide, carbon dio ide, oxygen and nitrogen in considerably varying percentages, new method control were found necessary, to maintain the volume of production of sulphu ous gases suitable for making sulphuric acid by the chamber process. Aft some experimentation the problem was solved by equipping one of the small and 3 of the larger blast-furnaces with tight tops, above the charge floor, to e clude atmospheric air, these being connected with a dust-chamber 26x36x1 in size, where most of the solid matter is precipitated from the gas, the dus chamber being so constructed as to conserve the heat of the gases sufficiently t concentrate the acid in the Glover towers. There are two octagonal Glov towers, of 30′ diameter and 50′ height, with suitable nitre plants at the foot each. After passing through the towers, the gases are conducted through tw large lead flues of 200 sq. ft. sectional area, which deliver the fumes to the cha ber system, containing 4,600,000 cu. ft. of chamber space. In a general way th chamber plant is of conventional design, yet the enormous quantities of fume received, and acid produced, have brought about developments that are qu new to the industry, among the most notable being the size of gas connection acid lines, acid coolers and fans, which are all on a scale never before know The discharge from the chamber plant is conducted into 10 Gay-Lussac towe which also are of a gigantic size hitherto unknown, the 2 latest and largest bei octagonal, of 36′ diameter and 65′ height. The estimated capacity of 180,0 tons per year of 60° Beaumé chamber acid is now a demonstrated fact, n withstanding the damning with faint praise that has been bestowed so liberal upon this plant. The company has contracted for the sale of its entire produ tion of sulphuric acid, and for an even larger output of acid than 200,000 to yearly, at its own option, for a period of 10 years, to the International Agric tural Corporation, at a price understood to be $3 per ton, and received considerable bonuses under this contract. The acid production was 25,000 tons in 1908, nearly 50,000 tons in 1909, above 80,000 tons in 191 is expected to reach nearly or quite 200,000 tons in 1911. This acid plant, much the largest and most complete in existence, requires a f only about 30 men for its operation.

Production has been as follows: 1,948,759 lbs. fine copper in 7,961,734 lbs. in 1902; 10,690,389 lbs. in 1903; 8,617,697 lbs. in 1904; 7,9 lbs. in 1905; 11,319,591 lbs. in 1906; 12,599,019 lbs. fine copper, 14,905 old in 1907; 14 5 lbs. fine copper in 1908; 14,058,954 00 lbs. in 191

nts per lb. in 1905, 11.79 cents re treated were $2.81 in 1905, I yielded an average ex tion being due mainly rt of the year, owing 1910. Low-gra all other cas the case of th hanging fo

meth

allation of its acid plant, by virtue of which a very serious handicap ed into a permanent source of large revenue. The company is man- siness ability and technical skill, and its annual reports are un- lete and satisfactory, giving detailed figures that are thorough, and areholders and others interested with ample material for an ade- anding of the company's resources, operations and results.

-SONORA COPPER CO. **MÉXICO.**

Chattanooga, Tenn. Letters returned from former works office, ., and former mine office, Fronteras, Arizpe, Sonora, Mex. Lands outheast of Douglas. Company planned beginning development 909, but apparently failed to do any work. Idle and apparently

MINERA TEODORA DE CHUQUICAMATA. **CHILE.**

turned unclaimed from former office, Valparaiso, Chile. Mine uicamata, Calama, Antofagasta, Chile. Organized July 20, 1901, Chile, with capitalization 120,000 pesos, shares 100 pesos par. No tions secured. Apparently moribund.

NE. **JAPAN.**

ce: Saretani-mura, Iyo-gori, Iyo, Japan. Ore is chalcopyrite, h iron pyrites, carrying 4 to 5% copper. Vein, traversing chloritic up to 7′ width, with an average of 12″ to 24″ only. Production, 74 lbs. fine copper. Idle some years.

ERES. **MÉXICO.**

y Velardeña Mining & Smelting Co., at Velardeña, Cuencamé, c.

PER SYNDICATE, LTD. **TRANSVAAL.**

ormer office was Permanent Bldgs., Johannesburg, Transvaal. n was mine manager. Organized under laws of Transvaal, with £10,000, and was said to have started existence with a working 00. Property was the Farm Waterplaats, and a year's option, at adjacent farms Lucasrust and Kopermijn, the two latter farms a of approximately 2,000 morgen. The mine had a 90′ shaft, hort drifts. Formerly at Pietersburg, Zoutpansberg, Transvaal.

SORA. **MÉXICO.**

d mine: Calmallí, Norte, Baja California, Mex. Emilano and manager. Property carries highly auriferous and argentifer- s, and is equipped with a small steam plant and a 10-stamp mill.

SONORA MINING CO. MÉXICO.

05 Kemper Bldg., Kansas City, Mo. Mine office: Suaqui de onora, Mex. Dr. J. C. Rogers, president; J. B. Hinthorn, vice- . L. Hines, secretary; Geo. E. Wittich, treasurer; Stanley F. endent. Organized 1905, under laws of Arizona, with capitaliza- , shares $1 par, and holds title to lands through ownership of tock of the National-Wardwick Consolidated Mining Co., S. A., r laws of México.

hectares, area circa 830 acres, in 2 groups, known as the Wardwick 1 mile from the Yaqui River and 9 miles from Suaqui de Batuc, the Todos Santos mine, an antigua once having a smelter, as large slag dump. The old workings were shallow, only oxidized en mined and smelted, but the property is said to have been a oducer, long ago, though records are lacking. The mine shows dy, carrying oxidized and sulphide ores, claimed to assay oz. silver, which claims seem excessive, and the g 28.7% copper, 2.8% lead and 139 oz. silver he 75′ Mendosa tunnel, and a 65′ shaft, claimed

to have yielded 150 tons of ore of $19.31 average assay value. Work was resumed, 1909, after 2 years idleness.

TESORA SILVER MINING CO. UTAH

Dead. Formerly at Silver City, Juab Co., Utah. Described Vol. VIII.

TETER-STONE AZURITE MINING CO. ARIZONA

Mine office: Dragoon, Cochise Co., Ariz. Dr. D. W. Teter, president; J. B. Stone, manager. Lands, 3 miles south of Dragoon, have a 4′ to 10′ contact deposit, between limestone and granite, showing outcrops of azurite and malachite, with sulphide ore shown in a tunnel. Early 1910 the company planned building a small Partridge hot-blast furnace, and a cyanide plant. Presumably idle.

TETON COPPER MINING & SMELTING CO. WYOMING.

Dead. Formerly at Jackson, Uinta Co., Wyo. Described Vol. IV.

TEXADA CONSOLIDATED MINING CO. BRITISH COLUMBIA

Office: Seattle, Wash. Mine office: Van Anda, Texada Island, B. C. G. L. Tanzer, president; D. Pabst, vice-president; M. Nally, secretary. Lands, 8 claims, known as the Raven group. Company also held, circa 1906, a bond on the Cornell mine. Presumably idle.

TEXADA COPPER MINING CO. BRITISH COLUMBIA

Dead. Formerly at Van Anda, Texada Island, B. C. Fully described Vol. V.

TEXAS-ARIZONA MINING CO. ARIZONA

Mine office: Dragoon, Cochise Co., Ariz. J. Q. Marrion, president; J. R. Hubbard, general manager. Management was changed, 1910.

Lands, near the Centurion mine, are about 20 miles from Dragoon, west of the Gunnison Hills. The mine has a shallow incline shaft, and a vertical shaft that was 120′ deep January, 1911, showing argentiferous lead and copper ores, with small copper values. The company shipped 5 carloads of ore, March to June, 1910, to El Paso, aggregating 45 tons of first class and 75 tons of second class ore, netting $3,328.65, the last carload, of 20 tons, carrying about 60% lead, 125 oz. silver and $3 gold per ton, with small copper values, netting $2 058.22. Was developing, with a small force, early 1911.

TEXAS CONSOLIDATED MINES & POWER CO. CALIFORNIA

Dead. The mine carried auriferous copper ore, with values mainly in gold and is said to have produced circa $1,000,000 gold, in 8 years previous to 1904. Equipment included electric power and a 20-stamp mill. Property was sold circa 1904, to W. H. Garlick. Formerly at Redding, Shasta Co., Cal.

TEXAS COPPER CO. ARIZONA

[illegible] office: Tucson, Pima Co., Ariz. Chas. F. Hoff, president and [illegible] [illegible]ization $3,000,000, shares $1 par. Lands, 3 claims, unpat[illegible] [illegible]ne-half mile north of the Gould mine, in the Amole distr[illegible] [illegible] of Tucson. Mine has a 35′ shaft and a 140′ tunnel, [illegible] [illegible]n with copper stains. Presumably idle.

T[illegible]ER MINING CO. MÉX[illegible]

[illegible]rio de Tesopaco[illegible]os, Sonora, Mex. W. W. H[illegible] [illegible]ounts. Org[illegible]07, under laws of Colorado [illegible] [illegible]y Ernest [illegible] E. Ewen and Luther A. [illegible] [illegible] Tesop[illegible]vas. Was developing [illegible] [illegible] Nat[illegible]o., Hermosillo. Idle.

MÉX[illegible]

[illegible]ffice: La Aur[illegible] Tez[illegible] Jersey, with [illegible] zation [illegible]wnership of [illegible] stock issue.

TEZIUTLÁN C[illegible] MÉX[illegible]

Office: 82 B[illegible] Teziutlán, Puebla, [illegible]

, president, treasurer and general manager; Stephen W. Reynolds, Chas. J. Peabody, second vice-president; preceding officers, A. , W. J. Best, E. W. Gould, Jr., Henry L. Nelson, Henry Shepard ter, directors; Donald C. Brown, assistant general manager; T. rs, mine superintendent; R. L. Lloyd, smelter superintendent.

April, 1905, under laws of New Jersey, with capitalization ıares $100 par. Controls, through entire stock ownership, the ber Co., and has a close working arrangement with the Compañía no. Regular dividend rate is 6% per annum, and dividends were 3; $350,000 in 1904; $495,216 in 1905; $800,000 in 1906; $800,000 00 in 1908. Net earnings were $914,013 in 1904, and were said ed $1,000,000 in 1906. State Street Trust Co., Boston, transfer l meeting, first Thursday in June.

ude La Aurora mine, area circa 4,500 acres, 10 miles from Teziu- ; 130 miles east of the City of México, with a 16-acre smelter-site, acres of miscellaneous lands, including La Chignautla limestone 3 miles from the smelter. Los Ocotes group has an area of 240 climate is equable, and the mines are surrounded by fine arable adequate supply of labor of good character.

mine, opened mainly by tunnels, has developed a considerable ous and argentiferous chalcopyrite, associated with sphalerite, assays of about 8% copper, up to 200 grams silver and 5 grams ton, with circa 15% iron, 20% sulphur, 10% calcium carbonate

s group, area 240 hectares, bought October, 1905, is 2½ miles Martín, Ejutla, Oaxaca, Mex., and includes the San Juan mine, the few copper properties that has paid for development, from ce inception, and, in addition, has given a profit, the mine having producer since 1900. This property shows 4 fissure veins, in hich one, developed in the San Juan mine, of 2′ to 30′ in width, meters, carries lenticular deposits of argentiferous chalcopyrite, bunches of galena in the oxidized zone, but is without zinc, anti- r bismuth, gangue ranging from quartz to fine-grained quartzite, irregular in course and pitch. The ore averages 4 to 5% copper, per metric ton, with a trace of gold, and the mine has produced carrying up to 11% copper and 4 kgs. silver per metric ton. De- 4 shafts, one for ventilation. The San Juan or main shaft is 200 th 10 levels opened, and is connected, on the 7th level, with the 00 meters to the north, of 164 meters depth, having 9 levels. The haft, 475 meters south of the San Juan, is not yet connected with ngs. The mine is quite dry, making only about 25,000 gallons

A large amount of argentiferous copper ore has been blocked 1908, at 40,000 tons, developed by about 4,000′ of workings,

at the San Juan mine of Los Ocotes group includes steam, gas and h steam hoists good for 500 meters depth, at the San Juan 6-drill Rand air-compressor. There also is an old wners, near the San Juan shaft. The production of f concentrates, yielding 121,000 lbs. fine copper r the old management, since greatly increased. arrow-gauge railway, of 10.7 miles length, ere connection is had with the Interoceanic rly operated electrically, now has 2 Shay a Rogers switch-engine at the works. A e port of Nautla, on the Gulf of México,

a distance of 100 miles, which would give a direct outlet, and reduce transpor-
tion charges, which are very high at present.

The company has 2 aërial tramlines, the lower of 50 metric tons hou
capacity, carrying ore and limestone, and the upper, of 15 metric tons hou
capacity, with automatic loading and dumping devices, carrying limestone

The old smelter, near La Aurora mine, has 3 blast-furnaces, and is of abo
300 tons daily capacity. The new smelter, 17 kilometers from Teziutlán
thoroughly modern in design and equipment, having been remodeled and blo
in Apr. 8, 1910. Buildings are all of concrete and steel, and the flow of mate
is by gravity throughout. Ore is brought from the mine in trains of 4 cars ea
passing over a gravity tramway equipped with scales, and dumped in two
of six 250-ton ore and flux bins, built of 3-16″ steel, having pneumatic ga
There are two 500-ton blast-furnaces, each 48x240″ at the tuyeres, doing
pyritic smelting, requiring about 7½% charges of Connellsville coke, charged
cars taking current from a third rail, with motors mounted on the axles, ore
dumped into 65-ton charge-hoppers above each furnace. Each hopper is
vided into 6 vertical sections, for half the height, each section having 2 ga
operated hydraulically by banks of levers in front of the furnace, permit
charging to any part of each furnace desired, as charging can be done at 10 di
ent points independently. The discharge of the water-jacket piping is vis
The furnaces have 11′ circular settlers, of 4′ 6″ height, with 18″ linings, pro
with cooling pipes. Under the furnace floor is a 4x7′ concrete-lined slag-tu
which also cares for drainage, slags being granulated and washed out by a
of water into the river, the launder having a 45′ fall. A 10′ steel balloon
leads from the furnaces to the 150′ steel stack, of 14′ diameter, set on a 30′
crete base.

The converter department, occupying an extension of the furnace buil
has a 30-ton electric crane, of 40′ span. There are 2 stands, and six 84
shells, with fusible disks, tilted electrically. Blister copper is cast into 10
pigs, in tilting moulds carried on trucks, and converter bars, averaging
in copper tenor, are exported through Vera Cruz, for refining at the Perth A
works, and electrolytic copper is marketed by L. Vogelstein & Co.

The power plant at the smelter has 5 Connersville blowers, of 10,000
capacity each, driven by 100-h. p. individual motors, for furnace blast
40x42″ Nordberg double blower, rope-driven by a 350-h. p. motor, for
blast. There are 2 hydro-electric power plants, and the cost of electric po
figured at only $14 per h. p. year, exclusive of interest and insurance. The
h. p. hydro-electric installation at the smelter takes water from the T
Xolat River, through a 3,600′ flume, under a head of 150′, the company
a government concession for 2,500 liters of water per second from that
The [illegible]nd hydro-electric power plant, on the Atexcaco River, 9 kil
fro[illegible]elter, has about 3,000 h. p. available, partially developed
1,5[illegible]ro-electric plant of 4 units, driven by Pelton wheels under
of 1[illegible]ng current at 6,000 volts, which is carried by double tra
line[illegible]ly adequate for the entire load, and stepped down to
in a [illegible]on at the smelter.

P[illegible] 788,404 lbs. fine copper in 1902; 6,786,488 lbs. [illegible]
7,512,2[illegible] 012 oz. [illegible] 057 oz. gold in 1905. The
was clo[illegible] work continued in the
and the [illegible] late 1908, but was
and again [illegible]
12,000,000 [illegible]
at th[illegible]
is [illegible]

ONSOLIDATED COPPER MINES, N. L. TASMANIA.
Organised circa 1893. Property was 26 acres, leasehold, on the
; of the Mt. Lyell field. Was one of the early-day attempts at
district. Formerly at North Mt. Lyell, Montagu Co., Tasmania.
ULPHUR & COPPER CO., LTD. SPAIN.
136 West George St., Glasgow, Scotland. Mine office: Alosno,
ı. Works offices: Hebburn-on-Tyne, Durham, Eng.; Willington,
ınd, Eng., and Cardiff, Glamorganshire, Wales. Sir James King,
an; preceding officer, Etienne M. Chalvet, Albert J. J. Messéan,
Louis O. Schmidt, René Millet, Thos. Alexander, Jas. Couper and
ennant, Bart., directors; Geo. Reid, secretary; Wm. P. Rutherford,
ger.

l Oct. 27, 1866, under laws of Great Britain, with capitalization
ıares £2 par. Dividends, begun 1868, have been paid since, with-
of a single year, this dividend record being comparable, among
only with that of the Quincy Mining Co. of Michigan. The divi-
ments have averaged upwards of 19% per annum since 1868, and,
1909, aggregated 820⅔%, amounting to the magnificent total of
ıtting this company well to the front among the profitable mines of
be. In addition to dividend disbursements, the company has
ns aggregating £2,458,499, and on Dec. 31, 1909, had £1,022,302
ı and choice securities. Net profits of operations have ranged from
£27,052 in 1868, to a maximum of £478,878 in 1899, with £225,135
147 in 1906, £261,023 in 1907, £137,377 in 1908, and £162,743 in

lude the Tharsis group, area 1,143 hectares, the Lagunazo group,
ıres, near Alosno, about 30 miles west of the Rio Tinto mine, and
Zarza group, area 618 hectares, near Calañas, and midway between
d Rio Tinto mines. The mines at Tharsis, worked by the Romans
by the Phœnicians before them, are identified by some with the
Bible. General geological conditions are much the same as at the
e mines being in the southern zone of the Andevallo or Sierra
:t of Huelva. The Tharsis group carries 4 main ore bodies, these
rally SE. strike. The largest ore body is the Filon del Norte, at
having an extreme width of 140 meters, and length of about 600
Filon de Sierra Bullones nearly adjoins the Filon del Norte, with a
trend, and the Filon del Centro, or Filon del Medio, is next in line,
ed by the Criadero del Sur, the most southerly of the ore bodies.
also works the Almagrera mine, about one mile southeast of the
harsis group.
azo mine has not been a copper producer, except from old leach-
e years, but shows a large quantity of ore rich in sulphur, though
r tenor that it scarcely can be termed copper ore. There are large
rtially leached ore at the Lagunazo mine, which continue to yield
of cement copper.
ll of the Tharsis mines is a massive cupriferous pyrite, formerly
opper, 50% sulphur and 45% iron, with very small quanti-
zinc, nickel, bismuth, antimony and arsenic, but with
percentage is decreasing. The mines, however, far
normous reserves of ore, low in copper, but of excel-
profitable, notwithstanding the decrease in
79,432 long tons of ore from the Sierra
moval of 226,859 cu. m. of overburden,
ction, for the year, of 373,075 tons
ined in 1908.

at last accounts. Lands, lying immediately north of the holdings of the Mag Murphy Copper Co., have an 85′ shaft, showing auriferous copper ore, with v ues mainly in gold. Equipment includes a small steam plant. Presumably i

THREE FORKS COPPER MINING CO. MONTA

Mine office: Three Forks, Gallatin Co., Mont. Herbert G. Dunbar, sup intendent. The mine has a 300′ shaft, developing somewhat bismuthi ore assaying up to 20% copper, with small gold and silver values. Equip includes steam power and an air-compressor. Was developing, with a sm force, at last accounts.

THREE JAYS COPPER CO. BRITISH COLUMB

Dead. Mine, near the Alberni Canal, made several small shipmen copper ore to the Tacoma smelter, 1901-1902, but was out of business, 19 Formerly at Alberni, Vancouver Island, B. C.

THREE MAN MINING CO. ALASK

Office: 31 Nassau St., New York, N. Y. Mine office: Landlock, Pri William Sound, Alaska. W. A. Dickey, president and general manager. Orga ized under laws of New York, with capitalization $5,000, and is a close corpo tion, having only 3 shareholders.

Lands, 43 claims, 10 patented, area 812 acres, on tidewater, at Landl Bay, which has a good harbor. The property, which has been under contin development since 1903, shows 12 ore bodies having a general EW. strike, occ ring as fissure veins and as deposits in shear zones in greenstone, of 1′ to 6 reported width, of which 4, under development, average circa 10′ in width, carr ing chalcopyrite of good average grade, occurring in lenticular shoots. Low-gra ore is continuous, with rich ore found mainly on the footwall, in paystreaks of to 8′ width, and 50′ to 75′ length, the largest shoot carrying massive chalco rite assaying 22 to 26% copper, the rich shoots being estimated to average 10 copper, 1.5 oz. silver and 50 cents gold per ton. The quantity of low-grade o of concentrating tenor is very much greater than that of the smelting ore, but t concentrating ore is not available for present use.

The mine is developed by tunnels of 50′, 225′, 90′, 225′ and 165′, Nos. 1 and being connected by a 65′ raise, all in ore, and the mine, having upwards of 3,00 of workings, was estimated, by the management, to have about 10,000 tons high grade ore partially developed, December, 1909. A test shipment of ci 150 tons gave returns of about 12.5% copper. No stoping has been done, all o produced having been extracted from levels and upraises.

The mine has no machinery or power equipment, owing to development tunnel, but has 12 small buildings, with ore-bunkers on a wharf at tidew connected by a short ground-tram with the portal of the 5th level. Produ was about 600 tons of 10% ore, 1910, shipped to the Tacoma smelter, y circa 1[illegible] lbs. fine copper. Property considered promising.

THRE[illegible]NING CO. WYOMI

D[illegible] Herbst was superintendent. Property, slightly o showin[illegible] was developing, with a small force, circa 1909. Form at Shos[illegible] Co., Wyo.

THUMB[illegible]G CO. ARIZO

Office: [illegible] Mine office: Dome, Yuma Co., Ariz. J. P Moffitt, pre[illegible] vice-[illegible]nt; J. L. Lee, second vice dent; H. E. P[illegible] Ming, secretary and tre preceding officer[illegible] Theobold, superinte Organized circa J[illegible]

Land[illegible] main sh[illegible] carryin[illegible] estimat[illegible] press, Sep[illegible]

Equipment includes a 12-h. p. gas engine. Management
mill, 1910, but apparently failed to build same.

'E MINING & MILLING CO. **ARIZONA.**

: Prescott, Yavapai Co., Ariz. Lands, 4 claims, area 240 acres,
st of Prescott. The property, having a fair surface showing, is
everal short tunnels, showing argentiferous and auriferous cop-
average grade. Idle, except for annual assessment work.

EEK MINING CO. **WASHINGTON.**

: Marblemount, Skagit Co., Wash. Lands, in the Thunder
the Cascade district, in the eastern part of Skagit county, carry
rgentiferous lead, copper and zinc sulphides, developed by several
els, said to show ore of both smelting and concentrating grades.
al mine buildings.

THÜRINGISCHE KUPFERBERGBAU SCHAFT. **GERMANY.**

rl Gürtler was manager; preceding officer, Alb. Heinel, J. W.
D. Haspelmath, directors. Organized under laws of Germany,
ion 1,000 shares, apparently without assigned value. Lands
arl Alexander, Sophie, August, Bernhard and Wilhelm Ernst
senach and Gotha, and the Hermann, Vatersegen, Vereinigte-
claims near Lauröden. The company is said also to have
circa July, 1902, near Ohrdruff, where a 240-meter tunnel was
rly at Gotha, Saxe-Coburg-Gotha, Germany.

DE PROPRIETARIOS DE LAS MINAS DABO. **SPAIN.**

ncada 31, Barcelona, Spain. Mine office: Cassolas, Barce-
roperty is the San Gervasio de Cassolas mine, carrying chalcopy-
years and apparently moribund.

MONTANA.

rned unclaimed from former office and mine, Butte, Silver Bow
a. O. Clymo, superintendent. Property is owned by Jas. A. Mur-
ate of Silas F. King. Lands are one fractional claim, area only
ring between the Bell and Wild Bill mines of the Anaconda, and
nd Edith May claims of the North Butte, developed by a 600'
the vein, with levels opened at 300', 500', 550' and 600', said to
re in the bottom, which statement apparently is not fully demon-
was resumed circa Sept. 1, 1908, but was stopped by an injunc-
the Anaconda Copper Mining Co., and litigation was in prog-
mutual charges of illegal extraction of ore. Idle.

E TIERRA AMARILLA. **CHILE.**

ociedad Industrial de Atacama.

EASING CO. **UTAH.**

: Bingham Canyon, Salt Lake Co., Utah. Geo. Bellinger,
t last accounts. Is controlled, through stock ownership, by
Property is, or was, a lease of the Tiewaukee mine, now owned
Bingham Consolidated Mining Co., and some ore was shipped
Presumably idle.

ARIZONA.

le St., Chicago, Ills. Mine office: Harrington, Yava-
Scherer, manager; Stanton W. Forsman, superin-
Eagle and Oro Bella mines, carrying auriferous
ed by 8 tunnels and a 400' shaft. Property
alues in silver and copper. Equipment
compressor, and there is a 20-stamp
t 35 men, at last accounts. Pro-
d 4,313 oz. gold in 1907;

Berwind and Kenneth B. Schley, directors; J. W. D. Moodie, general manager; Thos. Penrose, mine superintendent. Organized August, 1896, under laws of West Virginia, with capitalization $3,000,000, shares $5 par, and reorganized January, 1906, under laws of Maine, with capitalization $600,000, shares $1 par. Is controlled, through stock ownership, by the Tintic Co., and is operated as a close corporation, making no public reports. Property was mortgaged, 1910, for $150,000, jointly with the Yampa Smelting Co. and West Mountain Tramway Co., to secure a $675,000 issue of 8% gold bonds.

Lands include claims near the Mammoth, Grand Central and Centennial-Eureka mines in the Tintic district, having a 300′ shaft, with a power plant and air-compressor. Heavy expenditures on this property gave indifferent results and it has been idle several years.

Lands, 30 claims, area circa 180 acres, on Carr Fork, Bingham Canyon, near the Ohio mine, and adjoining the Utah Consolidated on the north and Boston Consolidated on the west, carrying a contact deposit of 10′ minimum, circa 37′ average and 200′ maximum width, between a quartzite foot and limestone hanging, this being among the largest ore bodies in the Bingham district outside of the properties having disseminated porphyry ores. The contact deposit carries disseminated chalcocite, covellite and chalcopyrite, formerly estimated to average 3.5% copper and $2 to $5 per ton in combined gold and silver values, but said, 1908, to have averaged 1 to 3% copper, 2 oz. silver and $1.50 gold per ton, while smelter returns for 1909 were only about 1.7% copper and probably under $2 per ton in combined gold and silver values. The ore has a considerable excess of iron, rendering it valuable for smelting the highly silicious ores common to the Bingham district.

Development is almost exclusively on the Yampa mine, a fractional claim of less than 6 acres area, entirely surrounded by the Utah Consolidated, the Yampa being developed by 2 tunnels and a shaft. The Craig haulage tunnel, on the 1,200′ level, is 3,248′ long, intersecting the main vein at about 2,200′ from the portal, and connecting with the shaft at 2,448′. The upper or Yampa tunnel intersects the shaft at 475′ and runs about 1,000′ on the vein. The 1,700′ shaft has 3 compartments, and is operated in 2 sections, one from the 400′ level to surface, and one from that level to the 1,200′ level, with balanced hoists. There are 12 levels opened, approximately 128′ apart. Ore from the upper workings is sent down the shaft to the Craig tunnel, which has an electric haulage equipment with 2 electric locomotives, taking trains of six 3-ton cars. The tunnel was straightened and track relaid with heavier rails, 1907. As the ground is heavy solid timbering is required, the mine using large quantities of sawed Oregon pine in square sets, with an extra outer post 3″ from the regular set, which is removed when the limestone crushes into the workings, and a new post put in, without disturbing the regular set. The mine also uses trussed timbers for lagging.

The power plant, near the portal of the Craig tunnel, has steam and electric equipment, with an electric hoist at the head of the blind shaft, on the 400′ level, and an auxiliary hoist actuated by compressed air. There is a 35-drill Ingersoll-Rand 2-stage air-compressor, direct-connected to a 200-h. p. motor.

The mine is served by the West Mountain Tramway Co., controlled also by the Tintic Co., which has a 12,270′ Leschen aërial tram, the longest in the district, of 700 tons daily rated capacity, having 600-ton ore-bins at the upper terminal, connecting with the Yampa smelter at the lower end. The tram cost about [illegible] per ton on cost of transporting ore.

[illegible] lbs. fine copper in 1905; 4,699,785 lbs. in [illegible] lbs. in 1908; 6,500,000 lbs. in 1909 and 6,1[illegible] to the Yampa Smelting Co., and, though small, is considered rich

LVER CROWN MINING CO. **UTAH.**

508 Auerbach Bldg., Salt Lake City, Utah. Mine office: Mam- Co., Utah. Hon. John A. Edwards, president; Dr. L. W. Snow, nt; Mansfield L. Snow, secretary, treasurer and general manager; fficers, C. E. Cole and M. K. Green, directors. Organized Aug. 20, · laws of Utah, with capitalization $1,000,000, shares $1 par, non- fully issued.

25 claims, area circa 500 acres, well watered and carrying some tim- Blue Belle district of the West Tintic, 8 miles from a railway. The hich was a small producer, circa 1883, shows fissure veins in por- ks, and contact deposits in crush zones in quartzite, carrying out- giving good assay values. There are 10 ore bodies, of which 3 are y three 50′ shafts and tunnels of 40′, 40′, 40′, 100′ and 250′, the mine it a quarter-mile of workings. One vein shows a 10″ paystreak of ena, estimated at 70% lead, 12 oz. silver and 75 cents gold per ton. includes a small steam plant and an air-compressor.

ELTING CO. **UTAH.**

Provo, Utah. Works office: Silver City, Juab Co., Utah. Chas. president; Jesse Knight, vice-president and general manager; H. E. retary; John Pingree, treasurer: Bela Kadish, superintendent; pre- ers, David Eccles and Col. C. Edw. Loose, directors. Organized ber, 1906, with capitalization $500,000, shares $1 par.

y is a reduction plant, built 1907–1908, of about 350 tons daily hich was planned as the first unit of a 700-ton smelter. Main e of steel frame, and the works include a small sampling mill. The two 14x60′ hand-roasters, 4 Kelly sintering converters, and three l furnaces. A 125-ton blast-furnace for copper is in a separate ling. The plant was blown in 1908, and blown out September, 1909, g an operating loss said to have been $211,000 in one year, with a cluding the cost of the plant, of nearly $1,000,000. The plant is of gn, well equipped, and well located for receipt of lead ores, with copper ore available, but was put out of business, not through high tated in the press, but mainly because of its inability to secure a riety of ores to permit satisfactory furnace mixtures. The unfor- ience of this plant, which was honestly built and managed, shows ly difficult it is to compete, on a commercial basis, with the American Refining Co., in its own field. Although the smelter has been offered on the dollar of its cost, no buyer has been found.

ANDARD MINING CO. **UTAH.**

422 Judge Bldg., Salt Lake City, Utah. Mine office: Eureka, Utah. E. J. Raddatz, president, treasurer and general manager; , vice-president; Geo. F. Busch, secretary; preceding officers, A. N. nd Jas. Beveridge, directors; John Westerdahl, superintendent. ct. 2, 1907, under laws of Utah, with capitalization $1,000,000, r, assessable, reported by the management to be fully paid, with levied amounting to $31,191.82 to Feb. 2, 1911; issued, $895,000. ing, Sept. 15th each year.

11 claims, patented, area 185 acres, 2½ miles from a railway, in the district. The property shows limestone and porphyry, carrying 2 ith NS. strike and dip of 55° W., reported as fissure veins in lime- ng argentiferous and auriferous lead and copper ores, with values d ores of low average tenor, reported by the management to assay to 50% lead, 1 to 105 oz. silver and $1 to $15 gold per ton. The reports the main ore body as 200′ wide. The mine has an old in- nd a 1,000′ shaft, with nearly a mile of workings. The 1,000′ level

was said to give a promising showing, and the ground southeast of the shaft was being tested by diamond drilling, from the bottom, late 1910.

Equipment includes a 100-h. p. steam plant, with an 80-h. p. double cylinder hoist, good for 1,500′ depth, and a 3-drill Rand air-compressor. There are 3 buildings. The management plans continuing sinking and drifting.

TINTIC VOLCANIC MINING CO. UTAH.

Office: 26 Walker Bank Bldg., Salt Lake City, Utah. Mine office: Eureka, Juab Co., Utah. R. A. Barney, president; Nicholas Comes, vice-president; E. H. McBeth, secretary and treasurer. Organized Apr. 1, 1909, under laws of Utah, with capitalization $100,000, shares 10 cents par, assessable issued, $70,000. Lands, 5 claims, unpatented, adjoining the Tintic Standard on the east, having a shallow shaft showing argentiferous and auriferous lead and copper ores.

SOCIEDAD DE LAS MINAS DE COBRE TINTO y SANTA ROSA. SPAIN.

Office: Rue Archimedes, 1, Brussels, Belgium. Mine office: Zalamea la Real, Huelva, Spain. Capitalization, 3,000,000 francs. Lands, 114 hectares including El Tinto, Santa Rosa and 9 other old mines. Property includes a 7-kilometer aërial tram to Calañas, and is leased to the United Alkali Co., Ltd.

TIPTON COPPER CO. NEW MEXICO.

Dead. Formerly at Tularosa, Otero Co., N. M.

TIP TOP COPPER CO. ARIZONA.

Office: Commonwealth Bldg., Philadelphia, Pa. ~~Letters returned unclaimed~~ from former operating office, 7 Coles Blk., El Paso, Tex. Mine office: Helvetia, Pima Co., Ariz. Geo. A. Aman, president; S. Charles Pratt, vice-president and general manager; Jos. Chamrod, superintendent, at last accounts. Organized 1902, under laws of Arizona, with capitalization $1,150,000, shares $1 par.

Lands, 24 claims, area 400 acres, including the Tip Top and Copper Dale claims, also a 100-acre millsite, in the Helvetia district, showing 3 contact veins averaging 14′ width, carrying carbonate and sulphide ores, giving average assays of 5% copper and 1 oz. silver per ton, with a trace of gold, opened by 7 shafts of 10′ to 150′ depth, and several tunnels, longest 958′, with about 4,000′ of workings, said to develop considerable ore. Equipment includes gasoline power. Was bonded, 1907, to Guggenheim interests, for $250 000, with cash payment of $75,000, but both parties to bargain were dissatisfied, and property reverted to owners. Made considerable ore shipments, 1906–1907. Production, 1906, was 298,890 lbs. fine copper. Property considered promising. Presumably idle.

TIP TOP COPPER CO. NEW MEXICO.

Dead. Was akin to a swindle. Lands were sold, circa 1906, to Bear Mountain Copper Co., for $15,000, giving shareholders a dividend of one mill on the dollar. Formerly at Silver City, Grant Co., N. M. Described Vol. VI.

TIP TOP MINE. ONTARIO.

Office: Port Arthur, Ont. Mine office: Kashaboiwe, Rainy River district, Ont. Col. S. W. Ray, manager; Richard Sandoe, superintendent, at last accounts.

Lands, 4 claims, freehold, area 336 acres, being locations K62, K63, K64 and K65, 6 miles from Kashaboiwe, on Round Lake, in Moss township, showing schist and diorite, carrying 3 contact deposits, ranging up to 150′ in width, with 2 ore bodies, of 25′ estimated average width, carrying circa 18′ of ore giving average assays of 7% copper, 5 to 12 oz. silver and $1 to $2 gold per ton. Development is by shafts of 50′ and 208′, with 640′ of workings, estimated to show 45,000 tons of ore, which seems excessive. The mine is said to have blocked out a considerable amount of ore, of 4 to 6% in copper tenor, on a vein ranging up to 60′ width in the bottom workings.

Equipment includes a 100-h. p. steam plant, with 10-h. p. and 30-h. p. hoists, and a 5-drill Ingersoll-Sergeant air-compressor. Part of the material for a smelter was secured 1907, but the smelter was not built. Idle.

IINERA DEL TIRO GENERAL, S. A. **MÉXICO.**

Ojocaliente No. 8, Aguascalientes, Mex. Mine office: Charotosí, Mex. J. G. Creveling, Jr., president and general manager; e-president; G. B. Wardman, secretary and treasurer; preceding Vestlund, and W. F. Layer, directors; DeWitt Creveling, superid Kilpatrick, mine superintendent; Jesús G. Robledo, engineer. 31, 1902, under laws of México, with capitalization 60,000 l later to 375 000 pesos, shares 100 pesos par, fully issued and e company has only 35 shareholders. Dividends were 150 000 70,000 pesos in 1906; 206,250 pesos in 1907; 48,750 pesos in 1908, 0 pesos, and the company reports total dividends of 626,250 pesos 0. Annual meeting, during last two weeks of July, on a date directors.

ertenencias, area 178 acres, with a 46-acre millsite, and a 50-acre nado district. The property, which is an antigua, known as the Charcas, discovered A. D. 1583, worked on a small scale for 3 a larger way since 1859, shows 2 main ore zones, carrying fissure y, near a limestone contact, with a generally EW. strike and dip The North vein, of 3 to 8 meters width, with known length of 500 d to depth of 410 meters, by shafts of 1,361′, 1,197′, 984′, 426′, and 180′, developing chalcopyrite, and sphalerite estimated by t to average 2% zinc, 430 grams silver and 8 grams gold per met- are 9 tunnels, 4 being reported by the management to be of 5 being reported to be of 1,312′ each, which seems remarkably c, the mine having 13,123′ of workings, Feb. 18, 1911. The mine oy about 750 men.

includes a 700-h. p. steam plant, with hoists of 100-h. p. and 10-drill air-compressor, and some use is made of malacates, at hafts. Fuel is Mexican Rosita coal, costing 15.50 pesos per a yearly consumption of about 4,000 tons. Buildings include an 50x50′ combination smithy and carpenter-shop, a well-equipped eneral store, office, laboratory, warehouses, a hospital, 5 dwell-, and accommodations for 40 Mexican families, the main structone. There is a 10-stamp mill, and a 150-ton concentrator, built of stone and sheet iron, having 7x12″ and 10x20″ Blake ts of rolls, with trommels and other necessary equipment. This n, Steele & Steele pneumatic dry concentrators, treating all the d giving a preliminary lead concentrate, cut out from the final zinc latter being a 45% zinc product, secured largely from rosin jack. y has a private 30″ narrow-gauge railway, known as the Central .1 kilometers length, running to Charcas, where connection is xican National line.

was 40,449 metric tons of ore, of 2.27% average copper tenor, circa 50,000 metric tons of ore, averaging 2.1% copper, in 1910. 1,929,036 lbs. fine copper in 1904; 2,281,761 lbs. in 1905; 1907; circa 2,100,000 lbs. in 1910. The property is considered anagement good.

. MINING CO. **OREGON.**

Nugget, Douglas Co., Ore. Property is a gold-copper mine, ly in gold, equipped with a small steam plant, 5-stamp mill and lant, employing about 15 men, at last accounts.

PPER CO. **ARIZONA.**

nerly at Williams, Coconino Co., Ariz. Fully described Vol. VIII.

US. **CHILE.**

works office: Olmué, Limache, Valparaiso, Chile. Lands, 12 the railway station of Limache, include the Felicidad, Abundan-

cia and Veta Grande mines, showing large quantities of low-grade auriferous a argentiferous copper ore. The smelter has 1 reverberatory furnace, and trea 1,300 metric tons of ore averaging 3.5% copper, producing therefrom ejec 46.89% average copper tenor, carrying 79,702 lbs. fine copper, in 1903. P sumably idle.

TOBACCO ROOT RANGE MINING CO. MONTA

Dead. Formerly at Mammoth, Madison Co., Mont.

SOCIEDAD BENEFICIADORA DE TOCOPILLA. CHI

Office: Valparaiso, Chile. Works office: Tocopilla, Antofagasta, Ch Organized Sept. 7, 1906, under laws of Chile, with capitalization £200,000, reduced to £180,000, shares £1 par. Is controlled, through ownership of of the issued stock, by H. B. Sloman. Company bought, circa 1909, the properties of the Anglo-Chilian Nitrate & Railway Co., Ltd.

Lands, 520 hectares, near the port of Tocopilla, including the San H Altamira, San Carlos, Feliciana, Colorado and Buena Vista mines, taken from the Anglo-Chilian Company, also the Deseada, San José, Perc Janequeo and Abandonada mines, all old properties, worked more or less in past, and now in process of rehabilitation. The company is experimenting electric rock drills.

The Mina Deseada is an old property, badly opened for modern wor having vertical shafts of 130 and 280 meters depth, and a 280-meter partly timbered, with workings for a length of circa 400 meters, on a ver average width, in granite. The vein is oxidized to depth of about 80 m with a transition zone following for depth of 60 to 120 meters, succeede chalcopyrite at a depth of circa 200 meters, the average tenor of ore bei to improve with depth. The ores of the oxidized zone average about 1 per, and the chalcopyrite about 18% copper, presumably after selec secondary sulphides including covellite and bornite. Water disappe depth of 100 meters, and reappears, in small quantities, at depth of 24 The mine had a productive capacity of about 1,500 metric tons of 1909. The mine requires considerable timbering, but is well ventilated. ment of the Deseada includes an electric hoist, good for 600 met raising one-ton cars at velocity of 2 meters per second, and a Gebe electric air-compressor.

The Mina San José, one of the best properties of the company, Deseada, has a nearly vertical vein, of 2 to 4 meters width, said to be between syenite and granite, carrying rich ore, oxidized to great dep mine is developed by tunnels, the lower, of 390 meters length, giving 180 meters, and the mine was estimated, 1909, to have developed 25 tons of ore, of 12 to 15% copper tenor, and was producing circa 1,000 of ore monthly, with a force of about 90 men, 20 of whom were e exploratory work. The mine has no water, and requires only partial Equipment includes an electric hoist, raising 500-kg. loads, good for depth, but the mine lacks an aërial tram, which is badly needed.

The Mina Feliciana has 2 parallel veins, of variable dip, in syenit chalcopyrite, with an oxidized zone of about 80 meters depth, succeed secondary ores, by chalcopyrite, developed by a 200-meter vertical air a 350-meter vertical working shaft. The mine shows about 30,000 of ore, of circa 3% copper tenor, suitable for concentration later, a duced, from development, ore averaging about 6% copper, with so 15% in copper tenor. The mine is capable of a daily production metric tons of ore, but development has been retarded by slow pro ing the main shaft.

The San Carlos group includes the San Carlos, Percance and mines, on the extension of a single vein in syenite, having a nearly with zone of oxidation of about 80 meters depth, succeeded by

to average 9% in copper tenor, with quartz gangue. The mine little water, and walls stand well.
ıena Vista and Colorado mines are producers of cupriferous hematite, ıs than 1% copper, with 30 to 40% iron, used for flux.
ost distant mines are 4 to 5 kilometers from the works, and some ore carts and by burros, but ore transportation is mainly by a system of ıert aërial trams, having a central station. The main line, of 1,350 th, has 18 towers, highest 18 meters, with longest span of 300 meters, t a speed of 2.5 meters per second, by a 3-phase electric motor, this a daily capacity of 40 metric tons of ore.
ırks, at Tocopilla, include a mill, smelter and power plant. The mill, tons daily capacity, begun work May, 1909, but ran intermittently ıonths. Equipment, furnished complete by the Friedrich Krupp c, includes a crusher, operated by a 13-kw. 3-phase motor, a No. 20 artz tables, 2 jigs and 5 Krupp tables of the Wilfley type. There is a plant for sea-water, with 2 square iron tanks, of 200 cubic meters ch, with others of similar size under construction for reserve, at last Sea-water is raised to heights of 30 to 100 meters by two 30-kw. pumps. The mill treats 3% ore that is mainly chalcopyrite with ıcite, yielding 10% concentrates, with a 25% loss in milling, and con- e briquetted for smelting.
l smelter, having a reverberatory furnace, was remodeled and blown 909. There is a 90-ton 48x84″ Colorado Iron Works blast-furnace, or 2 additional furnaces of the same size, sea-water being used for the furnace having 2 rectangular forehearths. The smelter treats ore rates averaging about 7% copper, and makes a matte of about 50% ores, being strongly silicious, require fluxing with iron and limestone, rought 4 kilometers in carts, at a carriage cost of 4 pesos per metric are trammed out in cars, by hand.
ınverter department, not in commission, at last accounts, has 2 movable hoods for 4, and has 6 shells, each 60x78″ in size. A 30- l dust-flue leads to a 30-meter chimney. There is a Blake crusher ll for converter linings.
ıwer plant at the works includes boilers and electric generators of gregate capacity. Furnace blast is supplied by one Connersville rated electrically, and converter blast by a Kühnle, Kopp & Kausch ımpressor. There is an electric light plant, with arc lamps.
mpany employs about 200 men, in the mines, mill and smelter, and plans the manufacture of finished copper products. The entire ot in full commission until August, 1909. Production of the mines, ırmer ownership was 3,150 metric tons of ore, ranging 14 to 19% in r, in 1904, and production of the present company was only 79,101 ıper, in 1907, but is estimated at 1,250,000 lbs. fine copper in 1910. nsidered valuable, and management seems progressive and capable.

A THE TOCOPILLA SMELTING WORKS. CHILE.

Former office was Valparaiso, Chile. Organized Aug. 11, 1906, of Chile, with capitalization 500,000 pesos, shares 50 pesos par. as sold, 1907, to the Sociedad Beneficiadora de Tocopilla, and the vas liquidated. Production was 245,634 lbs. fine copper, 1907. t Tocopilla, Antofagasta, Chile.

ARIZONA & CALIFORNIA.

Bldg., Los Angeles, Cal. Mine office: Ehrenburg, Todd, president; E. Julian Solomon, vice-president; preceding officers, Dr. H. Pittman and Henry R. Jan. 6, 1907, under laws of Arizona, with capi- par. Lands, 3 claims, area 60 acres, in the

Weaver district, circa 12 miles east of Ehrenburg, also 4 claims in Woman Mountains, San Bernardino county, California. Company 1907, developing the Ehrenburg claims by tunnel. Presumably idle.

TOGO MINING & SMELTING CO. WASHI

Office: Spokane, Wash. Letter returned unclaimed from form office, Chewelah, Stevens Co., Wash. M. Ibister, president; G. W secretary and manager; preceding officers, W. H. Stowell and W. D. V directors. Organized with capitalization $1,500,000, increased, I 1910, to $1,500,000, shares $1 par. Lands, 7 claims, with 160 acres laneous lands, in the Cedar Cañon district, developed by opencuts an to depth of circa 600′, showing chalcopyrite giving average assays of copper. Buildings include a smithy and cabins. Idle.

TOKAR (SUDAN) PROSPECTING SYNDICATE, LTD.

Dead. Was liquidated. Formerly at Khartum, Anglo-Egypti Described Vol. VIII.

MINA TOLDO.

Owned by Compañía Minera de Gatico.

TOLEDO MINING & POWER CO. M

Office: 108 La Salle St., Chicago, Ills. Mine office: Brando Co., Mont. Louis D. McCall, president and general manager, at la Organized circa 1905, with capitalization $50.000, apparently as Bismarck-Nugget Gulch Consolidated Mining Co. Lands, 17 coppe 18 gold claims, 3 groups of copper claims being on Stone Creek, in the tains. Property has a 60-ton concentrator and a 30-ton smelter. years and moribund.

SOCIÉTÉ ANONYME MINES METALIQUES DE TOLOSA.

Office: Monceau les Mines, France. Letter returned un former mine office, Leiza, Navarra, Spain. Capitalization, 715,0 francs par. Property comprises iron mines in Guipúzcoa, and le at Navarra, latter including the Regina and other mines, parti Idle and apparently moribund.

TOLTEC METALLURGICAL CO.

Dead. Was reorganized, circa 1909, as Vanegas Metallur merly at Matehuala, Catorce, San Luis Potosí, Mex. Describe

TOLTEC MINE.

Office: care of Alfred Meads & Sons, owners, Marquette, returned unclaimed from former mine office, Greenland, Ontona Lands, 320 acres, carrying the underlay of the Evergreen belt and adjacent beds of the Michigan. Production, 1851-1860, v fine copper. Some diamond drilling was done, 1908. Idle.

TOLTEC MINING & SMELTING CO.

Dead. Former office was Waco, Tex. A. W. Cunninghar The management planned a concentrator, 1906, but failed to b merly at Ayutla, Oaxaca, Mex.

TOLWONG MINERAL CO., LTD.

Mine office: Bungonia, Argyle Co., N. S. W., Australia. under laws of New South Wales, with capitalization £6,000, sh

Lands, 250 acres, well timbered and watered, on the Sl carrying a vein up to 11′ in width, of circa 4,000′ known leng opened by several shallow incline shafts, on both sides of a deep almost exclusively stannite, said to average circa 10% copper, arsenic, and up to 3 oz. silver, with very small quantities of zi trace of [illegible]

[illegible] includes a 110-h. p. steam plant, with electri

built 1910, and ready for blowing in at the end of that year, lant and a reverberatory furnace, with electric power, and is e tin-copper matte in two fusions. Property is decidedly s considered promising.

OPPER & ZINC MINING CO. **ARKANSAS.**
nerly at Tomahawk, Searcy Co., Ark. Described Vol. VI.

UNION MINING CO. **MICHIGAN.**
ner office was 60 State St., Boston, Mass. H. F. Fay was ized circa June, 1899, under laws of Michigan, and held lands, r option, in the vicinity of what is now the Ojibway mine, on as done. Formerly at Ojibway, Keweenaw Co., Mich.

OLD, SILVER & COPPER CO. **ARIZONA.**
ied unclaimed from former office, Bisbee, Ariz. Mine office: nise Co., Ariz. J. W. Shelor, president; R. C. Spink, vice- M. Smith, secretary; H. E. Haighton, treasurer; A. T. Schüs- ector; preceding officers, John Wahrenberger, S. C. Edmiston n, directors. The company has a bond issue, interest on which ilt for some years. Lands, 23 claims, adjoining the holdings e Consolidated Mines Co., developed by a 135′ shaft, on the a 75′ tunnel, showing copper ore. The Anna formerly was a Idle and presumably moribund.

INING CO. **IDAHO.**
Mullan, Shoshone Co., Idaho. John H. Foss, president; e-president; Hans J. Rice, secretary and treasurer; preceding Erickson, directors. Organized under laws of Idaho, with 00,000, shares $1. Lands, 8 claims, near the Carney mine, on th of Mullan, showing a promising vein of 8′ to 15′ surface little silver-lead ore. The mine has a 500′ crosscut tunnel, of workings, showing ore that has given assays up to 15% silver per ton.

NG CO. **WASHINGTON.**
a bad egg. Formerly at Pateros, Okanogan Co., Wash. II.

ONSOLIDATED MINING CO. **COLORADO.**
succeeded by Tom Moore Gold Mining Co. Formerly at Co., Colo. Described Vol. IV.

OLD MINING CO. **COLORADO.**
ucceeded, 1909, by Martin Mining & Power Co. Formerly at Co., Colo. Described Vol. VIII.

INE. **UTAH.**
est First South St., Salt Lake City, Utah. Mine office: Salt Lake Co., Utah. A. M. Surbaugh and Thos. Moore
Lands, 40 claims, 21 patented, area 600 acres, with direct the northeastern part of the Bingham camp. The mine has nd short tunnels, principal development being by the High- another tunnel driving at lower depth. The mine carries entiferous lead and copper ores, with small quantities of uartz, and has produced some ore.

INE. **JAPAN.**
Wakayama-mura, Naka-gori, Japan. Production was pper, 1907. Presumably idle.

CO. **WYOMING.**
ly at Encampment, Carbon Co., Wyo. Described Vol. VIII.

ER CO. **ALASKA.**
rly at Ketchikan, Alaska. Described Vol. VIII.

FUNDICIÓN DE TONGOI. CHILE.

Owned by Sociedad Chilena de Fundiciones, at Tongoy, Ovalle, Coquimbo, Chile.

TONOPAH-ALOHA MINING CO. NEVADA.

Dead. Formerly at Tonopah, Nye Co., Nev. Described Vol. VI.

TONOPAH COPPER MINING & MILLING CO. NEVADA.

Dead. Was a bad egg. Formerly at Tonopah, Nye Co., Nev. Described Vol. VIII.

TONOPAH GOLD & COPPER MINING CO. NEVADA.

Dead. Formerly at Tonopah, Nye Co., Nev. Fully described Vol. VI.

TONOPAH-GREENWATER COPPER CO. CALIFORNIA.

Dead. Formerly at Greenwater, Inyo Co., Cal. Described Vol. VIII.

TONOPAH-NORTHERN MINING CO. NEVADA.

Dead. Formerly at Manhattan, Nye Co., Nev. Described Vol. VIII.

TONOPAH OLENTANGY MINING CO. NEVADA.

Dead. Former office was 907 South Hilliard St., Spokane, Wash. F. A. Noteware was president; M. S. Bender, vice-president; A. A. Shride, secretary; O. S. Henderson, treasurer. Organized under laws of Washington, with capitalization $1,500,000, shares $1 par, nonassessable. Lands, 2 claims, area acres, in the South Manhattan district, claimed to show gold, silver and copper ores. Formerly at Manhattan, Nye Co., Nev.

TONOPAH-YERINGTON COPPER CO. NEVADA.

Dead. Was organized 1907, under laws of Arizona, with capitalization $1,000,000. No trace of operations secured, and company presumably abortive. Formerly at Yerington, Lyon Co., Nev.

TONTO RIVER COPPER CO. ARIZONA.

Letter returned unclaimed from former office, Pittsburg, Pa. Mine office Roosevelt, Gila Co., Ariz. Jas. Murtha, secretary; S. V. Thompson, manager; J. P. Bosch, superintendent, at last accounts. Lands, 38 claims, known as the Schell group, on Tonto Creek, about 20 miles north of Roosevelt and 60 miles from Globe, in the Sierra Anches, said to show 9 well mineralized veins carrying high-grade auriferous copper ores, with assays up to 60% in copper tenor in surface ores. Development is by shallow shafts and tunnels, a 370′ tunnel having been breasted in copper sulphides of commercial grade, early 1910. The mine had circa 750′ of workings, 1908, and a test smelter shipment is said to have returned 42% copper. Presumably idle.

TOOELE SMELTER. UTAH.

Owned by International Smelting & Refining Co., at Tooele, Tooele Co., Utah.

TOPEKA CONSOLIDATED MINING CO. COLORADO.

Office and mine: Central City, Gilpin Co., Colo. Henry P. Lowe, president, treasurer and general manager; C. A. West, secretary; preceding officers Sir Chas. Allen, Arthur Firth and M. A. Lowe, directors; Sidney B. Tyler, general superintendent. Organized July 30, 1909, under laws of Colorado, successor of Topeka Mining Co., with capitalization $1,000,000, shares $5 par, non-assessable, fully issued. Annual meeting, June 30th, each year.

Lands, 7 claims, patented, area 16.46 acres, in the Russell district, [illegible] schists and metamorphic gneiss, carrying 3 veins with NE. strike and dip [illegible] of which one vein, of 4′ average width, traceable 1,300′, carries auriferous argentiferous chalcopyrite and sphalerite, estimated to average 0.5% [illegible] 2% zinc, 2 oz. silver and $10 gold per ton. The mine has shafts of 1,[illegible] 510′, with 11,[illegible] workings, estimated to show circa 50,000 tons of ore. The mine was discovered and worked at intervals until 1900, when closed by litigation, until [illegible], 1909.

Equipment [illegible] mine, with a 250-h. p. hoist at No. 1 shaft and a 60-h. p. hoist [illegible] here is a 7-drill Rand Imperial 2-[illegible]

, and 15 hammer drills are used. There are 7 mine buildings, and a
ant having 200-ton storage bins and a sorting floor with grizzlies,
ore is loaded direct into railway cars. Production was circa 6,000
1910, though no ore was shipped except from development work,
nanagement plans continuing systematically. Property considered
nd management good.

COPPER CO. OF ARIZONA. **WYOMING.**

Was succeeded, circa 1909, by Topeka Gold-Copper Mining Co.
; Centennial, Albany Co., Wyo. Described Vol. VIII.

GOLD-COPPER MINING CO. **WYOMING.**

Laramie, Wyo. Mine office: Albany, Albany Co., Wyo. J. R.
president and treasurer; N. A. Cramer, vice-president; Wm. Benton,
id manager; preceding officers, G. F. Hicks and Jos. F. Geisler, direct-
Houston, engineer. Organized Oct. 1, 1910, under laws of Wyoming,
truction of the Topeka Copper Co. of Arizona with capitalization
shares $1 par, nonassessable; issued, $625,000. Annual meeting,
ch year.

6 claims, unpatented, area 120 acres, with a 2¾-acre millsite and 40
ber land, 3½ miles from a railway, in the Lake Creek district, showing
gabbro, carrying 4 ore bodies, of 12′ estimated average width, re-
sure veins and contact deposits, of which 2 veins are under develop-
ain vein, with strike of N. 70° W. and dip of 75°, carrying oxidized
ded by bornite and chalcopyrite, estimated by the management to
8% copper, 4 oz. silver and $16 gold per ton. Development is by 8
llow shafts, of 12′ to 70′ depth, and tunnels of 950′, 265′ and 360′,
of workings. The property has no machinery plant. Manage-
continuous development.

MINING CO. **COLORADO.**

Lands were 7 claims, patented, area 16½ acres, having considerable
t. Equipment included a small steam plant. Was reconstructed,
09, as the Topeka Consolidated Mining Co. Formerly at Russell
in Co., Colo.

O MINING CO. **WYOMING.**

Formerly at Hazelton, Johnson Co., Wyo. Described Vol. IX.

COPPER CO. **NEVADA.**

nd mine: P. O. Box 9, Manhattan, Nye Co., Nev. W. J. Stock,
)mer Maris, vice-president and manager; F. P. Jayne, secretary and
receding officers, J. B. Giffen and L. W. Haworth, directors. Organ-
, 1906, under laws of South Dakota, with capitalization $1,000,000,
r.

7 claims, area 120 acres, about 35 miles east of Manhattan, the
point, showing a mineralized zone apparently of about 600′ width,
ca 2,000′. At surface the mineralized zone shows irregular mixtures
chists and coarsely crystalline limestone, with frequent irregular
iron blowouts, with considerable decomposed ferruginous lime, highly
quartz outcrops, all of the various rocks showing carbonate copper
velopment is by a 180′ shaft, at an angle of 65°, on what apparently
all of the mineralized zone, this shaft showing a little bornite, but
copyrite below a depth of 20′. Equipment includes a small electric
sh pump and whim. Presumably idle.

KE MINING CO. **MICHIGAN.**

5–19 Exchange Place, Boston, Mass. Mine office: Leopold
lton, Houghton Co., Mich. Thacher Loring, president; Chilton
Frederick W. Nichols, agent. Organized under laws of
dization $500,000, shares $25 par, assessable. Lands,
35 and 36, T. 56 N., R. 33 W., lying east of the

TRANSVAAL COPPER MINES, LTD. TRANSVAAL.

Dead. Formerly at Middelburg, Middelburg district, Transvaal. Described Vol. VIII.

TRANSVAAL COPPER MINING CO., S. A. MÉXICO.

In the Mexican incorporation of the Transvaal Mining Co. of Utah.

TRANSVAAL MINING CO. OF UTAH. MÉXICO.

Office. 1408 Traction Bldg., Cincinnati, Ohio. Mine and works office: Cumpas, Moctezuma, Sonora, Mex. Louis J. Hauck, president; Percy Andrea, first vice-president; Theo. M. Foucar, second vice-president; Alfred Vogeler, secretary and treasurer; preceding officers, Louis Hehman, J. M. Eilers, Leo G. Cloud, Bernhard Freiberg and Solon Spiro, directors; H. C. Beauchamp, general manager; Dr. August Sandberg, superintendent; Arthur Houle, consulting engineer. Organized Dec. 19, 1908, under laws of Utah, as a reconstruction of the Transvaal Copper Co., with capitalization $6,200,000, shares $10 par; issued, $5,415,895, $9.48 paid. Bonds, $650,000 authorized, at 6%; issued, $570,600. Annual meeting, first Tuesday in March.

Lands, 1,879 pertenencias, or 4,133 acres, of mineral land, a 50-acre smelter-site, with a 75-acre townsite adjoining, La Piedra Verde Ranch of 15,000 acres area, and an interest in the San Nicholás Tolentino Ranch, of circa 26,000 acres, area, the ranches including timber and grasing lands. The mineral lands carry iron ore and limestone for fluxes.

The mineral lands show eruptive rocks, including rhyolite, granite and porphyry, with 8 ore bodies, occurring as fissure veins, and as contact deposits between trachite and granite, with brecciated porphyry gangue, latter having a NW. strike, with dip of about 65° NE., 3 of the ore bodies, under development, being estimated, by the management, as 2′ to 2,000′ in width, with length of 2,000′ to 5,000′ and proven depth of 1,200′. The widest ore body is a mineralized zone, apparently in trachite and rhyolite. Ores are almost exclusively sulphide, mainly bornite and chalcopyrite, with occasional chalcocite, a limited amount of oxidized ores being shown on the outcrops. The mines as a whole have 5 main shafts, with circa 20,000′ of workings, estimated by the management to show 75,000 tons of high-grade ore, and 500,000 tons of low-grade ore. The management formerly estimated that 2,500,000 tons of low-grade ore were shown in the Cobre Rico and Transvaal No. 1 mines. Work was begun [illegible] and has continued steadily, with the exception of a period from 1907 to January, 1909, when work was suspended because of financial conditions. About 5,000′ of diamond drilling was done, 1910, this showing a large body of ore on the Cobre Rico mine, estimated to be of 6% copper tenor.

The Cobre Rico mine has 2 shafts, No. 1 being circa 100′ and No. 2 circa 140′ in depth, at last accounts, with 2 tunnels, of circa 2,000′ aggregate length, at last accounts, with about 3,000′ of workings, developing a wide vein, the ore formerly estimated to average about 3% copper, 3 to 4 oz. silver and [illegible] gold per metric ton, but now estimated to average 2% copper, 1 to 2 oz. silver, a trace of gold. About 2,000′ of diamond drilling has been done on this property, showing ore to depth of 300′, where ore is cut off by trap. The management estimates 500,000 tons [illegible] in this ore body.

El Transvaal mine has [illegible] and 318′, with shafts and crosscuts, showing [illegible], formerly about the same [illegible]. About [illegible] drilling was [illegible] to a depth including [illegible] 1.15% to [illegible] inations in [illegible] Equipment [illegible] air-compressor [illegible]

Buckeye mine, developed exclusively by tunnel, has about 10,000′ of
on a blanket vein of 6″ to 4′ thickness, showing ore formerly said to
out 12% copper, 10 to 35 oz. silver and $1.50 gold per ton, and shipments
2,000 tons, of selected ore, to the company's smelter, is reported to have
age returns of 12% copper and 8 to 10 oz. silver, with a trace of gold.
about 3,000 tons of high-grade ore in the mine, and a large tonnage of
ore remains on the dumps, discarded in the selection of ore shipped,
obvious that the average grade is very much lower than was claimed

an Nicolás mine has a 250′ shaft and about 5,000′ of tunnels, develop-
of 12″ to 4′ width, carrying silver-lead values near surface, formerly
average 60 oz. silver per ton, the ore changing to copper values at
6,000 tons of ore smelted are reported, by the management to have
age returns of 60 oz. silver per ton. Equipment of the San Nicolás
vo 80-h. p. boilers, a steam hoist and a Sullivan air-compressor.
Ultima Chanza mine has a 300′ incline shaft and a 100′ winze, with about
orkings, developing a fissure vein of 10″ to 42″ width. The manage-
nates 50,000 tons of ore in sight, averaging 10% copper, 8 oz. silver
e of gold. Equipment includes a steam plant and hoist.
Virginia mine has a vein formerly estimated at 15′ average width,
a 100′ shaft, with about 1,000′ of workings, showing gold ore, said to
2 per ton. Transportation facilities are lacking.
Guadalupe mine carries cupriferous iron ore, used for flux.
earest rail station is at Nacozari, 30 miles north, but the Cananea,
y Pacifico railway has surveyed a line to within 9 miles of the smelter.
any has built about 35 miles of wagon-roads, and 25 miles of trails, at
50,000, with a maintenance charge of about $5,000 yearly.
ain camp, 25 miles southwest of Cumpas, is at La Verde, where mining
are centered. There are 20 buildings, including 3 power plants, a
chine-shop, 30x30′ adobe carpenter-shop, smithies at each of the
nines, 2 laboratories, a boarding-house, a 22x90′ general store, with a
ore at the smelter, a hospital, and several dwellings. The company
hone system, costing about $5,000.
ompany has 2 smelters, including a small plant at the Buckeye mine
5-ton reverberatory furnace, which was in blast only a short time, 1905,
as said to be making matte carrying up to 65% copper, 55 oz. silver
d per ton.
ain smelter, at Cumpas, at an average distance of about 25 miles
ines, was located at that point because of a good site and ample water
th lacking at the mines. Equipment includes a 125-ton 42x120″
oundry & Machine Works water-jacket blast-furnace, with room for
al furnaces of the same size, one of which was under erection, early
ere is a reverberatory furnace, variously rated by the company as of
ons daily capacity, and the works have a sampling mill, capable of
are [illegible] 3 furnaces. The smelter power plant includes three 80-
[illegible] boilers, an Allis-Chalmers tandem-compound engine, and
ville [illegible] This smelter was blown in May 1, 1906, treating ores
Buckeye [illegible] Nicolás mines, and doing a little custom business,
matte, [illegible] Laurel Hill works of the Nichols Copper Co.,
riously [illegible] the company, as averaging 40% copper, 100 oz.
[illegible] averaging 37% copper, 140 oz. silver and
[illegible] blown out October, 1907, and has been

[illegible] period of 18 months, the smelter, in
[illegible] to scarcity of freighting outfits,
[illegible] ay tenor of about 10% copper,

TRENTON-SONORA MINING CO. MÉXICO.

Office: Trenton, N. J. Mine office: Tarachi, Sahuaripa, Sonora, Mex. L. Laurent, manager; F. Acock, superintendent. Lands, 4 miles south of La Calera, include the San José, Santa Eduviges, El Porvenir and other mines, carrying argentiferous and auriferous copper ores, with values mainly in silver. The San José mine is reported to show an 18″ paystreak of highly auriferous chalcopyrite. Development is by a 200′ shaft, sunk on the vein, equipped with a hoist. There is a mill having hand-jigs, and a smelter with adobe furnaces, milling and smelting operations being along primitive but fairly efficient lines.

TRES AMIGOS GOLD MINING CO. MÉXICO.

Mine office: Temósachic, Guerrero, Chihuahua, Mex. B. L. Croff, president and general manager. Lands, in the Guaynopa district, show a vein of 25′ to 40′ reported width, apparently averaging about 30′, carrying ore assaying up to 15% copper, 20% lead and 3 oz. silver per ton, claimed to average 6% copper, 4 oz. silver and $10 gold per ton. Idle.

COMPAÑÍA MINERA TRES PUNTAS. CHILE.

Office: Santiago de Chile. Mine office: Tocopilla, Antofagasta, Chile. Manuel Salinas, local manager; Emilio Gatica, mine manager. Mines, at Tres Puntas and Tocopilla, yield mainly carbonate ore. Production, 1908, was about 1,000 metric tons of ore of 20% copper tenor, equal to circa 425,000 lbs. fine copper.

TRES SEÑORES MINING CO. MÉXICO.

Mine office: San Pedro Ocampo, Mazapil, Zacatecas, Mex. Property includes La Providencia and La Poderosa mines, near San Pedro Ocampo, yielding ores that have given smelter returns of 10% copper, 3,234 grams silver and 120 grams gold per metric ton. Was a small producer at last accounts.

BERGWERK FR. D. TREUPEL. GERMANY.

Mine office: Herborn, Hessen-Nassau, Germany. Fr. D. Treupel, owner; Carl Treupel, superintendent. Lands, 70 claims, opened by shafts and tunnels, developing iron and copper ores.

TREVEDDOE MINING CO., LTD. ENGLAND.

Office: 13 Thorgmorton Ave., London, E. C., Eng. Mine office: Bodmin, Cornwall, Eng. Col. Wm. F. Leese, chairman; R. Arthur Thomas, engineer; Wm. H. Adams, secretary. Organized Aug. 13, 1900, under laws of Great Britain, with capitalization £100,000, shares £5 par; issued, £95,000. There are £10,000, of 5% debentures, and £7,500, of 5% prior lien bonds, authorized, with £6,100 issued, interest being several years in arrears.

Lands, 500 acres, held under a 100-year lease, subject to rental and royalty, carrying tin and copper ores. Production was 60 tons of black tin and 175 tons of 7% copper ore, in 1902. Operations for some years past have shown yearly losses, and the company seems booked for extinction.

TRIANGLE MINES CO. ARIZONA.

Letter returned [illegible] from former mine office, McCabe, Yavapai Co., Ariz. Lands, 7 claims [illegible] the McCabe and Gladstone mines, [illegible] mile south of McCab[illegible] [illegible]oped by a 378′ shaft, showing auriferous [illegible] sulphides of fair assay [illegible] a steam hoist. Idle since circa 1907, [illegible] legal entanglements, wh[illegible] [illegible] to have been straight[illegible] presumably moribund.

TRIANGLE MINING CO. [illegible]

Dead. Was a swind[illegible] [illegible]outhly dividends [illegible] ored to peddle "bonds[illegible] [illegible] scribed Vol. IX.

TRIANGLE MINING & [illegible]

Office: 8 Allen Blk., [illegible] Co., Mont. Dr. Frank C. [illegible] Gephart, second vice-president [illegible]

preceding officers, Harry H. Parsons, David C. Smith, and J. C. Luke, Henry E. Kuphal, engineer. Organized Aug. 25, 1906, under laws of with capitalization $500,000, increased later to $1,200,000, shares $1 par, ble; issued, $500,000. Annual meeting, third Monday in February.

, 11 claims, unpatented, area 250 acres, well watered and timbered, in e district, 2½ miles from a railway, in 2 groups, known as the Triangle claims, and the Grass Widow group of 5 claims, circa 2 miles northeast and 19 miles south of Missoula. The company also owns several l in the townsite of Clinon, and a water-right on Rock Creek, and rpetual lease on the upper workings of the Hidden Treasure mine, half mile from the Triangle, at a royalty of 30% of the gross assay e extracted, which seems a high percentage.

roperty shows 6 fissure veins, in granite, of which 2, under develop- f 14′ estimated average width, carrying a little malachite and azurite, chalcopyrite, with some bornite, estimated by the management to % copper, 7 oz. silver and $1.20 gold per ton. Development is by 540′, 75′, 140′, 135′, 150′, 100′ and 130′. The mines have 1,783′ , estimated by the management to show 200,000 tons of ore, which too high.

pment is confined to the Triangle and Grass Widow claims, none of having any material showing of ore, or serious attempts at develop- e Triangle claim has a 450′ tunnel with a 400′ back, showing a vein nite, consisting of a few small seams, the footwall and hanging-wall ly well defined, carrying a vein of 6″ to 4′ width, the granite being ered for an inch or two alongside each seam. There is no gouge on nd no evidence of movement, and the zone of oxidation is shallow, eing found even in the oxidized portions of the vein, which carries ns of secondary enrichment, although small masses and particles of l occasionally of chalcocite, are found associated with clean, fresh e, and as stringers in bunches of specular hematite. Ore is essentially e, with mineral occurring in stringers and bunches, irregularly the veins, but usually on or near the walls. It is difficult to secure d samples, values being irregularly distributed, but a sample taken e-bin assayed 6.8% copper, 2 oz. silver and 80 cents gold per ton. ein, opened circa 400′ south of the Triangle, by a 40′ tunnel, is about he Grass Widow, though having a small amount of development better showing than the Triangle.

ent includes a 40-h. p. boiler and an Ingersoll-Rand air-compressor. buildings, including a small smithy and a log ore-bin. The manage- installing electric power, and building a 100-ton mill and a small

ON SMELTING & DEVEL- NT CO.

ARIZONA & NEW MEXICO.

Rector St., New York, N. Y. Mine offices: Kelly, Socorro Co., Gila Co., Ariz. Howard Paschal, president and general or, Scott E. Welker, and Hon. John B. Corliss, executive ers, F. W. Anness, Allen Curtis, Louis O. Hedden, arshall and L. J. Pierson, directors; Geo. R. Shidle, el, second vice-president; Henry J. Clarke, secre- acting general manager.

Arizona, with capitalization $5,250,000, 00, shares $1 par, in $250,000 partici- $5,000,000 common stock. Divi- stock, but in 1910 the company having liquidated the past due financial position.

Lands include a zinc, lead and copper property in New Mexico, copper lands in Arizona and a 150-acre group of silver claims in the Pipestone district of Jefferson county, Montana, on which only assessment work is done, the Montana property being said to have 800′ of shafts and trenches.

The Arizona lands are the Starlight group of 14 copper and lead claims, patented, in Godless Gulch, in the Stanley Butte district, circa 8 miles south of San Carlos, discovered 1886, but not opened until 1903, because a part of the San Carlos Indian Reservation, previous to its segregation in 1901. This property shows quartz, granite and limestone, having 3 known ore bodies, of 3′ estimated average width, carrying oxidized ores, formerly estimated to average 8% copper, 40% lead, 10 oz. silver and $3.50 gold per ton. The ore being low in silica, and rich in lead and iron, is self-fluxing, notwithstanding the existence of some highly deleterious elements. Development is by shafts of 140′ and 150′, and a 1,700′ crosscut tunnel. Ore shipments from the Starlight group, 1906, returned 4 to 12% copper, 40 to 50% lead, circa 10 oz. silver and $3.50 gold per ton, with smelter returns aggregating $15,900. The Starlight group has the wreck of an ancient adobe smelter, remaining from old operations.

The Kelly mine, which is the principal property, has an area of 302 acres, of which 212 acres are patented. The upper workings carry mainly lead and zinc carbonates, former giving smelter returns of 35 to 40% lead, with small silver values, and the zinc carbonates give smelter returns of 25 to 40% zinc. The sulphide ores, developed at depth, for 5 years ending 1910, gave smelter returns of 25 to 35% zinc, 12 to 15% lead, 0.5 to 2% copper and 6 to 8 oz. silver per ton, with small gold values. The 400′ three-compartment Traylor shaft has a steel headgear, and a 365′ shaft has a steam hoist. The Nit mine, adjoining the Graphic, has a 235′ working shaft. The workings of the Kelly mine, above the 400′ level, are under lease, expiring Oct. 1, 1911, to Cony T. Brown.

The Kelly mine has a 50x100′ power-house, with three 250-h. p. boilers and 18x36″ first-motion double-cylinder double-drum hoist, a 15-drill Ingersoll-Rand air-compressor, and an electric light plant. The mine has electric pumps.

The mill at the Kelly mine, built 1907, was not altogether satisfactory, and was remodeled and enlarged, 1908-1909, to present capacity of 75 to 100 tons daily. Equipment includes crushers, elevators and concentrating tables, with roasters and electric separators for parting the zinc and iron sulphides.

For the fiscal year ending Oct. 31, 1910, production of the Kelly mine was 20,700 tons of ore, of which 13,250 tons of ore were milled, yielding 6,957 tons of zinc concentrates, 1,522 tons of lead concentrates, 2,589 tons of iron middlings, 2,509 tons of crude zinc sulphides, 974 tons of crude zinc carbonates, 88 tons of crude lead carbonates, and 6.5 tons of copper ore. The additional ore produced by lessees, from the upper levels was 12,154 tons of zinc ore, 2,800 tons of lead ore and 120 tons of copper ore. This ore was sold for $386,188.73, of which amount $132,662.37 was for ores shipped by lessees. The company reports net income for this fiscal year, of $110,264, comparing with $72,360 for the preceding year, and reports expenditures of $60,214 on the development of the Kelly mine. Profit and loss surplus, Oct. 31, 1910, having been $92,696.

TRI-METALLIC MINING, SMELTING & REFINING CO. MEXICO.

Office: Nogales, Ariz. Letter returned unclaimed from former mine office, Tonichi, Ures, Sonora, Mex. J. L. Shepard, president; P. Sandoval, treasurer. Lands, 9 groups of claims, including the Creston de Cobre mine, 6 miles from Tonichi, the nearest rail point, in the Ures and Hermosillo districts. Property includes a government concession for the equivalent of about 100,000 miner's inches of water, from the Yaqui River, which, [illegible] could be made to develop a large water power. [illegible] shallow shaft, and a crosscut tunnel, developing [illegible] copper ores. Idle.

'AIN MINING CO. **MICHIGAN.**

82 Devonshire St., Boston, Mass. Mine office: Trimountain,)., Mich. Employs circa 800 men. Wm. A. Paine, president; Fred- d, secretary and treasurer; Frederick W. Denton, general manager; icers, J. Henry Brooks, Chas. A. Snow, R. Townsend McKeever and ton, directors; John Jolly, superintendent; Edw. Koepel, mill super- .. T. Mercer, engineer; Benj. D. Noetzel, clerk; Richard Bowden, ain; Jas. Vial, master mechanic at mine; Jas. Richards, master mill; Will Harris, supply clerk.

:d 1899, under laws of Michigan, with capitalization $2,500,000, ,r; paid in, $20. Is controlled, through ownership of 99,335 shares, ange Consolidated Co. Old Colony Trust Co., Boston, registrar. ing, second Wednesday in May.

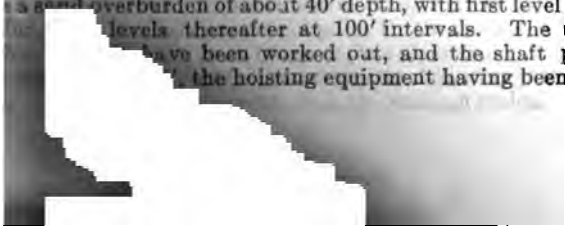
iagement of the Trimountain was taken over by the Copper Range at a time when the company's finances were not in the best of con- igh dividends had been paid previously, but the final installment)untain debt was paid, January, 1908, by A. C. Burrage, as per Dividends have been $1.50 March 10, 1903; $1.50 June 10, 1903; 908.

,120 acres, being the E. ½ of Sec. 19, W. ½ of Sec. 20, N. ½ of Sec. ¼ of Sec. 30, all in T. 54 N., R. 34 W. The Baltic mine lies to the .e Champion to the south, with undeveloped lands to the east and

) a very heavy sand overburden, the mine was opened by drop- hrough alluvium, with raises to surface on the angle of the dip of formation. The Baltic bed runs 15′ to 50′, with an average width : Trimountain property. Heavy copper is found near the walls,)wards of a ton in weight have been found, but values occur mainly :. The 2 extreme shafts, toward the Champion and Baltic mines, n those in the middle. The Trimountain is raked by a number of :an ground, some of which are up to 500′ in width. Lying parallel a 65′ west from the Baltic bed, is a very wide amygdaloid, carrying avy copper and considerable stamp-rock. This was opened by a the 7th level of No. 1 shaft, and has been explored, to some extent, f importance has been found, though the twin bed may be available a at some later period. The great width of the bed has led to dry- waste rock, which is used also for building underground chutes, ghly circular, with inner diameter of about 5′ and are filled about stopes are carried upward, the chutes being built at a sharp pitch, f the surrounding waste-rock serving to hold the walls immovable. n timbering brought about by dry-walling and building chutes is very great. The mine has electric pumps, and works about 60

e all of the same size and style, being 8x22′ outside of timbers, rtments, framed with 14x14″ sticks, exceptionally heavy timbering l to withstand the pressure of shifting sand above the solid rock. has been opened on the 10th to 14th level, inclusive, in No. 4 shaft, d 3 shafts have continued to improve with depth, but No. 1 shaft pointing.

ft, 210′ north of the Champion boundary line, is sunk at an angle s a sand overburden of about 40′ depth, with first level opened 168′ fo levels thereafter at 100′ intervals. The upper levels have been worked out, and the shaft permanently the hoisting equipment having been transferred



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steel headgear, and ... machinery, in the neighbor
Graphic, has a 235 ... 40x60′ carpenter-shop
400′ level, are un ... cross-compound
The Kelly ... condensing plant in a separate building
18x36″ first-m ... plant, in a 68x180′ steel frame building
Rand air-cor ... boilers and a 4,500′ Nordberg
The mi ... only, but actually running 65 drills
was remo ... giving a total duty equal to
daily. F ... At. No. 3 there is a large coal
roasters ... a cistern near No. 2 shaft stores water
Fo ... house over the cistern has a fire-pump
20,700 ... The mine is served by the Pa
zinc ... which reaches all shafts and the
2,50 ... Range telephone system.
cru ... improved with macadamized roads
by ... a large boarding-house, upwards of
an ... branch at the millsite. The company
$1 ... me. There is a water system, with
f ... use and fire protection.
... of steel frame, on stone foundations
... occupies a 100-acre millsite having
... rior. The mill has 4 steeple-compound
... Complementary machinery for each
... improved Hodge jigs, 6 slime tables and
... on a solid concrete base, replacing
... entirely eliminating vibration, and
... of rock in 24 hours, the heads
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... 22%, and

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by a generator in the mill engine-room.

Begun Jan. 4, 1902, with one leased head at the Arcadian
untain began production with a return of 37 lbs. fine copper
off later to 27 lbs., and, when the present management secured
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were 18.43 lbs. fine copper per ton in 1907; 18 lbs. fine copper per
16.58 lbs. in 1909 and 17.5 lbs. in 1910. Production has been as
32,160 lbs. fine copper in 1902; 9,237,051 lbs. in 1903; 10,211,230
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MINERA DE LA TRINIDAD. **MÉXICO.**

ice: Ayutla, Autlán, Jalisco, Mex. Property is El Patrocino
g auriferous copper ore, which is said to have been a considerable
resumably idle.

MINERA LA TRINIDAD DE CHARCAS, S. A. **MÉXICO.**

Espalda de Santa Veracruz 12, México, D. F. Mine office:
tezuma, San Luis Potosí, Mex. Lic. José Luis Requeña, president;
a, manager. Organized Oct. 1, 1903, under laws of México,
300,000 pesos, shares 100 pesos par, increased by a later issue
hares 50 pesos par, 10 pesos paid in.
the San Agustin, La Mascota, La Reina and El Rey mines.
ains, area 20 hectares, has an 80-meter shaft, developing
with values mainly in gold and silver. Another property
Equipment includes steam power, and about 40 men
accounts. Production, 1907, was said to be about one
carrying 4 to 5% copper and 700 to 1,000 grams silver per

MÉXICO.

Co. La Trinidad, Sahuaripa, Sonora, Mex. Described

No. 2 shaft, 1,023′ northeast of No. 1, was 2,200′ deep at the end of 1910 and a considerable improvement has been noted in ground below the 14th level with the bottom levels the best opened in this shaft. The shaft-rockhouse 40x62′ on the ground, and 84′ high, of steel frame, iron-sheathed, has 2,000-ton rock-bins, and is equipped with an engine, steam-hammer and two 18x24″ crushers. Rock is raised by a 2,500-h. p. 36x72″ Nordberg direct-connected duplex hoist, with double-conical drum of 18′ maximum diameter, capable of raising 6-ton skips from one mile depth.

No. 3 shaft, 1,027′ northeast of No. 2, sunk at an angle of 68°, was 1,900′ deep at the end of 1910. There is a sand overburden of about 60′ depth, and the ground was much disturbed below the 2d level, but is more settled at a greater depth, though the shaft develops ground that varies greatly in character with a material improvement in general value below the 14th level. Equipment includes a shaft-rockhouse and hoist that are duplicates of those at No. 2.

No. 4 shaft, the northernmost, 1,600′ deep at the end of 1910, is materially the best shaft of the mine. The shaft-rockhouse is a duplicate of those at Nos. 2 and 3, and the former temporary hoist was replaced, 1910, by the hoist formerly at No. 1 shaft, duplicating those at No. 2 and 3, installed in a new engine-house.

No. 5 is merely the site for a shaft, there being an overburden of sand mixed with boulders, 208′ in depth, which could be penetrated best by an upraise.

No. 6 also is merely a tentative site for a shaft, so located as to develop the Trimountain territory to the Baltic line.

The principal mine buildings and machinery, in the neighborhood of shafts 2 and 3, include a 32x45′ machine-shop, 40x60′ carpenter-shop, 25x45′ smithy and 30x60′ warehouse. There is a 35-drill cross-compound Rand air-compressor at No. 2 shaft, with a Deane condensing plant in a separate building adjoining. At No. 3 shaft the power plant, in a 68x180′ steel frame building, includes a battery of Stirling water-tube boilers and a 4,500′ Nordberg air-compressor guaranteed to run 45 drills only, but actually running 65 drills, 10 pumps and sundry pneumatic machinery, giving a total duty equal to running 90 drills or twice the rated capacity. At. No. 3 there is a large coal trestle, supplying fuel to the boiler-room, and a cistern near No. 2 shaft stores water from a small brook for the boilers. A house over the cistern has a fire-pump, with hose for defense of the mine buildings. The mine is served by the Painesdale branch of the Copper Range railway, which reaches all shafts and the principal shops, and has a branch of the Copper Range telephone system.

The mine location, improved with macadamized roads, is very neat in appearance, and includes a large boarding-house, upwards of 100 dwellings, and a general store having a branch at the millsite. The company maintains a hospital and a nurses' home. There is a water system, with 10″ mains, furnishing water for domestic use and fire protection.

The 176x205′ mill, of steel frame, on stone foundations, at Beacon Hill 3 miles west of Redridge, occupies a 100-acre millsite having about 2 miles of frontage on Lake Superior. The mill has 4 steeple-compound Nordberg stamps of which 2 are in use. Complementary machinery for each stamp includes crushing rolls, 36 improved Hodge jigs, 6 slime tables and 1 Wilfley table. No. 3 head was reset, 1908, on a solid concrete base, replacing the old timber foundation, the change entirely eliminating vibration, and under test this head has stamped 900 tons of rock in 24 hours, the heads having a normal capacity of about 800 tons daily each. Tailing losses, originally as high as 0.60 to 0.65%, were reduced later to 0.32%, and, were reduced, 1908, to 0.26%, by the installation of regrinding rolls and settling tanks. The mill has a 300-h. p. engine and a small but complete machine-shop on the second floor.

l boiler-house, of steel, has six 250-h. p. and two 200-h. p. Stirling ıtter maintaining a steam pressure of 180 to 200 lbs. per square inch, highest carried at any mill in the district. The boiler plant has a ng brick-lined steel smokestack, 165′ high and 7′ 6″ in diameter. f the boiler-house are 3 coal-trestles, under each being a 6x7′ tunnel, ıding to the boiler-rooms, the floors of the sheds forming the roofs ls. Feed-water for boilers is piped from a small stream, dammed t.

el-frame pump-house at the mill has a 20,000,000-gallon Nordberg g water from a well connected with a 40″ riveted steel pipe, running ntake crib in Lake Superior. The crib, built of heavy timbers and n rods, is 42x56′ on the bottom and 31′ high, sunk in 21′ of water, h 1,800 tons of rock, and anchored into the sandstone bed of the y iron rods. The 40″ intake pipe is laid on the floor of the lake into shallow water, and is anchored to the rock bed of the lake by he 500′ section nearest shore was laid in a 14′ trench, covered with in sacks, but this protection proved inadequate against heavy d was replaced, 1908, by a reinforced concrete covering, for a 50′.

buildings include a smithy and carpenter-shop, each 18x30′, and chouse. The townsite of Beacon Hill, lying on the slope above a number of dwellings, and mill buildings and townsite are lighted , supplied by a generator in the mill engine-room.

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[redacted]

MINING CO. MÉXICO.

ormerly at [redacted] Mex. Described

TRINIDAD MINING & SMELTING CO. MEXICO.

Mine office: Arcelia, Aldama, Guerrero, Mex. B. Davidson, mine manager, at last accounts. Has silver-lead ores carrying gold and copper values. Property includes the Luisa, Salvación, Sorpresa and Trinidad mines, carrying silver-lead ores, with gold and copper values. Has steam power and a 20-ton mill, employing, 1908, about 50 men.

TRINITY COPPER CO. CALIFORNIA.

Office: 33 State St., Boston, Mass. Mine office: Kennett, Shasta Co. Cal. Thos. W. Lawson, president; Arnold Lawson, vice-president; Homer Albers, secretary; Allen Arnold, treasurer; Austin H. Brown, general manager; preceding officers, Louis Auerbach, Arthur P. French, Henry H. Arnold, Frank E. Chase and Dr. Max Heicht, directors.

Organized Oct. 18, 1900, under laws of New Jersey, with capitalisation $6,000,000, shares $25 par. International Trust Co., Boston, registrar; American Loan & Trust Co., Boston, transfer agent. Shares are listed on the Boston stock exchange.

Lands, 1,700 acres, also a patented townsite, near Kennett, with total holdings of 3,233 acres, a smelter-site of 422 acres, formerly owned, having been sold to the Mammoth Copper Mining Co. of Maine. Property includes the Shasta King, which is the principal mine, the Lost Desert group, and the King Copper group.

The Shasta King group, of 12 claims, adjoins the Balaklala mine, on the southern fork of Squaw Creek, 4 miles east of Iron Mountain. The mine is located in a deep gulch, the topography being favorable for opening by tunnels which are used exclusively for development. The main tunnel, 1,145' long, 7x8' in size, with double tram-tracks, equipped with steel ore-cars, and a 7x8' double-track tunnel has been driven 175' vertically lower. The mine had over 7,500' of workings, 1906, which have not been greatly increased since, and the property has been tested by 5,119' of diamond-drill borings. The ore body is a lens, claimed to be approximately 150' wide by 1,000' long, and of unknown depth, but apparently the ore does not go to great depth, and it is possible that the bottom limits have been reached. The mine was claimed, by the management, to have circa 1,200,000 tons of ore in sight, with nearly 500,000 tons blocked out for stoping, but this statement was denounced, by Lewis E. Aubury, State Mineralogist of California, as a gross and willful prevarication. The management now claims that the Trinity has about 900,000 tons of ore in sight, but independent observers give very much lower estimates. It seems probable that the property has ore reserves of at least 400,000 tons, with fair chance of 750,000 tons, and possibilities of a greater tonnage. The crosscut tunnel driven in from the sides of the mountain, connect with drifts on the ore body which is low-grade disseminated chalcopyrite, variously estimated as from 1 to 4% in copper tenor, with combined gold and silver values of about $1 per ton. The ore carries small quantities of zinc and an excess of iron, and probably averages around 2½% copper and 1 oz. silver per ton, with small gold value. The Trinity also has an ore body, of undetermined size, on the opposite side of the gulch from the Shasta King.

The Shasta King mine has ore-bins, and a 2,000' incline tram, of about [illegible] tons daily capacity, leading to the head-house of the Balaklala tramway.

The Copper King group of 22 claims, on Motion Creek, about 2¼ miles south of the Shasta King mine, has about 1,000' of exploratory workings, in apparently no ore has been found in place.

The Statesman group has been partially explored, in an effort to locate and develop silicious ores required for fluxing the heavy sulphide ores of the Shasta King mine.

The Uncle Sam group, [illegible] continuous at last accounts, has been explored for fluxing ores.

ıide, but lacking the silicious ores required to make free-smelting ;ures. The Uncle Sam group shows some oxidized ore, at and near to 8% copper tenor.

ıent includes a steam plant, with a 6-drill air-compressor and power here also is a diamond drill, with which considerable boring has Buildings include a laboratory, warehouse, shops, hospital, and ellings for employés, which, unfortunately, cannot be fully occupied, ıly, by the company's employé. The company also erected a e building, at Kennett, which was sold for $15,000.

ıpany made a bluff at building a smelter, 1901, doing some grading but as the Trinity was worked mainly for the benefit of the stock ling was discontinued, and the site sold. At the company's annual bruary, 1905, the president was authorized to build a smelter, o specifications submitted by general manager Brown," but this vanished into thin air, like its predecessor. If printers' ink could s, the Trinity would have a glut of them.

/ears the management of the Trinity has been boasting about the ings that the mine would do in the way of production, and when- arket conditions were right, and "investors" of a certain sort were n "absolutely sure thing," immense quantities of printers' ink have ed, by Mr. Lawson, in ostensibly philanthropic attempts to induce led with more money than brains to cultivate the latter by exchang- er for Trinity stock, of which Mr. Lawson always has a copious various occasions there have been flourishes of trumpets, and ıts that production would begin shortly, each of these spurts of g succeeded by periods of quiescence, in which the normal forces d of a $10,000-a-year manager and two $3-a-day watchmen. The ually got to the point of production Sept. 25, 1907, at the rate of ns daily, but, strange to say, none of the ore produced got to the e mine again made a noble effort at production, circa October, 1908, managed to ship some ore to the Balaklala smelter, but closed down nd nobody outside of the management seems to have learned what oduction of copper may have been. The Trinity was claimed to ıct with the Balaklala, calling for the treatment of 308,000 tons of st year, and 360,000 tons yearly for 9 succeeding years, but appar- tract actually called for a minimum of 300, and a maximum of 1,000 ıich, so far as can be learned, was to have been matted for $3 per Lawson having been president of both the Balaklala and Trinity he contract was not carried out, and the Trinity again is back to its normal force of 3 men, now consisting of only one $3-a-day nd the $10,000-a-year manager, the manager having come back, ot sure that he is now drawing $10,000 annually. In fact it would y so large a salary to a manager, when the same amount of money ended legitimately, to so much greater advantage, by hiring ices of a good advertising man and a graduate muckraker, at $5,000 ch. Expenses should be held down, in California, as the "mining" Trinity is done mainly in the pockets of New England investors. t Lawson stated, at the annual meeting of 1909, that the company ke money with copper at the price then ruling, but general manager d, October, 1910, in a statement to shareholders, that the Trinity e copper at a profit, even with the metal selling at the low price then preferred not to," which statements are given for whatever they h, and without the slightest attempt to discriminate between Mr. Mr. Brown, as to which may be the prevaricator, if either or both. ıagemen[illegible] claimed, when the shares were listed on the : Exch[illegible] cash in the treasury, and also claimed

to have 80,000 shares of stock in the treasury, but the first balance sheet issued to the public, of date Feb. 19, 1907, showed that the treasury stock had disappeared mysteriously, this balance sheet giving assets of $5,221,000 in lands, which possibly is a trifle inflated, for the reason that the mine is said to have been bought by Lawson for $165,000 and a stock consideration, and was capitalized with the unselfishness that so distinguishes this great reformer and philanthropist, at $6,000,000, this being Mr. Lawson's idea of the square deal to his fellowers. The company's balance sheet, of Sept. 30, 1907, showed accounts receivable of $895, and cash $40,705, while the balance sheet for Sept. 30, 1907, gave cash resources of $282, with $895 in accounts receivable, and the balance sheet of Aug. 1, 1910, listed the company's resources at $6,075,726, of which $1,[illegible] was in cash, nothing in bills receivable, and the item of $173,923 was for expenses of the eastern office, listed as an asset. Nobody but a financial mountebank like Lawson would or could list money spent as an asset.

The company's annual statements are very unsatisfactory, and Mr. Lawson though asked for years to explain what has become of the Trinity treasury, has never vouchsafed any explanation, and the disappearance of the funds originally on hand, or supposed to be on hand, for the construction of a smelter, continues a deep mystery. The Trinity has progressed backwards in a remarkable manner, its large cash surplus sinking practically to the vanishing point, while the 80,000 shares of treasury stock, which the Boston stock exchange generously permitted Lawson to list, early in 1905, have disappeared also, as have the smelters promised at different times, and even the hole where the first smelter was to have been built has disappeared also, having been sold to the Mam[illegible]. In this connection, the Copper Handbook repeats its criticism of years past of the Boston stock exchange, which became an accessory to this swindle by permitting Lawson to list the stock on its board.

TRIUMPH GOLD-COPPER CONSOLIDATED SMELTING, LAND & IRRIGATION CO. ARIZ[illegible]

Dead. Was a fraud, promoted by the notorious Wm. F. Wernse gang of swindlers. Formerly at Pima, Graham Co., Ariz. Described Vol. III.

TRIUMPH TUNNEL SITE CO. ARIZ[illegible]

Dead. Was a swindle. Formerly at Safford, Graham Co., Ariz. Described Vol. VIII.

TRIXEY COPPER MINING CO. ARIZ[illegible]

Dead. Formerly at Phœnix, Maricopa Co., Ariz. Described Vol. [illegible]

TROJAN MINING CO. CALIFOR[illegible]

Mine office: Ballarat, Inyo Co., Cal. Lands, 5 claims, bought in March, 1909, are in the Argus range, about 15 miles from Ballarat, and show indications of copper.

TROUGH-GULLY COPPER CO., LTD. AUSTR[illegible]

Office: 46 Dame St., Dublin, Ireland. Mine office: Dungowan, [illegible] Co., N. S. W., Australia. Sir E. C. Cochrane, Bart., chairman; preceding W. F. Cotton, J. P., J. Mulligan, Rev. J. Robinson and W. J. Shannon, [illegible] J. Fitz-Harris, secretary; W. Smith, consulting engineer. Organized in 1908, under laws of Great Britain, with capitalization £17,000, shares £1. Lands, 120 acres, at Dungowan, near Tamworth, bought for £3,000 with £4,000 in fully-paid shares. No trace of operations secured, and [illegible] apparently moribund.

TROUT CREEK MINING CO.

Mine office: Trout Creek, Juab Co., Utah. [illegible] at last accounts. Lands, many miles from [illegible] containing copper, zinc, bismuth, silver [illegible] 1909, with a small force.

TROY CONSOLIDATED MINING [illegible]

Dead. Formerly at Troy, Pi[illegible]

t CO. **ARIZONA.**
s merged, 1902, in Troy-Manhattan Copper Co. Formerly at Ariz. Fully described Vol. II.

IINING CO. **COLORADO.**
merly at Granite, Chaffee Co., Colo. Described Vol. VI.

TAN COPPER CO. **ARIZONA.**
Broadway, New York, N. Y. Is practically out of business, d its property, 1907, to the Troy Consolidated Mining Co., for f 160,000 shares in the latter named corporation, which is dead. y, Pinal Co., Ariz. Fully described Vol. VI.

OPPER MINES, LTD. **BRITISH COLUMBIA.**
merly at Ainsworth, Kootenay district, B. C. Described Vol.

INE. **AUSTRALIA.**
ned unclaimed from former mine office, Stanthorpe, Queensland, ox & Rannie were owners, at last accounts. Mine has a vein of carrying considerable ore assaying 17.12% copper and 33 oz. shipped for smelting, low-grade ore being concentrated at an ad- l shipped to London. Production, 1906, was 112,000 lbs. fine 7 oz. silver. Idle since circa 1907.

RE MINING CO. **MONTANA.**
e: De Borgia, Missoula Co., Mont. Wm. Trentowsky, presi- rt, vice-president; Geo. Batley, secretary and treasurer; preceding Sjolander and John Wood, directors; John Lefevre, manager. ms, having a 500′ crosscut tunnel cutting a vein of 12′ to 17′ width, ly silver-lead ore. Equipment includes an air-compressor.

NING & REDUCTION CO. **MONTANA.**
turned unclaimed from former office, Cleveland, Ohio. Mine office: son Co., Mont. Wm. F. Rodgart, manager, at last accounts. n as the Buckeye mine, have a 170′ shaft, with about 600′ of work- ; ore giving fair assay values in lead, copper, silver and gold. Has a small sawmill and a 50-ton concentrator. Idle since circa 1908, ly moribund.

INE. **JAPAN.**
fice: Nishitate-mura, Kita-Akita-gori, Ugo, Japan. Kyosaku er and manager. Equipment includes steam installations aggre- h. p. Employed, 1907, an average of 1,422 persons. Production lbs. fine copper and 448,802 oz. silver in 1907, and 607,740 lbs. 3,371,440 momme silver in 1908.

NE. **JAPAN.**
ice: Tsuboi-mura, Kume-gori, Mimasaka, Japan. Ore is chal- ciated with iron pyrites, said to average 13% copper and 0.2% ing in three principal veins of 2′ to 4′ width, running parallel to ification of palæozoic clay-slate and schalkstein. Production was ne copper in 1903, and 354,855 lbs. copper and 3,308,835 momme No production reported for 1908. Presumably idle.

TSUCHIYA. **JAPAN.**
e: Ikuno, Tajima, Japan. Lands include the Karaya, Karatani ni mines, 2 latter operated jointly, having no power plant, and average of 76 hands, 1907. Production was 145,842 lbs. fine copper 73 lbs. copper and 2,100 oz. silver in 1907; 62,041 lbs. copper and e silver in 1908.

MINE. **JAPAN.**
Produc
1907;

TUBAL-CAIN COPPER & MANGANESE MINING CO. WASHINGTON

Office: 211 Colman Blk., Seattle, Wash. Letter returned unclaimed from former mine office, Port Townsend, Jefferson Co., Wash., with notation "Removed." Frank Hanford, president and treasurer; I. A. Nadeau, secretary; Victor E. Tull, general manager; S. Marpel, superintendent, at last accounts.

Lands, 29 claims, 1 fractional, on Iron Mountain, of the Olympic range, 46 miles from Port Townsend and 18 miles from a railway. The property is reported to show 5 veins, in a cross-section of 1,800′, one of which is claimed, by the company, to be nearly 200′ wide at surface, and is otherwise reported as 11 to 96′ in width, showing an altered compact iron-stained schist, bearing traces of copper, gold and silver. Other veins are said to show native copper, chalcocite and chalcopyrite, at surface. The center of the main or manganese vein is said to be a paystreak of 4′ to 6′ width, carrying native copper. Development was reported as by an 1,800′ tunnel planned, to cut all 5 veins, but possibly was a tunnel planned to be driven 1,800′. Equipment includes a Pelton wheel, taking water from the Dungeness River. Idle.

TUBE CITY MINING & MILLING CO. ARIZONA

Office: McKeesport, Pa. Mine office: Vekol, Pinal Co., Ariz. E. E. Zimmerman, superintendent. Property is the Jackrabbit mine, near Vekol, 25 miles south of Casa Grande, the nearest rail station. Development is by a shaft of circa 600′ depth, with ores carrying values mainly in silver and gold. The mine is wet, having a Prescott high-duty triple-expansion pump on the 400′ level, rated at capacity to lift 1,000 gallons per minute against a head of 1,000′. Equipment includes a steam plant, and the property was developing, with a fair force, at last accounts, 1910.

TUBUTAMA MINING & REDUCTION CO. MEXICO

Mine office: Tubutama, Altar, Sonora, Mex. Lands, 300 hectares, adjoining the holdings of the Sonora Mining & Milling Co., including some antique workings. Idle some years, and apparently moribund.

TUCKER MINING & MILLING CO., LTD. IDAHO.

Office: 25 O'Neil Bldg., Wallace, Idaho. Mine office: Mullan, Shoshone Co., Idaho. Peter Bahn, president and general manager; Harry Harris, vice-president; W. W. Bixby, secretary and treasurer; preceding officers are the directors; Stanley R. Moore, engineer. Organized March, 1907, under laws of Idaho, with capitalization $1,000,000, shares $1 par, assessable; issued, circa $700,000, given in exchange for the property. Annual meeting, second Saturday in April.

Lands, 6 claims, unpatented, area circa 120 acres, carrying some good timber in the Hunter district, circa 3 miles east of the Snowstorm. The property shows Burke quartzite, carrying 2 fissure veins, one up to 50′ in surface width, traceable circa 800′, carrying auriferous and argentiferous copper ore, the outcrops giving traces of copper and lead, with assays of circa 15 oz. silver and $1 per ton. Development is by a 675′ tunnel, that, at 85′ from the portal, cuts a 4′ vein carrying low-grade auriferous copper and lead ore, and about 300′ from the portal cut stringers of high-grade copper carrying silver.

Equipment includes a hydraulic installation of about 100-h. p. Buildings are a 16x16′ smithy, 16x16′ carpenter-shop and 16x26′ bunkhouse, all of log. Management plans continuing the tunnel.

SOCIÉTÉ DES MINES DE TUCO-CHEIRA. PERU

Office: 50 Blvd. Hausmann, Paris, France. Mine office: Casilla 1, Huaraz, Ancachs, Perú. A. Boscher, chairman; F. Maroni and P. d'Arcy, commissaires. Organized June 17, 1905, under laws of France, with capitalization f2,500,000, increased later to f3,750,000, shares f250 par. Lands, in 2 groups, carry copper and lead ores, and coal, and there is a 25-ton matting furnace. The property employed an average of 124 men, 1907.

:ONSOLIDATED COPPER CO. **ARIZONA.**

511 Chamber of Commerce, Milwaukee, Wis. Mine office: Tuc-
:o., Ariz. J. H. Wussow, president; Dr. M. A. Brandt, vice-presi-
Rodee, secretary; C. W. Schneider, treasurer; Hon. Fred W. Fickett,
ıager; preceding officers, J. G. Albright, C. F. Freeman, P. P. Don-
ıllantine, R. L. Bennett and S. W. Purcell, directors. Organized
07, under laws of Arizona, with capitalization $3,000,000, shares $1
essable, in one-half full paid and one-half common stock; issued,
Annual meeting, third Monday in March.

formerly 103 claims, in 6 groups, area 2,060 acres, are now 81 claims,
, in 4 groups, area 1,620 acres in the Papago district. The property
'ueblo Mining & Milling Co., 9 claims, is described under title of the
gh held by this company under an option calling for 51% of stock,
on of $150,000 worth of work. The 4 groups, circa 8 miles west of
s, and circa 35 miles west of Tucson, show granite-porphyry, schist
ne, with a considerable number of fissure veins and contact deposits,
ı being under development, the largest described as a chimney in
bout 55x150′ in size. The groups as a whole have shafts of 180′,
ı′, 95′, 70′, 120′, 110′, 225′ and 525′, and tunnels of 360′, 200′, 240′,
nd 800′, with 3,800′ of workings, estimated by the management to
ı amount of ore, with considerable quantities blocked out for stoping.
y as a whole, including the Old Pueblo, separately described shows
ıssays of 6 to 30% copper, 12 to 80% lead, 3 to 125 oz. silver and 80
gold per ton, from azurite, chalcocite, chalcopyrite and galena. The
'ere estimated, circa 1908, to show 2,000,000 tons of ore with 500,000
l out for stoping, which estimate seems excessive.

rcell group of 16 claims, 3 fractional, area 275 acres, shows 3 approxi-
ıllel mineral zones, developed by shallow shafts and a short tunnel,
d to assay 25% copper, 5 to 40 oz. silver and 8 cents to $5 gold per ton,
:s were excessive, with some silver-lead ores, and now estimated by
y to give assays of 15% copper, 20 oz. silver and $1.50 gold per ton.

ılello group of 9 claims, area 180 acres, circa 2 miles south of the
basic granite, with frequent quartz-porphyry intrusions, showing
ns, slightly developed, carrying ore that has given assays up to 24%
ı gold and silver values.

ıck Dyke group of 48 claims, area 960 acres, is west of and about 3
from the Purcell group, constituting a parallelogram 3,600′ wide and
, showing strong iron outcrops, with favorable indications, having a
ıhallow shafts, showing copper ore of 4 to 25% copper tenor, and
s lead ore assaying up to 69% lead and 139 oz. silver per ton. This
ttle development, but appears promising.

ıent includes a 250-h. p. steam plant, burning petroleum, with 2
here are 6 buildings, including 2 general stores. The company made
ent, October, 1907, of ore carrying 10 to 12% copper and $5 to $10
ıld and silver values per ton. The management is inclined to make
ıms, but the property is considered promising.

LOBE COPPER CO. **ARIZONA.**

Formerly at Globe, Gila Co., Ariz. Described Vol. VIII.

. COPPER CO. **NEW MEXICO.**

Tularosa, N. M. Mine office: Bent, Otero Co., N. M. F. P.
lent; H. E. Forrester, vice-president; Geo. B. Bent, secretary and
ıager; W. F. Drake, treasurer; H. Vincent Wallace, consulting
m Luschy, mine superintendent; A. F. Hazeltine, mill superintend-
ised March 5, 1905, under laws of New Mexico, as successor of
ning & Milling Co., with capitalization $5,000,000, shares $5 par.

Lands, 15 claims, area 300 acres, patented, a 10-acre millsite, and 500 acres of miscellaneous lands, including a 100-acre farm and ranch lands, and a 200-h. p. water-right, with total area of 807 acres, 12 miles northeast of Tularosa, the nearest rail point. The property shows what is reported to be porphyry and cupriferous schist, presumably a Permian red bed, the porphyry having been fractured and brecciated, with deposition of copper sulphides, constituting a blanket deposit, the bed being reported to dip at 25°, carrying mainly chalcocite, with some bornite and chalcopyrite, claimed to average 2.6% copper, with sandstone gangue, the shallow oxidized zone of 10′ to 30′ carrying carbonates, and occasional native copper. The management bored 11 churn drill holes, of 76′ to 354′ depth, 1909–1910. Development is by 3 shafts, one an incline, of only 60′, 50′ and 45′ depth, with 800′ of workings, at last accounts, probably increased since. The 800′ of workings were estimated, circa 1908, to show 500,000 tons of ore.

Equipment includes a hydro-electric power plant, completed 1910, with a small auxiliary steam plant, machinery including an electric hoist at the incline shaft, and an air-compressor. There are 10 mine buildings, including a 45x100′ structure housing the office, warehouse and general store.

A 65x70′ mill, originally of 30 tons daily capacity, was enlarged, circa October, 1910, to a rated daily capacity of 150 tons, equipment including an 8x14″ Blake crusher, Harts jigs and Wilfley tables. It is said that about 7,000 tons of ore were run through the 30-ton experimental plant, within 4 years, ending July 1, 1910, giving a return of 221,230 lbs. fine copper, which would indicate a net return of almost exactly 1.5% copper. The average tenor of ore was reported by the company, several years ago, to be 6%, but obviously is only about a quarter of that figure. The mill puts 15 into 1, giving concentrates said to average 37% in copper tenor, with about 1 oz. silver per unit of copper, but the figures would indicate only about 25% copper tenor for concentrates, if production is at the ratio named. A small shipment of concentrates was made to the El Paso smelter, July, 1910, and carefully selected hand-sorted smelting ore is said to have ranged up to 50% in copper tenor. The company estimates a cost of 8½ cents per pound for finished copper, after allowing for depreciation, which figure remains to be demonstrated, and it is not at all likely that copper can be made for any such cost with the present limited equipment. It is obvious that the ore is of very low average grade, but apparently the tonnage is large, and the property is considered promising, with possibilities of making a good low-grade mine, if extensively developed and thoroughly equipped.

TULAROSA MINING & MILLING CO. NEW MEXICO.

Dead. Was succeeded March 5, 1905, by Tularosa Copper Co. Formerly at Bent, Otero Co., N. M. Described Vol. VI.

MINA TULIPAN. CHILE.

Mine office: Chañaral, Atacama, Chile. Zoilo Rojas, owner; R. Olquin, superintendent, at last accounts. Equipment includes a small steam plant. Employed, 1903, circa 50 men. Presumably idle.

TULLOCH GOLD & COPPER CO. NEW MEXICO.

Office and mine: Silver City, Grant Co., N. M. D. H. Tulloch, president. Organized 1907. Lands, formerly 15 claims, area 300 acres, apparently are now circa 1,200 acres, on Edith Mountain in the White Signal district, said to show good ore near surface, and developed by 2 shallow shafts, one of 50′, on the Dagger Point claim, showing ore claimed to average circa 14% copper. Property is under option to the Mangas Development Co.

TULLY COPPER MINING CO. COLORADO.

Dead. Formerly at Pearl, Larimer Co., Colo. Described Vol. VIII.

TUM-TUM GOLD & COPPER MINING CO. WASHINGTON.

Dead. Former office was 1017 Scarrett Bldg., Kansas City, Mo. Jas. S. Clark was fiscal agent. The company claimed to own 10 claims, area 200 acres

vestern part of Washington, 60 miles in an airline from Portland, trace of operations was secured, and the company presumably was jobbery. Formerly at Spirit Lake, Skamania Co., Wash.

COPPER MINING CO. **WASHINGTON.**

Minneapolis, Minn. Mine office: Leavenworth, Chelan Co., y Jejeski, president; J. Cermak, vice-president; Francis Hrahovsky, drew Jejeski, secretary; John Sadoske, superintendent, at last rganized 1907, under laws of Washington, with capitalization res $1 par. Presumably idle.

MINERA DE TUNILLAS. **CHILE.**

Santiago de Chile. Mine office: Tunillas, Coquimbo, Chile. r. 18, 1906, under laws of Chile, with capitalization 600,000 pesos, s par. No trace of operations secured. Presumably idle.

COPPER CO. **MONTANA.**

d mine: 16 West Granite St., Butte, Mont. Edw. Hickey, presi- lielenberg, vice-president; J. J. Harrington, secretary; R. J. Mac- surer; preceding officers, T. E. Murray, J. A. Clifford, Daniel I. E. O'Rourke, directors; Patrick Sheehan, superintendent; A. E. eer.

d June 4, 1906, under laws of Arizona, with capitalization $800,000, of which $400,000 in stock was given for the property, and 210,000 ld, on the Butte market at par. The company had about $400,000 , April, 1911, and paid dividends of 15 cents per share, May, 1910. , 1911. Shares are listed on the Boston, Spokane and Butte es. Annual meeting, June 20th, each year.

1 fractional claim, area circa 6 acres, lying between the Speculator ms of the North Butte. The property carries 3 veins, of which 2, ment, are of 26′ to 40′ estimated average width, having an average)° S., one vein being known as the Tuolumne or Jessie, the other to be an extension of the Edith May vein, and the 3 veins some- vn as the North, No. 1 and No. 2 veins, all production having been th vein. The company became involved in litigation with the over rights to the Jessie vein, the apex of which was found in the romise strip, lying between the Tuolumne and the Jessie claim of tte, in which the North Butte held an undivided three-eighths litigation was settled amicably, Nov. 28, 1910, a decree of the he Tuolumne the eastern 412′ of the Jessie vein, below the 400′ irming the title of the North Butte to the Jessie vein in said 412′ level, and also confirmed the title of the North Butte to all of the ng west of the 412′ previously referred to, for a distance of about aims for damages were relinquished by both parties. Develop- ms to have established the fact that the apex of the North vein ine lies in the property of the Tuolumne company, and that it e Jessie vein near the 400′ level of the Jessie shaft, and the Tuo- prior location, hence the North Butte secured a very satisfactory t the Tuolumne people were wise in making even a hard settle- rence to protracted litigation with strong interests.

umne is opened by a main shaft that was 1,700′ deep May, 1911, nk to 2,000′, developing an ore body of 12′ to 15′ width, carrying , ranging from 5 to 12% in copper tenor, with an average of prob- . The north drift on the 1,600′ level May, 1911, was in a vein of th, carrying ore averaging about 12% copper. This shaft is to el headgear.

2 minor shafts, known as No. 2, of 2 compartments, 150′ deep, orth vein, and No. 3, of 50′ depth, these apparently having been urpose of proving the apex of the vein formerly in litigation. The

2 other veins of the Tuolumne are of some promise, though not as yet showing commercial ore, one vein carrying about 25′ of very low-grade copper ore on the 1,000′ level. In May, 1911, shipments of about 150 tons daily were being made from the 1,000′ and 1,200′ levels, ore averaging 7 to 9% copper, with very good gold and silver values.

Equipment includes a steam plant with six 150-h. p. Erie City boilers delivering steam at 150 lbs. pressure per square inch. There is a powerful Nordberg hoist, good for 3,000′ depth, which was being installed, early 1911, and a 20-drill Nordberg air-compressor. The power-house, covering boilers, hoist and compressor, is 40x100′, of steel, sheathed with corrugated iron. Other buildings are a 70x80′ carpenter-shop, of wood and iron, a 16x24′ smithy, and minor structures.

Ore, formerly shipped to the Butte Reduction Works, now goes to the Washoe Works, under contract. Forces averaged 105 men, March, 1910. Production, September, 1909, to May 31, 1910, was 19,484 tons of ore, estimated to have averaged about 10% copper and 35 oz. silver per ton and production January, 1911, was 2,703 tons of ore, yielding 491,911 lbs. fine copper and 8,220 oz. silver. Production is estimated at 3,750,000 lbs. fine copper in 1910. The property, though small, is considered decidedly valuable, and the people in charge have demonstrated that a local management is capable of making a dividend-paying mine in Butte.

TURGOVSKI WORKS. RUSSIA.

Mine and works office: Perm, Russia. D. T. Zaharovski, manager, at last accounts. Production, 1900, as per official Russian figures, was 111,686 lbs. fine copper, and unofficial returns of output for 1902 were 1,167,500 lbs. Idle.

TURKEY CREEK MINING & DEVELOPMENT CO. ARIZONA.

Dead. Was merged, 1909, in Bernoudy-Turkey Creek Co. Formerly at Paradise, Cochise Co., Ariz. Described Vol. IX.

TURK MINING & MILLING CO. WASHINGTON.

Office: Davenport, Wash. Letter returned unclaimed from former mine office, Turk, Stevens Co., Wash. A. H. Stiles, superintendent, at last accounts. Lands, carrying auriferous and argentiferous copper ore, were under development, on a small scale, 1906. Idle and presumably moribund.

TURNBULL DEVELOPMENT CO. ARIZONA.

Dead. Formerly at Globe, Gila Co., Ariz. Described Vol. VIII.

TURNER-ELY COPPER CO. NEVADA.

Dead. Former office was 35 Wall St., New York, N. Y. S. Herbert Williams was manager. Capitalization was $10,000,000, shares $10 par. Lands, 9 claims, area 116 acres, adjoining the Williams-Ely and lying between the Cumberland-Ely and Nevada Consolidated properties, said to show outcrops of copper sulphides, at various points, with some old workings, said to show copper sulphides of 8 to 12% copper tenor, near surface. The company began to develop disseminated sulphides in porphyry at depth. Formerly at Ely, White Pine Co., Nev.

TURNSTREAM COPPER MINING & DEVELOPING CO. CAPE COLONY.

Office: East London, Cape Colony. Mine office: Cathcart, Cathcart Co., Cape Colony. Organized circa June, 1907, under laws of Cape Colony with capitalization £30,000, working capital £10,000, as successor of Turnstream Copper Syndicate. Lands, 16 miles from Cathcart, on the Zwart Kei River, have 4 veins, on one of which a 40′ shaft has ore giving a general average assay of 12.55% copper. Presumably idle.

TURNSTREAM COPPER SYNDICATE. CAPE COLONY.

Dead. Was succeeded, circa June, 1907, by Turnstream Copper Mining & Developing Co. Formerly at Cathcart, Cathcart Co., Cape Colony.

ɜE COPPER CO. **NEW MEXICO.**
Formerly at Orogrande, Otero Co., N. M. Described Vol. VIII.

ɜE COPPER MINING CO. **ARIZONA.**
W. H. McKittrick was superintendent. Property was under develdiamond drill, 1903. Equipment included steam and gasoline rmerly at Gleeson, Cochise Co., Ariz.

AK GOLD & COPPER MINING CO. **NEW MEXICO.**
Portage, Wis. R. H. Owen, president; R. J. Rosenfeld, secretary ɜr; Col. F. Randall, superintendent. Organized Apr. 28, 1902, under ɴ Mexico, with capitalization $2,000,000, shares $1 par. Bonds, thorized; issued, $16,000.
13 claims, area 230 acres, and a 5-acre millsite, in the Bromide a 14 miles west of Tres Piedras, and 10 miles from a railway. Prinpment is on the Tampa mine, having a 13′ vein of auriferous and s copper ore, with a 5′ paystreak said to average 7.5% copper, ɔre being of concentrating grade. The Tampa has shafts of 80′, ′, with about one-half mile of workings, showing ore reported by assay 5 to 44% copper, 1 to 4.5 oz. silver and $1.20 to $3.80 gold h some ores assaying up to 2.3 oz. platinum per ton, and carrying denum. The main shaft shows ore of good average tenor, but in ities, and the management believes that it will be necessary to sink 000′ depth, in order to develop good ore bodies.
ıent includes a hoist and 3-drill air-compressor, with a hydraulic as Creek. There is a small sawmill, and a 40-ton leaching plant. nills, completed 1907, by the old management, planned to treat s, but which is not in operation. The company reports expendiut $25,000 during 1910.

ɜA MINING CO. **ARIZONA.**
Office was Los Angeles, Cal. Al. D. Myers was president and ɹands were in the foothills of the Whipple Mountains, 8 miles east of apparently little or no work was done thereon. Formerly at Par-Co., Ariz.

ɅTEIN MINE. **CAPE COLONY.**
by Namaqua Copper Co., Ltd.

H CENTURY ALASKA R CO. **ALASKA & WASHINGTON.**
ffice: Valdez, Alaska. Letters returned unclaimed from former Index, Snohomish Co., Wash. W. N. Robeson, business manager; Hubbart, superintendent, at last accounts. The Index property is ıg mine, of 9 claims, circa 2 miles north of the Sunset, and supposed extension of the Ethel vein, developed by a 400′ drift tunnel, on a ɜ 3′ paystreak carrying chalcopyrite and bornite. The property has tram. The Alaskan lands, near Valdez, presumably are idle also.

H CENTURY GOLD G CO., LTD. **ARIZONA & ONTARIO.**
Was a swindle, promoted by Anthony Blum, that paid dividends ıg stock. A Catholic priest in Canada sued Mr. Blum for selling him ning stock, and Mr. Blum had heart failure, while on the witness ɜupon the priest heard his confession, and gave him absolution, viving immediately thereafter, and the case then being fought out. Gleeson, Cochise Co., Ariz., and Kashaboiwe, Rainy River district, ibed Vol. VI.

H CENTURY KNIGHTS ISLAND R CO. **ALASKA.**
fice: Valdez, Alaska. Lands, 9 claims, adjoining holdings of the a nd Copper Co., south of Northeast Cove, on Dryer Bay.

ment is by a 390′ drift tunnel, 350′ above sea-level, following a 6′ ore chan carrying stringers and lenticular shoots of chalcopyrite along a shear-zone. there is a 30′ tunnel, 100′ lower, showing stringers of chalcopyrite. Equipm includes a bunkhouse and a small floating wharf. Presumably idle.

TWIN BUTTE COPPER MINING CO. MONTANA.

Office: Flint, Meagher Co., Mont. H. G. Klenze, I. J. Blackburn, Aaro Rehn, John McRae and W. I. Parkison, directors. Organized 1906, with cap talization $1,000,000. Lands, 4 claims, unpatented, circa 17 miles northwe of Butte, showing a vein of 20′ to 30′ claimed width, carrying surface ores said t give good assays in copper, with a little silver, and ore has been secured from 24′ vein giving assays up to 12% copper and 52 oz. silver per ton. Developm is by several shallow shafts and tunnels, and it was planned driving the ma tunnel some distance. Idle since circa 1907, and presumably moribund.

TWIN BUTTES MINING & SMELTING CO. ARIZONA.

Office: 314 Railway Exchange, Milwaukee, Wis. Operating offic Tucson, Ariz. Mine office: Twin Buttes, Pima Co., Ariz. Michael Ear president; W. A. Barber, vice-president; Edw. P. Hackett, treasurer; preceding officers, Hon. David S. Rose, W. B. Hill, Howard Nunnemacher, Geo. P. Mayer John G. Baxter and Jas. R. Ricketson, directors; Jas. S. Higgins, general ma ager; J. S. Brown, engineer.

Organized Sept. 8, 1903, under laws of Arizona, with capitali $1,000,000, increased, 1905, to $1,250,000, and again increased, January, 1 to $2,000,000, shares $1 par. Bonds outstanding were $100,000, at last acco Controls, or did control, through stock ownership, the Twin Buttes Railroad C and it was said February, 1910, that the sale of part of the road would liqu the company's indebtedness. Wisconsin Trust Co., transfer agent and re trar. Annual meeting, first Monday in January.

Lands, 61 claims, partly patented, area 1,250 acres, in the foothills of t Sierrita Mountains, in the Helvetia district. The mine, opened 1880, was successful under former ownership, owing to lack of cash, and poor manage though always considered promising. Lands are reported to carry fissure in limestone, and contact deposits having a limestone foot and granite-porp hanging. The various properties of the company had about a mile of work 1906, estimated to show 50,000 tons of ore blocked out for stoping, aver circa 7% copper and 1.85 oz. silver, with traces of gold, which estimate of probably was too high.

The Senator Morgan mine has a 7x16′ three-compartment shaft, of abo 500′ depth, showing a vein of 25′ estimated average width, carrying sulphi ore, estimated formerly to average 10% copper tenor in the bottom work which estimate was excessive. This shaft has rail connections, but the e ment has been moved to the new shaft.

The new Main shaft, 700′ east of the Senator Morgan, was 700′ deep in 1910, and has the equipment formerly at the Senator Morgan shaft, inclu a hoist and air-compressor.

The Copper Glance mine has a 415′ shaft, sunk on an ore body having 30′ gossan, succeeded by about 200′ of carbonate ore, and, on the 300′ lev crosscut passed through 35′ of marcasite carrying kidneys of chalcocite, crosscut on the 400′ level encountered a promising ledge of soft leached ore.

The Copper King mine has a 200′ shaft, showing carbonate ores in the workings, and sulphides in the bottom.

Equipment includes a 300-h. p. steam plant, burning wood and pe with a 125-h. p. Leyner double-drum hoist, capable of raising 3-ton loads 10-drill Leyner compound air-compressor at the Main shaft. There is plant at the Copper King mine. There are 14 dwellings, including machine-shop, smithy and a general store. The matter of

s given tentative consideration, 1907, but no smelter has been built. smelter could be secured from the Santa Cruz River, 5 miles distant. win Buttes railway, 25 miles in length, running from Twin Buttes completed 1906, has one locomotive and 3 flat-cars. It was said 1910, that the company had agreed to sell 18 miles of its line to the acific, for $215,000, leaving 7 miles to the company.
:tion was 700,329 lbs. fine copper and 11,294 oz. silver in 1906; copper and 342 oz. silver in 1907; 963,000 lbs. copper and 6,745 oz. 08; 1,097,550 lbs. copper and 9,800 oz. silver in 1909; 258,672 lbs. 3,446 oz. silver in 1910. The mine ended 1910 employing about d was shipping ore to the El Paso smelter. Property considered but handicapped by lack of adequate capital.

Y DEVELOPMENT CO. **COLORADO.**

Formerly at Turret, Chaffee Co., Colo. Described Vol. VI.

Y MINING & MILLING CO. **MONTANA.**

)ffice: Elliston, Powell Co., Mont. Allen McNaughton, superin- last accounts. The mine, developed by shaft, carries auriferous ferous copper ores, and has a small steam plant. Presumably idle.

VARDS COPPER MINE CO. **NORTH CAROLINA.**

and mine: Greensboro, Guilford Co., N. C. Organized September, capitalization $100,000, shares $100 par. Lands are sundry old including the Twin mine, with an 18′ vein, which was worked pre- American Civil War. Idle some years and apparently moribund.

GS MINING CO. **NEVADA.**

826 Wells Bldg., Milwaukee, Wis. Mine office: Cuprite, Esmer- Nev. A. F. Heidkamp, president; Elbert Oldt, general manager. on $1,250,000, shares $1 par. Lands, 4 claims, 3 miles from Cuprite south of Goldfield, having a vein of 5 to 10′ width, carrying mainly face ores, with a little chalcopyrite, opened by several pits, cuts, of circa 70′ each, said to give ore assaying 25 to 45% copper, 20 to and $20 to $40 gold per ton. Advertising of Koenig, Evans & Co., e, fiscal agents, was bad. Idle and apparently moribund.

ES DEVELOPMENT CO. **MICHIGAN.**

J. B. Paton was treasurer. Was a private syndicate, organized), with capitalization $200,000, shares $5 par, of which $75,000 was operty owners for an option, and 10,000 shares were sold the public perty was options on extensive tracts in Sections 23, 27 and 28, T. 25 , lying south of the Elm River and east of the Wyandot. Diamond started April, 1910, 3 holes being bored on section 27. Holes Nos. ot succeed in getting through the overburden, and No. 3 hole passed ′ of overburden, and was sunk to depth of 850′, with negative results, tober, 1910, owing to lack of funds, and all work was suspended and endered. Formerly at Winona, Houghton Co., Mich.

LD-COPPER MINING CO. **WASHINGTON.**

Formerly at Twisp, Okanogan Co., Wash. Described Vol. VIII.

S COPPER MINING CO., LTD. **ONTARIO.**

Oil City, Pa. Mine office: Sowerby, Algoma, Ont. Dr. E. L. ident; S. F. Amsler, vice-president; D. G. Bailey, secretary; J. C. asurer; F. W. Bailey, general manager; preceding officers, J. W. W. Coulter, G. W. Freeman and Edw. Schwabenbauer, directors; er, engineer. Organized Oct. 12, 1906, under laws of Ontario, with n $500,000, shares $1 par, nonassessable; issued $270,000. Annual t Tuesday in November.

[redacted] fractional, area 300 acres, freehold, including the Robin- [redacted] miles from Thessalon, and 4 from a railway. The prop- [redacted] slate, conglomerate and greenstone, carrying a

number of fissure veins, of which 3, under development, are of 2′ to 10′ estimated average width, carrying sulphide ores giving assays of about 4.5% copper, with small quantities of silver and gold. Development is by shafts of 50′, 25′ and 10′.

Equipment includes a 60-h. p. boiler and 35-h. p. hoist. There are 8 small buildings. The management plans further development, as soon as the copper situation improves.

TWO REPUBLICS MINING CO. **ARIZONA.**

Office and mine: Jerome, Yavapai Co., Ariz. R. A. Smith, president; John B. Lecorr, vice-president; Paul Smyly, secretary and treasurer; A. T Dixon, manager, at last accounts. Organized 1908, under laws of Arizona, with capitalization $1,000,000, shares $1 par. Lands, 16 claims, unpatented, circa 10 miles from Jerome, developed by a 600′ tunnel.

TYEE COPPER CO., LTD. **BRITISH COLUMBIA.**

Office: 45 Leadenhall St., London, E. C., Eng. Operating office: Board of Trade Bldg., Victoria, B. C. Works office: Ladysmith, Vancouver Island B. C. Thos. Headland Wilson, chairman; preceding officer, Nicol Brown. Harry von Berg, Albert Straube and H. Loeffler, directors; Wm. Gardner, secretary; W. H. Trewartha-James, general manager; J. W. Bryant, superintendent and chief engineer; W. J. Watson, smelter superintendent; G. B. Kitto, assistant smelter superintendent; R. G. Mellin and E. J. Conway, assistant engineers; E. J. Hearn, clerk.

Organized Apr. 4, 1900, under laws of Great Britain, with capitalization £120,000, increased, 1901, to £180,000, shares £1 par, fully issued and fully paid. Accounts for fiscal year ending Apr. 30, 1910, showed debit balance increased to £44,579, with reserve fund and investments, at cost, of £68,719, and creditors, overdraft and loan, £43,142. Dividends were 10% in 1904; 10% in 1905; 5% in 1906; 7½% in 1907; with none later.

Lands, 1,247 acres, including 13 claims, crown-granted, area 342 acres, a 45-acre smelter-site, 60-acre tramway terminal and 800 acres timber lands. The company was said to have bought the Big Strike group of claims, on Ship Bay, near Valdez, Alaska, and the company is searching for new properties, and has leased the Cornell, Copper Queen and Myrtle group of claims on Texada Island, from which former lessees shipped considerable ore to the Tyee smelter. The company also is prospecting for coal, with diamond drills, on islands adjacent to the east coast of Vancouver Island.

The Tyee mine, on Mt. Sicker, in the Somenos district, circa 11 miles northwest of Duncans, and about 80 miles from Vancouver, yielded only 1,200 tons of ore 1907, and has been idle since. This property was fully described Vol. VIII.

The smelter, known as the Ladysmith works, is well located, on a 45-acre site on Oyster Harbor, and takes custom ores from as far north as Alaska and as far south as México. The smelter was considerably improved, 1907–1908, at a cost of circa £20,000, and was remodeled and practically rebuilt 1909–1910. There is a 40x210′ wharf, having an electric hoist, connected, by an elevated incline trestle, with the smelter bins, which are of 5,400 tons capacity. The works are terraced throughout, permitting handling of material by gravity, and have a capacity of 500 tons daily. The sampling mill is 29x34′ on the ground and 70′ high. The roast-yard, described Vol. VIII, is no longer in use.

The 56x81′ wooden furnace building has 42x120″ and 48x160″ Allis-Chalmers blast-furnaces, of 200 and 300 tons daily capacity respectively, only the larger furnace being in blast, the smaller being held as a spare. The furnaces use a hot blast, and have water-jacket forehearths, slags skimming into a settler, and thence into a launder, where granulated and sluiced out by running water, to low ground in the bay, for filling. The 8x11x165′ dust-flue, arched over with corrugated iron, leads to a 90′ smokestack, of 7′ diameter. The furnaces reduce 9 to tons of ore and flux with one ton of coke. Equipment also includes a briquetting plant for fines, apparently not in present use, and the matter of adding an ele-

finery has been considered. Furnace product is a 40% copper matte, o American works for refining.
smelter power plant uses electric current and includes 2 Connersville nd an Ingersoll-Sergeant air-compressor. Miscellaneous buildings at er include a good laboratory, smithy and machine-shop.
uction of the Tyee mine was 23,823 tons of ore, yielding 2,115,617 lbs. r, 77,085 oz. silver and 2,776 oz. gold, in 1906, but was only 1,200 tons 907, and the mine is practically abandoned. Smelter production was lbs. copper in 1903; 5,045,000 lbs. in 1904; 3,039,398 lbs. copper, z. silver and 5,952 oz. gold in 1905; 3,173,431 lbs. copper in 1908; lbs. copper in 1909; 45,758 tons of ore, yielding 3,392,901 lbs. copper, . silver and 10,041 oz. gold in 1910. The management is entitled to its change of base, following the exhaustion of its mine, by which a al custom smelting business has been built up.

VANE COPPER MINE, LTD. **BRITISH COLUMBIA.**
office: Duncans, Vancouver Island, B. C. Lands were tested by drill, 1909, when it was reported that a good body of chalcopyrite was Presumably idle.

DEVELOPMENT CO. **NEW MEXICO.**
. Was succeeded, circa May, 1907, by Chemung Copper Co. For- Tyrone, Grant Co., N. M. Described Vol. VI.

HAILE MINING CO., LTD. **ENGLAND.**
. Former office was 352 Salisbury House, London, E. C., Eng. F. H.). Boyle and H. M. Leaf, were directors; Chas. N. L. Shaw, secretary. . Sept. 19, 1907, under laws of Great Britain, as successor of Tywarn- per Syndicate, Ltd., with capitalization £30,000, shares £1 par, and ated 1909. Formerly at Mt. Hawke, Scorrier, Cornwall, Eng.

HAILE SYNDICATE, LTD. **ENGLAND.**
. Was succeeded, Sept. 19, 1907, by Tywarnhaile Mining Co., Ltd., . Formerly at Mt. Hawke, Scorrier, Cornwall, Eng. Described

E COPPER MINES & SMELTER CO. **CALIFORNIA.**
: 1316 Continental Bldg., Baltimore, Md. Operating office: Nev. Mine office: Lone Pine, Inyo Co., Cal. John Salisberry, and general manager; Henry G. Merry, vice-president and consulting J. J. Griffith, secretary and treasurer; Raymond T. Baker, superin- Lands, 50 claims, area 1,000 acres, in the Ubehebe district, circa 50 t of Bonnie Clair station, on the Bullfrog & Goldfield railway. The said to show veins of 8′ to 50′ width, carrying auriferous and argentif- up to 20% in copper tenor, has an 80′ shaft and a 145′ tunnel, with lopments on other holdings. The company has done very little work panic of 1907, which interfered sadly with the original plans, but the ent contemplates further extensive work, when the financial situation

SAWA MINE. **JAPAN.**
office: Uchinosawa-mura, Waka-gori, Rikuchu, Japan. Production 118,699 lbs. fine copper.

NE. **JAPAN.**
office: Usagi-mura, Hikawa-gori, Izumo, Japan. Mine has a vein 3′ width, opened for 320′ in length, carrying chalcopyrite and bornite, l with hematite and limonite. Was worked extensively, 1870–1881, v nearly exhausted. Production, 1907, was only 23,249 lbs. fine cop- ric ton of zinc ore and 32,249 kwan iron pyrites.

IAISKA MINE. **RUSSIA.**
: Batum, Russia. Mine office: Zangezhur, Elizabethpol, Russia. r Bros., owners; G. Chaimazadi, manager, at last accounts. Lands,

15 miles north of the Ara
a number of veins in dia
of 1 to 2 meters width, sh
ing covellite, bornite an
16% copper, after assort
which disappears at sligl

The mine has one s
variety, with laterals to
tion of shafts, winzes, st
lower part serving as a s
in leather buckets, by
notwithstanding the arc
350′ depth.

A hydro-electric po
canal from the Ochtchy
at 80 amperes. There i

The smelter employ
in 2 small water-jacket l
in carts from Evlach, wit
is scarce and costly. M
converters, turning out
duction was circa 350,0
lbs. in 1906; 700,000 lbs

UINTAH COPPER SU

Dead. Formerly a

UINTAH MINING, M

Dead. Formerly a
Vol. VIII.

UINTAH TREASURE

Dead. Property w
Co., for $100,000. For
VIII.

UINTAH TREASURE

Dead. Was succe
Co. Formerly at Park

ULCAHOMO MINING

Office: 210 Second
Wyo., J. S. Atherly, p
dent; C. E. Carpenter,
Leroy Grant, R. C. Scot
laws of Wyoming, with
issued, $758,000. Ann

Lands, 11 claims, fr
per Mining Co., and 8 m
Wyoming, showing gabb
ing a SE. strike, estimat
cupriferous pyrite, estir
silver and $3 to $1,000 f
of 10′ to 115′ depth.

Equipment include
are 3 buildings. Idl

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COPPER CO. **CALIFORNIA.**
d. Formerly at Lone Pine, Inyo Co., Cal. Described Vol. VIII.

EP COPPER MINING & MILLING CO. **COLORADO.**
d. Formerly at Grand Junction, Mesa Co., Colo. Described Vol. VIII.

JOE MINING CO. **UTAH.**
:e and mine: Goshen, Utah Co., Utah. Louis Weber, president; ber, vice-president; Prof. J. H. Weber, secretary, treasurer and general . Organized under laws of Utah, with capitalization $10,000, shares 10 ', nonassessable; issued, $7,250, December, 1909.
ls, 9 claims, unpatented, area 180 acres, developed by a tunnel of owing streaks of high-grade copper ore, and the ground was being une, 1910. The Copper Jack group of 10 claims, in the Erekson district : County, was explored, 1909–1910, but apparently the bond thereon surrendered. Equipment includes two 50-h. p. hoists, a 6-drill air- or and a churn drill.

SAM CONSOLIDATED MINING CO. **UTAH.**
e: 516 Dooly Blk., Salt Lake City, Utah. Mine office: Eureka, , Utah. Hon. John Dern, president and general manager; Jas. Chip- :-president; Frank Kimball, treasurer; preceding officers, M. P. Braffet Havercamp, directors; Fred C. Dern, secretary; C. C. Griggs, super- :.
nized June 29, 1901, under laws of Utah, with capitalization $500,000, par, assessable; fully issued, with one assessment levied. The com- nerly owned a 50% stock interest, of 400,000 shares, in the May Day : Milling Co., which stock was distributed, July, 1910, to shareholders, dividend. The company owns 80% of the stock issue of the Richmond ıda Mining Co., adjoining the Uncle Sam. Regular dividend rate was er share monthly, changed, June, 1910, to 2 cents quarterly, with an idend of 3 cents, December, 1910, dividends for 1910 having been 19 share, with total dividends, to Dec. 31, 1910, of circa $400,000. Shares on the Salt Lake exchange.
ls, 6 claims, mainly fractional, including the Humbug mine, which is ipal property, producing mainly auriferous silver-lead ore, of both and milling grades, but the mine has some cuprite and copper carbon- 2 to 33% in copper tenor. A good ore body was developed, Septem- , near the Richmond & Anaconda. Equipment includes steam power centrator.
uction, for fiscal years ending June 7th, was 185 carloads of ore, giving er returns of $135,444.94, in 1908; 4,465 tons of ore, averaging $29.26 iving net smelter returns of $130,697.49, in 1909; ore giving net smelter $116,323.77, permitting dividends of $45,000 in 1910. The company fiscal year June 6, 1910, with $12,048.37 cash on hand.

SAM COPPER CO. **ALASKA.**
e: 1237–25 Broad St., New York, N. Y. Mine office: Ketchikan, Was said to be controlled by Alaska Mines Securities Co., through nership, secured May, 1906, but the latter named company is dead. miles from the Hadley, show a 40′ vein, traceable 1,200′, carrying aurif- argentiferous copper ore, of fair average tenor. Property has neces- ng buildings, and a 1,150′ tramway leading from the mine to a wharf on . Idle and presumably moribund.

SAM COPPER CO. **ARIZONA.**
l. Formerly at Gilbert, Yavapai Co., Ariz. Fully described Vol. VI.

VÆRKS NY INTERESSENTSKAB. **NORWAY.**
e: Trondhjem, Norway. Mine and works office: Birkaaker, Ren- ndhjem, Norway. H. F. Klingenberg, president; A. H. Bachke, vice- ; preceding officers and Henry Banck, directors; Fritz Myhre, agent.

Organized Aug. 28, 1888, as a reconstruction of a previous company, under laws of Norway, with issued capitalization of 97,200 kronor, shares 400 kronor par, fully paid.

The mine, discovered circa A. D. 1660, has been opened on several occasions, and worked on a small scale. The ore is slightly cupriferous pyrite, low in copper tenor, but of good sulphur average. The mine has been idle some years, awaiting the advent of a railway, under construction 1910, and the management plans beginning shipments, circa 1914, at the rate of about 20,000 to 30,000 tons of ore yearly.

UNDERLAY MINE. AUSTRALIA.

Mine office: Dandaloo, Narramine Co., N. S. W., Australia. J. Dunwell, owner and manager. The mine, discovered 1903, adjoining the Mount Royal mine, in Kennedy County, about 16 miles northwest of Dandaloo, has a 5′ vein, carrying silicious oxidized and sulphide copper ores, ranging up to 40% assay tenor, developed by shafts of 150′ and 200′. Idle several years.

UNEEDA MINING CO. ARIZONA.

Dead. Formerly at Globe, Gila Co., Ariz. Described Vol. IX.

UNEKURA MINE. JAPAN.

Mine office: Iwate, Rikuzen, Japan. Jiro Sato, owner. Forces averaged 126 hands in 1908, and the property has only an 8-h. p. installation. Production was 145,979 lbs. fine copper in 1907; 164,643 lbs. in 1908.

UNIDA GOLD & COPPER MINING CO. ARIZONA.

Office: 907 College Ave., Cleveland, Ohio. Mine office: Wickenburg, Maricopa Co., Ariz. Geo. Margaretic, president and general manager; J. F. Buchanan, secretary. Lands, in the Black Rock district, formerly held by the Electa Mining & Milling Co., which claimed average assay values of $27 per ton, have a 300′ shaft and tunnels of 200′ and 300′, showing ore giving good assay values in gold and copper. There was some litigation between officers of the company, early 1909, but apparently an amicable adjustment was reached. Equipment includes gasoline power. Several carloads of good ore was shipped, 1907. Idle since circa 1908.

COMPAÑÍA MINERA LA UNIÓN. MÉXICO.

Mine office: Viesca, Coahuila, Mex. Property includes El Esfuerzo, La Ampliacion de Providencia and other groups, producing mixed ores, carrying mainly copper values. Employed about 10 men, 1909.

COMPAÑÍA MINERA LA UNIÓN. MÉXICO.

Office: Guanajuato, Gto., Mex. Letter returned unclaimed from former mine office, Silao, Guanajuato, Mex. M. Sañudo, president; F. Arellano, secretary; Roberto Fernandez, consulting engineer. Organized under laws of México, with capitalization 60,000 pesos, shares 20 pesos par. Lands, 24 hectares, carrying auriferous and argentiferous copper ores, planned to be developed by a 100-meter shaft. Idle and presumably moribund.

UNION BLUE MINING CO. NEVADA.

Letter returned unclaimed from former mine office, Buckskin, Douglas Co., Nev. F. A. Goodale, superintendent, at last accounts. Company was promoted by the Consolidated Mines & Investment Co., of Denver, which is not regarded favorably. Lands, north of the Ludwig mine of the Nevada-Douglas Copper Co., were said to carry auriferous copper ore, and property was claimed to have shipped one carload of ore, 1907, to a Salt Lake smelter. The property was claimed to have gasoline power. Idle and presumably moribund.

UNION CONSOLIDATED COPPER MINES, N. L. AUSTRALIA.

Office: 101 Queen St., Melbourne, Victoria, British [illegible] Street Ave., London, E. C., Eng. Mine office: [illegible] South Australia. E. Lowenstein, chair[illegible] preceding officers, D. L. Yates, G. V[illegible] directors; Arthur Hebden, Londo[illegible]

enwood, engineer. Organized Dec. 23, 1904, under laws of Victoria, alization £150,000, shares £1 par, fully issued and fully paid. Owns terest in the Lyndhurst (South Australia) Copper Co., Ltd.
s are 12 leases, area 440 acres, though the company is said to control quare miles, in the Yudnamutana district, about 70 miles east of Lynd- nearest rail point, and 400 miles north of Adelaide, properties including of old mines that were failures in the past, on which a little mining was an old smelter built, many years ago. The property carrying what to the company as No. 6 lode was set off as the Lyndhurst (South) Copper Co., Ltd.
Daly mine, which is the principal property, is developed by numerous shallow, some remaining from former ownerships, equipped mainly line hoists. The main shaft apparently is of only 150′ depth. The aimed to show 5 veins, but No. 5 vein apparently is the only one of any importance. This is claimed by the company to average 400′ in aceable 1½ miles, but, as a matter of fact, No. 5 vein is of 10′ to 20′ rrying impregnations of specks of carbonate ore, with ferruginous stimated to average 4 to 6% copper, with a little gold, and the vein, nly one-fortieth to one-fiftieth the width claimed, is traceable only nile, or one-third of the distance claimed. This vein was claimed to le, carbonate and sulphide ores assaying 60% copper and 8 dwts. gold ton, but actually carries less than one-tenth of this average value. s self-fluxing. The company claims the biggest surface showing in which is absolutely untrue, and claims to have upwards of 3,000,000 e in sight, in No. 5 vein, which claim not only is absolutely untrue, but been known to be a wilful prevarication, when put forth by the manage- he company's chairman stated his conviction that the lands were suffi- at least 5 big copper mines, which was merely a wild guess, or some- much worse. The No. 5 vein of the Daly mine was worked, circa proved what the Australians call a duffer. Bulk parcels of ore sent for tests, are said to have given average returns of 27.7% copper, but are important, or otherwise, according to the method of selection.
company made much of the fact that the Tasmanian Copper Co., Ltd., ing a smelter in the district, and claimed to have a smelting contract company for the treatment of 1,000 long tons of ore weekly, at 35s. per smelting charge to be reduced to 32s. 6d. per ton when the production ,000 tons weekly, but the Tasmanian Copper Co., Ltd. abandoned the mine, smelter and all other properties in this district. The company y is averse to examination of its workings by other than its own men, ersion to letting in the sunlight has a sinister appearance.
company has 6 motor larries for transport, and has been endeavoring the South Australian government to join in building a railway line, na or Lyndhurst, to the mine.
smelter, at the mine, said to have been built 1909, with 150 tons daily actually was completed in 1910, and actually has a 100-ton water- st-furnace. There is said to be an adequate water supply, but any made by the company necessarily rests under strong suspicion. The said to have in connection an assay office, warehouse and office. By its utterly untruthful claims and its monstrous prevarications, this is regarded with much suspicion.

UNIÓN y CONSTANCIA. **MÉXICO.**

and mines: Indé, Durango, Mex. Reinaldo E. Avila, owner and Mines, which include the Unión, Constancia and Misma Matracal, ed in the Sixteenth Century. Country rock is andesite, showing 9 , carrying chalcopyrite, galena and sphalerite, associated with pyrite. under development [illegible] ore width and is opened by a shaft

of 18m. and by tunnels of 70m. and 100m., developing first-grade ore averaging 43% lead, 100 oz. silver and 54 oz. gold per metric ton, and second-grade ore averaging 4% copper and 20 oz. silver per ton, latter showing a little native copper.

The smelter, 4 miles from the mine, having two 30-ton water-jacket blast-furnaces, shipping matte to the Aguascalientes works of the American Smelting & Refining Co., for conversion and refining, has been leased or sold to the Indé Reduction Co.

UNION COPPER CO. ARIZONA.

Letter returned unclaimed from former office, Williamsport, Pa. Mine office: Globe, Gila Co., Ariz. S. G. Reading, president; W. F. Anthony, vice-president; F. L. Toombs, secretary and treasurer; H. F. Campbell, superintendent. Organized Oct. 31, 1906, under laws of Arizona, with capitalization $1,000,000. Lands include the Chapparal, Sieboth and Halliday groups, the Chapparal group, 13 claims, being circa 2 miles northwest of the Gibson, and the Halliday group, 4 claims, lying between the Gibson and Central. Equipment includes a small steam plant. Presumably idle.

UNION COPPER LAND & MINING CO. MICHIGAN.

Office: 70 State St., Boston, Mass. Mine office: Houghton, Houghton Co., Mich. Harry F. Fay, president; preceding officer, Harold H. Anthony, Ezra H. Baker, Samuel Carr, Albert B. Merrill and John G. Stone, directors; C. J. Morrissey, secretary and treasurer; J. Abner Sherman, land agent.

Organized 1863, and reincorporated 1893, under laws of Michigan, with capitalization $2,500,000, shares $25 par; issued, $2,000,000. Company paid a $40,000 dividend, Feb. 10, 1908, and net expenses for 1910 were $10,928.53, leaving a net cash balance of $26,570.71 on hand Dec. 31, 1910. Old Colony Trust Co., Boston, registrar; American Trust Co., Boston, transfer agent. Annual meeting, fourth Thursday in March.

Lands are 5,323 acres carrying both surface and mineral rights, and 1,043 acres additional of mineral rights only, in nearly 200 different parcels, practically all on the Keweenawan copper belt, in Keweenaw, Houghton and Ontonagon counties. Much of the land is covered with valuable timber, including pine, hemlock and hardwood, stated, by president Fay, to be valued, conservatively, at upwards of $125,000.

During the six months preceding March, 1911, exploratory work was done by diamond drilling in Sec. 1, T. 56 N., R. 33 W., and Sec. 36, T. 57 N., R. 33 W., west of the Alloues mine. Four holes were drilled, with aggregate depth of 3,659′, covering a horizontal distance of 5,299′, the holes cutting the Alloues conglomerate and a number of mineralized beds carrying indications of copper, but showing nothing of much importance.

UNION COPPER MINES CO. NORTH CAROLINA.

Office: 1120-52 Broadway, New York, N. Y. Mine office: Gold Hill, Rowan Co., N. C. Louis M. Ogden, president; Jos. Swift, vice-president; Woodruff Leeming, secretary and treasurer; preceding officers, Alex. Konta, Erasmus M. Cravath, Douglass Green, Chas. A. Heckscher, Samuel H. Lever and Edw. H. Swan, directors; A. W. Tucker, superintendent.

Organized May, 1907, under laws of Maine, as a reconstruction of the bankrupt Union Copper Mining Co., with capitalization $2,500,000, shares $5 par, nonassessable; fully issued. The shareholders of the bankrupt company were given 1 share of new for 2 shares of old stock. Shares are listed on the New York and Boston curbs. Annual meeting, in February. The company was said, August, 1910, to be contemplating consolidation with the Gold Hill Copper Co.

Lands, 1,150 acres, freehold, about 15 miles from Salisbury, in Rowan and Cabarrus counties, well watered and timbered. The property shows about carrying 5 veins, with average strike of N. 20° E. and practically vertical

0′ width, 3 of which carry copper ores, the other 2, reported to carry l gold ores respectively, being but slightly developed. The copper mineralized zones carrying lenticular shoots of ore, longest about 100′

The principal development is on the Big Cut copper vein, opened ınce of about one mile, by 10 shafts, of 150′, 225′, 650′, 400′, 200′, 300′, , 165′ and 200′, the deepest shaft, of 650′, having been claimed formerly ′ in depth, and these shafts were claimed to show a vein of 20′ to 40′ t actual maximum width is about 20′ only. The Big Cut vein shows ›res and a little native copper in the upper workings, succeeded by ite, with quartz gangue, estimated by the former company to average ›er, 3 to 30 oz. silver and $1.50 to $7.50 gold per ton, but a careful by Dr. A. R. LeDoux, gave averages of only 4.4% copper, 4 oz. silver ıts to $1.20 gold per ton, and this apparently was from ore produced, sampling of the mine itself, which was claimed, Oct. 26, 1908, by Alex. ssistant to the president, who was then Calvin H. Allen, to average ›opper, 2 oz. silver and 50 cents gold per ton. No. 7 shaft, of 200′ ›ws a vein 4″ wide at surface, and 3′ to 4′ wide on the bottom level, ore is claimed to average circa 4.5% copper. There are 14 shafts all he mine has about 5,000′ of workings. The property has been claimed, ›s, to have produced about $1,000,000 worth of gold, in early days. ıachinery plant is extensive, but archaic, formerly including 27 boilers, nd 3 air-compressors, but an old compressor was sold, and replaced by ›rsoll-Rand air-compressor. There is a small electric light plant. ıngs include a 45x70′ machine-shop, 40x60′ smithy, engine-house, ›es, a foundry with small iron and brass cupolas, an office building, ›tel, 130 dwellings and a stable for 400 horses and mules.

New York stock exchange house of Sig. H. Rosenblatt & Co. boomed ›xtensively, and went broke early 1911, causing a considerable scandal. o. Newman, who has been the power behind the throne in this com- its predecessors, for many years, worked the stock market diligently, ın upward movement in copper stocks caused the suckers to run freely, · Geo. Newman is said to have retired from the management, and the gement necessarily must be an improvement on the old, if the change ı is actual rather than nominal. The property is considered promising, s a mine, and not, as it has been for ten years past, as a stockjobbing designed to filch money from the credulous and poorly informed.

OPPER MINING CO. **CALIFORNIA.**

Property was sold, September, 1909, to Calaveras Copper Co. For- ›pperopolis, Calaveras Co., Cal. Fully described Vol. VIII.

OPPER MINING CO. **NORTH CAROLINA.**

Was succeeded, 1907, by Union Copper Mines Co. Formerly at Rowan Co., N. C. Fully described Vol. VI.

OPPER MINING CO. **WYOMING.**

Formerly at Encampment, Carbon Co., Wyo. Described Vol. VI.

OPPER SMELTER CO. **ARIZONA.**

Was a Wm. F. Wernse fraud. Property was an imaginary smelter, ›educe ores from imaginary mines. Formerly at Pima, Graham Co.,

OPPER SMELTING CO. **ARIZONA.**

Was the same as the Union Copper Smelter Co., a fraud put out by . Wernse gang of St. Louis. Formerly at Pima, Graham Co., Ariz.

EVELOPMENT CO. **CALIFORNIA.**

[illegible]rly at Johannesburg, Kern Co., Cal. Described Vol. IX.

I[illegible] **MICHIGAN.**

[illegible] Place, Boston, Mass. Operating office: Calumet, [illegible]gon, Ontonagon Co., Mich. Jas. MacNaughton,

general manager; Thos. H. Wilcox, superintendent, at last accounts. Property, first known as the Isle Royale & Lake Superior, was the first mine opened in the Porcupine Mountains. The old company was organized October, 1864, under laws of Michigan, with capitalization $500,000, and presumably has been wound up. The mine has 4 shafts, of 85′ to 400′ depth, with 4 levels opened, on an amygdaloidal bed lying north of the Nonesuch lode, and once had a small stamp-mill with Frue vanners. Was unwatered, February, 1908, by the Calumet & Hecla Mining Co., which holds an option on the property. Idle several years.

UNION MINES CO. ARIZONA.

Office and mine: care of Hoval A. Smith, manager, Bisbee, Cochise Co., Ariz. Property is an undivided interest of about 50% in the Arizona King, or Copper King mine, at Bisbee, described under title of Copper King mine.

UNION ORE EXTRACTION & REDUCTION CO. COLORADO.

Dead. Was reorganized, circa 1905, as National Radium & Copper Co. Formerly at Denver, Denver Co., Colo. Described Vol. V.

UNION SMELTING CO. ARIZONA.

Dead. Formerly at Chloride, Mohave Co., Ariz. Described Vol. VIII.

UNITED ALKALI CO., LTD. SPAIN.

Office: 30 James St., Liverpool, Eng. Mine office: Valverde del Camino, Huelva, Spain. Works office: St. Helens, Lancashire, Eng. Employs 3,000 men. John Brock, chairman; E. K. Muspratt, vice-chairman; Eustace Carey, secretary; J. H. Cresswell, general manager; C. Kaesmacher, assistant manager. Alex. Hill & Stewart, consulting engineers. Organized under laws of Great Britain, with capitalization £8,750,000. Net earnings were £362,244 in 1907, from which £133,746 was disbursed for interest on debentures.

The company is primarily a chemical and manufacturing corporation, with which copper mining is merely a small branch of the general business, and controls 46 subsidiary works and corporations, some of the plants being of very great size. The company has its principal works at St. Helens, Runcorn, Flint, Widnes and Glasgow, making extensive use of Spanish and Portuguese pyrite which are burned for sulphur, after which the cinder remaining is leached for copper.

The company's copper properties in Spain, mainly held under lease, include the Sotiel Coronada mines, separately described under title of their own; the Castillo del Buitron mines, held under lease from the Compañía del Ferrocarril y Minas del Buitron; the Cabezas del Pasto mines, held under lease from the Sociedad Colectiva C. y J. Sundheim, and Tinto and Santa Rosa mines, all in the province of Huelva. The Monte Rubio group, formerly held on lease, was abandoned, 1909. These properties show typical Huelvan slates, carrying lenticular contact deposits between slate and porphyry, having a generally E.-W. strike, with dip from 30° to vertical, carrying cupriferous pyrite.

The Cabezas del Pasto group of 6 mining concessions, area 104 hectares, includes also 300 hectares of adjoining lands, having lenticular ore bodies apparently increasing in size with depth, opened by 12 shafts, deepest 194 m., with circa 6,000 meters of workings, 1908, estimated to show 750,000 tons developed pyritic ore, and 1,500,000 tons of cupriferous schists underground, which is said to be both safer and cheaper than [illegible] and mining is by overhand stoping, with dry-wall [illegible] stopes. The Cabezas del Pasto ores carry 1 [illegible] sulphur, and the cupriferous schists range fro[illegible] pyritic ore above 1.5% copper, and all schis[illegible] are exported, the low-grade ores being leach[illegible] ore exported. The mine water carries up to [illegible] leached, the cement copper being washed and [illegible] ing 98.5% copper, which is the highest grad[illegible]

ıce plant of the Cabezas del Pasto includes a Robey hoist and pump, ıine is served by a tramline of 36cm. gauge, connecting with the com- ivate line, also by an aërial tram leading to wharves at La Laja, on the liana.

Castillo del Buitron property is a group of 4 concessions, area 47 acres, ːa La Real, and includes La Poderosa group of 6 hectares, adjoining, Concepción mine of 6 hectares area, at Almonáster. The Castillo del roup has 2 principal lenses of ore, these being the Levante, with a 150 meters, but of decidedly irregular outline, and the Poniente, with about 200 meters. Production of this group averages circa 1,500,000 opper yearly.

Tinto & Santa Rosa group includes La Santa Rosa and El Tinto mines, combined area of 141 hectares, at Zalamea La Real, leased from the de las Minas de Cobre Tinto y Santa Rosa. The Santa Rosa mine has lenses, with 7 levels opened, and the Tinto mine has ore said to average % copper and 46% sulphur. The group has 9 shafts, and was esti- 08, by the Spanish government, to have 1,500,000 metric tons of ore l. Production from this group was 38,005 long tons of pyrite and 803 of cement copper 1905, and 58,181 metric tons of ore in 1908, and pres- ction is estimated at about 2,000,000 lbs. fine copper yearly. These have a 9-kilometer Bleichert aërial tram to Calañas.

ːompany controls the Ferrocarril del Buitron of 42″ gauge, of 79 kilom- ːth, running from Castillo del Buitron to Huelva, equipped with 18 ːes, transporting ore, merchandise and passengers. The company was ː, by Estadistica Minera de España, to have projected an extension of ː La Rábida.

uction from Spanish mines was 103,225 metric tons of cupriferous ,247 tons of pyrite and 1,258 tons of copper precipitate, 1908. The formerly was a large purchaser of iron pyrites, but now supplies its ːrements, in the main. Production is estimated at 6,000,000 lbs. fine 10.

ARIZONA COPPER CO. **ARIZONA.**

ːr returned unclaimed from former office, Kansas City, Mo. Mine rescott, Yavapai Co., Ariz. Lands, known as the Mohoney group, in Rock district, are said to show a vein of 5′ to 50′ width, opened by a , and property has about 1,000′ of workings, showing ore assaying well silver and gold. Idle some years and apparently moribund.

ARIZONA COPPER CO., LTD. **ARIZONA.**

ː: 1 Broad Street Ave., London, E. C., Eng. Mine office: Vekol, , Ariz. Rt. Hon. Earl of Orford, chairman; Horace J. Nevill, vice- preceding officers and Thos. Syminton, directors; Jas. Francis Shearer, Van H. Brooks, mine manager. Organized Oct. 15, 1902, under laws Britain, with capitalization £200,000, shares £1 par; issued, £160,000, . Has an indebtedness of £30,000, not bearing interest.

s, 500 acres, known as the Reward mine, circa 6 miles from Vekol, ct. 15, 1902, of the Reward Consolidated Copper Mining Co., for Property includes a 30-ton smelter, of small present value. Lands ded, 1907, for 30 months to the Casa Grande Development Co., s succeeded by the Southern Copper Co., but the bond was forfeited. negotiations un[illegible] of the property.

BINGHAM [illegible] **UTAH.**

ː: Salt Lak[illegible] Salt Lake , Louis M[illegible] and Hoff- rintendent. [illegible] partly by the Sno[illegible] ve of r, 25% lead [illegible]

UNITED COPPER CO. **IDAHO, MONTANA & UTAH.**

Office: 42 Broadway, New York, N. Y. Operating offices: Butte, Mont., and Salt Lake City, Utah. F. Augustus Heinze, president; preceding officer, R. R. Kilroy, L. A. Dunham, Geo. Lane, Bernard C. Hughes, Geo. Kuehne, Jr., J. D. Coates, Kurnal R. Babbitt and M. M. Joyce, directors; Stanley Gifford, secretary and treasurer.

Organized Apr. 28, 1902, under laws of New Jersey, with capitalization $80,000,000, shares $100 par, in $5,000,000 preferred 6% cumulative stock, and $75,000,000 common stock; issued, $50,000,000, in $5,000,000 preferred and $45,000,000 common shares, at last accounts. Stock is listed on the Boston and Pittsburg stock exchanges. Metropolitan Trust Co., New York, Old Colony Trust Co., Boston, and Fidelity Title & Trust Co., Pittsburg, registrars. American Trust Co., Boston, Union Trust Co., Pittsburg, and C. S. Buckingham, New York, transfer agents. Annual meeting, first Wednesday in June.

The preferred stock is redeemable, at $125, in full, or any part, upon any dividend date, on 3 months notice. The board of directors has power to fix, determine and vary the disposition of any surplus, etc., from time to time, the powers of the board being practically absolute, and leaving shareholders without voice in the management, and apparently without recourse for the flagrant mismanagement from which this company has suffered.

The company has paid $7,462,500 dividends, of which $1,500,000 was paid on preferred and $5,962,500 was paid on common shares, preferred dividends being $150,000 in 1902, $300,000 each in 1903, 1904, 1905 and 1906, and $150,000 in 1907. The first dividend on common shares was paid 1905. Dividends on common shares were $450,000 in 1905, $3,150,000 in 1906, and $2,362,500 in 1907. The common stock was placed, 1906, on a "quarterly" dividend basis at rate of 7% per annum, but the company maintained this rate for only a short time, suspending the dividends 1907.

For fiscal years ending June 1st, the company's statements show income as follows: $1,045,475 in 1904; $1,513,850 in 1905; $3,011,620 in 1906; $861,023.97 in 1908, of which $841,662.50 was from dividends on securities held, and $19,361.47 from interest. President Heinze informed shareholders June, 1908, that the floating indebtedness of the company did not exceed $1,100,000. The company reported a surplus of $13,000, May 31, 1908. Later figures seem lacking.

The United Copper Co. is a securities holding corporation solely, and was organized, ostensibly, along much the same lines as its former great rival, the Amalgamated Copper Co., except that the Amalgamated buys control of subsidiary corporations to retain and operate, while the United is operated as a blind pool, under the personal direction of the president, and shareholders are unable to obtain any satisfactory statement as to what their holdings represent.

By reason of the settlement of the protracted litigation between the Amalgamated Copper Co. and United Copper Co., February, 1906, through the sale of the Heinze holdings in Butte to the Butte Coalition Mining Co., the status of the United Copper Co. was changed materially, the company having begun business as the owner of stocks and bonds of various subsidiary mining and holding corporations operating in Butte, as given in detail in Vol. V. The price paid by the Butte Coalition Mining Co., for the various Heinze holdings taken over is said to have been $14,000,000, but apparently only part of this amount was cash, the balance being in shares of the Butte Coalition Mining Co., which appreciated materially in market price, the consideration actually being considerably greater than stated, in case the United Copper Co. sold its holdings in Butte Coalition at the high prices ruling in the copper share market during the latter half of 1906 and the first quarter of 1907. Apparently the United Copper Co. has disposed of the bulk of its Butte Coalition stock, which was its most valuable asset.

assets of the United Copper Co. are known only to the management, but
y include control of the stock of the Montana Ore Purchasing Co.,
duction Co., and La France Copper Co., which are affiliations, with
unable to pay its taxes; the Ohio Copper Co., which has been cleverly
y Heinze through personal ownership of the operating tunnel; two-
he capital stock of the New York & Pittsburg Coal Co., and a mortgage
00 thereon, held through the Montana Ore Purchasing Co., which
amed corporation is said to own approximately 10,000 acres of coal
Washington County, Pa., supposed to be underlaid by the Pittsburg
ituminous coal, which property is said to be valued at $2,000,000; an
eld jointly with the Canadian Pacific railway in 540,000 acres of land
uthern part of British Columbia, in the vicinity of the Columbia &
Railway, a subsidiary of the Canadian Pacific. Miscellaneous hold-
ipposed to include the Rimini Gold Dike mine, claimed to be one of the
id most valuable ore deposits in the state of Montana, which claim is
oubt, and 13 claims, area circa 250 acres, called the Danielsville mine,
odge county, about 20 miles from Anaconda, said to show indications
'e. The company is said to hold also $75,000 first-mortgage bonds of
Copper Co., and is said to control the Stewart Mining Co., owning a
l mine in the Cœur d'Alene district, through the Montana Ore Purchas-
hich is said to own 673,250 shares of the 1,013,262 shares of the Stewart
Co. stock outstanding. With the exception of the lands, all of the
y companies referred to are Heinze promotions, all lacking cash, and
y all in more or less precarious financial condition.

[ay, 1906, the stockholders of the United Copper Co. authorized the
,000,000 Montana Ore Purchasing bonds, and $2,500,000 Nipper Con-
bonds, at par, to the Butte Coalition Mining Co. This presumably
ry out a bargain previously made, and it is presumed that the consider-
in shares.

. M. Hodgens, an owner of 1,300 shares of preferred stock in the United
o., and formerly cashier of the Heinze bank, at Butte, secured an alter-
it of mandamus, July, 1907, requiring the company to show its books,
ose whence earnings were secured, but apparently no such disclosure
. Mr. Hodgens alleges that earnings of the company were not more
00,000 in 1906, in which year an inspired article in the press said that
rofits, from various sources, were $12,000,000, the company claiming
of $3,011,620 in 1906. The United Copper Co. was unable, 1908,
La France Copper Co., a subsidiary corporation, to the extent of pay-
es in Butte, amounting to only about $5,000. This is a rather ridicu-
t for a company that claimed, only two years before, to have a net
ome of more than three millions of dollars

company's annual reports are models of all that such reports should
ving the merest outline of information, in the vaguest possible terms,
alleged interests in subsidiary corporations, all of which subsidiary
ns are similarly managed, in a most unsatisfactory manner. The
per Co. is the only producer in which the United Copper Co. is inter-
it is doubtful if that property is more than paying expenses. La France
. has a zinc-copper mine of problematical value, which has lost money
on. The Stewart lead mine is generally considered valuable, but is
ith the Heinze blight.

United Copper Co. is operated as a blind pool by F. Augustus Heinze,
hown himself utterly rapacious, unscrupulous and conscienceless in
and financial operations. Shareholders were tremendous losers in the
1907, when both preferred and common shares declined to merely
values. About one-third of the common stock is said to be held in
nd the unfortunate Dutch investors were endeavoring June, 1911, to

obtain some explicit information regarding the company's affairs. In view of the facts, the United Copper Co. can be considered only as an exceptionally daring piece of stockjobbery.

UNITED COPPER CO. WASHINGTON.

Dead. Was a swindle. Formerly at Galena, Kittitas Co., Wash. Fully described Vol. VIII.

UNITED COPPER EXPLOITATION & MINING CO. NEVADA.

Dead. Former office was 511 Continental Bldg., Denver, Colo. A. L. Emberson, now of 426 South Spring St., Los Angeles, Cal., was president; W. E. Flodin, vice-president; M. C. McKinnon, secretary and treasurer. Organized May, 1907, under laws of Arizona, with capitalization $10,000,000, shares $1 par. Lands were 2 groups, known as the Great Western and the Gates-Cocroft-Merrill group, in the Ward and Ely districts. Formerly at Ely, White Pine Co., Nev.

In Vol. IX of the Copper Handbook there appeared the following criticism of this company: "Advertisements of the company were highly untruthful and misleading. * * * Company apparently is merely a bit of stockjobbery." Mr. A. L. Emberson, the former president, wrote, under date Feb. 16, 1911, calling attention to these pointed criticisms, and made the following statements in his letter: "I wish to say emphatically that the substance and inference of this article is maliciously false and libelous * * * as to the untruthful and misleading statements of the advertisements, I declare that this statement, either literally or by inference, is without foundation in fact. I defy you, or any other man, to show wherein a single advertisement or a single representation of this company was untruthful or misleading * * * I hereby enter my serious protest and objection. It is just such carelessness or malicious intent to harm someone who has not seen fit to patronize, that has been the means of discrediting legitimate mining and mining operations."

Mr. Emberson having specifically challenged the editor of the Copper Handbook "to show wherein a single advertisement or a single representation of this company was untruthful or misleading," the proof so challenged is appended in the following series of 13 statements, all taken, verbatim et literatim, from the advertisements of the United Copper Exploitation & Mining Co., promoted by Mr. Emberson:

(1) "Lay the foundation today for your fortune by an investment in copper shares upon the ground floor."

(2) "Copper stocks combine the security of government bonds and the speculative features of fabulously rich gold mines."

(3) "More great fortunes have been made from copper investments than from any other source."

(4) "Undeveloped and partially developed copper properties offer greater opportunities to acquire wealth than any other industry."

(5) "Hundreds of millions of dollars are being made by persons of limited means who have the courage to co-operate in making copper mines."

(6) "Get into copper today. Get in upon the ground floor. Get in with good people. Get in with honest people. Get in with people who know how to find a mine and know how to make mines when they are found."

(7) "The company will operate upon a large scale and [illegible] mines and mining properties and develop, equip and operate [illegible] recognized copper-producing districts in the United States, for [illegible] its shareholders."

(8) "We have made satisfactory arrangements [illegible] develop and equip our properties."

(9) "The management has taken every [illegible] success of this company."

(10) "It is organized upon and will [illegible] lines and policies that has made the London

ons in the world, and has brought success and enormous wealth to the eims Exploration Co., which already controls millions of dollars worth properties."

"The United Copper Exploitation & Mining Co. makes every repre- as to its organization, officers, directors and managers and its proper- perations thereon as statement of facts and guarantees the correctness nd it will refund every dollar invested in its shares, and pay the expenses in the investigation by any stockholder, if any material statement of any is found untrue."

"Your greatest opportunity is presented to you now and here. This t time that you have had a chance to get in as an organizer of a first- ɔer mining company, and in such a liberal way that you will receive num of results with the minimum of investment, and with capable, xperienced management with an efficient and reliable engineering ɔse judgment in mining is unerring."

riticisms of Vol. IX of the Copper Handbook have been reprinted here- exact language used; the denial and challenge of Mr. Emberson have ed herein in his exact words, and the extracts from the advertisements mberson's company have been reprinted herein in their exact words, tly the reader has the original evidence in his hands, regarding this , and the men behind it, "whose judgment was unerring," who had ery precaution to insure a prodigious success," and who had "made y arrangements for ample funds," but whose promotion unfortunately te of all these surroundings. The reader therefore may act as the jury as to just who has been lying about the United Copper Exploitation Co.

COPPER-GOLD MINES CO. **OREGON.**

: Salem, Ore. Letter returned unclaimed from former mine office, ss, Josephine Co., Ore. O. S. Blanchard, president; Owen A. Thomas, nd general manager. Lands, on Pickett Creek, an affluent of the er, near Merlin, and 14 miles south of Grants Pass, are said to show to 10′ width, carrying ore similar to that of the Waldo mine, giving to 8% copper and $30 to $100 gold per ton. Equipment includes er and an air-compressor, and the co pany was said to have let a a Portland firm, for a 50-ton smelter, which apparently has not been e.

COPPER-GOLD MINING & EXTRACTION CO. **ARIZONA.**

Was stillborn. Formerly at Morristown, Maricopa Co., Ariz. Vol. III.

COPPER MINING CO. **ARIZONA.**

Formerly at Tucson, Pima Co., Ariz. Described Vol. V.

COPPER MINING CO. **WASHINGTON.**

418 Hutton Bldg., Spokane, Wash. Mine office: Chewelah, , Wash. Conrad Wolfle, president and general manager; W. G. e-president; Gale Smith, secretary and treasurer; preceding officers, h, J. H. Griffith and S. Rosenhaupt, directors; Frank Vilwock, super- Organized July 16, 1906, under laws of Washington, with capital- 000,000, sh[illegible] fully [illegible]. Bonds $20,000 authorized. ting, fo[illegible] in January.

10 cl[illegible] [illegible]res, and 240 acres [illegible] land[illegible] [illegible] rail point. The [illegible] [illegible]imated average [illegible] [illegible] reported [illegible] [illegible] silver and [illegible] [illegible]drite on [illegible] [illegible] per ton.

Development is by shafts of 275′, 175′ and 275′, with a 150′ winze, and a 1600′ tunnel on the 400′ level, of which the first 735′ is a crosscut and balance a drift, with a 500′ lower tunnel, on the 1,000′ level, planned to be driven 3,000′, to gain a back of 1,100′. The mine has about 6,000′ of workings, estimated by the management to show 150,000 tons of ore, of $6 to $10 gross value, per ton.

Equipment includes a 150-h. p. steam plant, with a hoist, 4-drill and 6-drill Franklin air-compressors, 11 power drills, 2 pumps and an electric light plant. There are 5 mine buildings, including a 15x24′ frame machine-shop. The company was said, October, 1909, to have placed an order for the equipment of a 50-ton mill, but no mill has been built. Ore was shipped, to the Northport and Granby smelters, yielding circa 350,000 lbs. fine copper, 1908, and a little ore was shipped 1909-1910. The management plans continuous development and regular production.

UNITED ELY COPPER CO. NEVADA.

Dead. Formerly at Ely, White Pine Co., Nev. Described Vol. VIII.

UNITED ELY MINES CO. NEVADA.

Dead. R. R. Vail was manager. Lands were prospects in vicinity of Ely, said to show copper ore, on which a little work was done, 1906-1907, with a force of 10 to 15 men. Equipment included a small steam plant. Formerly at Ely, White Pine Co., Nev.

UNITED EMPIRE CO. BRITISH COLUMBIA.

Dead. Was succeeded, December, 1906, by United Empire Co., Ltd. Formerly at Princeton, Boundary district, B. C. Fully described Vol. VI.

UNITED EMPIRE CO., LTD. BRITISH COLUMBIA.

Office and mine: Princeton, Yale district, B. C. Wm. C. McDougall, president and general manager; John M. Smith, secretary and treasurer; preceding officers, Mrs. M. L. McDougall, John M. Murray and R. L. Reid, K. C., directors. Organized December, 1906, under laws of British Columbia, as successor of United Empire Co., with capitalization $500,000, shares $1 par, issued, $300,000. Annual meeting, first Tuesday in November.

Lands, 9 claims, area 250 acres, 692 acres of crown-granted coal lands and 2,500 acres miscellaneous lands, in the Similkameen district. The copper lands show limestone, diorite and sandstone, with 2 ore bodies, of which one, under development, is estimated at 100′ width, and is said to be traceable 4,500′, carrying malachite and occasional azurite, with chalcopyrite at depth, ore formerly being estimated to average 2% copper, 2 to 4 oz. silver and $1 to $2 gold per ton. Development is by shafts of 30′ and 50′, and by tunnels of 125′, 250′ and 80′. There are about 2,000 tons of ore available for extraction, but no ore has been blocked out for stoping. Adjoining the copper ore, on the west, boundary, is a series of coal measures, apparently of promise. Presumably idle.

UNITED EXPLORATION CO. WYOMING.

Office: 113 Devonshire St., Boston, Mass. Letter returned undelivered from former mine office, Battle, Carbon Co., Wyo. Company is a reorganization of the Beulah Copper Co. Lands, 13 claims, area circa 250 acres, having 800′ tunnel. Idle some years and apparently moribund.

UNITED GERMAN COPPER MINES, LTD. GERMANY.

Dead. Was dissolved, September, 1904. Formerly at Münster-am-Stein, Bavaria, Germany. Described Vol. III.

UNITED GLOBE MINES. ARIZONA.

Office: 20-99 John St., New York, N. Y. Mine office: Globe, Ariz. Jas. Douglas, president; Geo. Notman, secretary and treasurer; [illegible] superintendent; Robt. B. Riddell, chief clerk. Capitalization $1,000,000, $100 par. Is controlled, through ownership of [illegible] by the Old Dominion Co. For [illegible] with expenses of $301,090, [illegible] $854,256. Dec. 31, 1910.

s, 29 claims and 3 millsites, lying west of the Old Dominion group, the Gray and Hoosier mines. The property has a 765′ three-compart- n shaft, showing a vein of circa 30′ width, carrying a 700′ ore shoot 4% copper and upwards. The mine is being developed, latterly, ie workings of the Old Dominion, of which this mine is practically a ying the main vein of the Old Dominion. The Maggie vein, cut 85′ ie "B" shaft of the Old Dominion, 1908, shows sulphide ore, including le massive chalcopyrite, of excellent average tenor. Openings, 1910, h level of the Hoosier workings, developed an ore body on the Gladi- showing ore assaying 16.88% copper, 2.9 oz. silver and $12 gold per d productive ground is opened on the 800′, 1,000′ 1,200′ and 1,400′ he ore bodies are extensive, but erratic, and the ores are decidedly ough working well in connection with the Old Dominion ores, and the obe has developed considerable sulphide ore, of great assistance in e Old Dominion ores, which are notably deficient in sulphur. An tonnage of concentrating ore, of 3 to 4% copper tenor, has been devel- ell as large quantities of high-grade smelting ore, up to 10% in copper underground haulage line has been installed, on the 14th level east "A" shaft of the Old Dominion mine. Lessees are now producing from outlying mines.

ment includes a steam plant, hoist and air-compressor. The 200-ton s been idle some years, and is now too antiquated for use, all ores ed in the Old Dominion smelter.

ction was 4,607,537 lbs. fine copper and 5,277 oz. silver in 1906; bs. copper and 12,382 oz. silver in 1907; 2,599,155 lbs. copper, 29,308 nd 17 oz. gold in 1908; 3,674,728 lbs. copper, 43,486 oz. silver and 33 1909, and was circa 3,000,000 lbs. fine copper in 1910. Construction e said to have been completed, and the mine ended 1910 in a posi- n $100,000 or more yearly, with copper at 12½ cents per pound. onsidered valuable and management good.

GOLD & COPPER CO. **ARIZONA.**

Formerly at Hereford, Cochise Co., Ariz. Described Vol. VIII.

GOLD & COPPER CO. **NEW MEXICO & CALIFORNIA.**

Was a swindle that sold stock and paid dividends simultaneously. t Lordsburg, Grant Co., N. M. Fully described Vol. V.

GOLD & COPPER MINING CO. **ARIZONA.**

ffice: Prescott, Ariz. J. B. Tomlinson, managing director. Lands, atented, well timbered, carrying water-rights on the Hassayampa , 10 miles south of Prescott. The property shows a vein of 4′ to 5′ ring values mainly in gold, developed by the 300′ Gold Bug shaft, l on the American Eagle claim. There is a 20-stamp mill, enlarged umably idle.

OLD & COPPER MINING CO. **COLORADO & NEW MEXICO.**

Was a swindle. Formerly at Turret, Chaffee Co., Colo. De- V.

OLD MINING, MILLING & TUNNEL CO. **COLORADO.**

fice: Idaho Springs, Clear Creek Co., Colo. A. H. Ristedt, manager. nts the company had a floating debt of circa $17,500. Lands, near gs, carry argentiferous and argentiferous copper and lead ores. Equip- es a small hydraulic plant with an air-compressor, and there is a ill. Idle.

REENWATER COPP CO. **CALIFORNIA.**

Was merged [illegible] -water & Death Valley [illegible] Co., Cal.

UNITED LEAD MINING CO. IDAHO.

Office: Spokane, Wash. Mine office: Osburn, Shoshone Co., Idaho. E. W. Conrad, general manager, at last accounts. Organized under laws of Washington, as the Idaho Lead-Silver Mining Co., and changed name March, 1910, to present title. Lands carry argentiferous lead and copper sulphides. Equipment includes a gasoline engine and air-compressor. Presumably idle.

UNITED METALS CO. ALASKA.

Mine office: Coppermount, Prince of Wales Island, Alaska. Harry Corbin, superintendent, at last accounts. Lands, about midway between Coppermount and Sulzer, giving a promising showing of high-grade ore, and a little ore was shipped, 1905, to the Coppermount smelter. Idle several years and apparently moribund.

UNITED METALS SELLING CO. NEW YORK.

Office: 42 Broadway, New York, N. Y. John D. Ryan, president; A. W. Evarts, secretary; R. W. Stuart-Wortley, treasurer; preceding officers, Wm. Rockefeller, Jesse Lewisohn and Frederick P. Olcott, directors; C. S. Henry & Co., 12 Leadenhall St., London, E. C., Eng., European agents.

Organized Jan. 29, 1900, under laws of New Jersey, with capitalization $5,000,000, shares $100 par. The balance sheet of Dec. 31, 1910, shows an investment of $4,000,000 in stock of the International Smelting & Refining Co. with $202,000 in other investments, and $14,029,499 in cash and accounts receivable, giving a total of $18,231,499, with accounts payable of $7,270,780, leaving a surplus of $10,960,719. Dividends to end of 1910 were 230%, of which a 50% dividend, declared May, 1909, was from partial proceeds of sale of the Raritan refinery to the International Smelting & Refining Co., which gave the company $2,500,000 cash and $4,000,000 stock in the International. Regular dividend rate is 7½% quarterly. Dividends were 15% in 1900; 5% in 1901; 10% in 1902; 10% in 1903; 10% in 1904; 20% in 1905; 20% in 1906; 30% in 1907; 20% regular and 50% extra in 1909; 20% in 1910.

The company does a general commission business in metals, mainly in copper, and is the largest copper broker in the world, being the sales agent for the Amalgamated Copper Co., and affiliated corporations, and also for a considerable number of other producers, the company having the marketing of upwards of 500,000,000 lbs. of copper yearly. The commission formerly charged on Amalgamated copper was 1½%, cut, 1906, to 1%. This commission is exceedingly reasonable, in view of the facilities given, these including the guaranty of all sales accounts, and, when desired, advances of 75 to 90% of the invoice value of copper consignments. A considerable part of the company's former profits were derived from the Raritan refinery, sold, 1909, to the International Smelting & Refining Co., which was fully described under title of this company, Vol. VIII.

UNITED MINES CO. ARIZONA.

Dead. Was organized 1904, with capitalization $5,000,000, with office at Globe, Ariz. No trace of operations secured, and apparently no mining work ever was done. Formerly at Globe, Gila Co., Ariz.

UNITED MINING CO. UNITED STATES, CANADA & MEXICO.

Dead. Was a bad egg, promoted by Albert Freeman. Formerly at Leadville, Lake Co., Colo., and numerous other points. Fully described Vol. V.

UNITED MINING & DEVELOPMENT CO. OF AMERICA. CALIFORNIA.

Dead. Was succeeded Jan. 17, 1905, by United Mining Co. Described Vol. VI. Formerly at Valley, Calaveras Co., Cal.

UNITED MINING & HOLDING CO. COLORADO & NEW MEXICO.

Office: 65 Journal Bldg., Boston, Mass. Mine office: Estey, Socorro Co., N. M. Letter returned unclaimed from former mine office, White Pine, Gunnison Co., Colo. Geo. H. Cragin, president; Benj. F. Coburn, secretary, engineer and general manager; preceding officers, F. E. Ewing and J. E. Sin-

Company was promoted apparently as successor of the Dividend Milling Co. The company is said to have an issue of $75,000 first- bonds, on the New Mexico property.

s, 9 claims, patented, area 55 acres, known as the Morning Glim or p, formerly held by the Spar Copper Mines & Tunnel Co., on Contact , in the Tomichi district, near White Pine, Gunnison county, Colorado, ve been bought for $60,000, from the Estate of Chas. L. Tutt. The p, developed by tunnel, has circa 2,200′ of workings, and is claimed oduced upwards of $75,000 worth of ore in the past. The Spar prop- a small gasoline plant. The company was peddling stock at last and is regarded with suspicion, owing to its antecedents.

PEAK DOWNS COPPER & COAL CO., LTD. **AUSTRALIA.**

: Edwards St., Brisbane, Queensland, Australia. Mine office: d, Clermont Co., Queensland, Australia. John Currie, chairman; ıchanan & Co., secretaries; J. T. Coates, mine manager; W. H. Rands, engineer. Organized circa April, 1908, under laws of Queensland, alization £75,000, shares 7s. 6d. par; issued, 130,000 shares, 4s. 6d. Company was a reconstruction of the Peak Downs Freehold Copper)., Ltd., which was a reconstruction of the Peak Downs Copper Co. s, originally circa 1,200 acres, freehold, apparently have shrunk to 37 npt from labor conditions. Property is the old Peak Downs mine, early days, carted ore circa 300 miles, securing profits therefrom of in 15 years operation. The mine, reopened 1906, by predecessors of t company, has a vein of 2′ to 3′ average width carrying shoots of ; ore, in 3 narrow parallel veins of 6″ to 20″ width, ore, as a whole, circa 4.5% copper. The mine, opened to depth of 270′, has been r retimbered, and, when reopened, old pumps and pipes were found into copper precipitate, by the action of the acid mine waters.

melter, built some years ago, has reverberatory furnaces, and a new ıter-jacket blast-furnace was blown in, July 24, 1907, working inter- until October, 1907, when smelting was suspended. Production, melter was in blast, was said to be circa 7 tons of matte daily, and a unt of regulus was secured also. Production is estimated at 500,000 ıpper, for 1907. Mine considered promising, but will require exten- ɔpment, its eyes having been picked out by the old management. October, 1907.

REEFS, N. L. **AUSTRALIA.**

: 378 Queen St., Brisbane, Queensland, Australia. Mine office: ke, Lennox Co., Queensland, Australia. C. C. Moulton, secretary; general manager. Lands, known as the Shamrock mine, are 16 miles iikvan. The smelter has a 50-ton blast-furnace, and 2 small rever- and has experienced difficulty in securing adequate supplies of fuel Ore smelted 1906 gave average returns of 1% copper, 1 oz. silver and d per long ton. The company employed about 60 men, when work- luction was 1,087 long tons of ore, yielding 36,310 lbs. fine copper, ver and 288 oz. gold, in 1907. Idle since 1907.

SMELTERS, RAILWAY & COPPER CO. **WYOMING.**

Cleveland, Ohio. Mine office: Rudefeha, Carbon Co., Wyo. ːe: Encampment, Carbon Co., Wyo. Isaac N. Pennock, president r; J. E. Haskell, vice-president; Willard Pennock, treasurer; preceding ırner Moore, A. L. Hawse, W. E. White, Eugene M. Cobb, F. A. Bald- ıdrew S. Upson, directors; Harry T. Forrest, assistant secretary and Geo. H. Hand, general superintendent; Andrew Anderson, mine lent. Organized Feb. 10, 1909, under laws of Wyoming, with on $12,500,000, shares $10 par, nonassessable, in $2,500,000 non- 7% preferred stock and $10,000,000 common stock; issued,

$8,190,000, at last accounts. Bonds, $2,500,000 authorized, at 6%, for 20 yea issued, $2,100,000, of which apparently $1,600,000 remain outstanding. Th bond issue was put out, Jan. 1, 1909, by the Penn-Wyoming Copper Co. Th preferred stock was provided, ostensibly, for the purpose of taking up the bon issue, at any time during the life of the bonds, or at the option of the bond holders. On Nov. 5, 1909, the United Smelters, Railway & Copper Co. w claimed to hold more than 91% of the outstanding stock of the Penn-Wyomin Copper Co. Cleveland Trust Co., registrar. Annual meeting, second Wedne day in February.

The property claimed by this company is described under the title of th Penn-Wyoming Copper Co., which apparently is the legal owner, and fu particulars regarding the entire chain of promotions, including this com pany, are given in the article descriptive of Penn-Wyoming Copper Co., order that matters be stated in logical sequence. This company was claim to have finished paying the total indebtedness of the Penn-Wyoming Copp Co., amounting to $1,390,798.62, principal and interest, in March, 1909, whi indebtedness was reported as paid at different times previously, but apparen the amount actually paid, or that might have been paid, was $359,969.62, p interest, this amount having been the balance actually due, or claimed to b due, on the underlying notes of $1,390,798.62, which underlying notes a balance both were claimed, by Eugene M. Cobb, a director of this company, an the former president of the Penn-Wyoming Copper Co., to have been paid by the Penn-Wyoming. This company was claimed, March, 1909, to have working capital of $250,000 in its treasury, but went into bankruptcy later President Pennock sent out notice of what was practically a 5% assessment, June, 1910, ostensibly to protect the property from foreclosure by bondholders and an attempt was made at foreclosure, by the bondholders, who apparently are mainly insiders of this corporation.

Perkin, Bacon & Co., English engravers, engraved and printed certificates of stock for the United Smelters, Railway & Copper Co., in 1909, but late in 1910 had not been paid therefor, and unfeelingly refused to deliver the goods until the bill was paid, hence certificates of this company were not distributed to English shareholders who turned in their Penn-Wyoming stock therefor. Read ers are referred to the article descriptive of Penn-Wyoming Copper Co. for fur ther and complete particulars regarding this company.

UNITED STATES & BRITISH COLUMBIA CO. MONTANA

Dead. Lands, known as the Burton group, about one-half mile east o the Corbin Copper Co., had two 100′ shafts and a tunnel, latter said to cut 5′ vein, on which a little work was done, 1907. Formerly at Corbin, Jefferso Co., Mont.

UNITED STATES COPPER CO. IDAHO

Dead. Lands were 5 claims, known as the McGowan group, taken un option circa May, 1907, east of the holdings of the Missoula Copper Mining C on Snowstorm Hill. Apparently little or no work was done. Formerly Mullan, Shoshone Co., Idaho.

UNITED STATES COPPER CO. NEW MEXICO

Office: 701 Majestic Bldg., Milwaukee, Wis. Mine office: Hano Grant Co., N. M. J. W. McAlpine, president and treasurer; W. L. Bliss, se retary; preceding officers, M. S. Nord, John Orlebeke, Louis Pagels, F. C. Bo Wm. Tharinger, C. B. Manville, E. B. H. Tower, Jr. and W. M. Brown, dire ors; E. W. F. ReQua, vice-president; N. A. Karsten, assistant treasurer; R. Baker, superintendent. Organized May 1, 1911, under laws of New Mexi a reconstruction of the Philadelphia Copper Mines Co., with capitaliza $500,000, shares $1 par.

Lands, 5 claims, 3 fractional, surveyed for patents, area circa 60 acres, pa timbered, in the Central district, near Hanover, showing a contact vein be

id granite-porphyry, with a strike of N. 36° E., and practically ver-
merly estimated at 25′ to 75′ average width, but now estimated, by
nent, at 150′ width, carrying carbonates and sulphides, latter mainly
, with some bornite and occasional chalcocite, estimated by the
t to average 6% copper, 4 oz. silver and 3 oz. gold per ton, which
high. Selected surface ores have given assays of circa 2% copper,
nd $28.50 gold per ton. The mine, opened 1881, shipped some good
said to have paid its way in the past, under various ownerships.
t is by trenches and shafts of 180′, 265′, 65′, and 35′, with tunnels
and 60′, all in ore. The mine has 1,050′ of workings, estimated by
nent to show 50,000 tons of ore blocked out for stoping.
ient includes a steam plant with two 100-h. p. Freeman tubular
ists, and a 10-drill Ingersoll-Rand No. 10 Imperial electric drill.
buildings, including a warehouse and office.

TATES GOLD & COPPER CO. **WASHINGTON.**

Formerly at Chewelah, Stevens Co., Wash. Described Vol. VI.

TATES GOLD & COPPER CORPORATION. **NEVADA.**

Was a bad egg, promoted by John McKinley and Jos. H. Reall. Humboldt House, Humboldt Co., Nev. Described Vol. VIII.

TATES METALS REFINING CO. **NEW JERSEY.**

42 Broadway, New York, N. Y. Works office: Chrome, Middle-
J., and Grasselli, Lake Co., Ind. Employs about 600 men at the
ks, and 125 men at the Grasselli works. Wm. G. Sharp, presi-
elstein, vice-president; E. J. Hothorn, secretary; F. W. Batchelder,
. Y. Robertson, general manager; Lawrence Addicks, superintend-
works; Wm. Thum, superintendent Grasselli works.

ed November, 1903, under laws of New Jersey, and reorganized
, with capitalization $4,000,000, shares $100 par, half in 7% cumula-
d and half in common shares; issued, $3,100,000, half preferred and
n stock. Is controlled, jointly, through stock ownership, by the
es Smelting, Refining & Mining Co., and Aron Hirsch & Sohn, of
Germany. Annual meeting, second Tuesday in May.

rome works, enlarged, 1910, to about 15,000,000 lbs. monthly capac-
a complete smelting and converting plant for the treatment of ores,
, mattes and bullion, copper supplies being received mainly from
ana, Arizona, California and British Columbia, with odd lots picked
er fields. The smelting department has two 75-ton reverberatory
resmelting blister copper, 2 furnaces for remelting cathode cop-
rcular blast-furnace, 42″ at the tuyeres and 13′ high, using an 11-oz.
re. Waste gases from the reverberatories are burned under a
Vilcox boiler. The power plant includes steam-driven dynamos of
200 h. p., giving, respectively, 5,500 amperes at 115 volts, and 6,500
130 volts. The converter department has a capacity of 3,000,000
copper monthly.

l received in slabs and cakes, and cast into anodes of 350 to 400 lbs.
Walker casting machine having 22 moulds, and anodes are trans-
l of 15, from the casting machine to the electrolytic tanks, by electric
nes.

trolytic plant has 816 cells, forming two systems of 12 compart-
g 34 baths each, with 408 cells in a system. Tanks are 3′ 6″ broad,
0′ long, lead-lined, each bath containing 15 anodes and 16 cathodes,
thode providing terminal plates. Cells are arranged in steps, in 2
12″ drop between tanks. Current is conveyed to the cells by copper
4 [illegible] section. Current density is 15 to 17 amperes per square foot,
[illegible] potential of bath is 0.3 volts, with a cell bath temperature
[illegible] olyte contains 40 grams copper and 140 cc. sulphuric

acid per liter. The blister copper treated contains antimony, arsenic, selenium and tellurium, as well as copper, nickel, gold and silver, and the sludge from the tanks is treated by filter presses, and refined in a cupel furnace, for gold and silver values. As much silver is volatilized in refining, the gases from the furnace are drawn off by a fan, then cooled and filtered through flannel sacks, before entering the stacks. From the waste electrolyte liquor, crude nickel sulphate and copper sulphate are made, there being, in connection with the refinery, a sulphate plant where bluestone is produced, for the requirements of the works.

The Grasselli plant, consisting of a 75-ton electrolytic lead refinery, at Grasselli, a suburb of Chicago, was the first electrolytic lead refinery in the United States.

The plants of the United States Metals Refining Co. are strictly modern in design and equipment, and are noted for the technical excellence of their practice and the purity of their commercial products.

UNITED STATES & MEXICAN MINING CO. **MÉXICO.**

Office: 42 Murray St., New York, N. Y. Mine office: Hostotipaquillo, Abasalulco, Jalisco, Mex. Isaac P. Martin, manager, at last accounts. Lands include the Trinidad and Guadalupe mines, carrying auriferous and argentiferous copper and lead sulphides. Has water power, and employed, 1907, circa 75 men.

UNITED STATES & MÉXICO CONSOLIDATED MINING CO. MÉXICO.

Dead. Was a bad egg. Formerly at La Cananea, Arispe, Sonora, Mex. Described Vol. VIII.

UNITED STATES MINING CO. **UTAH.**

Office: 400-55 Congress St., Boston, Mass. Operating office: 920 Newhouse Bldg., Salt Lake City, Utah. Mine offices: Bingham Canyon, Salt Lake Co., Utah, and Eureka, Juab Co., Utah. Wm. G. Sharp, president; Wm. F. Coolidge, vice-president; F. Winthrop Batchelder, secretary and treasurer; Albert F. Holden, managing director; Frederick Lyon, assistant managing director; preceding officers, R. D. Evans, Eugene N. Foss, N. W. Rice, E. C. Swift, J. J. Storrow and Sidney W. Winslow, directors; Hon. Clarence E. Allen, general manager; Geo. W. Heintz, general superintendent; Jas. F. Barnard, general mine superintendent; A. P. Maybury, mine superintendent at Bingham; R. A. Brown, mine superintendent at Tintic; Richard E. Parker, consulting engineer; Percy Williams, engineer; Aron Hirsch & Sohn, sales agents.

Organized 1899, and reorganized, 1901, under laws of Maine, with capitalization $15,000,000, shares $25 par. Debentures, $500,000, at last accounts. Is controlled, through ownership of 98% of stock issue, by United States Smelting, Refining & Mining Co., stock control having been obtained through exchange of shares, with a cash bonus paid to the United States Mining Co. Controls, through ownership of entire capital stock, the United States Smelting Co.; controls, through ownership of practically entire stock issue, the Centennial-Eureka Mining Co.; controls, through ownership of majority of stock and bonds, Niagara Mining & Smelting Co.; owns a half interest in the International Metals Selling Co. National Shawmut Bank, Boston, registrar. Annual meeting, in October.

The properties at Bingham include the Old Jordan, Telegraph, Commercial, Galena and adjoining claims, and the Niagara mine is held, through a controlling stock interest. The United States Supreme Court decided, October, 1907, in favor of the company, in the litigation with Col. E. A. Wall over the Kempton lode. The mines are developed mainly by a 450′ shaft and 2,500′ tunnel, are timbered with 8x8″ Oregon pine, and were said, 1906, to have about 2,000,000 tons blocked out for stoping, of which about 90% was low-grade ore. An aerial tram, of 25 tons hourly capacity, takes ore to the railway.

The Old Jordan and Telegraph mines were silver properties originally, opened on a fissure vein of silver-lead ore, crossing the big sulphide copper dike from which production has been secured latterly. The Old Jordan group has about 5 miles of workings, developing a large amount of ore. Copper ores are

d deficient in iron, requiring heavy fluxing, and range in tenor from copper, 2 to 5 oz. silver and $1 to $2.50 gold per ton, and are said lter returns of 26 to 28 lbs. copper, and $2 to $2.50 per ton in combined lver values.

alena mine, reopened circa 1905, is said to have produced upwards of worth of ore, under previous ownership, with average smelter returns d, 25 oz. silver and up to $10 gold per ton. The Galena carries lower values, in addition to auriferous silver-lead ores, with a productive circa 400 tons daily.

ntennial-Eureka mine, in the Tintic district, is described elsewhere, itle of its owner, the Centennial-Eureka Mining Co.

ition to its metalliferous mines, the United States Mining Co. owns and a large limestone quarry, supplying flux, and has coal mines, the ring a coking plant in connection. The advantages pertaining to ownership of ores, fluxes, fuel and smelter, under a single manage- ery great.

ng is done by the United States Smelting Co., a subsidiary corpora- elter being described under title of its owner.

tion was 15,841,667 lbs. fine copper in 1905, and for fiscal year ending 5, the smelter produced, from Utah ores, 14,965,438 lbs. fine copper, lbs. lead, 2,107,956 oz. silver and 71,445 oz. gold. For later years, is included in figures of United States Smelting, Refining & Mining also include California copper production, from the Mammoth ther details regarding closely related interests will be found in the s of the United States Smelting Co. and United States Smelting, Mining Co.

TATES MINING CO. **COLORADO & WYOMING.**

1204-37 Wall St., New York, N. Y. Henry T. Clarke, Jr., presi- T. Clarke, vice-president and treasurer. Capitalization $1,500,000, par, in $500,000 preferred and $1,000,000 common shares. Is a olding corporation only, controlling a majority of the outstanding of the Doane Verde Mining Co., and share interests in the Battle l Site Mining Co., Penn-Wyoming Copper Co., and Newsboy Mining o., latter of Ouray, Colorado, and also owns an interest in a tract of d near the Reindeer, Bessie Wilgus and Coon Valley mines, at Lead- Co., Colorado. Idle.

TATES MINING & SMELTING CO. **MÉXICO.**

Was a bit of stockjobbery, promoted by Henry Voorce Brandenmerly at Hermosillo, Sonora, Mex. Described Vol. V.

TATES MODERN MINING CO. **WASHINGTON.**

Bellingham, Wash. Letter returned unclaimed from former mine er, Whatcom Co., Wash. Lands, 5 miles from Shuksan and 19 miles acier, on the headwaters of the Nooksack River, show 3 contact tween granite-porphyry and slate, of which No. 1 vein, of 25′ reported lth, carries ore giving good assay values in copper, zinc, silver and mine has about 150′ of tunnels. Idle.

TATES SMELTING CO. **UTAH.**

400-55 Congress St., Boston, Mass. Operating office: 920 New- , Salt Lake City, Utah. Works office: West Jordan, Salt Lake Co., ploys circa 1,200 men. Wm. G. Sharp, president; C. G. Rice, vice- Albert F. Holden, managing director; preceding officers, B. Preston . Carpenter and J. J. Storrow, directors; F. W. Batchelder, secretary er; Geo. W. Heintz, general manager; S. C. Hazelton, smelter super- T. R. Jones, manager custom ore department. Is controlled, through of entire capital stock issue, by the United States Mining Co., which on[illegible] by the United States Smelting, Refining & Mining Co.

Lands are a smelter-site of 150 acres, near the former sites of the Utah Consolidated and Bingham smelters, 12 miles from Bingham Canyon and about 8 miles from the Tintic camp, on the bank of the Jordan River. The works include a sampling mill, lead concentrator and electrostatic plant for the separation of zinc and iron from lead ores, a lead smelter, an arsenic plant, a baghouse, and a calcining plant, also a copper smelter now idle. The company owns its own limestone quarries, at Topliff.

The sampling mill has a 10x20″ Blake crusher, a Gates gyratory crusher, a set of Davis rolls, a set of Colorado Iron Works rolls, and a Snyder sampler, the ore running the entire gamut of this machinery, giving a final sample of 1 part in 720.

The concentrator, enlarged from 100 to 350 tons daily capacity, in 1[illegible] on the bank of the Jordan River, about one-half mile southwest of the smelter. Equipment includes a Blake crusher, Allis-Chalmers rolls, a Denver Engineering Works tube mill, Hartz jigs, Overstrom and Wilfley tables, Sherman slimers, Colby tanks, trommels, elevators and centrifugal pumps. Water is taken from the Jordan River, by gravity, through a 7-mile canal. Concentration is about 1 into 1, with an extraction of 92 to 95% of the lead and zinc, 85 to 90% of the gold and silver, and 80% of the copper, by assay values.

The electrostatic mill, of 75 tons daily capacity, is 40x40′ in size, and [illegible] stories high, adjoining the concentrator. Material is zinc middlings from the concentrator, which go to a dryer-bin, in the top story, dropping thence to a Bartlett & Snow dryers, of 50 tons capacity, consisting of 9x7x22′ and 11x7x[illegible] chambers. From the drying chambers middlings go to 9 roughing jigs on the third floor, and 12 finishing jigs on the second floor, and are screened through trommels of 16, 40, 60, and 90 mesh, passing to rolls and going thence to final separators, of which there are 15, made in sections, each 6′ 6″ long, 18′ wide and 24″ high, each containing 2 electrodes. The electric generating apparatus is contained in a room on the second floor.

The smelter is in two departments, of about 1,200 tons daily capacity each, one for lead, and one for copper. The copper department, idle for several years, has six 200-ton water-jacket blast-furnaces, and a 125-ton reverberatory furnace. Pyritic smelting, employed originally, was abandoned. The converter department of the copper smelter has 2 stands, with an electric traveling crane and silica mill, and the works include a briquetting plant for fines. The smelter has a 300′ steel stack, connected with the furnaces by flue, with separate branch flues leading to a baghouse.

The lead smelter, built 1904, originally had three 100-ton water-jacket blast-furnaces, and now has six 200-ton blast-furnaces, each having 2 water jackets on each side, and one on each end, with ten 3½″ tuyeres on each side. The furnaces being 45x160″ at the tuyeres, widening to 132x160″ in the shaft. The crucible is elliptical, firmly braced by four 5″ I-beams, stayed with 2½″ [illegible]. Lead matte is tapped to shallow circular moulds, in which anchors are placed, for imbedding in the cast matte, for handling by a monorail crane running to the end of the building, where matte is broken by sledging, and sent to the calcining department. Slag is tapped to the forehearths, which have [illegible] for the fumes, through a pipe, and slag skims into cars hauled by electric locomotives for transportation to the dump. Slag-cars are tapped through a hole 8″ above the bottom, and buttons and shells carrying 0.6 to 0.9% lead are returned to the blast-furnace bins, for resmelting. Fumes discharge from the furnace through a 3x6′ downtake, to a 15x180′ balloon flue leading to a [illegible] gular brick flue-chamber, with hopper-bottom, terminating in the [illegible]

The matte, assaying 7 to 10% copper, 12 to 15% lead, 3 to 4% [illegible] 23% iron and 21 to 23% sulphur, is taken to the roaster plant [illegible] teen 70′ hand-roasters, and after one or more roasts is taken to the [illegible] mill, which has a 20x10″ Blake crusher, rolls, elevators and [illegible]

0-volt General Electric induction motor. The crushed matte from
mill then goes to a 30-ton reverberatory furnace, 8x12x20′ in size,
shed matte of about 40% copper tenor, and making white metal of
copper tenor, sent to the United States Metals Refining Co., at
J., for conversion. Lead is drawn off through an Arents siphon, to
eeled to the bullion house, where it is dumped into 3 melting kettles,
furnace. The molten lead yields first a dry dross, consisting mostly
which is skimmed off, and, after the temperature is lowered, a wet
imony and arsenic is skimmed, this being sent to a sweating furnace,
l sweated out, as far as possible, and the residue sent to the blast-
After skimming and sweating, the lead is drawn from the melting
h iron siphon pipes, and cast into anodes, which are sent to the
rks of the United States Metals Refining Co., for electrolytic refining.
d plant includes 26 converter-roasters, for lead ores, which, in effect,
g furnaces, adapted to raw ores. Each converter-roaster consists
brick-lined square shell, with a 3′ hood, and a bottom of grate-bars,
ch a 9-oz. blast is blown. Charges require about 12 hours treatment,
o a solid cake, which is discharged by a ram, like coke from a by-
n, after which the sinter cakes are broken in a Blake crusher, and
terial is conveyed automatically to steel cars, going thence to bins
ce-house, where mixed with charges for the blast-furnaces.

ck baghouse is 60x283′ in ground section, and 58′ high, with 2 floors,
ent and the other the thimble floor, divided into 8 compartments, 3
ses and 5 for blast-furnace fumes. The floor is of steel, underneath
2′ basement, with 8 cellars, each divided into 3 sections. There are
en by a 100-h. p. electric motor, drawing smoke and fumes from all
works. The gases, having an initial temperature of 300° C., are
assing through 3 series of steel tubes, from one brick chamber to
tubes, each 2′ in diameter and 20′ long, connecting each chamber,
ally going, through a pipe 30′ long and 6′ in diameter, into the bag-
h of the 5 blast-furnace bays has 416 bags, and each of the 3 roaster
20 bags, each bag being 18″ in diameter and 32′ 6″ long, woolen
used for roast gases, and canvas bags for the blast-furnace gases.
e hung vertically, with metal thimbles at top and bottom, the upper
losed, and lower ends opening into the dust-cellars, the floor of the
ove the basement having 18″ circular holes, with thimbles 6″ high
iameter, extending upward from each hole, over which the feet of the
pped. Apparently the bags wear for a long time. The bags are
y 12 hours, the workman who does this wearing a rubber suit and
t, with a supply of compressed air for breathing, but an apparatus
vised for shaking the bags simultaneously, from a point outside the
The dust from the bags, amounting to about 8 tons daily, is wetted
aken to the briquetting plant, where molded into briquettes, and
the furnaces. Gases, after leaving the baghouse, contain less than
volume, of sulphurous fumes, this amount being the maximum per-
he courts. Each blast-furnace bay has a separate stack, 6x100′ in
e gases from the 3 roaster bays discharge through a steel stack 235′
′ 6″ in diameter.

ghouse saves considerable zinc, lead and silver, previously lost
atilization. The dust from the hags returns about 30% lead, with a
rtion of arsenic. Patents have been applied for in connection with a
, providing for the [illegible] with zinc
m zinc sulphate, which [illegible] tion tak-
the flues, while the [illegible] ire
er than 100° C. T[illegible] zinc
d other materials [illegible]

weight, of crushed coke, dampened, and fed upon the grates of a battery of 5 small furnaces, each about 15′ long and 3′ wide, with party walls, the mixture being maintained at a thickness of about 12″ upon the grates, each furnace having a capacity of 5 tons daily.

The arsenic plant, installed circa 1909, is very complete. The dust collected on the basement floor of the baghouse, from blast-furnace fumes, is taken in individual 5-ton motor-cars to the arsenic plant, where dumped into storage bins, which discharge to hand-cars running over the charge-hoppers of 2 Brunton arsenic furnaces, each of 16 tons daily capacity of charge, yielding circa 2 tons of finished product daily. The charge-hoppers are kept continually full to prevent air entering the furnace, and each charge-hopper has a steel rod, with revolving vanes, keeping the charge loosened so it flows freely, regulation being effected by raising or lowering the cast-iron sleeve connecting the spout of the hopper with the furnaces. Each furnace is circular, built of fire-brick, with a sheathing of 3-16″ steel, 14′ 6″ in diameter and 3′ high, with a 9″ crowned roof at the center. Each furnace has a revolving-hearth, of 14′ diameter, actuated by a 5″ spindle, on which is mounted a 66″ gear-wheel, driven by a 12″ gear connected with a worm on the shaft, which is belted to a 5-h. p. motor, one motor driving both furnaces, a clutch on the 66″ gear allowing individual control. A period of 5 minutes 17 seconds is required for one revolution, at which speed 10 to 12 hours are required to work the charge from the center of the hearth, where received, to the edge. The hearth is supported by 8 circular angle-irons, on which is laid a 2″ course of fire-brick, surmounted by 1″ of cement, forming the surface of the hearth, and further support is given by 12 radial steel arms. The furnace temperature is about 900° F., which volatilizes the arsenic, but not the lead, and the by-product remaining after the arsenic has been driven off discharges at the back of each furnace, by a cut in the wall, with an 8x12″ steel overflow pipe, on a level with the hearth, leading to steel hopper having a cylindrical discharge opening closed by a gate.

Fumes leave the furnace at a temperature of 900° F., and pass to the condensing chambers, recording thermometers being placed along the walls of the chambers, the temperature decreasing to only about 80° F. in the last bay, but the operation of the furnaces is governed more by deposition of arsenic in the chambers than by temperature. The condensing chamber is double, 200′ long, 20′ wide, with height of 10′ for the first 50′ of length, and is 8′ high for the remaining distance of 150′. Each side is divided, by baffle-walls, into 25 bays, so arranged that the fumes are compelled to take a zigzag course in passing through the chamber, each alternate bay having a 3x5′ door. Fumes from the condensing chambers are drawn off by a 4′ Sturtevant fan, driven by a 10-h. p. motor, and discharged to a chamber at the end having 9 woolen bags, 18″ in diameter and 22′ to 28′ long, bags being shaken down once a shift, a fan and bag equipment being provided for the crude chambers, and also for the refining chambers.

The crude product carries 97 to 99% arsenious trioxide, which is removed through the doors, and sent, in buggies, over a monorail crane, to the refining furnace, where charged direct into three 30x66″ steel hoppers, in the top of the refining furnace, which is 6x15x25′ in size, of ordinary reverberatory type, having a fire-brick lining, with 2 fireboxes, each 31x54″. Access to the interior of the refining furnace is through three 9x15″ doors on each side, and a temperature of about 700° F. is maintained. The capacity of the refining furnace is 15 tons daily, and output of crude arsenic being only about 2 tons daily, from each Brunton furnace, the refining furnace is worked only part time. The product of the refining furnace is crystalline arsenious trioxide, of 99.5 average tenor, which is sent to a 3′ buhr-mill, ground and packed for shipment. The grinding is done in a small room, tightly sheeted and ventilated with an exhaust fan discharging to the crude condensing chambers.

ape into the air. Workmen about the arsenic plant wear a one-piece suit lls, with a hood, furnished by the company, and also wear respirators, tering the chambers, or otherwise coming in contact with the arsenic. oyés of the arsenic plant are required to take a bath, and make a com- ange of clothing, when going off shift.

power plant includes steam and electric installations. There are two Stirling water-tube boilers, generating steam at 140 lbs. pressure, fed by n automatic stokers, with draft induced by a National centrifugal discharging to a 150′ steel stack. Electric current, taken from the ectric plant of the Mill Creek Power Co., 10 miles distant, is received at olts, and stepped down to 480 volts in three 300-kw. transformers. The or the concentrator is stepped up to 1,440 volts for transmission, and pped down, at the mill, to 480 volts, by a 200-kw. transformer, the power the concentrator including two 75-h. p., one 30-h. p., one 50-h. p., and . p. Westinghouse 3-phase 60-cycle 440-volt induction motors. The ver plant includes a 750-h. p. General Electric steam turbine, a 200-h. p. Electric induction motor, belted to a 150-kw. continuous-current gen- 3 Nordberg tandem-compound Corliss engines, direct-connected to rille blowers; one 16x24x36″ Nordberg cross-compound Corliss engine, connected to a 16x30x40″ air-compressor, having a capacity of 9,000 free air per minute, compressed to 95 lbs. working pressure, for oper- air-lift pumps, sampling mill, forges and various pneumatic machinery. o is an electric light plant.

her particulars in connection with this company will be found in the n of the United States Smelting, Refining & Mining Co.

STATES SMELTING, REFINING [INING CO. **UNITED STATES & MÉXICO.**

e: 400–55 Congress St., Boston, Mass. Sales office: 42 Broadway, k, N. Y. American operating office: 920 Newhouse Bldg., Salt Lake h. Mexican general office: 11 San Bernardo, México, D. F. Wm. G. resident; Chas. G. Rice, vice-president; Albert F. Holden, managing preceding officers, B. Preston Clark, Jas. J. Storrow and Sidney W. executive committee; Frederick Lyon, vice-president in charge of ; Sidney J. Jennings, vice-president, in charge of exploration and ıvestments; preceding officers, Robt. S. Bradley, Stephen L. Bart- t. J. Edwards, Galen L. Stone, John W. Weeks, Chas. F. Brooker, eat Paine, 2d., Henry H. Wehrhane, Frederick Ayer, Wm. Barbour, Bayley, Nehemiah W. Rice and David A. Ritchie, directors; F. W. er, secretary and treasurer; E. L. Carpenter, assistant to the president; ırie, comptroller; Carl F. Moore, chief engineer; A. P. Anderson, field Geo. W. Heintz, traffic manager and general manager United States Co.; J. H. Horlick, mercantile manager.

nized Jan. 10, 1906, under laws of Maine, with capitalization $75,000,000,) par, in $37,500,000 of 7% preferred cumulative stock and $37,500 000 stock; issued, $24,316,000 preferred and $17,555,150 common stock, r, 1910. The company had 8,213 shareholders Sept. 30, 1909, and had lers of preferred shares and 2,282 holders of common shares, Dec. 31, ational Shawmut Bank, Boston, registrar; City Trust Co., Boston, gent. Annual meeting, in May.

ompany ended 1907 with an available surplus of $4,067,087, which was through adding $733,255 to reserve, and by various other deductions, urplus of $557,003. The balance sheet of Dec. 31, 1909, gave current 11,419,214.31 and current liabilities of $5,781,191.76, leaving an excess assets over current liabilities of $5,638,022.55, and the company 10 with excess of current assets of $4,862,936, with a surplus of 5. Net earnings were $3,504,522 in 1906; $2,386,539 in 1907; net

earnings of $3,535,556.61, with deduction of $517,609.36 for depreciation, reserves and general expenses, leaving a net profit of $3,017,947.25, in 1909; net earnings of $4,155,012.57, less deductions of $1,018,652,17, leaving a net profit of $3,136,360.40 in 1909; net earnings of $3,738,540, and net profit, after deductions, of $2,484,318 in 1910.

The company's dividend rate is 7% on preferred stock, payable in quarterly dividends of 1¾%, January, April, July and October, first dividend having been paid Apr. 15, 1906. Dividends on the common stock, begun 1907, are 4% yearly, in quarterly dividends of 1%, giving dividend requirements for both preferred and common shares of $2,400,000 yearly. Dividends were $1,700,953 on preferred and $701,961 on common shares in 1909; $1,701,700 on preferred and $703,100 on common shares in 1910, giving total dividend disbursements of $13,288,938 to Dec. 31, 1910.

The company is a securities holding corporation only, controlling, through practically entire stock ownership, the United States Mining Co., United States Smelting Co., Mammoth Copper Mining Co., and Needles Mining & Smelting Co. The company also controls, through ownership of a large majority of stock, the Centennial-Eureka Mining Co., Bullion-Beck & Champion Mining Co., United States Stores Co. and United States Lime Co., and owns a majority of both preferred and common stock issue of the American Exploration Co. The company controls, through practically entire stock ownership, the Compañia Minera Real del Monte y Pachucha, of México, which property was bought for 3,800,000 pesos, and controls, through ownership of 100,000 shares, the Peruvian Mining, Smelting & Refining Co., and owns a half interest in the United States Metals Refining Co., the other half being owned by Aron Hirsch & Sohn, of Halberstadt, Germany, and has a large interest in the International Metals Selling Co. The company also owns slightly less than a majority interest in the shares of the Richmond-Eureka Mining Co. The various subsidiary corporations are described separately, under their respective titles. Control of the United States Mining Co. was secured by exchanging stock, three-fourths in preferred and one-fourth in common shares of the United States Smelting, Refining & Mining Co. having been given, share for share, plus $1 per share cash bonus, for each share of United States Mining Co. The company was reported, April, 1911, to have taken an option on the Mt. Andrew mine, in Alaska, and is said to have obtained options on a number of other Alaskan properties. The company is said to own or control 82 different mines in México, and is popularly credited with planning the location of a smelter on Puget Sound.

Production, including the outputs of all subsidiary corporations, and metals from custom ores treated, has been as follows: 15,841,667 lbs. fine copper in 1905; 33,856,287 lbs. copper, 27,828,644 lbs. lead, 4,852,292 oz. silver and 162.55 oz. gold in 1906; 38,518,378 lbs. copper, 53,617,324 lbs. lead, 6,739,269 oz. silver and 235,822 oz. gold in 1907; 32,803,603 lbs. copper, 27,304,347 lbs. lead, 8,340,566 oz. silver and 128.208 oz. gold in 1908; 36,672,606 lbs. copper, 41,627,995 lbs. lead, 9,637,119 oz. silver and 128,393 oz. gold in 1909; 28,630,45 lbs. copper, 51,450,985 lbs. lead, 10,776,465 oz. silver and 113,246 oz. gold in 1910.

The United States Smelting, Refining & Mining Co. has properties of great present and greater potential value. The earlier years of operation were marked by a number of mistakes in policy, from which the management has profited and the company, during the past decade, has worked from a decidedly disadvantageous situation, to the present assured position, with a highly promising future.

UNITED STATES TREASURY MINING CO. NEW MEXICO.

Mine office: Chloride, Sierra Co., N. M. Lands include a timber tract [illegible] miles north of the mine. The mine has a fissure vein up to 28' in width, said to be traceable 3,000', carrying values mainly in gold, with some chalcocite assaying up to 70% copper, presumably from carefully selected samples, developed by [illegible]

compartment shaft, sunk at 65°. Equipment includes a 40-h. p. Fair-
orse steam hoist, and a 5-drill Norwalk air-compressor. The manage-
nned a mill, August, 1910.

VERDE COPPER CO. **ARIZONA.**

e: 20 Exchange Place, New York, N. Y. Mine and works office:
Cavapai Co., Ariz. Employs about 1,000 men. Hon. Wm. A. Clark,
; Jas. A. Macdonald, vice-president; J. H. Anderson, secretary; H. H.
treasurer; Chas. W. Clark, general manager; preceding officers are the
Will L. Clark, assistant general manager; Robt. E. Tally, mine super-
; Thos. Taylor, smelter superintendent; Clarence V. Hopkins, mining

nized 1883, under laws of New York and reorganized Sept. 2, 1899,
s of West Virginia, with capitalization $3,000,000, shares $10 par; fully
d fully paid. Is practically a close corporation, having less than 20
ers, and is controlled, through stock ownership, by Senator Clark, who
d with holding 254,059 shares, with 10,516 shares in the name of W. A.
., and 12,000 shares in the name of Mr. Macdonald. Stock transfers
l only at rare intervals. Five hundred shares were sold at auction,
910, for $70 per share.

s earnings were $8,038,126 in 1906; $6,557,918, with operating expenses
072, leaving net earnings of $3,078,846, in 1907, company ending year
plus of $5,131,608, including bills and accounts receivable of $1,508,401,
nts in choice bonds and stocks of $1,314,239, and cash of $155,309.
ue of 1909 production, as certified to the county assessor, at Jerome,
0,761.14, and the company ended 1909 with a cash balance of $374,203.
lend payments were begun, 1892, by old company, on the basis of 25
share monthly, increased, 1896, to 50 cents per share monthly, and
reased, 1898, to $1 per share monthly, maximum dividends being
0 in 1899, in which year the net earnings were $5,435,970. Recent
have been as follows: $2,005,000 in 1905; $2,700,000 in 1906;
0 in 1907; $2,025,000 in 1908; $2,700,000 in 1909; $2,700,000 in 1910,
l dividend payments, to end of 1910, of $30,255,570.

ls, 13 claims, patented, area 230 acres, with sundry adjoining property,
the North Venture and South Venture claims, which have produced a
-grade ore, in the Verde district of the Black Hills range, at an average
of 5,600′ above sea-level, and about 1,800′ above the valley of the
ver. The property shows porphyritic rocks, slate and schist, the mine
a zone of slates and intrusive dioritic rocks, the neighboring limestone
erimposed unconformably, and apparently having no genetic connec-
the ore deposits.

United Verde was a small gold and silver mine, discovered 1880, opened
l closed 1885, after a short and unprofitable career, but was bought,
Senator Clark, who foresaw its possibilities, and has developed it into
e great mines of the world.

mine is opened on a single monstrous lens of sulphide ore, in slate, of
0′ extreme width and circa 1,900′ length, proven to depth of 1,000′,
ody consisting of more or less irregular masses, in a much broken and
l area, the lens having a dip of 72° and being intruded by a 70′ quartzite
; carries about 1% copper, and from 0.25 to 0.75 oz. gold per ton,
tzite being used for converter linings. The gossan outcrop, originally
auriferous and argentiferous oxidized ores, to a depth of circa 160′, has
ked out. The zone of secondary enrichment carries mainly chalcocite,
e covellite, and other secondary copper ores, all highly argentiferous.
zone carries mainly chalcopyrite, with a little bornite, both auriferous
ntiferous. No ore assortment is attempted, and no concentration is
erything from the mine going to the furnaces, the average of ore from

all openings formerly being circa 6.5% copper and 15 to 32% sulphur, with considerable gold and silver values, but the ore is by no means so rich as formerly.

The ore is very heating, owing to its high sulphur tenor, and is liable to spontaneous combustion, while, owing to the more or less shattered condition of the lens, it is difficult entirely to prevent the access of air, very little of which will keep a sulphur fire burning incessantly. The most serious fire, in August, 1902, caused a total suspension of mining, but finally was gotten under control by pumping the mine full of carbonic acid gas, this being made by treating crushed limestone with dilute sulphuric acid, in iron tanks, the gas being forced, by natural pressure, into the top of the shaft, whence it fell, by gravity, to the bottom of the mine, displacing the lighter atmospheric air. In April, 1905, a serious explosion killed 5 men, and for a time threatened the entire mine. The fire had eaten its way to a point below the 700′ level, and a cave on this level, caused by the fire, fissured the superincumbent rock-mass so that surface water from the heavy spring rains seeped down into the fire zone, generating steam that blew out the solid masonry bulkheads and endangered the lives of the miners by steam and sulphur fumes—a truly diabolical combination. In fact, the explosion at the United Verde might be termed an artificial, volcano, just as the "air-blasts," at the Quincy and other Lake Superior mines are called artificial earthquakes. The fire on the 400′ level has been burning since 1897, and the mine is on fire in various places, from the 7th level to surface, fire in stopes not worked being walled off by cement bulkheads having steel gates. Mining has been in progress for several years, in the fire zone, under the Plenum system, introduced by J. J. Shaw. By this method, air under pressure is blown against the face of the stopes, by electric fans. The air feeds the fire, which is a smouldering one, but drives back the deadly fumes into the shattered rock-mass, and permits the extraction of ore. The fire, while dangerous and annoying, cannot destroy the copper, all of which will be recovered, eventually, by mining or leaching.

The mine is subject to bad caves, one of which carried down the office building and killed a number of employés, some years ago. Owing to fires and caves, the shafts sunk in ore were subject to drawing, causing their ultimate abandonment, the new shafts being sunk in the country rock. From a miner's standpoint, the United Verde is not an especially desirable working-place, as the openings are very hot, and the acid waters cause blisters and sores upon the unprotected skin, while the mine fires and caving ground render underground work more or less hazardous. Strenuous efforts have been made to render the mine safer, but, owing to its having been opened wrongly at the start, such efforts are made at a disadvantage, though the mining system has been much improved in recent years, and the United Verde, while by no means an ideal place for the employment of persons with weak nerves, is much safer than at one time.

Underground openings are very extensive, with enormous ore reserves, estimated up to 20,000,000 tons, which is much too high. The mine is developed to a depth of 1,000′, and diamond drill borings show ore to a depth of 1,200′, with decreasing values. Production is mainly from the 5th and lower levels. The mine is worked pillar-and-stall, and timbered with square sets, filled with waste, worked-out stopes being filled with culls, and occasionally with barren rock blasted from the mountainside above the mine, and milled into abandoned stopes, a practice considered somewhat dangerous.

Development is by No. 1 shaft of 500′, with 3 levels, which is closed, No. 2 shaft of 500′, with 5 levels, which is now unused, and No. 3 shaft of 1,200′, with 10 levels. There also are tunnels of 800′, 2,640′ and 6,593′, the tunnels having electric haulage. No. 3, the main shaft, which is the latest sunk, has 5 compartments, and was located 900′ from the old main shaft, in order to sink in country rock throughout, but cut ore, at 600′ depth, which considerably ex-

e known ore limits of the mine. The main shaft has 4 cages, operated
balance.
6,593′ drainage tunnel was begun Dec. 23, 1906, and completed Sept.
being driven, from both ends, in less than 21 months. This tunnel,
rom the Verde valley, connects with the workings on the bottom level,
of 1,000′, draining the entire mine. The tunnel is 7x9′ in the clear,
2′ water conduit underneath, and has one track, with room for a second,
ed later.
roast-yard, described Vol. VIII, is no longer in use, heap-roasting
en abandoned.
surface plant and smelter are located on top of the mine, the precipi-
of the cañon rendering such a location obligatory, when the mine was
Equipment includes a steam plant, of about 2,600 h. p., with 2 power-
and a compound air-compressor of 6,000 cubic feet capacity per min-
ıg steam cylinders of 28″ and 52″, with 48″ stroke, and air cylinders
d 44″. There is an electric generator direct-connected to a 250-h. p.
nd electric current is taken from the Arizona Power Co. In 1910 a
being built on Oak Creek, where the company plans installing its own
ınt. Fuel is coke, costing $12.75 per ton, for the smelter, and coal and
ı are used for steaming purposes, there being a 500,000-gallon tank at
unction, and a 175,000-gallon tank at the mine, for oil storage.
er is received through 2 miles of 10″ pipe from the Walnut Springs dam,
)07, and, the supply being somewhat scanty, water is husbanded with

precipitation plant, formerly near the smelter, was removed to the
the drainage tunnel, the new plant consisting of a flume one-half mile
wide and 10″ deep, with a grade of 0.8%, having settling tanks 120′
)pper being precipitated from the mine-water on scrap-iron.
smelter, built on the hanging-wall side of the mine, too close to the ore
s had considerable trouble from caving ground. The smelter was prac-
built, 1903, while in blast, and was enlarged by a fifth furnace, 1907,
a sixth furnace in 1910. Present equipment includes 6 rectangular
:ket blast-furnaces, 4 of circa 500 tons daily capacity each, and two
of circa 700 tons daily capacity each, giving the works a nominal
of about 3,400 tons daily, but in practice at least one furnace is held in
ıs a spare. There also is a Knudsen furnace of 175 tons daily capacity,
)ly operated on the Knudsen discontinuous semi-pyritic process of
for treating ores carrying under 5% copper, but rich in
tory furnace, formerly used for smelting flue-dust and
r, was dispensed with, years ago, as was a small
nodes. The smelter-stack has a screen-top, to
rries high values in gold and silver. Furnace
rith a capacity of 20,000 cubic feet of air per
converter department has 8 stands, 2 having
hells, and two 50-ton traveling cranes. Converte
el oil engines, of 350 and 450 h. p. The produc
)r refining mainly to the Waclark Wire Works
ontrolled by Senator Clark, where the gold and
ically, and the copper is used mainly for drawing
rumors, at intervals, for years, that the smelter would
these were without foundation.
United Verde & Pacific railway, controlled by the
arrow-gauge line, traversing a very difficult country,
works with the Santa Fé, Phœnix & Prescott railroad, at
nsideration is said to have been given, tentatively, to
struction of a railway from Jerome to Flagstaff.

Underground employés work 8-hour shifts, and such as wish it are furnished rooms for $5 per week, and table board at $7 per week, in a fine hotel built by Senator Clark.

The largest production was 43,995,932 lbs. fine copper in 1899, and recent production has been 29,275,503 lbs. fine copper, 668,842 oz. silver and 23,734 oz. gold in 1904; 32,683,951 lbs. copper, 486,041 oz. silver and 15,915 oz. gold in 1905; 38,827,265 lbs. copper, 428,317 oz. silver and 12,913 oz. gold in 1906; 33,015,457 lbs. copper, 356,938 oz. silver and 11,733 oz. gold in 1907; 36,183,000 lbs. copper, 494,574 oz. silver and 20,334 oz. gold in 1908; 36,695,259 lbs. copper, 495,478 oz. silver and 17,019 oz. gold in 1909; 36,663,880 lbs. copper, 563,132 oz. silver and 19,266 oz. gold in 1910.

In early years the United Verde made copper for 5 cents per pound, and even for a trifle less than that figure, after deducting gold and silver values included in the copper, but present costs are much higher. The cost per pound of finished copper, after deducting gold and silver values, was 9.17 cents per pound in 1904; 9.27 cents per pound in 1905; 8.69 cents in 1906; 10.54 cents in 1907, the cost for 1907 having been abnormally high. Under average circumstances, the cost of United Verde copper may be figured as 9 to 10 cents per pound, with a tendency, similar to that experienced by all other copper mines, toward increased costs. Owing to the former policy, now abandoned, of withholding all information, the United Verde has been lied about more industriously than almost any other mine in the world, and it has been stated, repeatedly, especially in the prospectii of light-weight copper mining companies having stock for sale, that the mine made copper for nothing, the gold and silver values covering all expenses, but this statement never was true. The United Verde also has been pointed out, repeatedly, as a perfect example of blind luck in mining, but the story is equally unfounded, the mine having been taken by Senator Clark as a thoroughly discredited gold-silver mine, and developed, by liberal application of cash and brains, into a magnificent copper mine, the credit therefor being due to Senator Clark, and not to the Goddess of Chance. The mine, while it has seen its best days as a low-cost producer, is one of the best copper mines of the world, with many years of large and profitable production ahead.

UNITED VERDE EXTENSION GOLD, SILVER & COPPER MINING CO. ARIZONA

Dead. Was reorganized 1902, as the United Verde Extension Mining Co. Formerly at Jerome, Yavapai Co., Ariz.

UNITED VERDE EXTENSION MINING CO. ARIZONA

Office: 111 Broadway, New York, N. Y. Operating office: Prescott, Yavapai Co., Ariz. Mine office: Jerome, Yavapai Co., Ariz. Louis Whicher, president; Harold Pierce, vice-president; I. M. Gans, secretary; Charles E. Ball, treasurer; J. J. Fisher, general manager; C. C. Burger, engineer; preceding officers, W. W. Cohen, Henry Sachs, Owen N. Abrahams and Warren Akers, directors; Thos. A. Varden, superintendent. Organized 1902, under laws of Maine, as a reconstruction of the United Verde Extension Gold, Silver & Copper Mining Co., with capitalization $3,000,000, shares $10 par, and reorganized under laws of Delaware, with capitalization $4,000,000, shares $10 nonassessable; issued, $3,600,000. Approximately 340,000 shares were set aside for exchange, on a share for share basis, for outstanding stock of the old corporation, and 20,000 shares were offered for public subscription at $5. In about 700 shareholders. The company was said to have $50,000 cash in treasury, at the end of 1910. Federal Trust Co., Boston, registrar; State Trust Co., Boston, transfer agent. Shares are listed on the Boston exchange. Annual meeting, in October.

Lands, 5 claims, area circa 74 acres, known locally as the Little Daisy, having one or more lenticular ore bodies, carrying native copper, chrysocolla, azurite and cuprite, succeeded at depth by copper sulphides carrying chalcocite,

nd high in iron. The fault-fissure opened in this mine has an EW.
l, according to Mr. R. M. Atwater, Jr., should join the United Verde
a near the southern end of the latter.
nine has a tunnel, but is developed mainly by an 800′ vertical shaft, on
Daisy claim, about 1,700′ from the main shaft of the United Verde
h collar 450′ lower. This shaft, after passing through 50′ of iron
countered copper carbonates, continuing for depth of about 150′,
by conglomerate, and from a depth of 425′ to 578′ passed through
ying copper sulphides and manganese. The mine has about one-half
ifts, the 700′ level showing a vein of about 5′ width, carrying high-
assaying up to 40% in copper tenor. There are about 2,000′ of drifts
′ level, developing a large body of sulphide ore, of 32′ to 41′ width,
uriferous and argentiferous chalcopyrite and pyrite, giving assays of
)pper and $1 to $5 per ton in combined gold and silver values. A 130′
a the 800′ level reaches the so-called 1,100′ level, on which some work
early 1911, but discontinued because of inability to handle the water,
int, although the mine has a pump of 72,000 gallons daily capacity on
vel, the mine making 20,000 to 22,000 gallons of water daily, Novem-

ic power is used throughout, current being taken from the Arizona
, and equipment including an electric hoist, air-compressor and pump.
men were employed, early 1911. Property considered promising and
nt good.

VERDE JUNIOR COPPER CO. **ARIZONA.**
. Lost charter 1902, and lands 1906. Was a stockjobbing scheme,
by Benj. F. Peach and Edwin Wallace. Formerly at Jerome, Yava-
riz.

VERDE SYNDICATE, LTD. **BRITISH COLUMBIA.**
. Formerly at Howe Sound, New Westminster district, B. C. De-
l. VIII.

OPPER & GOLD MINING CO. **NEW MEXICO.**
. Charter was forfeited 1902. Formerly at Tres Piedras, Taos Co.,
escribed Vol. VI.

OPPER MINING CO. **WYOMING.**
. Formerly at Encampment, Carbon Co., Wyo. Described Vol. VIII.

INES CORPORATION. **UTAH.**
. Formerly at Alta, Salt Lake Co., Utah. Described Vol. VIII.

AL COPPER MINING CORPORATION, LTD. **MÉXICO.**
. Was dissolved Feb. 26, 1909. Formerly at Ario de Rosales, Ario,
, Mex. Described Vol. VIII.

VER MINING & SMELTING CO. **ALASKA.**
office: Ketchikan, Alaska. J. W. Daly, manager, at last accounts.
on the Unuk River, which empties into Burroughs Bay, carries gold
r ores. Has steam power.

)N COPPER SYNDICATE. **CAPE COLONY.**
: Brown's Bldgs., Johannesburg, Transvaal. Mine office: Rei-
rdonia, Cape Colony. A. Dickson, J. Dale Lace, E. Brayshaw,
nan, N. Tenhoff and C. E. Campbell, directors; J. G. Davis, secretary.
circa June, 1908, under laws of Transvaal, with capitalization £10,000.
an option of the Farm Aoovoorby, on the Orange River, near Reimoes,
[illegible] of Upington. The option is for £5,000 cash and 16,000
[illegible] at 15s. per morgen. The property shows cuprite
[illegible] in quarts gangue, ore assaying 20 to 40%
[illegible]. Presumably idle.

SOCIEDAD MINERA UPOLONGOS. ARGENTINA.

Dead. Lands were sold to Famatina Development Corporation, Ltd. Formerly at Chilecito, Rioja, Argentina. Described Vol. V.

UREA MINING CO. MÉXICO.

Dead. Henry Willhoff was superintendent. The mine, slightly developed by a small force, circa 1903, showed argentiferous copper and lead ore. Formerly at Velardeña, Cuencamé, Durango, Mex.

IGNACIO SILVA URETA é HIJOS. CHILE.

Works office: La Ligua, Aconcagua, Chile. Property is the Fundición de Alicahue, 37 kilometers from La Ligua, with a carriage charge therefrom of 1 pesos per metric ton. The smelter has a Harnecker 36" circular water-jacket blast-furnace, doing matting only, and smelting ore mainly from the Fundición mine. Slags average 0.5 to 0.75% copper. Production is hampered by the high price of coke, which costs 100 pesos per metric ton, delivered, and boilers are stoked with wood. Production was 99,000 kgs. of matte of 53.5% average copper tenor, equal to 116,776 lbs. fine copper, in 1907; 48,500 kgs. of auriferous and argentiferous copper matte, of 45% average tenor, equal to 106,923 lbs. fine copper, in 1909.

URIQUE DEVELOPMENT CO. MÉXICO.

Dead. Formerly at Urique, Arteaga, Chihuahua, Mex. Described Vol. VIII.

URUÁCHIC MINING & SMELTING CO., LTD. MÉXICO.

Office: 168 St. Vincent St., Glasgow, Scotland. Mine office: Uruáchic, Rayón, Chihuahua, Mex. Dr. Henry D. Boddington, manager; preceding officers, W. C. Tait, J. Campbell, J. A. Roxburgh, and T. Macnair, directors; J. M. Davies, Jr., secretary; M. T. Boddington, superintendent. Organized Oct. 19, 1906, under laws of Great Britain, with capitalization £11,000, shares £1 par; issued, £10,800, fully paid.

Lands, 10 pertenencias, known as La Republica group, carrying argentiferous and slightly auriferous copper and lead ores. Equipment includes water-power and an air-compressor, and the property has a 50-ton concentrator, and a smelter with a reverberatory furnace rated at 25 to 50 tons daily capacity. Employed circa 40 men, at last accounts.

UTAH AMALGAMATED COPPER CO. UTAH.

Dead. Was reorganized, 1908, as Utah Gold & Copper Mines Co. Formerly at Stateline, Iron Co., Utah. Described Vol. VIII.

UTAH APEX & HIGHLAND BOY CONSOLIDATED MINING CO. UTAH.

Mine office: Bingham Canyon, Salt Lake Co., Utah. Organized Feb. 9, 1904, under laws of Maine. No trace of operations secured, and company apparently abortive.

UTAH-APEX MINING CO. UTAH.

Office: John Hancock Bldg., Boston, Mass. Mine office: Bingham Canyon, Salt Lake Co., Utah. Employs 150 men. Edw. R. Hastings, president; John W. Horne, treasurer; preceding officers, Henry R. Bradley, John F. Gorman, R. F. Haffenreffer, Jr., Geo. W. Hayden, Geo. H. Lyman, Chas. A. Morse and Frank Schirmer, directors; Robt. S. Oliver, general manager; R. L. Parker, superintendent; E. D. Gardner, engineer.

Organized May, 1902, under laws of Maine, as a merger of the Copper Mining Co. and York Mining Co., with capitalization $2,500,000, increased 1906, to $3,000,000, shares $5 par. Bonds, $500,000, authorized and 7% convertible, issued $289,000. Company has absorbed, since organization, the Highland Boy Mining Co., Petro Mining Co., Minnie Mining Co. and Flagstaff Mining Co. For fiscal year ending Sept. 1, 1910, gross ore sales were $[illegible], with mining costs of $202,388.55, leaving a mining profit of $[illegible], reduced by $28,177.25, for development charges, to a net profit of $[illegible], the company ending the year with $34,245.18 cash on hand. Federal Zinc Co. [illegible]

State Street Trust Co., Boston, transfer agent. Annual meeting, esday in September.

, 33 claims, area 254 acres, including the York, Copperfield, Petro, Boy Consolidated and Phœnix groups, adjoining the Utah Consoli- he south and west, on York Hill, in Carr Fork Cañon. The various before absorption by the present company, produced circa 300,000 e, mainly lead carbonates and sulphides, with some chalcopyrite. rty shows limestone and quartzite, carrying the Parnell, Petro, York bedded veins, 3 of which are more or less developed, these being by 6 fissure veins, of which the Dana, Leonard, Louisa, York, and e been more or less developed, the Dana, which is the principal ore rently occurring as a contact deposit between quartzite and limestone, ı ore shoot standing vertically, without disseminations in the contact, ı width, and 500′ in length, on the 4th level. The mine primarily is a f high-grade lead ore, but has considerable copper, and all ores carry gold values, with an excess of iron, giving low smelting charges. ores carry about 2% copper, and $6 to $8 combined gold and silver ton, the second class copper ores carrying only about $3 per ton in gold and silver values. First-class lead ores carry 35 to 50% lead, and gold values, and second-class lead ores range 7 to 14% in lead ı small gold and silver values.

ine, opened by 3 shafts and 6 tunnels, had 46,000′ of workings, April, e tunnels, known as the Parnell, Minnie, Smilax, Andy, Andy No. 2 ıu, are spaced at 200′ vertical intervals, and are connected by incline s, having electric hoists, on the Parnell vein, which is estimated by the o be 5′ in width, and to be mineralized for about 1,000′ in length, and depth. The Andy tunnel develops 3 ore shoots, on the Parnell vein. nu tunnel, which is the principal working, is about 1 mile in length, Parnell vein with a back of circa 2,200′. Since the decline in the ket, 1907, attention has been devoted mainly to silver-lead ore, and a ore body, opened 1910–1911, in the Parvenu tunnel, having a maximum f 35′, with a width of better than 100′, and length undetermined, has a large tonnage of low grade direct-smelting ore of 15 to 20% lead 3 to 5 oz. silver per ton, and excess of iron, estimated to carry net 8 to $10 per ton.

0′ Bleichert aërial tram, not in present use, runs from the portal of unnel to a loading station. Ore is shipped over a spur-track of the e of the Utah Copper Co.

ment includes a 15-drill air-compressor and 2 electric hoists, one of double-drum Davis hoist, installed at the 7th level station, in the ınnel.

d Phœnix mill, at the mouth of the Parvenu tunnel, was dismantled, 200-ton mill built 1909, on the same site. The new mill is said to ıcentration of 4 into 1, with a saving of about 77% of assay values, ısed down late 1910. Production was at the rate of about 100 tons of ore daily, April, 1911. Property considered promising.

IZONA GOLD & COPPER MINING CO. ARIZONA.

107 Continental National Bank Bldg., Salt Lake City, Utah.
: Chloride, Mohave Co., Ariz. Heber S. Cutler, president; Jas. E. -president; John W. Geiger, secretary; Walter J. Burton, treasurer; fficers, L. G. Burton, Henry Green and J. F. Shelley, directors; Edw. intendent. Organized Nov. 11, 1907, under laws of Arizona, with ion $1,000,000, shares $1 par, assessable; issued, $715,675. Annual econd Tuesday in September.

, 57 claims, unpatented, area 1,140 acres, and a 20-acre millsite, in the trict, 18 miles northwest of Chloride, the nearest rail point, showing

quartz veins traversing granite and mica-schist, carrying auriferous copper ore. Property includes the Hall and Golden Gate mines, latter having 2 incline shafts deeper of 105′, on parallel veins, and there also is a tunnel, the property as a whole having about 2,000′ of workings. Equipment includes a 5-stamp mill. Idle.

UTAH-BINGHAM MINING CO. UTAH.

Office: 68 Bridge St., Springfield, Mass. Letter returned unclaimed from former mine office, Bingham Canyon, Salt Lake Co., Utah. W. W. Bellows president and general manager; J. M. Donahue, vice-president; H. K. Bellows, treasurer; preceding officers, C. S. Ballard, and B. J. Perry, directors; Parrington M. McCree, mine superintendent and engineer. Organized Feb. 3, 1906, under laws of Maine, with capitalization $2,000,000, increased, Apr. 18, 1908, to $2,750,000, shares $5 par; issued, $2,460,860. Company controls the Ilion Mining Co. through ownership of the entire stock issue. Shares are listed on the London stock exchange. Federal Trust Co., Boston, registrar.

Lands, 19 claims, partly fractional, 17 patented, area 115 acres, including former holdings of the Ilion Mining Co. and Giant Chief Consolidated Mining Co., lying between the Telegraph and Old Jordan mines of the United States Mining Co. The property, estimated in the press to have yielded $1,500,000 worth of ore, previous to present ownership, shows limestone, quartsite and porphyry, carrying 7 ore bodies, of 6″ to 6′ width, occurring as fissure veins and as irregular deposits in limestone, latter having a generaliy NE. strike, with average dip of 30°. Four of the ore bodies are said to carry ore of fair assay tenor, mainly silver-lead, with a little auriferous copper ore, expected to increase to considerable quantities at greater depth. The principal limestone ore body, of irregular outline, circa 200′ in extreme width, and traceable about 3,000′, carries melaconite, chalcocite, chalcopyrite and galena, estimated by the company to average 2 to 5% copper, 10 to 40% lead, 5 to 16 oz. silver and 4 cents gold per ton.

Development is by a 200′ Giant Chief shaft, and tunnels of 250′, 360′, 420′, 600′ and the 900′ Turgreen tunnel, with total workings of about 2 miles, of which about 3,000′ are now in use, considerable ore being blocked out for extraction.

Equipment includes a 100-h. p. General Electric motor, taking current from the Telluride Power Co., with a hoist good for 500′ depth, a 5-drill Ingersoll-Sergeant air-compressor, and a small electric light plant.

There are 10 buildings, including a 20x40′ frame machine-shop, 20x30′ smithy, 24x26′ office and a 16x80′ boarding-house. Some production was secured, 1908–1909, but the mine was not a producer in 1910. Property considered promising.

UTAH BUCKHORN MINING CO. UTAH.

Dead. Was succeeded, circa January, 1908, by Del Verde Tunnel Co. Formerly at Ogden, Weber Co., Utah.

UTAH CONSOLIDATED GOLD MINES, LTD. UTAH.

Dead. Was reorganized, 1903, as Utah Consolidated Mining Co. Formerly at Bingham Canyon, Salt Lake Co., Utah.

UTAH CONSOLIDATED MINING CO. UTAH.

Office: 949–42 Broadway, New York, N. Y. Mine office: Bingham Canyon, Salt Lake Co., Utah. Works office: Murray, Salt Lake Co., Utah. Urban H. Broughton, president; Adolph Lewisohn, vice-president; T. L. Heimann, second vice-president; preceding officers, James Phillips, Jr. and C. King, directors; E. P. Addicks, secretary and treasurer; Joseph R. Risque, general manager; Fred Cowans, general superintendent; W. M. Johnson, assistant superintendent; C. L. Morris, smelter superintendent; E. P. Mathewson, consulting metallurgical engineer.

Organized 1903, under laws of New Jersey, with capitalization $1,500,000, shares $5 par, as a reconstruction of Utah Consolidated Gold Mines, Ltd., a British corporation that, in turn, succeeded the Sevier Gold Mines, Ltd., Co.,

. Property of the Utah Consolidated Mining Co. is 2,490 shares of shares of the capital stock of the Highland Boy Gold Mining Co., of ey, the latter corporation holding direct title to the Utah properties. pany also owns 5,000 shares of stock of the International Smelting & Co., which cost $500,000, and is returning $40,000 yearly in dividends. pany has circa 4,500 stockholders. Shares are listed on the Boston hange.

company's total income for 1910 was $1,253,715, and the company e year with surplus of liquid assets over liabilities of $943,342. Net were $1,038,637 in 1903; $1,164,348 in 1904; $1,887,385 in 1906; 8 in 1906; $1,179,412 in 1907; $326,312 in 1908; $154,263 in 1909; 1 1910, showing a terrific and most alarming shrinkage. It was stated ent Broughton that the net profits of the first quarter of 1911 were as he total profit for 1910.

dends of the present company, and its predecessor have been $732,000 nothing in 1902; $900,000 in 1903; $900,000 in 1904; $1,050,000 in 1905; 0 in 1906; $2,100,000 in 1907; $600,000 in 1908; $600,000 in 1909; in 1910.

ls, 31 claims, patented, area 239 acres, known as the Highland Boy Carr Fork Cañon, circa 2½ miles from Bingham Canyon. A smelter- ine Cañon, across the Oquirrh divide, was sold, 1908, to the Interna- elting Co. The Highland Boy mine was a considerable producer of d ore, 1870–1890. The company had about 150 acres of mineral land ed, previous to 1907, on which diamond drilling has been done since .

property has 6 ore bodies, occurring as replacements in limestone strata 300′ thickness, dipping 25° to 45°N., lying between quartzite walls, series of nearly vertical porphyry dikes, having a strike of N. 20° to The ore bodies occur in the limestone as well-defined shoots, having an ke, N. dip and NE. pitch. The ore bodies are large, up to 100′ in d circa 150′ to 200′ in length, separated by barren bars of limestone, rgest ore body has been said to be approximately 320′ in extreme width maximum length. A new body of lead ore is being developed, in the rkings, in hitherto unexplored territory, in an extension of the Yampa . The ore is chalcopyrite, associated with pyrite, with some bornite cocite, with a limestone gangue, formerly carrying 2 to 13% copper, verage of 3.5 to 4%, and $2.50 per ton in combined gold and silver ut averaging, 1910, approximately 2.8% copper, 29% iron, 32% sul- % silica, 1.5 oz. silver and $1.60 gold per ton, the ore being self-fluxing. shoots grow unmistakably leaner with depth. A new ore body esti- average 4.5% in copper tenor was being opened on the 10th level, 11, and considerable lead ore of promise has been developed.

Highland Boy mine is opened by an old 900′ shaft, with a new three- nent shaft started at a central point, and 5 tunnels, of 725′ to 2,600′ No. 3 tunnel is 725′ in length; No. 4 is 120′ vertically lower; No. 5 is No. 4; No. 6 is 100′ below No. 5, and No. 7, 100′ below No. 6, and 700′ e crest of the mountain, is 2,600′ in length, and is the main avenue of n, all tunnels being connected, and ore milled, through chutes, to No. 7 There are 2 blind shafts, starting from the 700′ level, with large electric ising ore to that point, for extraction by the electric haulage plant in nnel. The ore breaks easily, and is extracted by the top-slice caving and the mine is timbered with square sets, timbering expense being nd culls are used for underground filling. Ore is broken mainly on

openings were 12,444′ in 1905; 10,732′ in 1906; 10,120′ in 1907; 7,064′ 8,950′ in 1909, and, for the 7 months preceding April, 1911, new open- 14,432′, showing that the management has awakened to the necessity

of pushing new work more rapidly. Ore reserves were estimated, by the management, at 1,202,930 tons in 1907; 1,487,218 tons in 1908, and the company's annual report for 1909 contained a special report, by a mining engineer, giving the estimated total of developed ore as 1,237,470 tons, of which 981,680 tons were reported to have an average assay value of 2.36% copper, 0.959 oz. silver and 0.064 oz. gold per ton. Depending upon these figures, which were thoroughly explicit as to actual tonnage and average values, shareholders were given a rude awakening, by the figures of December, 1910, which were prepared with care, by Messrs. Burger and R. H. Channing, whose thorough examination of the mine revealed reserves amounting to only 381,000 tons, averaging 2.44% copper, 0.63 oz. silver and 0.05 gold per ton, in addition to which it was estimated that 100,000 to 250,000 tons additional might be recovered, from old stopes and fills. This shrinkage of two-thirds in ore reserves renders it obvious that the management was extremely lax in its methods, and recalls to mind the action of the same management, in 1906, when the mine was almost gutted of its richest ore, in order to secure a maximum yield and maximum profit for the year. The reaction that followed the partial exhaustion of rich reserves in 1906 induced the management to lay the blame for its wrong policy on Mr. R. H. Channing, who had resigned the position of manager to go to the Cerro de Pasco mine in Perú, but, as Mr. Channing merely followed instructions in pushing the production of high-grade ore, he cannot be held responsible for the mistake, and, notwithstanding the attempts of the management to place the blame on him, it was to Mr. Channing that the directors turned, in 1910, for the truth regarding the property.

A 12,700′ aërial tram leads from the portal of No. 7 tunnel to ore-bins on the Rio Grande Western railway. There is a subsidiary aërial tram, crossing Carr Fork Cañon, used for handling lumber and mining supplies. The long tramway, from the mine to the Tooele smelter, is described under title of the International Smelting & Refining Co.

The smelter, at Murray, described Vol. VIII, was razed, 1909, and all material of value therefrom sold to the International Smelting & Refining Co. Shipments to the Garfield smelter were stopped July 1, 1910, and it has been claimed in the press, that changing shipments to the Tooele smelter will reduce smelting charges about $1 per ton.

Production has been as follows: 233,700 tons ore, yielding 13,553,483 lbs. fine copper, in 1904; 287,148 tons ore, yielding 17,264,474 lbs. copper, 374,681 oz. silver and 28,290 oz. gold, giving an average extraction of 3% copper, 1.3 oz. silver and 0.1 oz. gold per ton, in 1905; 18,533,974 lbs. copper, 457,812 oz. silver and 42,001 oz. gold in 1906; 279,642 tons ore, yielding 13,987,557 lbs. copper, 390,296 oz. silver and 34,554 oz. gold, giving average returns of 50.87 lbs. copper, 1.4 oz. silver and $2.47 gold per ton in 1907; ore averaging returns of 42.9 lbs. copper, 1 oz. silver and $1.88 gold per ton, yielding 10,648,243 lbs. fine copper in 1908; 280,637 tons of ore averaging 35.8 lbs. copper, 1.07 oz. silver and $1.54 gold per ton, yielding 10,043,900 lbs. fine copper in 1909; 177,044 tons of ore, averaging 41.15 lbs. copper, 0.848 oz. silver and $1.63 gold per ton, yielding 7,489,471 lbs. copper, in 1910.

The cost of finished copper, per pound, after deduction of included gold and silver values, was circa 5 cents in 1904; 7.6 cents in 1905; 4.2 cents in 1906, this being the lowest cost for copper made by any large mine in the world in that year, but secured by gutting the reserves of rich ore; 7.45 cents in 1907; 9.26 cents in 1908; 10.27 cents in 1909. A fight for control, made by dissatisfied shareholders, resulted in the victory of the old management, which retained control, by the narrow margin of 13,000 votes, at the annual meeting of April, 1911. The Utah Consolidated has seen its best days, but remains a mine that, with careful management, should be able to yield considerable profits for some years to come. In view of its action in gutting the mine in 1906, and giving to shareholders

ıntruthful and highly misleading figures of ore reserves, the present t rests under considerable suspicion.

ISOLIDATED MINING & MILLING CO. **UTAH.**

424 Atlas Blk., Salt Lake City, Utah. Mine office: Mammoth, Utah. S. S. Jones, president; H. S. Cutler, vice-president; Hart J. ıecretary and treasurer; preceding officers, Hon. Reed Smoot, A. N. ınd Hugh J. Cannon, directors; Chas. H. Carter, superintendent. March 10, 1907, under laws of Utah, with capitalization $250,000, nts par, nonassessable. Shares are listed on the Salt Lake and San :changes. Lands, 6 claims, patented, near the Sioux Consolidated o mines, developed by a 500′ shaft, with 2 levels opened, and a tun- ed. Part of the property has been worked by lessees, who have ıall production. Equipment includes an electric hoist.

PER CO. **CALIFORNIA.**

Samuel McRoberts was superintendent. Organized 1907, under ne. Lands were some distance east of Lone Pine, in the Ubehebe apparently no work was done thereon by the company. Formerly ', Inyo Co., Cal.

PER CO. **UTAH.**

604 McCornick Bldg., Salt Lake City, Utah. Mine office: Bing- ı, Salt Lake Co., Utah. Works office: Garfield, Salt Lake Co., ı. M. MacNeill, president; Col. Daniel C. Jackling, first vice-presi- l manager and chairman executive committee; Col. Chas. Hayden, president; Spencer Penrose, secretary and treasurer; preceding ı. Guggenheim, Murry Guggenheim and T. W. Lamont, members executive committee; preceding officers, Daniel Guggenheim, Silas rnest Thalmann, John Hays Hammond, Wm. B. Thompson, Frank and Eugene Meyer, Jr., directors; Robt. C. Gemmell, assistant ager; Kurnal R. Babbitt, general counsel; Samuel Untermeyer, ınsel; Pope Yeatman, consulting engineer; David A. Crockett, ısurer; John K. MacGowan, purchasing agent; J. D. Shilling, mine nt; Wm. Spencer, assistant mine superintendent; Frank G. Janney, superintendent; C. T. Van Winkle, superintendent Magna mill; t, assistant superintendent Magna mill; Frank G. Janney, Jr., su- Arthur mill; John M. Hayes, assistant secretary and cashier; gs, assistant purchasing agent; G. O. Bradley, mechanical engineer; ich, mine engineer; H. C. Smith, designing engineer.

ed June, 1903, and reorganized Apr. 30, 1904, under laws of New capitalization $4,500,000, shares $10 par, increased, October, 1905, 0; again increased, March, 1907, to $6,000,000; again increased, 3, to $7,500,000; again increased, Jan. 25, 1910, to $25,000,000, ır, nonassessable; issued, $15,625,990. The new stock issue, 1910, $8,282,240, of which $3,100,000 in stock was given for the prop- Boston Consolidated Mining Co.; $4,445,120, or 444,512 shares, r 1,000,152 shares of Nevada Consolidated Copper Co.; $734,370 or ı, were sold for cash, at a premium of 400%, for $50 per share, and ere issued for the conversion of $5,500 of bonds, at par. Shares the New York, Boston and Paris stock exchanges. American oston, transfer agent; Guaranty Trust Co., New York, and City oston, registrars. Annual meeting, fourth Friday in April.

ıpany's bonded debt is now only $2,000, being the outstanding a $1,500,000 issue of first-mortgage convertible 6% gold bonds , 1908, and due Jan. 1, 1918, convertible into stock on a basis of ' until Jan 1, 1913.

ıpany controls, through stock ownership, the Nevada Consolidated owning slightly more than 50% of the outstanding stock, having

exchanged therefor its own stock on the basis of 1 share of Utah for 2¼ shares of Nevada. The company controls, through stock ownership, the Bingham & Garfield Railway Co., described later. During 1910 the Utah absorbed the Boston Consolidated Mining Co. and the Shawmut Consolidated Copper Co. A large share interest in the Utah Copper Co. is held by the American Smelting Securities Co.

Net income was $5,401,775 in 1910, of which $3,890,912 was secured from the operation of its own property, and the balance came from stock interests in subsidiary companies, earnings comparing with $2,160,000 in 1909. Net earnings were equal to $2.90 per share in 1909, and $3.45 per share in 1910, on outstanding stock. The company ended 1910 with a surplus of $6,083,980, and current assets exceeded liabilities by $3,231,100.

Dividends, begun Sept. 30, 1908, were 50 cents quarterly, 1908 and 1909, and 75 cents quarterly, 1910 and during the first half of 1911. Dividends aggregated $696,387.50 in 1908; $1,464,387.50 in 1909; $4,648,675.50 in 1910, a total of $6,809,450.50.

Lands are 665 acres of mineral claims and 5,472 acres of miscellaneous property, latter including millsites and surface rights for dumping waste. Lands embrace the original group of 195 acres, bought of the De Lamar-Wall Mining & Milling Co., the Boston Consolidated group of 51 claims, area 359 acres, the Shawmut Consolidated group of 100 acres, and outlying fractional claims of 11 acres area, a total of 665 acres, lying on both sides of Bingham Gulch, with principal development on the northern side. The company also has bought for $75,000 the Payroll group of 10 claims, 2 fractional, area 175 acres, lying south of the western part of the original holdings, this acquisition giving the company all the intervening ground between its original holdings and those acquired from the Boston Consolidated. Of the mineral lands, 166 acres are more or less developed. Lands other than the main mineral group consist of 1,586 acres in Bingham Canyon, part of which is really mineral land, including surface rights bought from the Little Eddy, Puritan, Bingham Amalgamated and other companies, for dumping overburden stripped from the mines, and, in 1910, the company arranged with the Bingham Mines Co. for the use of Copper Center Gulch for dumping overburden, in which 9,000,000 cubic yards can be put. Lands also include 509 acres in Utah County, the original 3,000-acre millsite at Garfield, the 910-acre millsite of the Boston Consolidated at Garfield, the Pelican Point millsite of 1,085 acres, and an old 200-acre millsite at Bingham Canyon, taken over with the Boston Consolidated.

The property shows porphyry and quartzite, the country rock being monzonite, an altered decomposed friable porphyry that breaks easily, yet stands well, carrying seams and veinlets of bornite and chalcocite, but having ore occurring mainly in the form of chalcocite disseminated as specks quite uniformly throughout the partially shattered porphyritic mass. At points the quartzite flanking the monzonite is mineralized to a sufficient extent to render it an ore of commercial value, and the quartzite ore is treated in precisely the same manner as the porphyry ore. The monzonite, at surface, and for some little depth, carries copper carbonates, of low tenor, probably averaging under 1% copper, these giving a brave showing, because of the tendency of the malachite to stain the surrounding monzonite. The upper portion of the porphyry, carrying such ores, is removed and treated as waste, there being no process now known for recovering the copper values profitably from oxidized ores of such low tenor, but, in all human likelihood, the time will come when the [illegible] now stripped and dumped as worthless, can be treated [illegible] contents, low as these are, and, when that time [illegible] ores, being already mined, will be available for [illegible] loading into railway cars by steam shovels, and [illegible] agement of the company reckons the average [illegible]

oxidised ores at 105′, and the average thickness of the disseminated mmercial tenor as 345′, a ratio of 0.3 waste to 1 of ore, consequently 3 apping must be stripped for 10 tons of ore developed for mining, the hich stripping is chargeable to the mining cost of the ore. In actual t has been found cheaper to send considerable quantities of the over- arrying oxidized ores, to the mill, rather than to employ the large f additional labor required to separate the waste thoroughly from the ore.

Utah Copper Co. has the largest developed ore body in the world, its nnage exceeding that of the Rio Tinto, its nearest copper competitor, exceeding the proven tonnage of the greatest of the enormous iron he Mesaba range, and exceeding the developed tonnage of gold ore of combined mines of the Witwatersrand. Not only has the Utah Copper rgest body of developed ore of any mine, but it also is, at present, the re producer, measured by tonnage, of any mine of any metal.

mine has been developed by very extensive underground workings, urn and diamond drill boring. The aggregate length of all underground in the Utah and Boston mines, was 63.78 miles to Dec. 31, 1910, but hird of these workings had been destroyed by opencast operations on group, and by underground mining on both groups, a total of 20.43 nderground openings having been excavated, leaving accessible, in ps, 43.35 miles of workings. Borings by churn and diamond drills for ry purposes aggregated 10,015′ in 1910, showing a maximum thickness rcial ore up to 600′ in depth, succeeded by ore of a similar nature, though mercial tenor, the cupriferous monzonite continuing unaltered to the epth reached by any borings, the bottom limits of payable ore being d, not by any radical change in the ore or its gangue, but by the gradual ut, at depth, of the disseminated sulphides. The amount of ore fully and blocked out was 152,130,000 tons, Dec. 31, 1910, of which about) tons have an average copper tenor of 2%, the balance averaging %, and in addition there are 51,370,000 tons of additional ore, partly , giving total ore reserves, proven and partially proven, of 203,500,000 , estimated by the management to average 1.67% copper, this esti- g based upon the average of 27,186 samples of ore, taken from 225,722′ raises, winzes and drill-holes.

nally both the Utah and Boston Consolidated were opened as under- ines, but underground work was succeeded and supplemented by far ensive opencast operations, and, in 1910, both mines, which were properties, were thrown into a single gigantic mine. Descriptions of ese properties, as they existed separately, were given Vol. VIII.

original underground mine of the Utah, operated by the top-slice caving ventually will be broken into open pits, and the entire mine worked

The mine openings are rectangular, laid out like the streets of a blocks above blocks, like the successive floors of a building. There are , entering the hills at approximately right angles to the gulch. These e avenues, and, crossing the avenues, at right angles, parallel with the streets, these being opened 150′ apart. Paralleling the tunnels, or are drifts, corresponding to city alleys, these being 75′ on either side enues. The tunnels are 10x10′, or larger, and all openings are of lly large dimensions, connections between the various floors being had from alley to alley. Stope levels are opened at intervals of 17′ and avenues, streets and alleys [illegible] the same system as is used et nomenclature of [illegible] fusing to a stranger, most logi[illegible] understood. The nd min[illegible] ning costs are less tha[illegible] ed out,

above the main tunnel level, about 25,000,000 tons of ore. The main working tunnel has a double tram-track, laid with 30-lb. rails, with an electric haulage system.

The underground workings of the Boston Consolidated, known as the Sulphide mine, included 15 known ore bodies, in an area of about 100 acres. Two veins developed had an EW. strike, with average dip of 28° N., the main ore shoot being estimated as 160′ wide and 340′ in length. This mine yielded a limited amount of ore of better than 10% copper tenor, with corresponding increase in gold and silver values, but the average return, from all ore extracted, 1908 was only 2.802% copper, and became materially lower thereafter. The old management of the Boston Consolidated estimated that the ores of Sulphide mine averaged 2.5% copper, 2 oz. silver, and $2 gold per ton. The Sulphide mine is developed by tunnels, Armstrong No. 1 tunnel, the main working level, having an electric haulage system, the other principal tunnels being the Armstrong No. 2, Peabody, Work, Phœnix and Ingersoll. The Sulphide mine was yielding about 200 tons of ore daily, but work was discontinued. The zone is to be prospected thoroughly, though not especially promising for underground work, the ore averaging very low in grade.

The porphyry mine of the Boston Consolidated is opened by 15 tunnels, with about 10 miles of workings, and consists of 110 acres of monzonite-porphyry country rock, being a continuation of the porphyry ore body of the Utah Copper Co. Opencast work of the Boston Consolidated was by 21 terraces, cut in the sides of the mountain.

The porphyry ores of the Boston Consolidated gave decidedly disappointing results in initial production, the upper ores showing a considerable excess of iron, and the porphyry ores treated for the first half of 1908 gave concentrates ranging 14 to 19% copper and circa 25% iron, with a final smelter recovery of only 17 to 22 lbs. fine copper per ton. It is obvious that the Boston Consolidated property can be handled to materially better advantage as a part of the Utah Copper Co. than was possible when it was an independent unit.

The opencast workings, which are of by far the greater importance, are on a truly colossal scale. The porphyry ore body lies mainly on the southern face of a mountain, and practically the entire face of this mountain, of about 200′ height is being removed, the first 100′ or so from surface as capping, and an average of about 300′ following as ore. Notches are cut along the mountain side for successive lines of railway track, and, as the rock is removed, these notches become broad terraces, that eat deeply into the flank of the mountain. Hand-labor is employed but sparingly, and the actual work of extraction is done by the most powerful of movable machinery, the very nature of the ore body and the method of its mining precluding the use of any machinery except that set upon wheels, and capable of traversing a railroad track. Equipment of the opencast mine, at the end of 1910, included 22 Marion and Vulcan steam-shovels, of 70 to 90 tons weight each, 34 standard-gauge locomotives, 11 narrow-gauge locomotives, 80 standard-gauge dump-cars of 12 cu. yds. capacity each, 118 standard-gauge dump-cars of 6 cu. yds. capacity each, and 146 narrow-gauge dump-cars of 4 cu. yds. capacity each. The ground must be blasted before removal by steam-shovels, and holes are bored by churn-drills, and are blasted in sections averaging 40′ thick, 60′ deep and 1,000′ long, each section or bench containing circa 180,000 tons of ore, requiring about 25 tons of dynamite for its blasting, and a single blast has torn down 15,000 tons of ore. The cost of mining is about 40 cents per ton of ore won, including the cost of stripping and development, with an actual cost for ore only, loaded in the cars, of 25 cents per ton, for blasting and shoveling. The actual stripping of the ore was begun, with steam-shovels, August, 1906, and has continued continuously since that time. About 10,000 tons of ore were being mined daily, [illegible]. The cost of underground mining is about four times that of opencast [illegible]

ı of ore secured, and as soon as the stripping has advanced sufficiently, nd mining will be discontinued entirely, and all ore won opencast. 'emoval and disposal of the overburden is a gigantic task in itself, ·rock from the capping being loaded into cars by steam-shovels, and ɔwn the cañon, at a number of different points, on lands bought for the In and around the mines are 25.2 miles of standard-gauge track, 5.16 ırrow-gauge track, and 2.26 miles of 3-rail track, a total of 32.62 miles, by the Bingham & Garfield Railway Co.

36′ incline gravity tram, built by the Boston Consolidated, handles the he upper levels down the mountain-side. There are 4 parallel tracks, ge, laid with 36-lb. steel rails, with 2 Stine drums at the upper ter- rating 10-ton cars in counterbalance, with 3,000-ton steel ore-bins at terminal, on Carr Fork.

ıg equipment includes steam plants at both the Utah and Boston ; extensive use is made of electric power, received from the Magna arfield, and electric power for the air-compressor and shops for the ıne is taken from the Telluride Power Co. The Boston mine has mpound air-compressors, of 60 drills aggregate capacity, and the ɛ also has air-compressors, but the mines have a minimum equip- ted mining machinery, for the reason before given. Buildings at the ne include a 40x80′ machine-shop, 40x30′ carpenter-shop, 3 smithies, structures. The Utah mine also has a considerable number of shops ıgs, required for its operation, but the principal shops are at the mills

ingham & Garfield Railway Co., organized July, 1908, under laws of a capitalization of $1,000,000, shares $100 par, and is controlled by Copper Co., through ownership of the entire issued stock, of $750,000. $2,500,000-issue of ten-year 6% bonds, convertible into stock of the er Co. at $50 per share, at any time after July 1, 1911. The main line, ingham Canyon and Garfield, is about 20 miles in length, traversing le rough country. The average grade for the entire line is about 2%, s a maximum grade of 2.5% for 14 miles. There are 4 tunnels, all wide and 22′ high, the longest being 2,079′, with an aggregate length There are 4 steel viaducts, spanning the cañons at a great height, , across Carr Fork, being 690′ long and 190′ high. Equipment of the ɛs 12 Mallet articulated compound locomotives, each engine and ten- ng 310 tons, with a weight of 225 tons on the driving wheels, each ɔcomotive being 90′ 6″ in length. The hopper-bottom steel ore-cars ons nominal capacity, with 10% excess allowance for overload. The st of the road is about $160,000 per mile, and the cost of the complete ıwards of $3,000,000. The railway was opened July, 1911.

ɔmpany has had 3 mills, one at Bingham Canyon, now dismantled, t Garfield, 20 miles from the mines. The mill at Bingham was the ncentrator, and the smaller mill at Garfield was taken over with the nsolidated. The 900-ton Copperton mill, at Bingham Canyon, fully Vol. VIII, was closed permanently Aug. 1, 1910, and dismantled, all that was suitable being sent to the Arthur mill, for use in remodeling . Extensive improvements in the Arthur plant at Garfield will give ay a total milling capacity of 20,000 tons of ore per day.

ature of the ore, which is mainly very finely disseminated chalcocite, s fine crushing, which inevitably causes considerable sliming. The trates easily and well, but losses in tailings unavoidably are heavy, n[illegible] at the old Copperton mill, and extraction by [illegible] assay values, with a concentration [illegible] of the company at Garfield,

stands on a 3,000-acre site, 4 miles east of the Garfield smelter and 1 mile east of the Arthur mill, and it is connected with the mines by the Bingham & Garfield, Denver & Rio Grande and San Pedro, Los Angeles & Salt Lake railways. The mill, of steel frame, on concrete foundations, with reinforced concrete floors, iron siding and composition roofing, is in two 3,000-ton units, of 6 sections each, and is 600′ long by 505′ wide, each unit being 300x505′ in size, the 2 units, with their outlying buildings and yards, occupying a site of about 20 acres, and the plant is so designed that 2 additional units of the same size can be added when desired. Milling was begun June, 1907, with 2 sections, and the 12th and final section of the mill started work circa November, 1908.

The ore-bins of the Magna mill are of 38,000 tons aggregate capacity, there being bins of 25,000 tons capacity in the coarse crushing department, and 13,000-ton bins in the fine crushing department.

The Magna mill is divided, longitudinally, into 3 departments, for coarse crushing, fine crushing and concentrating. Each of the 12 coarse-crushing sections of the mill has two No. 7½ Gates gyratory crushers, 2 sets of 5x20″ roughing rolls, of special design, three 6′ Chilean mills, of special design, 2 sets of 15x37½″ rolls, of special design, and three 6′ Chilean mills, of special design. The fine crushing department for the entire mill contains 36 six-foot Chilean mills, and 24 sets of 16x36″ rolls, with necessary feeders, elevators and screens. The concentrating department for the entire plant is built on 3 floors, one above the other, having respective areas of 120x600′, 164x600′ and 120x600′. In this department there are 72 jigs, 48 Wilfley tables, 1,104 six-foot vanners of suspended type, 24 four-compartment classifiers, and 384 nine-foot conical settling tanks. The Magna mill made a saving of 67.3% of assay values from ores averaging only 1.43% copper in 1910, and was running all units, but not up to full capacity May, 1911. The average extraction of both mills was 63.55% in 1910. The Magna mill is being given increased machinery and alterations that will increase its former nominal capacity of 6,000 tons, and former actual capacity of nearly 10,000 tons, to about 12,000 tons daily capacity.

The 3,000-ton Arthur mill, about 1 mile west of the Magna mill, built by the Boston Consolidated Mining Co., at a cost of upwards of $1,500,000 was being remodeled, May, 1911, and is to be given an ultimate capacity of 8,000 tons of ore daily. The mill, as built, was in six 500-ton units, with 13 operating units, 370x555′ in size, of steel and concrete construction. There are 9,000-ton ore-bins in the coarse-crushing department, and 12,500-ton bins in the fine-crushing department. The coarse-crushing department is a separate building, 35x74′ in size, located 85′ back of the main building, the coarse ore bins taking up 300′ of the length of this building, the remainder being used for coarse crushing. The mill, as built, had 4 Gates crushers, 312 individual Nissen stamps, 284 Wilfley tables, 256 Johnson tables and 312 Callow settling tanks, there being no elevators, all material flowing by gravity. In the remodeling of the Arthur mill, the Nissen stamps have been replaced by Chilean mills, and additional vanners installed, effecting an increased capacity of nearly 100%, by which 5 sections of the mill were made to handle nearly the same tonnage as formerly was treated by the entire 13 sections. The Arthur mill, when remodeled, will have the following equipment: 2 No. 6 Gates crushers, 2 sets of 72x20″ rolls, of special design; 26 sets of 15x37″ rolls of special design; 26 six-foot Chilean mills, of special design; 78 impact screens 3x4′ size; 26 steel apron ore-feeders, of 30″ size; 52 four-compartment Janney mechanical classifiers; 52 five-compartment Janney mechanical classifiers; three-compartment Janney mechanical classifiers; 156 Garfield roughing tables of 4x12′ size; 26 Garfield roughing tables of 6x12′ size; 26 No. 5 Wilfley tables, 832 six-foot vanners, and 312 nine-foot dewatering cone tanks. Electric power used throughout, is taken from the Telluride Power Co.

e 13,000-h. p. steam-electric plant, circa 2,000′ east of the Magna mill, 158x288′ building, of steel frame, erected by the Minneapolis Steel & ery Co. The boiler plant has 26 Heine 419-h. p. water-tube boilers, ; under 175 lbs. steam pressure, equipped with American automatic having separate mechanical drives, of special design. This plant also ts electric current 20 miles for the operation of the Utah mine, at Bingham. .re two 26x54x48″ Allis-Chalmers cross-compound Corliss condensing direct-connected to two 1,500 kw. a. c. generators, and three 32x70x48″ :g cross-compound Corliss condensing engines direct-connected to three v. a. c. generators. There are 2 monolithic concrete smokestacks, each h, of 12′ inside diameter at the top.

: pumping plant of the Magna mill includes the original installation, reserve as an auxiliary, the main installation consisting of a Nordberg :pansion condensing pump having 42x22x59″ cylinders, and plunger 16″ ;ter, with a common stroke of 52″, of capacity to force 10,000 gallons of :r minute, from a pond on the millsite, through 1,900′ of 24″ pipe, against of 230′, to a 5,500,000-gallon concrete-lined reservoir above the mill. ;inal pumping plant, now held in reserve for emergencies, consists of one -stage turbine pump, direct-connected to a 250-h. p. General Electric n motor, with capaciity to lift 2,500 gallons per minute under the same :onditions as the main plant, one 12″ two-stage turbine pump direct- :d to a 350-h. p. General Electric induction motor, with capacity of lons per minute, and one 15″ two-stage turbine pump, direct connected)-h. p. induction motor, with a capacity of 4,500 gallons per minute, total capacity of 10,500 gallons per minute for the auxiliary plant, or allons per minute for both plants, jointly. An auxiliary pumping plant, he Magna mill consists of two 8″ Worthington single-stage pumps direct- :d to induction motors, with combined capacity to raise 3,000 gallons of :r minute to a 500,000-gallon high-service concrete reservoir 100′ above ı reservoir.

ter for the Arthur mill is developed partly from springs on the millsite, aken partly from the Garfield Water Co. The pumping plant of the nill consists of one 3,000-gallon rotary pump, direct-connected to a 400- stinghouse induction motor, and two 1,500-gallon rotary pumps, direct- :d to two 250-h. p. Westinghouse induction motors. Water is pumped)ond on low ground, below the mill, through 4,000′ of 20″ wood-stave a concrete-lined reservoir of 2,000,000 gallons capacity, against a static 350′. There is a 1,500,000-gallon clay-lined reservoir, 40′ above the ervoir, for fire protection.

cellaneous buildings at the Magna mill consist of a 56x105′ machine- steel frame, with brick walls, on concrete foundations, thoroughly l for all repair work, a 48x72′ carpenter-shop, a 52x100′ warehouse, and :. Buildings at the Arthur mill, all of steel and concrete, include a machine-shop, 80x120′ foundry, a 40x40′ carpenter-shop, and a smithy. Utah Copper Co. employs about 3,200 men, of whom circa 1,900 are at s, and about 1,300 are at the mills and shops at Garfield.

duction of the Boston Consolidated Mining Co. was 3,223,836 lbs. fine n 1904; 3,565,483 lbs. in 1906; 6,146,125 lbs. copper, 78,128 oz. silver 46 oz. gold in 1907; 6,148,512 lbs. copper, 49,130 oz. silver and 7,446 in 1908.

duction of the Utah Copper Co. was 5,473,469 lbs. copper in 1905; 6 lbs. in 1906; 43,689,875 lbs. in 1908; 51,749,233 lbs. in 1909; 85,644,511) ... April, 1911, was at the rate of about 96,000,000 lbs. ... completing of the mills completed, the company ... than 150,000,000 lbs. of finished copper ... that a productive capacity of

even 20,000 tons of ore daily, which would be the maximum amount that the remodeled mills could handle, under favorable circumstances, would by no means be the possible limit of output of the mines. The company's copper is marketed through the American Smelting & Refining Co., on a 1% commission basis.

Mining costs for 1910 were 40.97 cents per ton of ore, this figure including 13.3 cents per ton for stripping and general development costs. Milling cost for 1910 averaged 46.63 cents per ton, giving a total cost of 87.06 cents per ton for mining and milling, but not including cost of transportation, which presumably was 28 cents per ton, giving a total estimated cost of $1.156 per ton. The ore treated 1910 averaged 1.43% copper, with an average extraction of 66.55% of assay values, giving a net recovery, in the form of concentrates, of 0.951665%, or a trifle better than 19 lbs. of finished copper per ton, giving a cost of almost exactly 6 cents per pound of copper, in the form of concentrates unsmelted. The total mining and milling cost, exclusive of transportation, of 87.6 cents per ton, for 1910, was a reduction from similar aggregate costs of 94.43 cents per ton in 1909. The following figures of cost of finished copper are net, after deduction of included gold and silver values: the estimated average cost of finished copper was 8.16 cents per pound for the second quarter, and 8.73 cents per pound for the third quarter of 1908. Cost of finished copper was 8.787 cents in 1909, and is given by the company as 8.069 cents in 1910, and, for the first quarter of 1911 was 8.43 cents, comparing with 8.069 cents for the corresponding quarter of 1910. Lowest cost reported was 7.53 cents for the second quarter of 1910. The estimated average cost of 7 cents per pound for copper, made by the management originally, is not likely to be reached, but it is obvious that while the Utah Copper Co. has not reached, and cannot reach, the extreme low cost originally predicted by the management, it has fully demonstrated its ability to make copper, in enormous quantities, at an average cost well under 10 cents per pound, and is making copper at a somewhat lower average cost than the average cost of the 10 largest producers of the world. The ore reserves of the mine are as nearly inexhaustible as those of any mine of any metal. The management is excellent, and is entitled to the credit of making the Utah, which was the pioneer among the so-called porphyry mines, a magnificent success, in the face of very considerable obstacles, despite a vast amount of skepticism and criticism on the part of mining men and the general public.

UTAH DEVELOPMENT CO. UTAH.

Dead. Was succeeded, circa September, 1908, by North Utah Mining Co. Formerly at Bingham Canyon, Salt Lake Co., Utah. Fully described Vol. V.

UTAH & EASTERN COPPER CO. UTAH.

Office: 127 Church St., New Haven, Conn. Operating office: 308 McCornick Bldg., Salt Lake City, Utah. Mine office: Dixie, Washington Co., Utah. Works office: Shem, Washington Co., Utah. Louis E. Stoddard, president; Chas. E. Graham, vice-president; T. W. Farnam, secretary and treasurer; preceding officers, E. G. Stoddard, W. D. Bushnell and Fredk. F. Brewster, directors; Chas. H. Doolittle, general manager, at last accounts. Organized Feb. 7, 1901, under laws of West Virginia with capitalization $1,500,000, increased later to $3,500,000, shares $5 par, in $2,000,000 preferred and $1,500,000 common stock.

Lands, 11 claims, patented, area 220 acres, and a 40-acre smelter site, including the old Dixie mine, in the Tutsagubet or Cave Springs district, on Green River, showing 5 ore bodies in limestone, one, of 40' estimated average width, carrying cuprite, azurite and massive malachite, said to give assays of 15% copper. Principal development was by a 775' blind shaft, sunk from the breast of a 225' tunnel, but the shaft caved, June 1, 1905, and it was necessary to run a new tunnel, of 800', to reopen the mine. Old workings are said to show about 100,000 tons of ore. Equipment includes a small [illegible] plant.

e are 2 smelters, both idle, the old 25-ton smelter being poorly located, l antiquated. The newer smelter, at Shem, has a 100-ton water-ast-furnace, with water power, secured from the Santa Clara River, les distant, and a small auxiliary steam plant. The Shem smelter is miles from Acoma, on the Rio Grande Western railway, the nearest oint, and transportation, for 14 miles of this distance, is by traction th a down-grade haul for loded larries.

uction was 1,448,597 lbs. fine copper in 1904; 400,166 lbs. in 1905; s. in 1907. The property was closed down, October, 1907, and has ince. Property considered promising, but is greatly handicapped by il transportation.

MERALDA COPPER MINING CO. **NEVADA.**

. Formerly at Fitting, Humboldt Co., Nev. Described Vol. VIII.

TENSION COPPER MINING CO. **UTAH.**

. Was merged, 1908, in North Utah Mining Co. of Bingham. at Bingham Canyon, Salt Lake Co., Utah. Described Vol. VIII.

ORY MINING CO. **UTAH.**

: Park City, Utah. Mine office: Brighton, Salt Lake Co., Utah. mon, president; J. P. Langford, secretary; J. F. Frankel, treasurer. circa December, 1908, under laws of Utah, with capitalization hares 50 cents par. Lands are in Big Cottonwood Cañon. Presum-

LD & COPPER MINES CO. **UTAH.**

· returned unclaimed from former offices, Everett, Mass., and 331 St., West Newton, Mass. Mine offices: Newhouse, Beaver Co. Stateline, Iron Co., Utah. W. U. Ladd, president; C. A. Spaulding, nd treasurer; John T. Breckon, manager; Thos. W. Gallagher, mill dent; Prof. H. L. Wells, consulting engineer. Organized May, 1908, of Arizona, as successor of Utah Amalgamated Copper Co., with ion $3,000,000, shares $1 par, nonassessable. The company began nt of 1% dividends from stock sales, October, 1908, and in May, 1909, n extra dividend of one-half per cent. Dr. Watkins, formerly con-h the company, claims that these dividends were without his knowl-nsent.

, 37 claims, unpatented, in 2 groups, claimed to be near the Tintic use mines, the truth of which depends entirely upon the construction word "near." The lands carry some timber, and include a millsite rights. The properties as a whole are claimed to show 31 known h may or may not be true.

eaver county claims formerly were claimed to be 30 claims, in 5 th of Newhouse, in the Washington district of the Needle Range , and now are claimed to be 2 groups, 3 miles apart and the company also has 160 acres, 15 miles north of Stateline, in Iron county. The nty lands are said to be near the Erie mine, including the True Blue, e or Blue Bell group of 19 claims, showing lead carbonates and sul-h quartz gangue, claimed to average 12 to 15% lead, 12 to 15 oz. 1 to $2 gold per ton. This group shows silver-lead ore giving assays per and 14 oz. silver per ton, and copper ore assaying up to 9%. The mine has shafts aggregating circa 500', and about 1,500' of tunnels, nnel, on the Blue Bell claim, being 400' long.

lanhattan group of 18 claims, 3 miles north of the Indigo Blue, was have a vein of 6' to 8' width, with NS. strike and nearly vertical dip, be traceable for 5,700', carrying oxidized ores assaying 3 to 67% to 17% lead, 23.7 oz. silver and $6 gold per ton, and also is claimed 5' vein, traceable 2,000'. The Manhattan group is developed by llow shafts and trenches.

Prof. Wm. H. Burr is claimed to have reported 7 veins, with NS. strike, traceable circa 1,800′, of which 2 are claimed to have been cut by the main tunnel. The ores are largely zinciferous, and difficult of reduction. Ores shipped are claimed to have returned $25 to $40 per ton. The company has claimed to have ore in sight to the value of $4,830,600, which is untrue, whether a deliberate fabrication or otherwise.

The company was claimed, August, 1910, to be installing a hydro-electric power plant, taking water under a head of 210′, and formerly had a Pelton wheel generating 10 h. p. The company claimed to have a 2,000′ line of 6″ pipe, for water power.

The property is connected by a 12-mile wagon-road with Stateline, and was claimed, untruthfully, to have a line of auto-trucks, reducing the cost of ore shipments from $6 per ton to 70 cents per ton.

The company is claimed to have an air-compressor, and also is claimed to have necessary mine buildings.

Prof. Burr is claimed to have reported, circa June 15, 1909, that the machinery for the first 100-ton unit mill was reported to have been shipped. This mill was first talked of in January, 1909, but at the end of 1909 was still missing, though the company claimed to have set aside funds for its construction. The company was claimed, October, 1910, to have a 125-ton mill practically completed, and was also claimed, 1910, to plan a 250-ton mill, but apparently this mill has not yet become a producer.

The company shipped a little ore, but not enough to pay operating and development expenses, and the inference is unavoidable that the dividends paid were mined from the pockets of the public. From October, 1908, until January, 1909, no ore whatever was shipped, though dividends were continued. The company reported, January, 1909, that production was about $3,000 per month, and that only about $150 per month was required to pay dividends, and apparently dividends were paid on about 100,000 shares, to only part of the shareholders. Many lies were told about this property, and these seem to have accrued to the benefit of those who were peddling stock. The company is not well considered locally by mining men, and is regarded with much suspicion.

UTAH GOLD MOUNTAIN MINING CO. COLORADO & UTAH.

Mine office: Marysvale, Piute Co., Utah. Letter returned unclaimed from former mine office, Telluride, San Miguel Co., Colo. Organized October, 1906, under laws of Utah, with capitalization $4,500,000, shares $1 par, as a merger of the Log Cabin Gold & Copper Co., Ltd., and the Gold Development Co. Lands, 67 claims, area 1,300 acres, 12 miles west of Marysvale, in the Mount Baldy district, said to have 3 tunnels, with circa 3,000′ of workings showing a wide vein, said to give ore of good average assay value. Equipment is said to include an air-compressor. Presumably idle.

UTAH IDEAL MINING CO. UTAH.

Letters returned unclaimed from former office, Salt Lake City, Utah. Mine office: Bingham Canyon, Salt Lake Co., Utah. Wm. H. Flower, president; Wm. Rees, secretary and treasurer. Organized March, 1908, under laws of Utah, with capitalization $30,000, shares 10 cents par. Lands, 7 claims, in the Cottonwood cañon. Apparently no work ever done, and presumably worthless.

UTAH INDIAN PEAK MINING CO. UTAH.

Letter returned unclaimed from former office, Salt Lake City, Utah. Mine office: Lund, Iron Co., Utah. E. G. Rowe, president; Peter Porter, secretary and treasurer. Organized 1907, with capitalization $500,000, shares $1 par. Lands are in the Needle Range Mountains, 3 miles west of Lund. Presumably idle.

UTAH LEASING CO. UTAH.

Office: 516 Dooly Bldg., Salt Lake City, Utah. Mine office: Bingham Canyon, Salt Lake Co., Utah. J. C. Dick, president and general manager.

vice-president and treasurer; A. Thomas, secretary; preceding officers, S. Porter and E. E. Price, directors. Organized circa July, 1909, under Utah, with capitalization $30,000, shares $10 par.

perty is a 3-year lease on a portion of the Telegraph mine of the United ining Co., which is opened by an 800′ tunnel, and the lessees are mining the old silver-lead stopes, operated many years ago, finding consider- silicious ore, worth $6 to $18 per ton, carrying values mainly in gold and There are 3 grades of ore, quite definitely separated, the copper ore ranging 5 to 6% in copper tenor, with combined gold and silver values $5 per ton. The mine is said to have about 30,000 tons of ore in sight. luction is about 1,000 tons of ore monthly, including circa 200 tons of sent to the United States smelter at Midvale, 200 tons of copper ore, sent to the Yampa smelter, and 600 tons of low-grade silicious copper to the Garfield smelter, for converter linings.

METAL MINING CO. **UTAH.**

e: 45 Milk St., Boston, Mass. Operating office: 66 West Third ., Salt Lake City, Utah. Mine office: Tooele, Tooele Co., Utah. S. Farmer, president; Cabot J. Morse, secretary; preceding officers, othwell, Wm. M. Wadden, M. Allison Taylor, Arthur B. Martin, H. P. 'm. E. Hubbard and J. M. Masten, directors; W. E. L. Dillaway, ; Samuel H. Treloar, general manager; Thos. Treloar, superintendent; inings, consulting engineer.

nized June 8, 1909, under laws of Maine, with capitalization $7,500,000, par. Is a holding company, controlling, through stock ownership, the Central-Standard Copper Co., which also is a holding company, con- through stock ownership, the Bingham Central Mining Co. and the Standard Copper Co. This company gave the Bingham Central- Copper Co. 300,000 shares of stock, or about 1 share for 3, the stock tock of the Bingham Central-Standard being escrowed for a term of 2 piring November, 1911, with a Boston trust company. The Bingham tandard Copper Co. had $347,000 bonds outstanding, and bondholders n the privilege of converting bonds into stock, within 2 years, on the 3 per share, or may accept cash in 5 years, instead. State Street Trust on, registrar; Commonwealth Trust Co., Boston, transfer agent.

s, circa 3,400 acres, including mineral lands and 139 acres of timber th a millsite, and a water-right estimated as capable of developing . Company's holdings extend from Carr Fork Cañon, in Bingham ver the divide of the Oquirrh range into Middle Cañon, Tooele County, l include former holdings of the Bingham Metal Mining Co., Bingham ., Bingham Central Mining Co. and Bingham Standard Copper Co. the Bingham Metal Mining Co. and Bingham Metals Co., in Middle the Tooele side of the divide, were circa 1,300 acres, fairly timbered g a sawmill. The Middle Cañon lands show a limestone belt much that on the Bingham side of the divide. The Tooele lands, in Middle ve 5 tunnels, No. 1 being circa 5,000′, No. 4 being 1,700′ and No. 5 ′ in length, at last accounts. It is thought that the cupriferous por- Bingham Canyon may extend to this property.

Carr Fork property, in the Bingham Canyon district, adjoins the nsolidated, Utah Consolidated and Bingham-New Haven properties, es the Bingham Central and Bingham Standard groups, carrying 3 systems, known as the Saginaw, Burning Moscow and Nast, each for a distance of circa 4,500′, and all intersected by the Old Jordan e property also carries several smaller veins having lead ores.

s of the Bingham Standard Copper Co. were 320 acres, partly pat- eloped by the Saginaw tunnel, and the mine is said to have produced worth of ore under a former management, shipping some ore in 1907.

The lands of the Bingham Central Mining Co. were 190 acres, patented, developed by 2 tunnels, known as the upper or Whiteley tunnel, and the lower, or Jeff Davis tunnel, with about 9,000′ of workings.

The Whiteley or upper tunnel, of about 2,000′ length, shows mainly silver-lead ore, and has about 500′ to drive to reach the main ore bodies, which should be tapped at depth of about 450′ below the Deems tunnel.

The Jeff Davis or lower tunnel, of circa 2,000′ length, cut, at circa 800′ distance from the portal, a vein of sulphide concentrating ore carrying about 2% copper, with small gold and silver values, and at a distance of 1,700′ cut a silver-lead vein, of 2′ to 8′ width, carrying a considerable percentage of shipping ore, with copper values of 2 to 5%. In 1908 this tunnel opened 2 new ore bodies, one, of 3′ to 4′ width, carrying copper ore giving assays of 12%, the other being a vein of silver-lead ore of good average tenor.

The Amelia tunnel, with portal about 175′ vertically above the Jeff Davis tunnel, develops a vein of about 75′ estimated average width, which, for a length of circa 90′, carries low grade concentrating ore, said to average about 2.5% copper and $1.50 gold per ton, with small silver values.

The Deems tunnel, driven from Log Fork, is an old working, about 400′ long, showing a strong vein carrying some good ore.

The Saginaw tunnel, of about 700′ length, is a drift for 400′, on a strong fissure vein, showing a paystreak, of 1′ to 12′ width, from which considerable ore shipments have been made.

The Mountain Maid tunnel of the Bingham Central-Standard group is about 950′ in length.

Tunnel No. 1, about 1 mile long at the end of 1910, being driven from the Tooele side, is planned to cut entirely through the mountain, a distance of circa 11,000′, ending in Carr Fork, and will have a back of about 2,300′ vertically, at its deepest point, under the Ridge claim, developing ore bodies about 900′ below the deepest workings of the Bingham Central-Standard group. The tunnel is 8x9′ in the clear, with a grade of 0.5%, carrying double-tracks laid with 35-lb. steel rails, and is being driven by three 8-hour shifts, at remarkably low working costs. By cutting entirely through the mountain this tunnel will afford direct connection and transportation facilities between the Bingham camp and the Tooele smelter, cutting a number of ore bodies at great depth, and also developing a considerable water power, the flow of water having been about 600 gallons per minute, when the tunnel was a half-mile in length, which flow should be doubled upon completion.

No. 2 tunnel is located about 1 mile down the cañon from No. 1, and is 800′ lower, vertically.

The Burning Moscow and Saginaw claims, in Carr Fork Cañon, were under lease, and lessees were extracting a little silver-lead ore, during the latter part of 1910. In February, 1910, this company sued the New England Gold & Copper Mining Co. for damages of $1,650,000, for ore alleged to have been extracted illegally.

The property includes a millsite in Middle Cañon, near the mouth of No. 1 tunnel, about 4 miles from the International smelter. Enough water has been developed for a 500-ton mill, while further water supply can be obtained from springs on the opposite side of Middle Cañon, and it is planned to pipe water through the tunnel, and down Carr Fork Cañon, to Bingham Canyon, where water is needed.

Equipment includes small mining plants at the various properties. The main power plant, near the portal of No. 1 tunnel, in Middle Cañon, has 2[illegible] and 125-h. p. direct-connected Pelton water-wheels, and the management plans installing a heavy electrical equipment, ultimately. The main plant includes a generator, an Ingersoll-Rand air-compressor and a small electric light plant.

)arding-house, with accommodations for about 40 men, and a smithy, h of No. 1 tunnel, and numerous buildings are located at the different

ah Metal Mining Co. is an ambitious undertaking, with a very large ınd, including a number of properties of merit, and the management o credit for wisdom in devoting its efforts entirely to the completion tunnel, rather than scattering its work over a number of different

IICHIGAN MINING & MILLING CO. **UTAH.**
Former office was Salt Lake City, Utah. J. K. Parsons was secre-asurer. Organized circa September, 1906. Property, known as the roup, in the Beaver Lake district, showed 4 veins, developed by the mine was said to have shipped about $5,000 worth of ore, under management. Apparently no work was done by this company. Frisco, Beaver Co., Utah.

)LAND COPPER MINING CO. **UTAH.**
Formerly at Basin, Grand Co., Utah. Described Vol. VIII.

IES COALITION CO. **UTAH.**
411 Newhouse Bldg., Salt Lake City, Utah. Letter returned rom former mine office, Alta, Salt Lake Co., Utah. Capt. Duncan president; Jas. B. Risque, vice-president; Roland H. Strickland, reasurer and general manager; preceding officers, Louis H. Farns-. G. Woolley, Jr., directors. Organized December, 1908, under laws th capitalization $1,250,000, shares $2.50 par. Has authorized a ıe of 10-year 6% bonds, in denominations of $100, dated March cured by mortgage to the Utah Savings & Trust Co.
15 claims, 4 fractional, patented, including the Black Bess group, at Little Cottonwood Cañon. The property is said to carry 4 strong , and a contact deposit, developed by a 350′ shaft and several tun-a 3,200′ drift, on the Black Bess vein, with a back of 900′, the vein ıth of 5′, carrying oxidized ores assaying up to 8% copper, 6 to 8% oz. silver per ton, with maximum silver assays of 300 oz. per ton.)lanned to crosscut to the 4 other veins from this tunnel.
ıent includes 3 gasoline hoists and an air-compressor, with electric the Heber plant, the gasoline plant being kept in reserve as an The property was said, late 1909, to be shipping about 50 tons of ore med to carry net average values of $25 per ton. Presumably idle.

IING CO. **MÉXICO.**
fice: Temósachic, Guerrero, Chihuahua, Mex. J. C. Warrel, su-t, at last accounts. Organized under laws of Arizona, with capitali-),000. Lands, adjoining the Tres Amigos mine, are said to carry an ıned by a 100′ tunnel showing copper ore. Presumably idle.

IING, MILLING & TRANSPORTATION CO. **UTAH.**
returned unclaimed from former office, Boston, Mass., and from office, Frisco, Beaver Co., Utah, but the company was not dead, at ı. Chas. T. Birchard, president and general manager; John Thomp-ır. Lands include the Hub and Lady Bryan mines, latter bought tthew Cullen et al, south of the Burning Moscow, 6 miles from a he Star district. The property is opened by a 300′ two-compart-ıhaft, developing a vein variously reported as 2′ to 30′ in width, ıntiferous lead carbonates, and there is a bedded deposit in limestone h-grade cuprite, from which small shipments of ore of 10 to 12% r have been made. Equipment includes gasoline power, with a r-compressor.

IONTANA COPPER MINING CO. **MONTANA.**
Lands were 13 claims, on Smart Creek, near Stone, bought circa

October, 1907. The property was said to have shipped considerable low-grade ore, from surface workings, under a former management. Formerly at Phillipsburg, Granite Co., Mont.

UTAH-NEVADA COPPER CO. UTAH.

Dead. Formerly at Elgin, Grand Co., Utah. Fully described Vol. VIII.

UTAH-NEVADA DEVELOPMENT CO. NEVADA & UTAH.

Office: 333 Judge Bldg., Salt Lake City, Utah. Mine office: Lofgreen, Tooele Co., Nev. Letter returned unclaimed from former office, Black Horse, White Pine Co., Nev. Leslie L. Savage, president; H. B. Lamb, vice-president; J. A. Foley, secretary and treasurer. Capitalization $100,000, shares $1 par. The company is said also to have lands in the Gold Circle district of Elko County, Nevada. The principal property is in the West Tintic district, near Lofgreen, and the company is said to have a 100-ton concentrator, completed late 1905. Presumably idle.

UTAH-NEVADA GOLD & COPPER MINING CO. UTAH.

Letter returned unclaimed from former office, Ogden, Utah. Mine office: Promontory, Box Elder Co., Utah. J. Stanley Dee, president; David Jensen, vice-president, W. D. Pyper, treasurer; I. C. Dallimore, secretary. Organized 1903, with capitalization $500,000, shares $1 par. Lands, 6 claims, in the Newfoundland district of Box Elder and Weber counties, Utah, having sundry open-cuts and shafts of 50′ and 70′, showing 2 veins of 3′ to 5′ width, carrying chalcopyrite and pyrite with quartz gangue, assaying up to 32% copper, 17 oz. silver and $12 gold per ton. Idle several years and apparently moribund.

UTAH & NEW YORK GOLD & COPPER MINING & MILLING CO. UTAH.

Dead. Formerly at Milford, Beaver Co., Utah. Described Vol. VIII.

UTAH-PHILADELPHIA MINING CO. UTAH.

Dead. Formerly at Alta, Salt Lake Co., Utah. Described Vol. IX.

UTAH-RELIANCE MINING CO. UTAH.

Office: 408 South State St., Salt Lake City, Utah. Mine office: Ibapah, Tooele Co., Utah. J. G. Bywater, president; D. B. Tripp, vice-president; Richard B. Shepard, secretary, treasurer and general manager; preceding officers, W. A. Langford and Samuel Divett, directors. Organized 1908, under laws of Utah, with capitalization $5,000, shares one cent par, assessable; issued, $5,000, fully paid. One assessment of one mill has been levied, but the company still lacks a mill. Lands, 8 claims, unpatented, area 160 acres, circa 45 miles from a railway, showing porphyry and limestone, having a 175′ tunnel, carrying auriferous and argentiferous copper ore. Idle, owing to distance from rail connection.

UTAH SMELTING CO. UTAH.

Dead. Was succeeded, 1908, by Independent Smelting Co. Formerly at Bonneville, Box Elder Co., Utah. Described Vol. VI.

UTAH SOUTHERN GOLD & COPPER MINING CO. UTAH.

Dead. Formerly at Milford, Beaver Co., Utah. Described Vol. VI.

UTAH-UNITED COPPER CO. UTAH.

Office: 222 D. F. Walker Bldg., Salt Lake City, Utah. Mine office: Milford, Beaver Co., Utah. John T. Treasure, president; A. J. McMullen, vice-president and general manager; Chas. A. Weaver, secretary; A. D. McMullen, treasurer; preceding officers, Jos. E. Edmunds, Arthur B. Gatrell, T. M. Pace and H. T. Harrison, directors; D. P. Rohlfing, engineer. Organized Oct. 1, 1907, under laws of Utah, as a merger of the Wasatch Mining & Milling Co. and Silver Copper Mining & Milling Co., with capitalization $600,000, shares $1 par, assessable; issued, $216,702, with $16,888.75 assessments levied. Annual meeting, second Tuesday in October.

Lands, 17 claims, 1 fractional, 2 patented, a 10-[illegible] water-right, including the Skylark and O. K. [illegible] 6 miles from a railway and 12 miles west of Mi[illegible]

zonite and granite, reported to carry 4 ore bodies, occurring as fissure contact deposit between monzonite and limestone, with 3 ore bodies stimated to range 20′ to 100′, 50′ to 200′ and 50 to 300′, in width, ıe, traceable 6,300′, is opened by shafts of 30′, 100′, 150′, 310′ and 415′, e body now is estimated by the management as of 22′ width, opened f 420′, 150′, 25′, 100′ and 385′, and one tunnel of 140′, the company for- ng reported 4 tunnels, longest 350′, the mine having 1,080′ of work- ated by the management to show 63,360 tons of ore in sight, with s blocked out, formerly claimed by the company to average 26.% cop- 0% lead, 6 oz. silver and $15.40 gold per ton, and now reported to % copper, 10.5% lead, 15 oz. silver and $2.50 gold per ton, ores includ- copper, auriferous and argentiferous cuprite, melaconite, azurite, e and marcasite, with a generally ferruginous gangue. The manage- deepening the shaft to 500′. Equipment includes a 25-h. p. hoist, ıre 3 small mine buildings.

RINGTON MINING CO. **NEVADA.**

Provo, Utah. Letters returned unclaimed from former mine ington, Lyon Co., Nev. John Roundy, president; Jos. Wirthlin, ent; Heber C. Jex, secretary and treasurer; preceding officers, Heber nd Jack Cockrell, directors; A. G. Gutheil, manager, at last accounts. 1907, under laws of Utah, with capitalization $100,000, shares 10 Lands, 13 claims, east of the Mason Valley mine, and next east of Yerington Copper Co., said to show 8 exposures of copper ore. The said to have secured good title, late 1908, after two years litigation. l years.

PER CO. **UTAH.**

306 Dooly Bldg., Salt Lake City, Utah. Mine office: Bingham alt Lake Co., Utah. Thos. Weir, president; John Weir, Jr., vice- J. M. Burt, secretary and treasurer; preceding officers, Henry Catrow Catrow, directors. Organized May, 1907, under laws of Utah, with on $3,000,000, shares $5 par.

were circa 225 acres, patented, but the company lost 3 claims to the malgamated Mining Co., 1910, after litigation. Property includes nimuck mine, which was an important silver-lead producer in early velopment is by the 900′ Weir tunnel, and the company is said to d some development through the tunnel of the Bingham-Butte Min- Equipment includes an air-compressor. Idle.

MINING CO. **UTAH.**

Heber, Utah. Mine office: Ouray, Uinta Co., Utah. Col. Geo. sident and manager; Chase Hatch, secretary. Lands, 640 acres, 7 Ouray, in the extreme eastern part of the Uintah Indian Reserva- rly held by the Florence Mining Co. The property shows impregna- dstone, giving several strata of blanket veins, exposed in the faces ing assays of 2.5 to 14% copper, with small gold and silver values. ill having some sort of a leaching process was put into commission .0. Presumably idle.

BISBEE DEVELOPMENT CO. **ARIZONA.**

Former office was Utica, N. Y. Was organized circa 1906, by nnected with the Modern Copper Mining Co., to take over the up, near the Modern mine, in Tombstone Cañon, 7 miles northwest Apparently little or no work was done. Formerly at Bisbee, Co- riz.

INING & M **COLORADO.**

1420 Ch Ward, Boul- lo. G. A Ore carry

gold, silver and copper. Has water power and a 20-stamp mill. Idle several years and apparently moribund.

UTOPIA MINING & MILLING CO. WYOMING.

Mine office: Centennial, Albany Co., Wyo. Bernard Holtum, manager. The property has a vein said by the company to be 20′ wide, and independently reported as of 18′ to 14′ width, carrying ruby copper and gold, giving fair assay values in copper, small silver values and high assays in gold. The mine is opened by a 1,100′ tunnel, and was developing, with a small force, late 1910.

UTSUNOMIYA MINING CO. JAPAN.

Mine office: Mihara-mura, Itsuki-gori, Bitchu, Japan. Property is the Mihara mine, having only a 10-h. p. installation, which employed an average of 666 hands in 1907, and only 177 hands in 1908. Production was 136,266 lbs. fine copper in 1903; 293,045 lbs. in 1906; 80,531 lbs. copper, 1,201 oz. silver and 30 oz. gold, in addition to 3,470,931 lbs. of auriferous and argentiferous copper ore, giving total production estimated at 150,000 lbs. fine copper in 1907; 438,160 kwan auriferous and argentiferous copper ore, valued at 70,817 yen, estimated to have yielded circa 125,000 lbs. fine copper in 1908.

COMPAÑÍA MINERA DE LAS VACAS i LOS VILOS. CHILE.

Office: Valparaiso, Chile. Mine office: Petorca, Aconcagua, Chile. Organized Aug. 6, 1905, under laws of Chile, with capitalization 400,000 pesos, shares 10 pesos par. Presumably idle.

VALDEZ-BOSTON COPPER CO. ALASKA.

Dead. Former office was Alaska Bldg., Seattle, Wash. Lands, near the holdings of the Alaska Northwest Copper Co., apparently were but slightly developed. Formerly at Valdez, Prince William Sound, Alaska.

ELIODORO VALENCIA. PERÚ.

Mine office: Quichin, Camaná, Arequipa, Perú. Property, near the coast in southern Perú, has argentiferous copper ore. Presumably idle.

VALENCIA COPPER MINING CO. CALIFORNIA.

Dead. Formerly at Sherwood, Trinity Co., Cal. Fully described Vol. VI.

SOCIADAD VALENCIANO-ANDALUZA DE ALTO HORNOS y MINAS DE PEÑAFLOR. SPAIN.

Office: Glorieta, 1, Valencia, Spain. Mine office: Peñaflor, Sevilla, Spain. Don Baldomero Deu, president and agent. Capitalization, 150,000 pesetas, shares 250 pesetas par. Property is the Elvira mine and extensions, carrying copper and iron pyrites, at Peñaflor, and a group of claims, area 144 hectares, at Pueblo de los Infantes, Sevilla. Idle.

VALENSUELLA COPPER CO. ARIZONA.

Office: Terre Haute, Ind. Mine office: Bouse, Yuma Co., Ariz. David L. Watson, president and general manager; Geo. C. Foulkes, secretary; F. W. Deidesheimer, treasurer; Ernest A. Haggott, consulting engineer; Jos. Bowyer, superintendent. Organized 1901, under laws of Arizona, with capitalization $1,250,000, shares $1 par.

Lands, 7 claims, patented, area circa 100 acres, and a 60-acre mill and smelter-site, 12 miles southwest of Quartzite. Property shows limestone and schist, carrying 2 contact veins, of fair size, one, of 12′ estimated average width, being developed by shafts of 270′ and 890′, latter an incline, with upwards of 1,300′ of workings, showing malachite, azurite and copper oxides, said to give a general average assay of 12% copper, 4 oz. silver and $1.50 gold per ton. Equipment includes gasoline power, with 2 hoists, and buildings include 2 engine-houses, an 18x24′ smithy and 6 dwellings. Water is supplied by a 1,000′ artesian well. There is a 40-ton Vulcan blast-furnace, of small present value.

VALENTINE COPPER & GOLD MINING CO. UTAH.

Dead. Formerly at Bingham Canyon, Salt Lake Co., Utah. Described Vol. VI.

JELA COPPER MINING CO. **ARIZONA.**
: and mine: Benson, Cochise Co., Ariz. Organized 1907. Lands, miles northwest of Benson, near the San Domingo mine of the Hub Investment Co., are said to show extensive outcrops of self-fluxing). Idle.

MINING CO. **UTAH.**
:: Salt Lake City, Utah. Mine office: Park City, Summit Co., on. Thos. Kearns, general manager; J. P. Boyle, superintendent, at nts. Mine has auriferous and argentiferous copper ores. Idle some

MINE. **YUKON.**
r returned unclaimed from former office, Vancouver, B. C. Mine hite Horse, Yukon, Canada. Arthur D. Palmer, owner; Arthur ı, manager. Lands, 1 claim, area 50 acres, circa 3 miles southeast of Chief mine, and about 6 miles south of White Horse, connected, by a wagon-road, with Wigan station, on the White Pass railway. The hows a contact zone of 18′ estimated average width, between limestone te, with numerous outcrops of ore, mainly chalcopyrite, associated opyrite, with occasional malachite, azurite, cuprite and native copper, to average about 10% in copper tenor. A little stripping has been there is an incline shaft of 92′ and two shafts of 20′, with several hun- f workings. A 40-ton test shipment of high-grade chalcopyrite, 1904, ter returns of 18% copper and $5 gold per ton. Equipment includes boiler and an 8-h. p. hoist, and 12 to 15 men were employed, at last

ANONYME FRANÇAISE DES MINES **SERVIA.**
UIVRE DE VALIEVO.
: 13 Rue Rougemont, Paris, France. Mine office: Rebelj, Valievo, M. Ducos, president; A. Bevelley, vice-president. Organized Jan. 10, er laws of France, with capitalization 2,000,000 francs, shares 100 . Debentures, 50,000 francs, at 6%, in bonds of 100 francs par. y idle.

IA MINERA BRONCES DE VALLENAR. **CHILE.**
Formerly at Vallenar, Atacama, Chile. Described Vol. VIII.

MINING & MILLING CO. **COLORADO.**
Formerly at West Cliff, Custer Co., Colo. Fully described Vol. VI.

VIEW MINING CO. **CALIFORNIA.**
· returned unclaimed from former office, San Francisco, Cal. Mine ncoln, Placer Co., Cal. W. B. Hellings, manager. Lands, 90 acres, howing impregnations in a zone up to 250′ in width, between schistose a gossan outcrop of about 100′ width, traceable circa 1,000′ carrying ilver values estimated to average $4 per ton, and the gossan was me years, for gold. The contact deposit has a 5′ to 30′ paystreak, pper and zinc sulphides, from which ore shipped averaged about 5% Equipment includes two 5′ Huntington mills. Idle some years.

VIEW MINING CO. **MONTANA.**
Formerly at Anaconda, Deer Lodge Co., Mont.

COPPER MINES, LTD. **ITALY.**
Was liquidated, 1909. Formerly at Corchi, Borgotaro, Parma, scribed Vol. VIII.

DE COPPER CO., LTD. **ARIZONA.**
Formerly at Humboldt, Yavapai Co., Ariz. Fully described Vol. IV.

A COPPER & GOLD MINES CO., LTD. **BRITISH COLUMBIA.**
returned unclaimed from former office, 807-108 La Salle St., Chicago, e offices: Van Anda, Texada Island, B. C. H. W. Treat, general [redacted] officer and L. Goodacre, trustees; Jas. Raper, agent; Thos.

Kiddie, superintendent, at last accounts. Lands, 20 claims, crown-granted, area 840 acres, including the Copper Queen and Cornell mines, and a townsite on Marble Bay. The company apparently has been bankrupt for years, though kept alive by Mr. Treat, and has been bonded, from time to time, to various operators, who have held the property for short periods only.

The mines have lenses of rich ore, mainly bornite, with some chalcopyrite, carrying small gold and silver values, with garnetiferous and calcareous gangue, but the lenses are neither large nor continuous, and have not proven profitable under operation. Ores produced have ranged in tenor up to 8% copper, 2.5 oz. silver and $1 gold per ton. The Copper Queen mine has a 500′ main shaft, with a 180′ winze, and the Cornell mine, originally opened by a glory-hole, which caved, has a 550′ main shaft. There are other shafts of 80′ and 150′, and tunnels of circa 4,000′ aggregate length, the mines as a whole having about 2½ miles of workings.

Equipment includes small steam plants, with 25 h. p. and 35 h. p. boilers, and a 5-drill Rand air-compressor. The mines have a warehouse and shipping wharf, and there is a 20,000′ sawmill.

The reduction plant includes a small sampling mill, and a small and obsolete smelter, 1 mile from the mine, connected therewith by tram. The smelter has a 50-ton circular furnace, and a 25-ton rectangular furnace, not in blast for some years. Production was 1,127,533 lbs. fine copper in 1900, and for 1901 was about 9,000 tons of ore, shipped to the Tyee smelter, estimated to have yielded circa 1,000,000 lbs. fine copper.

VAN ANDA MINES & SMELTER SYNDICATE. BRITISH COLUMBIA.

Dead. Formerly was at Van Anda, Texada Island, B. C. Fully described Vol. V.

VAN BRITT COPPER CO. ARIZONA.

Mine office: Planet, Yuma Co., Ariz. Organized 1908. Lands, on the Williams Fork River, are said to show ore giving average gross assay values of circa $80 per ton. Idle since circa 1908.

VANCOUVER & BOUNDARY CREEK DEVELOPMENT & MINING CO. BRITISH COLUMBIA.

Dead. Formerly at Penticton, Boundary district, B. C. Described Vol. III.

VANCOUVER COPPER CO., LTD. BRITISH COLUMBIA.

Dead. Formerly at Mt. Sicker, Vancouver Island, B. C. Fully described Vol. VIII.

VANCOUVER ISLAND COPPER CO., LTD. BRITISH COLUMBIA.

Office: 909 Alaska Bldg., Seattle, Wash. Mine office: Sidney, Vancouver Island, B. C. J. I. Hutton, president; Hon. Edgar Dewdney, vice-president; Porteus B. Weare, second vice-president; Nathan V. Hendricks, secretary; John W. Black, treasurer. Organized 1906, under laws of Washington, with capitalization $100,000, shares $1 par. Company was controlled, through stock ownership, by the Alaska Northwest Copper Co., which went out of business without paying its debts.

Lands are the Indian Chief group, on Sidney Inlet, on the western coast of Vancouver Island, said to show a large body of low-grade ore, carrying chalcopyrite and bornite with quartz gangue. Test shipments of 78 tons of selected bornite gave assays of 17.35% copper and 2.5 oz. silver per ton.

A 2,400′ Riblet aërial tram, having a drop of 1,800′, connects the mine with 3,000-ton ore-bunkers on tidewater. Presumably idle.

VANCOUVER ISLAND MINING & DEVELOPMENT CO., LTD. BRITISH COLUMBIA.

Office: 45 Leadenhall St., London, E. C., Eng. Mine office: [illegible] Vancouver Island, B. C. F. H. Faviell, chairman; J. I. Hutton, [illegible]. Organized Nov. 18, 1902, under laws of Great Britain, [illegible] £50,000, shares £1 par; issued £36,195. Lands, [illegible] held under 2-year option, lying mainly east of the [illegible]

xtension of the Tyee. The Westholm has a 510′ two-compart-
00′ west of known occurrence of ore in the Tyee, and has about
of workings, showing, on the 500′ level, a wide mineralized zone
l ore concentrations of 3 to 10% copper tenor. The Blue Bell
ft, from which 5 carloads of ore, shipped 1906, gave returns of 5
Idle several years.

RAILWAY SYNDICATE, LTD. BRITISH COLUMBIA.

operty was sold, February, 1907, to Vancouver Copper Co., Ltd.,
ormerly at Mount Sicker, Vancouver Island, B. C.

ANNONI. PERÚ.

ce: Casapalca, Oroya, Perú. Property, in the vicinity of hold-
ackus & Johnston Co., include La Huilca and El Minero mines,
ntiferous copper ore. Average forces were 30 men, 1907, and 44
average wages of 1 peso daily. Production was 300 metric tons
g 99,207 lbs. copper and 390 kgs. silver, in 1905; 700 metric tons of
; 14% copper and circa 1,200 grams silver per ton, yielding 216,050
er and 840 kgs. silver, in 1907.

UGUET. ALGERIA.

Sold property to Société Anonyme des Mines de Cuivres de Achai-
erly at El Miliah, Philippeville, Algeria. Described Vol. VIII.

ROPHET COPPER CO., LTD. ARIZONA.

Formerly at Clifton, Graham Co., Ariz. Described Vol. VI.

INING CO. ARIZONA.

Tucson, Ariz. Mine office: Vekol, Pinal Co., Ariz. Maj. E. S.
resident; J. V. Neuhaus, vice-president; S. J. Garnett, secretary;
on, treasurer; Harry R. Newitt, superintendent. Company is sup-
e controlled by New Orleans capital.

s, 42 claims, said to have been bought for circa $200,000, about 6 miles
e Reward mine and 35 miles southwest of Casa Grande, in the Vekol
s. Property includes 6 old mines, dating from 1881, said to have pro-
the past, nearly $3,000,000 worth of silver-lead ore, and old ore dumps
contain 350,000 tons of second-grade ore that probably can be treated
. The old mines shipped some ore carrying up to 400 oz. silver per
onsiderable lead, and a small amount of copper. Development is by a
ompartment main shaft, and the mines have about 6 miles of old
carrying a strongly argentiferous sulphide complex of lead, copper
with indications of increased copper values at depth.
pment includes a steam and electric plant, with an air-compressor and
1 good for 1,000′ depth. Buildings include a smithy, machine-shop,
-shop, office and laboratory. The mill, of 40 tons rated daily capacity,
mps. Property considered promising.

RANGE COPPER CO. ARIZONA.

r returned unclaimed from former office, Security Bldg., Los
Cal. Mine office: Winkelman, Gila Co., Ariz. Chas. E. Finney,
; Edw. W. Brooks, vice-president and consulting engineer; Robt. J.
secretary and treasurer; preceding officers, A. J. Pickrell and L. M.
rectors. Organized July 21, 1910, under laws of Arizona, with capitali-
,000,000, shares $10 par, in 25,000 shares preferred and 275,000
mmon stock. Annual meeting [illegible]

s, 53 claims, 2 patented, a[illegible] of Casa
ncluding about 200 acre[illegible] 1911.
. Mine has a 600′ m[illegible] with
00′ of workings. T[illegible]
t includes an antiq[illegible]
EÑA MINING & SM[illegible]
s: 165 Broadway, New [illegible]
encamé, Durango, Mex.

mittee; H. M. Moran, general manager; W. F. Foster, manager; Alfred Hamilton, general superintendent; Wm. Davey, mine superintendent; A. D. Emery assistant mine superintendent. Organized Feb. 23, 1905, under laws of México with capitalization 3,000,000 pesos, and is controlled, through ownership of 60% of the capital stock, by the American Smelters Securities Co.

Lands, 2,500 pertenencias, area 6,177 acres, including the town of Velardeña, with a population of 5,000. Property includes the Terneres and Santa María silver-lead mines, the Copper Queen mine, carrying argentiferous copper ores, and a number of smaller properties. The mines, first opened circa A. D. 1650, were worked originally for silver-lead carbonates, succeeded, at depth, by a strongly argentiferous and somewhat arsenical sulphide complex of lead, copper and zinc. Considerable development was done in the different mines, 1910.

The Copper Queen, Reina de Cobre or El Cobre mine, 27 kilometers by rail from Velardeña, shows mainly oxidised ores, which become base and low in grade at depth of about 600'. Values are mainly in copper ore, said to average about 3% copper and 250 grams silver per metric ton, though there is considerable lead ore also. Normal production is 400 to 500 metric tons of low-grade ore daily.

The Terneres mine, said to have produced $22,000,000 worth of ore before coming under the present ownership, has a 600' main shaft, and a main tunnel with electric haulage, having about 25 miles of workings. The mine shows good ore in the bottom workings. Normal production is about 400 metric tons daily, mainly copper ore, though considerable silver-lead ore is produced also. The Terneres has an aërial tram for ore shipments.

The Santa María mine, at Velardeña, is opened by numerous shafts, developing silver-lead ore, and production ranges 100 to 500 metric tons daily.

The company has a private narrow-gauge railroad, known as the Ferrocarril Velardeña, of about 20 miles length, connecting the mines and smelter, the principal branch being a 29-kilometer line from Velardeña to the Copper Queen mine.

The reduction plant, at Velardeña, includes a 200-ton concentrator, a sampling mill, added 1910, and 2 smelters, the older antiquated and out of commission for some years.

The new 1,200-ton smelter, blown in 1907, is about 4 miles from Pedricena on the Mexican National railway. The plant has twelve 250-ton ore-bins, surmounted by a movable steel bridge, operated electrically, for distribution of charge, charge-cars being loaded automatically from the bins, and hauled to the charge-floor by electric locomotives. The smelter has three 150-ton lead furnaces, and three 250-ton copper furnaces, with room for 1 additional copper stack. Each blast-furnace has an elliptical double brick-lined settler, 4x12' inside, and slags are hauled, by electric locomotives, in 10-ton cars. There are extensive flues and dust-chambers, leading to a 230' brick stack, and the works have a briquetting plant for flue-dust and fines. The lead smelter includes 4 Godfrey roasters, and there are 5 Huntington-Heberlein converters, of 125 tons daily aggregate capacity, for desulphurizing lead ores. The smelter has a converter plant, matte being shipped to the Aguascalientes works. A small experimental baghouse was erected, 1910.

A 1,200-h. p. central power plant, at the smelter, furnishing power for the mines and works, has a steam plant with gas producers and a complete electric plant, also generators with hydraulic power. There are electric hoists and air compressors at the principal mines.

Buildings include necessary shops and offices, and a considerable number of dwellings for employés, and the company maintains a clubhouse for the American workmen.

OLIVERIO L. VELASCO y CA. MÉXICO.

Office: Apartado 953, México, D. F. Mine office: Chichihualco, Bravos.

Mex. Oliverio L. Velasco, general manager. Property is El Mel-
ıe, carrying gold, silver and copper ores, employing, 1907, circa 75 men.
ANONYME DES MINES DU VELAY. **FRANCE.**
: 19 Rue Dubois, Lyons, France. Mine office: Azerat, Brioude,
ire, France. Organized June 30, 1906, under laws of France, with
tion 400,000 francs, shares 100 francs par. Presumably idle.
MINIÈRE DE VELEZ RUBIO. **SPAIN.**
: 43 Rue de Courcelles, Paris, France. Mine office: Velez Rubio,
Spain. Organized Feb. 14, 1902, under laws of France, with capitali-
00,000 francs, shares 100 francs par. Presumably idle.
PORTLAND MINE, LTD. **BRITISH COLUMBIA..**
. Was reorganized, Nov. 18, 1905, as New Velvet-Portland Mine,
merly at Rossland, Trail district, B. C. Fully described Vol. V.
(ROSSLAND) MINE, LTD. **BRITISH COLUMBIA.**
. Was merged, January, 1904, in Velvet-Portland Mine, Ltd. For-
Rossland, Trail district, B. C. Described Vol. IV.
COPPER CO. **MÉXICO.**
. Formerly at Soyopa, Ures, Sonora, Mex. Described Vol. IV.
MINING CO. **WASHINGTON.**
. Formerly at Orient, Ferry Co., Wash. Described Vol. VIII.
A MINING & MILLING CO. **MÉXICO.**
. G. I. Bentley was president and general manager. Organized
er laws of West Virginia, with capitalization $400,000, shares $1 par.
re 17 hectares, known as the Missouri group, carrying auriferous and
ous copper ore, slightly developed by a 100′ two-compartment shaft.
at Ocotlán, Oaxaca, Mex.
E HILL MINING CO. **ARIZONA.**
: and mines: Jerome, Yavapai Co., Ariz. Thos. E. Campbell, presi-
general manager; Geo. H. Avery, vice-president and superintendent;
Avery, secretary; Frank E. Jordan, treasurer. Organized 1900, under
rizona, with capitalization $3,000,000, shares $1 par. Lands, 6 pat-
ms, area 110 acres, 2 miles south of Jerome, showing 2 fissure veins,
y company to average 90′ width and to carry average value of 4.7%
5 oz. silver and $4 gold per ton, in oxide and sulphide ores, which is an
ate, developed by shafts of 65′ and 87′, and tunnels of 205′ and 457′.
circa 1904, out of funds and apparently moribund.
KYSHTIM WORKS. **RUSSIA.**
d by Kyshtim Corporation, Ltd., at Kyshtim, Perm, Russia.
TURSKI WORKS. **RUSSIA.**
: Italianskaya 3, St. Petersburg, Russia. Mine and works office:
ilsk, Perm, Russia. Is owned by the heirs of P. P. Demidoff, Prince
to. Production, for first 9 months of 1908, was 440,350 lbs. fine cop-
roduction is estimated at 600,000 lbs. fine copper for 1909.
APEX COPPER MINING CO. **ARIZONA.**
: 3 West Main St., Bloomsburg, Pa. Letter returned unclaimed
ıer mine office, Jerome, Yavapai Co., Ariz. Chas. B. Lutz, president
urer; Jas. H. Mercer, vice-president; M. P. Lutz, secretary, at last
Organized 1900, with capitalization $3,000,000, shares $1 par.
was sold by the sheriff, 1906, but was redeemed by the president for
shareholders. Lands, 6 claims, area circa 90 acres, in Mescal Gulch,
iles south of Jerome, slightly developed by 2 tunnels and a shaft. Idle
1904, and moribund.
CENTRAL COPPER & GOLD MINING CO. **ARIZONA.**
. Jas. F. Mowles was president and general manager; Chas. T.
ice-president; A. A. McPherson, Edw. Beven, Geo. W. Ramey, Jos.
s and Wm. V. Holley, directors. Organized circa November, 1909,

under laws of Arizona, with capitalization $1,500,000, shares $1 par. Lands were 2 claims, area 40 acres, adjoining holdings of the United Verde on the north. Apparently no work was done. Formerly at Jerome, Yavapai Co., Ariz.

VERDE CHIEF COPPER MINING CO. ARIZONA.

Office: 1616–20 Broad St., New York, N. Y. Letter returned unclaimed from former mine office, Jerome, Yavapai Co., Ariz. Chas. L. Tompkins, president; Dr. W. E. Delabarre, vice-president; Frank K. Kohler, secretary and treasurer; R. H. Smith, assistant secretary and treasurer. Organized June 29, 1900, under laws of Arizona, with capitalization $3,000,000, shares $1 par. Annual meeting, first Monday in July.

Lands, 13 claims, area 260 acres, in the Verde district, 7 miles south of Jerome, including the Carrigan & Gadette group, in Mescal Gulch adjoining the Cleopatra, having circa 1,700′ of workings, showing auriferous and argentiferous sulphides. The Paragon group of 3 patented claims has tunnels of 135′, 150′ and 1,066′, the 150′ tunnel showing ore. Diamond drilling is said to have given unsatisfactory results. Idle several years, except for annual assessment work.

VERDE CONSOLIDATED COPPER CO. ARIZONA.

Office: Prescott, Ariz. Letter returned unclaimed from former mine office, Jerome, Yavapai Co., Ariz. T. E. Campbell, secretary and treasurer. Capitalization $1,500,000, shares $1 par. Lands, 6 claims, 2 miles south of Jerome, apparently but slightly developed. Idle some years and presumably moribund.

VERDE COPPER MINING CO. ARIZONA.

Office: 303–167 Dearborn St., Chicago, Ills. Mine office: Jerome, Yavapai Co., Ariz. W. P. Cooper, president; E. C. Weatherley, vice-president; John Tierney, general manager; J. J. O'Donohue, secretary and treasurer; J. P. Mowles, superintendent. Organized January, 1904, under laws of Arizona, with capitalization $3,000,000, shares $1 par, as North Verde Copper Co., and name changed, January, 1909, to present title.

Lands, 6 claims, area 120 acres, near the United Verde, having a 375′ shaft, and a 250′ tunnel, latter showing calcspar, iron and soft rock, in a zone of circa 150′ width, with a very little ore carrying 2.5% copper and 3 oz. silver per ton, and a trace of gold. Equipment includes a 70-h. p. boiler, 40-h. p. Fairbanks & Morse double-cylinder hoist and an air-compressor. Lands were jumped, January, 1908, but company claimed that assessment work was done properly, and jumping illegal, and apparently won out on this contention. Idle, except for a few weeks, since 1907.

VERDE GRANDE COPPER CO. ARIZONA.

Office and mine: Jerome, Yavapai Co., Ariz. J. C. Scott, president and general manager; I. P. Nihell, vice-president; C. M. Heim, secretary and treasurer; preceding officers, A. H. Lyons and J. W. Hubbard, directors. Organized September, 1906, under laws of Arizona, with capitalization $8,000,000, shares $1 par; issued, $5,700,000. Company endeavored, August, 1910, to float a $20,000 bond issue, among its shareholders, but only $2,000 was subscribed, and this was returned. Annual meeting, third Saturday in December.

Lands, 9 claims, patents pending, area 125 acres, on the southern slope of Smelter Hill, the United Verde being on the opposite slope, about a mile distant, lands being located on a precipitous hill, with poor roads. The property shows diabase, diorite, slate and schist, carrying stringers of argentiferous and auriferous azurite, chalcocite and chalcopyrite, of good assay tenor, but not in commercial quantities, occurring mainly in schist. The management believes that the lands carry an extension of the United Verde ore body. Development is by 3 tunnels, with about 2,000′ of workings.

Equipment includes a steam plant, with a 60-h. p. hoist, good for 150′ depth, and an 8-drill Ingersoll-Rand air-compressor. There are 8 buildings

a 40x44′ power-house, 12x18′ carpenter-shop and 12x14′ smithy, with ise and messhouse. The former management talked of building a hich was ridiculous, when no ore had been developed. The present nt, which seems an improvement, is endeavoring to raise funds, badly id hopes to extend a 560′ crosscut to intersect a mineralized ledge that ations of carrying ore at depth.

RANDE COPPER CO. **MEXICO.**

Was partly fraud and partly folly. Property was sold, Jan. 13, Hermosillo, Copper Co., S. A., which is practically a reorganization. at Ures, Sonora, Mex. Fully described Vol. VIII.

ING COPPER CO. **ARIZONA.**

Formerly at Jerome, Yavapai Co., Ariz. Fully described Vol. VI.

INING CO., LTD. **IDAHO.**

office: Osburn, Shoshone Co., Idaho. L. J. LePage, president; J. E. ice-president; W. G. Lefever, treasurer; A. L. Williams, manager; officers and C. C. Gillen, directors. Organized September, 1906, with ion $1,000,000, shares $1 par. Lands, 12 claims, in McFarren Gulch, m Osburn, adjoining the Gray on the southwest. Has a shaft and owing ore assaying up to 6% copper, 11% lead and 25 oz. silver per several years and apparently moribund.

INING & MILLING CO. **WYOMING.**

Formerly at Encampment, Carbon Co., Wyo. Fully described

UEEN COPPER CO. OF ARIZONA. **ARIZONA.**

Was succeeded, December, 1906, by Jerome Verde Copper Co. at Jerome, Yavapai Co., Ariz. Described Vol. VI.

UEEN MINING CO. **ARIZONA.**

office: Pantano, Pima Co., Ariz. P. M. Hilton, superintendent. miles from Pantano, and about 15 miles west of Benson, show argent- d and copper ores, developed by a 2-compartment shaft, from which id ore was shipped, to the Deming smelter. Equipment includes ver, and property was under development, with a force of about 15 st accounts.

IVER COPPER CO. **ARIZONA.**

r returned unclaimed from former office, Newport, Ky. Mine office: avapai Co., Ariz. Lee Pfau, president and general manager; C. M. e-president; Geo. Hundinger, secretary; S. L. Berry, superintendent, ounts. Organized as a merger of the New England-Arizona Mining Pfau Gold Mining and Reduction Co., with capitalization $2,500,000, par. Company was sued, August, 1910, by Arthur L. Garford, for or monies advanced, Jan. 1st to Nov. 17, 1909.

s supposedly are 35 claims, in the Cherry Creek district, circa 9 h of Jerome, including the Pfau group of 10 claims, area 200 acres, ew England-Arizona group of 17 claims, with an additional group of 8 l to carry fluxing ore and timber, about 5 miles east of the Pfau. The and-Arizona mine, 2 miles from Turkey, has a number of shallow shafts tunnels, and the Pfau mine is said to have several thousand feet of The property is said to have a 250′ shaft, showing values mainly in a tunnel on the B. B. claim is said to show an 8′ vein carrying high gold.

ment includes steam and gasoline power, with a hoist and air-com- The concentrator, at the Pfau mine, of 100 tons rated capacity, has ills and a cyanide plant. Is not regarded favorably. Idle and pre- noribund.

OPPER CO. **MONTANA.**

J. C. Carter was superintendent. Organized under laws of West

Virginia, and charter was proclaimed forfeited, 1902, owing to unpaid franchise taxes. Lands were 5 claims, 16 miles from Hamilton, claimed to show ore averaging up to 20% copper, with a trace of gold. Formerly at Hamilton, Ravalli Co., Mont.

VERMONT & ARIZONA COPPER CO. ARIZONA.

Office: 150 College St., Burlington, Vt. Mine office: Gleeson, Cochise Co., Ariz. Letter returned unclaimed from former operating office, Tombstone, Ariz. Hon. Hamilton S. Peck, president; C. G. Norris, vice-president; J. H. McLoud, secretary and treasurer; preceding officers, W. H. Varnum, C. H. Stevens, Geo. A. Kimball, W. R. Cheney, Dr. D. C. Hawley and Hon. W. T. Smith, directors; J. A. Collier, superintendent, at last accounts. Organized July 25, 1899, under laws of Arizona, with capitalization $1,500,000, shares $5 par.

Lands, 11 claims, area 220 acres, 4 miles from Gleeson, in the Turquoise district, on the western slope of the Dragoon Mountains, showing 2 gold and silver veins and several copper veins, latter giving assays of 23 to 43% from selected carbonate ores. Development is by a 230′ main shaft, with circa 1,500′ of workings, there also being about 1,000′ of workings on 10 adjoining claims. Company claims to have developed a large body of low-grade milling ore. Equipment includes steam power. Idle several years and apparently moribund.

VERMONT & BOSTON MINING CO. VERMONT.

Dead. Former office was 113 Devonshire St., Boston, Mass. J. H. Perkins was manager. Property was the Berkshire mine, which has been operated in a small way, at occasional rare intervals, the last work having been done by this company, circa 1901. Formerly at Berkshire, Franklin Co., Vt.

VERMONT COPPER CO. VERMONT.

Office: 576 Fifth Ave., New York, N. Y. Mine office: South Strafford, Orange Co., Vt. G. E. Parks, secretary; G. M. Heckscher, manager; Chas. O. superintendent. Organized circa 1906, under laws of Arizona, as successor of Elizabeth Copper Co., with capitalization $1,000,000, and since has taken over the Strafford Mining Co. and the Sharon Power Co.

Lands, 12 miles from Pompanoosuc, the nearest rail station, include the old Elizabeth mine, opened 1793, for magnetic pyrities, and operated early in the Nineteenth Century by the Vermont Copperas Co., which is said to have made at one time, circa 6,000,000 lbs. of copper yearly, beginning a small incidental production of copper circa 1830, when it was found that the mine carried an average of about 3% copper, in the form of chalcopyrite disseminated in pyrrhotite, and the Elizabeth is said to have been the largest American copper producer, at one time, previous to the opening of the rich mines of Lake Superior.

The ore body is a lens in foliated mica-schist, wedging out at the bottom, the lens having been mined for 700′ in length, and is reported, by the management, to have been opened for more than 2,000′ in length, ranging 50 to 100′ in width. The management estimates upwards of 1,000,000 tons of ore in sight, this consisting of chalcopyrite, associated with pyrrhotite. Diamond drill borings made with 2 machines, 1909, have shown ore to continue for 200′ depth below the present workings. The mine has a 1,340′ tunnel with back of 225′, and a 200′ incline blind shaft. The dumps carry about 50,000 tons of discarded ore, of which large portions are estimated, by the management, to average 1.7% copper.

A hydro-electric power station on the White River, built for 750 h. p., is equipped for 500 h. p., and transmits current 9 miles to the mine and mill. There also is a small steam plant and an air-compressor at the mine.

The reduction plant at the mine included a mill and smelter, the former using the Rowland magnetic separation process. The buildings were burned February, 1909, but were rebuilt the same year. The smelter has a 200-

ace, in which semi-pyritic smelting was tried, but was abandoned, ieap-roasting. The smelter has a 200-h. p. blower, but is idle, pending uction of an acid plant, planned by the management, which reports that nsive facilities of railroad construction have been secured. Idle.

MINING CO. **UTAH.**

. Formerly at Alta, Salt Lake Co., Utah. Described Vol. IX.

:A COPPER MINING CO. **MONTANA.**

. Company presumably was succeeded, Apr. 20, 1906, by the Butte :a Copper Mining Co., but the corporate relations between the two ; seem indistinct. Lands were 2 claims, area 12 acres, west and south lmont mine of the Anaconda Copper Mining Co., opened by shafts 130′, from which a little ore of 5 to 10% copper tenor was shipped, ɪrmerly at Butte, Silver Bow Co., Mont.

LSKABET VESTERDALENS KOBBERGRUBER. **NORWAY.**

. Property passed to Aktieselskabet Porsa Kobbergruber. For- Næverfjord, Finmarken, Tromsö, Norway. Described Vol. VIII.

LANDE MINING CO. **MÉXICO.**

. Formerly at Altar, Sonora, Mex. Described Vol. VIII.

LANDE MINING CO. **MÉXICO.**

. Formerly at Bacoachi, Arizpe, Sonora, Mex. Described Vol. VI.

LANDE MINING & MILLING CO. **COLORADO.**

: and mine: Steamboat Springs, Routt Co., Colo. Lands, on Copper miles from Steamboat Springs, have a 177′ tunnel, cutting a vein of ted width, carrying good gold values. Presumably idle.

CA SILVER & COPPER MINING CO. **MÉXICO.**

. Former office was St. Louis, Mo. C. H. Hoffman was manager. nized under laws of Maine, and operated circa 1903, with a force of men. Equipment included a small steam plant. Formerly at Char- ezuma, San Luis Potosí, Mex.

N-ELY COPPER CO. **NEVADA.**

. Lands were sold, circa 1907, to Cumberland-Ely Copper Co. at Ely, White Pine Co., Nev. Described Vol. VI.

N-ELY EXTENSION COPPER CO. **NEVADA.**

. Was organized circa 1906, with capitalization $1,000,000, shares $1 issued about $700,000 stock. Lands were 4 claims, 2 fractional, on ɔarently little or no work was done. Property was sold, circa Novem- , to Thos. F. Cole, et al. Formerly at Ely, White Pine Co., Nev.

N MINE. **NEVADA.**

ɛd by Nevada Consolidated Copper Co., at Ely, White Pine Co., Nev.

EI MINING CO. **MEXICO.**

l. M. A. Ammon was general manager; A. M. Brewster, assistant Manuel Rivera, mine superintendent. Lands are 74 acres, between El l El Rosario mines, in the Taviche district, principal property being El mine, having a 60-meter shaft, showing a vein of 18′ width, carrying ɪrgentiferous copper sulphides and free gold. The 200′ level was said re carrying 5 to 8 kgs. silver, and 30 to 70 grams gold per metric ton. nt included a 60-h. p. double-drum hoist. Work was suspended early ɔrmerly at Ocotlán, Oaxaca, Mex.

Y-THOMPSON MINING CO. **MÉXICO.**

l. Was succeeded by Thompson-Lehmer Mining Co. Formerly at Oaxaca, Mex. Described Vol. VI.

WIN MINING CO. **NEW MEXICO.**

ɛ office: Hachita, Grant Co., N. M. Organized 1908. H. L. Mar- ɪnager, at last accounts. Property is undeveloped claims on the hill e King mine, near Hachita. Presumably idle.

VICTOR & BELLE CROWN MINING CO. ARIZONA.

Office and mine: Wendendale, Yuma Co., Ariz. John B. Martin, president and general manager; F. C. Piper, vice-president; J. H. Matteson, secretary and treasurer; preceding officers, J. E. Matteson, R. R. MacDonald, W. E. Enos and T. H. Finnegan, directors. Lands, 10 claims, are 180 acres, in the Harcuvar Mountains, circa 8 miles north of Salome, the nearest rail point, showing a vein of 5′ to 7′ width having a 30″ to 36″ paystreak, giving assays of 15 to 20% copper and $15 to $20 gold per ton, developed by shafts of 80′, 35′ and 450′, and tunnels of 755′, 165′ and 230′, with about 1,200′ of workings. Equipment includes gasoline power.

VICTOR BONANZA MINING CO. CALIFORNIA.

Dead. Formerly at Dos Palos, Merced Co., Cal. Described Vol. III.

VICTOR CONSOLIDATED MINING CO. IDAHO.

Mine office: Wallace, Shoshone Co., Idaho. Ely P. Spalding, general manager, at last accounts. Has silver-lead and argentiferous copper ores. Presumably idle.

VICTOR CONSOLIDATED MINING CO. UTAH.

Office: 53 City and County Bldg., Salt Lake City, Utah. Mine office: Eureka, Juab Co., Utah. J. S. Wills, president; J. A. Groesbeck, secretary; Vivian McCune, general manager; Jos. Treloar, superintendent, at last accounts. Organized under laws of Utah, with capitalization $375,000, shares 50 cents par, reported as assessable, with 5 assessments levied, and fully paid. Lands, 5 claims, patented, including the Victor and Boss Tweed mines, carrying auriferous and argentiferous copper ore, developed to depth of 800′, from which a production of circa 200 tons of ore monthly is said to have been secured, at one time. Production was only 4 carloads of ore, 1907. Idle.

GEWERKSCHAFT VICTORIA. GERMANY.

Mine office: Burgholdinghausen, Westfalen, Germany. Herman Heymann, J. L. Kruft and August Achenbach, executive committee; Herr Dietermann, general manager. Capitalization 600,000 marks, shares 600 marks par. Mine has copper, lead and zinc sulphides, all more or less argentiferous. Production, 1908, was 3,258 tons of ore, of which, 796 metric tons were lead ore, 734 tons were zinc ore and 40 tons were copper ore. Employs 123 men.

VICTORIA BOULDER MINING CO. COLORADO.

Mine office: Salina, Boulder Co., Colo. H. B. McClure, manager, at last accounts. Ores carry gold, silver and copper. Has steam power. Idle several years and presumably moribund.

VICTORIA CHIEF COPPER MINING & SMELTING CO. NEW MEXICO.

Office: 100 Broadway, New York, N. Y. Mine office: Engle, Sierra Co., N. M. Col. Robt. R. Hopper, president; Stephen J. Macy, vice-president; W. H. Weston, general manager; Julia Howe Bigelow, secretary and treasurer; preceding officers, Wm. Buchanan, Henry G. Munger, Eugene S. Neal, Howard Clinton Dickinson and Dana A. Rose, directors. Organized 1906, under laws of Arizona, with capitalization $3,000,000, shares $1 par.

Lands, 11 claims, 1 fractional, area 216 acres, bought, at sheriff's sale, of the defunct Black Peak Gold & Copper Mining Co. and 3 claims, 1 fractional, area 20 acres, held under bond and lease, at last accounts. Property lies on the western slope of the Sierra Caballo, about 2 miles east of the Rio Grande River, 25 miles west of Cutler, and 12 miles from Engle, to which a wagon-road was built. The company claims its lands are in the same general range of mountains as the Bisbee mines of Arizona, which is absolutely untrue, the Victoria Chief being in the Caballo Range, Caballo being Spanish for horse, while the Bisbee camp is in the Mule Mountains, and between the two lie the Burro Mountains, burro being Spanish for jackass.

The mine has vertical fissures in quartzite, with ore shoots carrying copper malachite, bornite, and chalcopyrite, from which selected ores are said to assay

% in copper tenor. The ores apparently are shallow and seem confined uartsite. The management claimed to have developed a considerable 20% copper ore, carrying gold and silver values, which was untrue. Farish was claimed to have stated, December, 1906, that the mine could 00-ton smelter, with ore of 10%, and possibly of 15% copper tenor, as untrue. Development is by 2 tunnels, showing occasional ore shoots ' in width, and 50' to 100' in length, the 500' tunnel on the Marion claim ore claimed to give average assays of 20% copper, and $1.20 per ton in d gold and silver values, and the mine was claimed, March 11, 1908, to 00' of workings.

ldings include a general store, and the company was claimed to have November, 1906, a 10x10" air-compressor, 3 rock-drills and a 32-h. p. engine. The company was said, 1907, to be building a fine hotel at and to be making wax models of the mountains. The company was falsely, to plan a $200,000 smelter. A small amount of ore was shipped, s, by former owners, years ago, from the Oahu claim, and this company a carload of ore, 1907, to the El Paso smelter, assaying 20.3% copper, arently exhausting the mine.

s company was promoted by "Col." Rebt. R. Hopper and Miss Julia H. , and the same firm of fakers organized the Statehood Mines Co., on the the Sierra Consolidated Gold Mines Co., under the same old dodge of a tee" to buy the stock back, at par, $1 per share, but the "guarantee" ıdler lacks value. This company claimed to be free from debt, with lands , and claimed to have $75,000 in the treasury, all of which claims are doubt. In October, 1906, the company was peddling stock at 75 cents e, with a "guarantee" to buy the stock back, within 6 months, at 6% if the purchaser were dissatisfied. The company claimed, in its ad- ents, to own 10 full mines, of 20 acres each, which was untrue, as the ' were merely claims. The company claimed, in its advertisements, mine was located "in a country that has demonstrated, beyond doubt, test possibilities in copper mining in the world," which was as far from h as anyone could get. Papers in bankruptcy have been served on the lders, proceedings brought by the creditors, being understood to be of a y" nature, doubtless being brought to cover up the crooked operations ow & Hopper. The Victoria Chief Copper Mining & Smelting Co. was rate fraud, and both the he-president and she-secretary seem to be but common swindlers.

IA CONSOLIDATED MINING CO. UTAH.

ce: Provo, Utah. Mine office: Eureka, Juab Co., Utah. Lafay- lbrook, president; Hon. Reed Smoot, vice-president; J. R. Twelves, y and treasurer; Col. C. Edw. Loose, manager; J. C. Sullivan, superin- .

Organized July 30, 1910, with capitalisation $700,000, shares $1 par. ıpany was a reconstruction of the Victoria Mining Co., which was organ- rch, 1899, under laws of Utah with capitalization $250,000, shares $1 y issued, and paid dividends of $192,500. The present company paid , stock dividend, leaving 200,000 shares unissued. Dividends were in 1910. Shares are listed on the Salt Lake stock exchange.

ıds, 4 claims, patented, adjoining the Grand Central mine, including ıer property of the Snowflake Mining Co., bought, 1910, for $40,000. perty carries auriferous and argentiferous lead and copper ores. The merly was worked through the Grand Central shaft, on the Mammoth he mountain, but this shaft was too far from the property, hence the ıs reopened, circa May, 1910, after several years idleness, through the Victoria shaft, on the Eureka side of the mountain. Equipment in- team-power and an air-compressor, and the management is said to plan ıl tram.

VICTORIA COPPER MINING CO. MICHIGAN

Office: 512–60 Congress St., Boston, Mass. Mine office: Victoria Ontonagon Co., Mich. Employs circa 225 men. Fred H. Williams, president. Chas. D. Hanchette, vice-president; Jas. P. Graves, treasurer; preceding officers Willard S. Martin and David A. Barber, directors; Sydney S. Millett, secretary and transfer agent; Geo. Hooper, superintendent; Thos. Carlyon, mine superintendent; Chas. Caddo, mill superintendent; C. R. Everett, clerk; R. S. Schultz, Jr., engineer.

Organized Jan. 16, 1899, under laws of Michigan, with capitalization $2,500,000, shares $25 par; paid in, $13. Last assessment was $1, Jan. 11, 1909. Company ended 1910 with quick assets of $1,694.69, and lost $37,925.13 on the year's operations. The company ended 1910 with 1,350 shareholders. Shares are listed on the Boston stock exchange. First National Bank, Boston, registrar. Annual meeting, fourth Monday in February.

Lands, 2,395 acres, including 2,289 acres mining lands, in Sections 19, 20, 29, 30 and 31, T. 50 N., R. 39 W., and Sections 24, 25 and 36, T. 50 N., R. 40 W., giving a tract with an extreme EW. width of 2 miles, and an extreme NS. length of 2¾ miles, lying just west of the Ontonagon River, practically all on the mineral belt, only about 100 acres lying on the eastern sandstone. The tract may carry the western extension of the amgydaloidal bed under development by the Lake Copper Co. Neighboring mines, all idle for many years, are the West Minnesota on the north, National on the east and Tremont-Devon on the west. Litigation over a 40% undivided interest in 320 acres of land, in the main mine tract, resulted, 1908, in a verdict of $9,647.70 damages against the company. The lands are well timbered, with an inexhaustible supply of good sandstone for building purposes. Nearest railroad is the Chicago, Milwaukee & St. Paul, at Rockland, 3 miles distant.

The first attempt at Lake Superior copper mining, in historic times, was made in the winter of 1770–1771, on what is now Victoria property. The next work was done in 1849, when the property was opened, under the name of Cushin, on a line of prehistoric pits containing masses of native copper, one weighing upwards of a ton. The name was changed, 1850, to Forrest, and the property was reorganized, 1858, as the Victoria Mining Co. Under these titles the property made 373,279 lbs. fine copper, at a loss of about $180,000. The first stamp-mill was burned by a forest fire, and the second was swept away by a flood. The property was operated regularly, on a small scale, 1849–1855, and thereafter spasmodically. The mine was unwatered 1881, but remained idle until work was begun, March 1, 1899, by the present company.

The mine is located on a high and steep hill, notwithstanding which the solid rock is covered with heavy sand and clay drift. The Forrest amygdaloidal bed, on which the mine is opened, is 5′ to 80′ wide, with an average of circa 12′, very irregular in width, rolling in dip and bunchy in contents, with a strike of N. 66° E., and average dip of 61° NW., strike giving about 1½ miles of outcrop on Victoria lands. The Forrest bed evidently is one of the cupriferous amygdaloids of the Evergreen belt, opened to the northeast by the Mass and Adventure, but which one of the series is uncertain. The formation is much disturbed at surface, the bed being irregular in dip, but widening at depth, with more regular walls. The bed is low in average grade, but fairly regular in copper contents, carrying low-grade stamp-rock, with best values near the hanging-wall.

The old mine had 5 shafts, numbered east to west, opened erratically, at irregular intervals, with levels spaced at 55′ to 65′. No. 1, a single compartment shaft, was 244′ deep; No. 2, with two compartments, 247′ west of No. 1, was 246′ deep; No. 3, with one compartment, 258′ west of No. 2, was 300′ deep; No. 4 with one compartment, 310′ west of No. 3, was 130′ deep; No. 5, with one compartment, 578′ west of No. 4, was 60′ deep. The old mine had about 4,000′ of laterals.

2 shaft, which was chosen for new operations, was enlarged to two ments, 8x12′ inside measurement, and is 2,089′ deep, bottomed 38′ e 22d level. Levels below the 4th have been opened at regular intervals with drifting on all levels except the 20th and 21st. The total drifting orrest bed, tributary to No. 2 shaft, was 25,035′ at the end of 1910, and on there are 6,750′ of crosscuts, the longest being 716′ on the 4th level 31′ on the 4th level south, 604′ on the 19th level north, and 2,117′ on the el south. Short drifts have been opened from these crosscuts, on vari-, but without much encouragement. The total openings tributary to aft are 35,872′, and the mine was estimated, 1908, to show circa 400,000 tamp-rock, with 300,000 tons blocked out for stoping.

productive part of the mine tributary to No. 2 shaft, on the Forrest elops an epidotal amygdaloid having an average width of 4′ to 12′, to 80′, at one point in the bottom workings. Walls are quite regular, h zones are frequent, where the mineralization has extended into the anging, or both, giving an occasional maximum of 50′ width of mineral-

The footwall bed underlying the Forrest, at a depth of 2′ to 12′, is eralized in places, carrying occasional masses from 100 pounds to 3 or 4 veight, but is very bunchy, copper occurring mainly on the foot, with able epidote on the hanging. Underlying this epidotal bed, at a dis-circa 60′, is a 6′ amygdaloid showing much epidote and allied minerals, ttle stamp-rock. Stopes have been opened on all levels from the 4th 5th inclusive, and also on the 18th and 22d levels, with fairly uniform

The copper shoot developed by this shaft is 1,000′ to 1,500′ wide, with rake to the southwest. The ground stoped is low in average grade, ly regular in contents, with main values in stamp-copper. All levels the 17th are connected by winzes, giving ventilation and safety. The nd well, without timber, excepting shafts and along the levels. New , 1910, were, 1,344′ of drifts, 247′ of crosscuts, 141′ of raises and 438′ of giving a total of 2,171′ of new openings for the year, and 5,122 cubic were stoped. The mine works 18 power drills.

exploratory shaft, circa 2,600′ east of No. 2, was sunk, 1907–1908, to 121′, with some drifting and crosscutting, which met with small en-nent, and work was stopped.

6 shaft, 3,455′ east of No. 2, was started December, 1909, to develop ern end of the property, previously explored by diamond drill borings. ft, 7x15′ 6″ in dimensions, has three compartments, with 2 skipways, for 6-ton skips, and concrete and steel construction are used wherever the usual method of concrete stringer construction having been modi-overing the entire footwall with concrete, in which are imbedded light tringers, on which the rails are set. This shaft was 463′ deep, March, th plats cut at 105′, 263′ and 363′, and 125′ of drifts and crosscuts, show-ing of much promise.

mine has a 724′ crosscut tunnel driven into the bluff overlooking the owing the contact between the Keweenawan trap beds and the eastern e, with several amygdaloidal beds exposed, on which 176′ of drifting le encouragement. There also are old crosscut tunnels of 150′ and 419′. siderable diamond drilling has been done north of the Forrest bed, a 5,292′ of holes having been drilled, in 2 cross-sections, disclosing several t may warrant future attention.

2 shaft has a 30x50′ frame shafthouse, on stone foundations, equipped neumatic hoist and a 5-ton traveling crane for handling skips, man-cage ber. The rockhouse, in connection with the shafthouse, is 37x40′ in wood, on concrete piers, having storage-bins for both stamp-rock and ith chutes, loading-gates and air-lifts, and there is a steam hammer for

The skip dumps into a large storage-bin, from which rock is fed by

gravity to 18x24" and 13x18" crushers that discharge into bins, from which the rock is loaded into 6-ton railway cars.

The power-house is 36x40', with a 24x28' wing, of wood, on stone foundations, with a steel roof, equipped with a 20x48" Webster, Camp & Lane double-cylinder hoist, having a single conical drum of 8' minimum and 12' maximum diameter with 11' face, carrying 3,000' of 1⅛" rope, raising 4-ton skips, and equipped with an automatic safety stop and throttle-closing device. There are two 12-drill Rand air-compressors, and 20 rock drills. The boiler-house is 36x50' in size. Buildings at No. 2 shaft include a 30x60' wooden machine-shop, a 28x34' carpenter-shop, a 30x55' smithy, having a 22x29' wing, a 21x66' change-house, a 34x36' surgery and hospital, a 24x72' warehouse, a 17x[illegible] general store, a 24x24' mine office with a 12x18' wing, a 16x24' mining captain's office, a three-story frame boarding-house, a 19x41' frame schoolhouse, and [illegible] dwellings, the company owning upwards of 80 buildings. A 10x16x28' steel cistern holds water from the mine for feeding boilers, and water for domestic use and fire protection is pumped by a steel windmill from a well having a storage tank, and there are about 6,000' of mains and pipes. A sawmill having a 50" circular saw furnishes timber and lumber, having sawed 262,956' of lumber in 1907, and about 200,000' in 1910.

Equipment at No. 6 shaft includes a temporary frame shafthouse and engine-house having a 12x28" Nordberg geared hoist with a cylindrical drum of 5' diameter and 6' 9" face, which formerly was at No. 2 shaft, and with which No. 2 was sunk to its present depth of 2,089', though the hoist was rated at only 1,200' capacity. Buildings at No. 6 shaft include a changing-house and warehouse.

A large water-power has been developed from Glenn Falls, on the west branch of the Ontonagon River, about one mile from the mine, at a cost of $440,593, to Dec. 31, 1910. This is the best natural water-power of the Lake Superior copper district, the stream dropping about 110' on the company's property, by a series of small falls, between which are numerous rapids, with sandstone bottoms. The company utilizes 72' of this drop. Power is developed by means of a dam, canal and shaft.

The dam, built up from excavations in bedrock, is 225' between abutments and has 32 eighteen-inch I-beams, 10' apart, sunk vertically 5' to 10' in bed-rock, with cement filling. The dam has an extreme height of 24', with width 14' at the bottom and 8' at the top, and has a 320' main section, with wings 100' and 160', giving a total length of 580', built with an arch up-stream, for great strength. The dam is faced, on the water side, with 5x10' plates of ¾" steel, bolted to the steel I-beams through the concrete. The center of the dam has an apron 80' wide, also a floating boom to guide logs, as the stream is used for logging operations, the dam being substantially built, so that it cannot be torn out by a log-jam. The outlet is a 44" steel pipe, leading from the bottom of the dam to the power canal. The dam is provided with two 44" flush pipes for drainage and flushing out silt, a log-chute, waste-weir and sand-fence. There are 6 canal head-gates in 2 sets, in a frame of 20" I-beams, set vertically apart, with 6 heavy oak gates, worked vertically by rack and pinion, operated by hydraulic power, the gates being 6' wide, in the clear.

The canal diverting water from the dam is 4,800' long, the first 4,000' in earthwork, trapezoidal in section, with 20' base and side slopes of 1½ : 1. The depth is 10' at the head-gates, with a bottom slope of 1" in 100'. The last 800' is cut through sandstone, roughly rectangular in section, with a 14' base and depth of 14'. At the end the canal opens out in a forebay, at the extreme end of which the compressor shafts are located. The canal is equipped with drop-gates, slush-gates, overflow weirs and submerged measurement gates.

The 3 intake shafts of the compressor are 5' in diameter, spaced 19' center to center. The shafts were sunk through solid sandstone, by [illegible]

ainaty holes, bored to the required depth of 343′, then enlarged from in diameter by reaming with a special bit having 4 cutting arms, each ngth, actuated by a No. 9 Rand drill.

shafts, lined throughout with concrete, formerly drew air into the shafts 5,000 tubes of ⅜″ diameter, but there is now only a single opening at ch shaft, air being carried downwards, in bubbles, by the falling water. from the bottom of the 3 shafts is a 360′ tunnel, running to a large air-, excavated from solid sandstone. The water seal at the intake end is y ⅜″ steel shells, firmly concreted into the bottoms of the shafts. The ber is 281′ 6″ long, and 18′ wide, with minimum of 21′ and maximum of t, having a maximum capacity for 80,264 cu. ft. of compressed air. The l at the upflow end is formed by an arch of rock, 40′ long, below which a ′ high leads to the upflow shaft, which is 16x18′ in section, sunk at 72°, ertical depth of 271′, leading to surface, where the water is again dis-nto the river. The power head developed is 72′, and the pressure head ng a maximum air compression of 117 lbs. per square inch. Imprisoned d down the shafts by suction, and swept along the tunnel in bubbles, shing water, is released in the compression chamber, and the constant of fresh air, in myriads of millions of bubbles, causes compression, the held from escaping backwards by the superior pressure of the falling The compressor is provided with suitable head-pieces, a 24″ supply pipe ig with a 12″ pipeline leading to the mine and mill, and there is a 12″ pipe, giving a safety vent, when the air-chamber becomes fully charged, y vent discharging with tremendous force, the air carrying with it some ter that pulled it down, throwing a fine spray hundreds of feet into the a terrific roar.

Taylor hydraulic-pneumatic plant was completed, May, 1906, and nishing 4,000 to 5,000 h. p. under a full head of water, and has shown an of 82% under test. This plant is the most powerful single-unit air-or in existence, and was the fifth installation of the sort in the world. ible to operate one, two or three of the inlet shafts, if so desired; with ading variation of the energy developed, but only one unit is in regular sufficing for the company's needs. The compressor is thoroughly auto-ad practically isothermal, separation being practically complete, and unusually dry. Not a pound of waste nor a gallon of oil is required for tion of this plant, which comes as near to furnishing perpetual motion y that the ingenuity of man ever can devise.

xtensive topographical and hydraulic survey of the company's lands ratershed was made, 1909, by Messrs. J. G. White & Co., of New York, ing that an average of 15,000 h. p. can be developed on the western the Ontonagon River, but the expense of development necessarily will

Owing to the extreme drought of 1910, the water supply was much mal, greatly hampering operation, and it became necessary to provide l storage for water, which was secured through the acquisition of on the western branch of the Ontonagon River, near the outlet of Lake giving considerable water storage. Ultimately the Victoria should 0 to 12,000 h. p. of electric energy for sale, and a transmission line to a and Calumet would give access to a market where this amount of uld be readily salable. Perhaps a much nearer market may be found, ke district of Ontonagon county.

mine and mill are connected by a 4,800′ tramline, in 2 sections, the up-%, and the lower with a 12% grade. A stationery double-sheave hoist, of the incline, serves to pull the empty cars up the steeper grades, but trains are operated by gravity, in counterbalance. A compressed-air e switches trains of four 6-ton cars from the head of the incline to and 2 rockhouse.

The stampmill, on the bank of the river, near the hydraulic works is 50x150′ in size, of wood frame on concrete foundations, having a single 24x24″ Allis-Cuyahoga stamp. Foundations of the mill and stamp are of concrete beds, capping solid sandstone, with machinery anchored by eye-bolts cemented into the rock. The stamp, and part of the washing machinery and shafting, were taken from the old mill at the Belt mine. The stamp has 5-8″ mortar screens, and all oversize above 5-16″ is returned to the head, which has a capacity of 550 tons daily. The washing floor contains 22 Hodge jigs, 5 Wilfley tables, 6 Card tables, 1 Standard table, hydraulic separators and settling tanks. Machinery is driven by a 12x12″ piston-valve engine. The mill went into commission June, 1906, tailing losses running only 0.1 to 0.15% copper. Mineral is smelted by the Calumet & Hecla.

Production has been as follows: 546,334 lbs. copper in 1906; 1,207,237 lbs. in 1907; 1,290,040 lbs. in 1908; 1,062,218 lbs. in 1909; 1,164,564 lbs. in 1910. Tonnage costs are low, but finished copper costs are high, owing to the exceedingly low average tenor of the rock stamped, which was only 0.63%, or 12.7 lbs. of finished copper per ton, secured at a cost of 15.8 cents per lb. in 1907, with a cost of 14.34 cents per lb. in 1908, and 13.67 cents per lb. in 1909, in which year unusually heavy expenditures were made for new construction and extensive exploratory work. The rock continues painfully low in grade, and averaged only about 9 lbs. fine copper per ton in 1910, but, for the first 5 months of 1911, was said to have ranged between 11 and 13 lbs. per ton. These returns would be absolutely ruinous, and the mine hopeless, were it not for the great advantage that the property enjoys through the cheapest power that is had by any copper mine in this or any other district. Cost per ton of rock stamped was $1.51 in 1908, and for the first 7 months of 1910 the average cost was about $1.14 per ton. It is obvious that the Victoria needs 15-cent copper to break even on its present basis of production, but could a larger ore supply be secured, by enlarging No. 2 shaft, even the present phenomenally low average cost could be lowered, and the Victoria is in a position, if given a larger tonnage of rock to stamp, to handle rock of lower average grade than perhaps any other mine in the Lake Superior district. The company's holdings are extensive, and exploratory work is being conducted with vigor, while the management has displayed both courage and care in its conduct of the enterprise.

VICTORIA COPPER MINING CO. UTAH.

Dead. Formerly at Ashley, Uinta Co., Utah.

VICTORIA DEVELOPMENT CO. ARIZONA.

Dead. J. M. Ormsby was president. The company was organised circa 1909, as successor of the Paymaster Consolidated Mines Co. Lands were 32 claims, circa 25 miles southeast of Tucson, in the Pima district of the Sierrita Mountains, including the Paymaster group of 17 claims, Olive group of 2 claims, North Prosperity group of 7 claims, Schumaker group of 2 claims, and Keystone group of 24 claims, the latter having 3 tunnels, showing lead and gold values. The Paymaster mine, opened 1887, was said to have produced upwards of $500,000 worth of ore, under former ownership, and had shafts of 90′ to 220′ depth, with circa 4,000′ of workings, developing a vein of 15′ to 20′ width, carrying argentiferous lead and copper ores, claimed to average 6% copper, 40% lead and 65 oz. silver per ton, with 100,000 tons of ore in sight, which estimates were grossly excessive. Production of the Paymaster was 4,735 lbs. fine copper and circa 20,000 oz. silver, 1907. Formerly at Tucson, Pima Co., Ariz.

VICTORIA GOLD & COPPER MINING CO., LTD. BRITISH COLUMBIA.

Dead. Formerly at Rossland, Trail district, B. C. Described Vol. VIII.

VICTORIA MINE. ONTARIO.

Owned by Mond Nickel Co., Ltd.

VICTORIA MINING & SMELTING CO. NEW MEXICO.

Dead. Formerly at Organ, Donna Ana Co., N. M. Described Vol. VIII.

ıÑÍA MINERA VICTORIAS DE CHACARILLAS. **CHILE.**
ce: Iquique, Chile. Mine office: Pica, Tarapacá, Chile. Organized , 1906, under laws of Chile, with capitalization 3,600,000 pesos, shares ıs par. Presumably idle.

ı MINING CO. **COLORADO.**
ıd. Formerly at Grand Junction, Mesa Co., Colo. Described Vol. VIII.

ı MINING & SMELTING CO. **MÉXICO.**
ıd. Formerly at La Cananea, Arispe, Sonora, Mex. Described Vol.

ıY COPPER MINING CO. **ALASKA.**
ce: 812 Alaska Bldg., Seattle, Wash. Mine office: Ketchikan, Island, Alaska. M. McFernan, president; E. D. Fisher, vice-president; D. Leehey, secretary; J. R. Kelley, treasurer; preceding officers, Dr. nnor, C. J. Cronin and E. F. Tiernan, directors; Patrick Heaney, gen- ager. Organized March, 1901, under laws of Washington, with capital- ı1,500,000, shares $1 par, nonassessable, fully issued. Annual meeting, nday in September.

ds, 14 claims, 6 patented, area 260 acres, on Seal Bay, Gravina Island, south of Ketchikan, the claims lying from sea-level to an elevation of ›ove the beach. The property shows granite, greenstone and limestone, by the management to carry 11 veins, of which 4 are under develop- e main vein being estimated by the management at 22′ average width, chalcopyrite with quartz gangue, being highly silicious, estimated to about 5% copper, 19% sulphur, 19% iron and 52% silica, with $2 per ›mbined gold and silver values. Development is by a 2,100′ tunnel, ust above sea-level, 50′ from the harbor, intersecting 11 veins.

management plans erecting a 100-ton mill, believing that the ore can be ated about 5 into 1.

/ICUÑA. **CHILE.**
›e and mine: Higuera, La Serena, Coquimbo, Chile. Property 5 mines and a smelter.

Champeta, opened 1855, which is the principal mine, is the deepest in ıct, having a considerable number of parallel veins, with a main vein 7′ width, dipping at 60° to 80°. The oxidized zone, of about 70 meters ı followed by 30 meters of rich secondary sulphides, succeeded by chal- of 10 to 15% reported average copper tenor, presumably after selection. on of La Champeta mine was 11,950 metric tons of ore of 10 to 11% enor, 1903.

Cortada and San Francisco mines, area 3 hectares, are opened to a 150 meters, and for a horizontal length of 140 meters, having 2 main 3′ to 5′ average width, and a large number of secondary veins, walls ıch broken, the mine being almost a stockwerk. The ores average about ›pper tenor only, rendering them unavailable for present use, though › promise.

San Ramón mine, opened 1851, is 270 meters in depth, having a vein 4′ average and 15′ maximum width, carrying low-grade ores.

Panchita mine, opened 1850, is circa 350 meters in depth.

Solitaria mine, opened 1893, is about 130 meters in depth, with slight nent.

smelter, at Higuera, 18 kilometers from Totoralillo, the nearest rail ıs 3 small reverberatory furnaces, producing matte of about 50% aver- ›er tenor, sent to El Astillero works, at Huasco, for conversion.

duction has shown a considerable diminution in the past decade, having 13,262 lbs. fine copper in 1903; 856,286 lbs. in 1906; 215,936 lbs. in 1908; › 43,091 lbs. in 1909.

SANTIAGO VICUÑA. CHILE.

Office and works: Huasco, Freirina, Atacama, Chile. Property includes a mine, which is said to be deteriorating, and 2 smelters.

El Astillero works, at Huasco, include a mill having a crusher and stamps and a smelter having 6 three-deck calcining furnaces and 3 reverberatory furnaces, burning imported coke, employing 93 men, at average wages of 1.5 pesos daily, in 1903, and 65 men in 1908. This plant smelted 3,685 metric tons of ore, averaging 4.85% copper tenor, making Chile bars of 96% average tenor, with slags averaging 0.8%, in 1903, and treated circa 3,300 metric tons of ore of about 12.5% copper tenor, and resmelted 350 tons of 50% matte, with a consumption of 4,700 metric tons of coal and a production of 560,000 kgs. fine copper in 1908. Production of this smelter was 1,318,364 kgs. fine copper in 1903.

El Ijirio smelter, at Morada, 27 kilometers from Sarco, the nearest rail station, has 2 reverberatory furnaces, producing matte of about 50% average copper tenor, shipped to El Astillero works for conversion, with slags running about 0.5% copper, formerly employing 50 men, at average wages of 1.75 pesos daily. Carriage charges to the railway are 6 pesos per metric ton, and fuel is imported coke, costing 27 pesos per metric ton. El Ijirio works treated 2,929 tons of 15% ore, yielding 359,070 kgs. fine copper, in 1903, producing 51,500 kgs. fine copper in 1908, and only 3,410 kgs. in 1909. It is planned reconstructing and modernizing this plant.

Production was 3,698,291 lbs. fine copper in 1903; 2,277,353 lbs. in 1907; 1,414,420 lbs. in 1908; 929,009 lbs. in 1909.

VIDAL i VIDELA. CHILE.

Mine office: Cerillos, Coquimbo, Chile. Property is the Hermanos mine, idle except for leaching mine waters, from which 162 metric tons of precipitate of 65% copper tenor were secured, 1903, and sold to smelter at Guayacan, being equal to 233,044 lbs. fine copper. Presumably idle.

VIELLA COPPER CO., LTD. SPAIN.

Dead. Was wound up, compulsorily, February, 1903. Formerly at Viella, Huesca, Spain. Described Vol. IV.

COMPAÑÍA MINERA VIESCA y COAHUILA. MÉXICO.

Dead. Formerly at San Juan de Guadalupe, Durango, Mex. Described Vol. VIII.

VIGSNES KOBBERVAERKS AKTIEBOLOG. NORWAY.

Dead. Property passed to Aktieselskabet Meraker Gruber. Formerly at Röros, Trondhjem, Norway. Fully described Vol. VIII.

VIKING COPPER MINING CO. WASHINGTON.

Dead. Formerly at Orient, Ferry Co., Wash. Described Vol. VIII.

VILLAGE BELLE GOLD & COPPER CO. COLORADO.

Office and mine: Walden, Larimer Co., Colo. David Hendrickson, president and general manager; M. C. Ward, vice-president. T. John Payne, secretary and treasurer; preceding officers, George Post and Thomas H. Sampson, directors. Organized July 16, 1902, under laws of Wyoming, with capitalization $100,000, shares $1 par. Lands, 4 claims, unpatented, reported by company as 150x300′ in size, which would give an area of 4 acres, said to have an 8′ vein carrying ore averaging 15% copper and 7 oz. silver per ton, opened by a 100′ shaft, having a 150′ drift, at last accounts. Equipment includes a 20-h.p. steam plant, and the mine has a 25x64′ mill. Presumably idle.

COMPAÑÍA MINERA DE VIÑA DEL MAR. CHILE.

Office: Santiago de Chile. Mine office: Freirina, Atacama, Chile. Organized Feb. 8, 1905, under laws of Chile, with capitalization 60,000 pesos, shares 200 pesos par.

VINCENNES-ARIZONA COPPER CO. ARIZONA.

Dead. Formerly at Kelvin, Pinal Co., Ariz. Described Vol. VII.

TOR COPPER MINING CO. **CALIFORNIA.**
. Formerly at Greenwater, Inyo Co., Cal. Described Vol. VIII.
TOR GOLD & COPPER MINING CO. **UTAH.**
. Formerly at Uinta, Weber Co., Utah. Described Vol. VI.
CREEK GOLD & COPPER CO. **OREGON.**
. Formerly at Austin, Grant Co., Ore. Described Vol. VIII.
OLD & COPPER MINING CO. **WASHINGTON.**
. Formerly at Loomis, Okanogan Co., Wash. Described Vol. VIII.
VA MINING CO. **VIRGINIA.**
office: Virgilina, Halifax Co., Va. Mine has gold and copper ores.
t includes a 10-stamp mill. Presumably idle.
COPPER CO. **PENNSYLVANIA.**
: 12 Wiest Bldg., York, Pa. Mine office: Charmian, Franklin Co.,
H. Dechert, president; Chas. E. Wills, vice-president and general
Clarence A. Wills, secretary; Harry S. Wiest, treasurer. Lands,
way between Charmian and Gladhill, in the Blue Ridge Mountains,
Maryland state line, show ore carrying native copper, silver and gold
d to give assays of $25 to $600 per ton, from these metals. Develop-
a 200′ shaft sunk at 47°, and 4 diamond drill holes, of 165′ to 800′,
l, 1907. Equipment includes a hoist and air-compressor.
-ARIZONA COPPER CO. **ARIZONA.**
Formerly at Globe, Gila Co., Ariz. Described Vol. VIII.
BELLE GOLD & COPPER MINING CO. **ARIZONA.**
Lost lands, 1906, to Arizona Belle Mining Co. Formerly at Vail,
Ariz. Described Vol. V.
BELLE MINING & DEVELOPMENT CO. **MONTANA.**
Formerly at Cooke, Park Co., Mont. Described Vol. VIII.
C. MINING MILLING & SMELTING CO. **MEXICO.**
: 16 North Eighth St., St. Louis, Mo. Mine office: Concheño,
ihuahua, Mex. J. W. Clayton, president and manager; Thos. B.
e-president and manager; preceding officers, W. W. Candy, R. H.
d W. A. Clayton, directors. Organized under laws of Arizona with
ion $1,250,000, shares $1 par.
, south of Temósachic, circa 75 miles from a railway, include the
ine, having 4 tunnels, developing a vein of 8′ reported width, the
unnel showing auriferous and argentiferous copper sulphides giving
2.12% to 42.73% copper, 7.6 to 13 oz. silver and up to 40 cents gold
A carload test shipment, circa October, 1909, to the Torreón smelter
ave returned 33% copper, 15 oz. silver and 0.32 oz. gold per ton.
; includes steam power, and the management planned a reduction
a 1909.
CONSOLIDATED COPPER CO. **MARYLAND & VIRGINIA.**
618 Walnut St., McKeesport, Pa. Mine office: Stony Man, Page
Letter returned unclaimed from former mine office, Libertytown,
Co., Md. W. Harry Hamilton, president; J. H. Lohman, vice-presi-
. Robertson, secretary; George B. Humick, treasurer; Thos. A. Dun-
al manager; C. C. Cramer, mill superintendent, at last accounts. Or-
t. 15, 1901, under laws of New Jersey with capitalization $1,000,000,
ar; issued, $515,000, at last accounts; 1908.
, formerly 1,070 acres, in 2 tracts, in Maryland and Virginia, have
ed to 64 acres of mineral lands, 3 acres of timber lands and a 6-acre

irginia tract, formerly 220 acres, freehold, on Hoak Mountain, has
ed to 12 acres, and apparently there is a $2,250 trust deed outstand-
. The Virginia property formerly was said to show 3 parallel veins,
trap and quartzite, one of which, opened by a 320′ shaft, with 950′

of workings, was said to be of 12′ average width, and to give average assays of circa 6% copper, 4 oz. silver and $1.80 gold per ton, mainly from carbonate ores with occasional occurrences of native copper. Equipment included a gasoline hoist and 3-drill air-compressor.

The Liberty mine, in Frederick county, Maryland, area formerly 850 acres, was held under a 20-year bond and lease, but holdings have been reduced to 32 acres of mineral land, 3 acres of timber land and a 6-acre millsite. The Liberty is an old mine, long idle, showing 2 ore bodies, reported by company as deposits in limestone, apparently opened to depth of 90′ only, showing malachite, melaconite, chalcocite, bornite and tetrahedrite, with values mainly in bornite, giving average assays of 2.16% copper, 4.7 oz. silver and $1.80 gold per ton. Property was estimated, 1906, by the management, to show 50,000 tons of ore. The Liberty mine, closed down, 1860, on account of the American Civil War, was reopened, 1866, for a short time only, and has not been a producer since.

Equipment of the Liberty mine includes a 65-h. p. steam plant, with hoist good for 1,000′ depth, and a small Sullivan air-compressor. Buildings include a 16x28′ machine-shop, 20x28′ carpenter-shop, 2 small smithies, an office and 5 dwellings. The old 60-ton wooden concentrator, 20x40′, had 3 Sturtevant centrifugal crushers, 3 Wilfley tables and a sizer. Machinery for a new mill was bought of the Wellman-Seaver-Morgan Co., but the Virginia Consolidated Copper Co. being unable to pay for it, machinery was returned. The company has done no work on either property for some years, and apparently is moribund.

VIRGINIA COPPER CO., LTD. VIRGINIA.

Office: 419–136 Liberty St., New York, N. Y. Letter returned unclaimed from former mine office, High Hill, Halifax Co., Va. The late Hon. Commodore P. Vedder was president; F. M. Davis, vice-president; Jas. B. Van Woert, secretary; Richard Lamb, general manager; Evan Davies, superintendent. Organized Aug. 31, 1900, under laws of Great Britain, with capitalization £300,000, shares £1 par. Lands, 1,617 acres, including the High Hill mine, in the Virginia district, developed by 8 shafts of 140′ to 300′ depth, with about one mile of workings. Property shows 2 veins, giving assays up to 5.9% copper, 2 oz. silver and 80 cents gold per ton, from highly silicious ores. Has a 350-h. p. steam plant and concentrator. Idle some years and apparently moribund.

VIRGINIA COPPER MINING & SMELTING CO. ARIZONA.

Dead. Formerly at Casa Grande, Pinal Co., Ariz. Described Vol. VI.

VIRGINIA DEVELOPMENT CO. MEXICO.

Office: Douglas, Ariz. Letter returned unclaimed from former mine office, Fronteras, Arizpe, Sonora, Mex. W. B. McBride, president; S. Gross, manager, at last accounts. Lands, 19 hectares, apparently shrunk from 32 hectares, near the Cabullona mine, 16 miles south of Douglas, having a shallow 2-compartment shaft, said to show native copper and mixed carbonates, giving average assays of 26% copper, 30 oz. silver and $4.96 gold per ton. Was developing, with a small force, August, 1910.

VIRGINIA MINING CO. IDAHO.

Office: 333 Atlas Blk., Salt Lake City, Utah. Letter returned unclaimed from former mine office, Baker, Lemhi Co., Idaho. M. B. Sowles, president; J. D. Pardee, vice-president; W. A. Byers, secretary, treasurer and general manager. Organized 1904, under laws of Arizona, with capitalization $1,000,000, shares $1 par.

Lands, 12 claims, 8 partly patented, area 240 acres, in the Sand Creek district, showing slate, granite and porphyry, having 8 fissure veins, said to average 2′ in width and to be traceable 6,000′, carrying chalcopyrite and galena, assaying up to 7% copper, 2% lead, 2 oz. silver and $25 gold per ton. Mine is reported to have 3,000′ of workings, with 7,000 tons of ore in sight. Equipment includes a 3-stamp mill. Idle.

IIA SMELTING CO. **VIRGINIA.**

ice: 509–131 State St., Boston, Mass. Works office: West Norfolk, Co., Va. Col. W. E. C. Eustis, president; A. H. Eustis, vice-president; ustis, secretary and treasurer; E. H. Hamilton, superintendent. Organ- v. 10, 1909, under laws of Maine, as successor of Eustis Smelting Works, pitalization $1,000,000, shares $100 par, nonassessable, in $500,000 pre- nd $500,000 common stock. Annual meeting, first Tuesday in October. perty is a smelter, known as the Eustis Smelting Works, located on tide- nd also having direct rail connection, the location, near Norfolk, being ly favorable for a custom smelting business, as more coal is shipped out is vicinity than from any other center in North America, and this traffic ds favorable freight rates on return cargoes, and the location also insures r best coke for metallurgical use, on highly advantageous terms. Ore by vessel is unloaded by a mechanical digger, into standard railway cars, ilities to set aside any desired portion into a sample-car, standing on a track. The digger has a maximum capacity of 1,000 tons in 24 hours. l cars containing ore, whether from the wharf or direct rail shipments, ed by locomotives upon trestles, whence ore and coke are dumped into bins having a storage capacity for 25,000 tons of ore, and, under pressure, ks can store 50,000 tons of ore.

e smelter has a single water-jacket blast-furnace, 4x36′ at the tuyeres, ons daily capacity, using sea-water for the jackets. The plant does l custom business, treating concentrates from Sherbrooke, Quebec, and m El Cobre mine of the Cuba Copper Co., the iron in the Sherbrooke rates fluxing the silicious Cuban ores. The works have steam, electric umatic power, and the management contemplates the addition of cal- nd probably a sintering plant also, and has given consideration to the of adding a chamber acid plant. The smelter treated 78,518 tons of ore, 5,579,456 lbs. fine copper in 1909, and production was 1,929,176 lbs. n 1910.

E COPPER CO. **OREGON.**

ad. Formerly at Baker City, Baker Co., Ore. Described Vol. VIII.

E MINING & DEVELOPMENT CO. **ARIZONA.**

ce: Paradise, Ariz. Mine office: Portal, Cochise Co., Ariz. E. F. president and general manager; W. T. Epley, vice-president; Geo. A. secretary and treasurer; preceding officers, C. E. Welch, G. D. Flowers, Jordner and J. W. Allen, directors. Organized July 14, 1906, under Arizona, with capitalization $1,000,000, shares $2 par, nonassessable, of he promoters were given $600,000 for the property; issued, $780,000. meeting, first Monday in July.

ds, 8 claims, unpatented, area 160 acres, in the California district, 2 ore bodies, one of 100′ claimed average width, with NW. strike, the e body being a contact deposit carrying irregular pockets of ore, mainly te and chalcopyrite, with some oxidized ore, giving assays of from a 58% copper, from a trace to 28 oz. of silver, with traces of gold. Develop- by a number of pits, of 10′ to 26′, and the Virtue tunnel of 760′, March 1, anned to be driven about 1,100′, to cut the vein giving a back of about There is no power equipment.

LA VIUDA. **CHILE.**

ned by Nueva Sociedad Compañía de Lota i Coronel, at Algarrobo, , Atacama, Chile.

DIERE CONSOLIDATED MINING & ELTING CO. **COLORADO.**

ad. Formerly at Turret, Chaffee Co., Colo. Described Vol. VIII.

& SONS. **WALES.**

ice and works: Swansea, Glamorganshire, Wales. This firm, of which

the late Earl of Swansea was the head, is one of the oldest metallurgical enterprises in Wales. The Hafod works, at Swansea, dating from 1810, include smelters for the treatment of gold, silver, lead, copper, zinc and complex ores and a small electrolytic refinery. There are a number of manufacturing plants among these being rolling mills for copper plates and sheets; lead works for the manufacture of pig and bar lead, and lead pipes, rods and sheets; spelter works for making zinc plates; bluestone works for the manufacture of copper sulphate; sulphuric acid works, and an artificial manure works utilising the acid. The firm also owns the Margam works, at Port Talbot, near Swansea, having rolling mills making copper, brass and yellow metal sheets, tubes and other finished products, and owns collieries in Wales.

COMPAÑÍA MINERA VLADIVOSTOCK DE COLLAHUASI. CHILE.

Office: Iquique, Chile. Mine office: Collahuasi, Tarapacá, Chile. Organized March 31, 1906, under laws of Chile, with capitalisation 640,000 pesos, shares 16 pesos par. No trace of operations secured.

FUNDICIÓN EL VOLCAN. CHILE.

Owned by Compañía Minera de Maipó, at El Volcan, Victoria, Santiago, Chile.

VOLCANIC MINE. BRITISH COLUMBIA.

Mine office: Grand Forks, Boundary district, B. C. R. A. Brown, owner. Lands, 102 acres, on the north fork of the Kettle River, showing a great belt of cupriferous pyrrhotite. Vein, claimed to be 600′ wide, shows small values in copper and gold near surface, with promise of better values at depth. Has an 800′ tunnel, which has not yet reached the ore body. Property, though low in grade, is considered promising, because of vast size of its ore body. Idle some years.

VOLCANIC, MINING, SMELTING & DEVELOPMENT CO. BRITISH COLUMBIA.

Dead. Formerly at Grand Forks, Boundary district, B.C. Described Vol. IV.

MINAS VOLCANILLOS. MÉXICO.

Office and mine: Avenida Borbon No. 6, Autlán, Jalisco, Mex. Carolina Blake, manager. Lands, 28 pertenencias, area 69 acres, and a 10-acre millsite, with 100 square miles of timber lands, held under a government concession in the Cacoma district, including the Volcancillos and adjoining mines, the property being well watered, and timbered with dense pine and oak forests. The property was held, for a time, by the Cacoma Mining & Smelting Co., which made a bad fist of matters, and failed, under disgraceful circumstances.

The Volcancillos group, 12 miles west of Autlán, shows diorite and porphyry dikes, carrying 6 known contact deposits, of 5′ to 80′ width, of which one, of 80′ maximum width, has exclusively chalcopyrite, carrying 4 to 15% copper, and 4 oz. silver and about $5 gold per ton. The mine has a 300′ two-compartment shaft, and several tunnels, one having a back of about 150′, but still in the oxidized zone. The mine has about 1,000′ of laterals, all in ore, and is estimated by the management to show about 100,000 tons of ore. The mine, discovered 1891, was opened by Edward Blake, and remains in his family.

Equipment includes a steam plant, with a 40-h. p. hoist good for 1,000′ depth, and there are several buildings. The 10-ton mill and 10-ton smelter formerly in use have been abandoned.

Since the opening of the mine, except for a short period while in the hands of the Cacoma Mining & Smelting Co., the ore from the Volcancillos has been sold to the Indians, who have been metal-workers from time immemorial, probably from a period long before the end of the Aztec empire. The unfortunate natives fell upon evil days while the property was in the hands of the Cacoma outfit, but, since the mine was taken back by the Blake family, the ore again has been sold to the natives, at an average price of only about 4 cents per pound.

:r in the form of ore, the Indians dressing and smelting the ore to copper, ufacturing the metal into various forms, in which work they are exceed-llful, though the methods used are primitive.

[EER MINING CO. **UTAH.**

:e: 232 D. F. Walker Bldg., Salt Lake City, Utah. Mine office: Beaver Co., Utah. W. C. Albertson, president and general manager; avenor, vice-president; S. G. Cole, secretary; H. E. Havenor, treasurer, secretary and engineer; preceding officers and Geo. Havercamp, direct-ganized under laws of Utah, with capitalization $50,000, shares 10 r, nonassessable; issued, $25,550. Annual meeting, second Monday Lands, 6 claims, unpatented, area circa 600 acres, in the North Star 7 miles from the San Pedro railway, showing contact deposits between ; and intrusive porphyry. The mine has only two 12′ pits, and a 40′ hich is planned to be continued.

[RNET COPPER, LTD. **CHILE.**

d. Was liquidated, October, 1905. Formerly at Antofagasta, Chile. d Vol. V.

[MINING CO. **IDAHO.**

d. Formerly at Osburn, Shoshone Co., Idaho. Described Vol. VIII.

[CONSOLIDATED COPPER CO. **NEVADA.**

d.. Was succeeded by Nevada Vulcan Mining Co. Formerly at Soda-neralda Co., Nev. Described Vol. IV.

[COPPER CO. **ARIZONA.**

:e: 45 Gurley St., Prescott, Ariz. Mine office: Jerome, Yavapai . Chas. T. Joslin, president; W. S. Norvell, secretary; M. B. Hazel-surer; Jos. Larsen, superintendent. Organized Jan. 20, 1909, under Arizona, with capitalization $3,000,000, shares $10 par, nonassessable. claims, partly fractional, area 98 acres, in Deception Gulch, surrounded nited Verde, Hull, Haynes and Verde Grande properties. Development ; two-compartment Montana shaft planned to be sunk 1,200′ and a ving a back of about 300′, planned to connect with the shaft. Pre-idle.

[COPPER CO. **OREGON.**

er returned unclaimed from former office, San Francisco, Cal. Mine Takilma, Josephine Co., Ore. Company bought the property of the n View Copper Co., for $24,000. Mine is said to show a promising vein :e. Equipment includes a 30-ton Vulcan smelter, never blown in. ral years and apparently moribund.

[COPPER MINING CO. **CALIFORNIA.**

:e: 625 Market St., San Francisco, Cal. Letter returned unclaimed ner mine office, Kennett, Shasta Co., Cal. John R. Lyle, president and nanager; E. G. Humphrey, vice-president; Alton J. Knight, secretary surer; preceding officers, E. C. Knight, F. Lyle, C. B. Lyle and W. T. irectors. Organized Oct. 18, 1905, under laws of Oklahoma, capitali-,500,000, shares $1 par. The company was selling stock, 1910, at 25 share flat, or at 50 cents per share with a guarantee of money back rs. Annual meeting, Oct. 26th of each year.

ds, 14 claims, patented, area 250 acres, known as the Great Verde mine, ; the Balaklala and the Shasta King on the west, lands being on Squaw rca 10 miles from Kennett. The property shows rhyolite and andesite, asional gossans, having an ore body claimed to be 80′ wide, carrying rite disseminated in pyrite, estimated by the management to average pper, 2 oz. silver and $3 gold per ton, which figures probably are too he mine was said, 1908, to have 12 tunnels, of circa 1,200′ aggregate nd has 4 tunnels showing low-grade ore, near surface, with about one-of workings. The property is claimed to show occasional native copper,

and chalcopyrite up to 20% in copper tenor. Diamond drilling, 1907, is claimed to have developed good sulphide ore, and the company shipped a little ore, 1907, to the Kennett smelter. Presumably idle.

VULCAN COPPER MINING CO. WYOMING.

Office: Wausau, Wis. Letter returned unclaimed from former mine office, Encampment, Carbon Co., Wyo. W. M. Monroe, president; W. D. Kolloch, secretary. Organized 1898, with capitalization $1,000,000, shares $1 par. Lands 120 acres, in the Encampment and Battle Lake districts. Has 3 shafts, deepest about 100', showing a 15' sulphide ore vein. Idle some years and moribund.

VULCAN COPPER MINING & SMELTING CO. NEVADA.

Dead. Was reorganized, 1901, as Vulcan Consolidated Copper Co. Formerly at Sodaville, Esmeralda Co., Nev.

VULCAN-ELY COPPER CO. NEVADA.

Dead. Was a stockjobbing scheme. Formerly at Ely, White Pine Co., Nev. Fully described Vol. VIII.

VULCAN MINING, SMELTING & REFINING CO. NEVADA.

Mine office: Cherry Creek, White Pine Co., Nev. H. A. Woodworth, president; T. A. Danaher, general manager, at last accounts. The company has 2,500,000 shares. Lands, partly patented, in the Hunter district, circa 30 miles from Ely, the nearest rail point, show copper and silver-lead ores, and some small shipments were made, 1907. Idle several years.

VULTURE PEAK COPPER CO. ARIZONA.

Office and mine: Wickenburg, Maricopa Co., Ariz. Byron Smith, superintendent, at last accounts. Organized 1907. Lands, said to be extensive, which were in litigation until circa 1908, are said to show a 3' vein, carrying 1[illegible] copper ore, with ore assaying up to 51.8% copper, 8.5 oz. silver, and $[illegible] gold per ton. The management planned a 1,000-h. p. power plant, on the Hassayampa River, near Wickenburg. Idle.

WABASH MINING CO. CALIFORNIA.

Dead. Formerly at Letcher, Fresno Co., Cal. Described Vol. VIII.

WABASH MINING CO. UTAH.

Office: 521 Atlas Blk., Salt Lake City, Utah. Mine office: Park City, Summit Co., Utah. Col. Nicholas Treweek, president and general manager. John R. Barnes, vice-president; W. Mont Ferry, secretary and treasurer; preceding officers, John M. Daugherty and J. Leonard Birch, directors; Ben. Angwin, superintendent. Organized under laws of Utah, and reorganized Feb. 15, 1906, under laws of Utah, with capitalization $2,000,000, shares $5 par, in $750,000 full paid and $1,250,000 part paid stock, with 40 assessments levied to end of 1910. The company is said to have expended circa $500,000 on development.

Lands, 17 claims, patented, area 320 acres, of which 140 acres were freehold and 150 acres were held under bond and lease, at last accounts. The mine has an 800' main shaft, with about 3 miles of workings, developing 6 veins, carrying auriferous and argentiferous copper and lead ores, with values mainly in silver. Equipment includes a good hoist and an air-compressor, and there are necessary mine buildings. Employs circa 30 men.

WABUSKA COPPER MINES CO. NEVADA.

Mine office: Wabuska, Lyon Co., Nev. J. E. McDermott, manager. Lands, 13 claims, known as the Minnesota group, 16 miles from Yerington, said to carry large deposits of iron ore, showing a gossan of 50' to 100' width, covering a contact deposit, between limestone and granite, of about 20' average width, carrying sulphide ore assaying 1 to 30% copper, developed by 2 shafts, one of circa 500' depth, showing ore said to average better than 3% in copper tenor. There also are several shallow pits, deepest 15', showing ore giving assays of 2 to 40% copper. The property has necessary mine buildings.

ER AZURITE COPPER CO. **NEVADA.**

ce: 428 South Summit St., Dayton, Ohio. Mine office: Tonopah, ., Nev. Frank Everett, president and manager; S. K. Bradford, vice-it and engineer; Raymond Lyon, secretary and treasurer; preceding H. D. Keefer and Jas. I. Kuller, directors; S. J. Dillabaugh, superin-. Organized July 15, 1907, under laws of Nevada, with capitalisation 00, increased, 1910, to $2,500,000, shares $1 par, nonassessable; issued, ,000,000. Annual meeting, second Tuesday in September.

ds, 23 claims, unpatented, area 500 acres, in the Wagner and Fair Play , latter circa 35 miles east of the nearest rail point, Mina. The Wagner hich is the principal property, shows a contact zone of 400′ to 600′ width, e circa 2 miles, between an altered granite foot and a limestone hanging, V. strike, and dip of 50° N. The outcrop carries argentiferous and as copper ores, including malachite, azurite, cuprite, melaconite, chal-ornite and chalcopyrite, with a quartz gangue, ores being estimated by agement to average 2% copper, 5 oz. silver and $3 gold per ton. Devel-is by the 453′ Wagner shaft, and 2 tunnels, one, of 850′ length, carry-or 135′, and one, of 225′ length, carrying ore for 125′. The mine has 500′ of workings, and the management estimates 15,000,000 tons of ore which is an unduly liberal estimate, though the property has a rather ble surface showing of low-grade ore.

ipment includes a 60-h. p. steam plant with a 15-h. p. hoist and a 4-ight-line air-compressor. There are 10 mine buildings. The manage-ans continuing mining development, and building a 10-stamp mill. considered promising.

R-GREEN MINING & MILLING CO. **COLORADO.**

d. Formerly at Pearl, Larimer Co., Colo.

TA COPPER MINING CO. **MICHIGAN.**

d. Was a swindle. Name was changed to Erie Consolidated Mining tion Co. Formerly at Matchwood, Ontonagon Co., Mich. Fully de-ol. II.

TCH MINING CO. **UTAH.**

e: 2206 Lincoln Ave., Ogden, Utah. Letter returned unclaimed from ine office, Brigham, Box Elder Co., Utah. H. C. Baker, president and manager; J. W Abbott, vice-president; H. R. Wadleigh, secretary. d April, 1904, under laws of Arizona, with capitalization $1,500,000, par, stock issue being divided into 5% cumulative preferred and com-es.

ds, 505 acres, patented, on the western slope of the Wahsatch Moun-niles from Brigham City. The mine shows mainly lead and silver ores, e are copper deposits in a prospective stage. Equipment includes a oncentrator, connected with the mine by a 4,200′ aërial tram. Water is the mine and mill under a considerable head, estimated to be capable ting 180 h. p. Idle several years.

IT COPPER MINING CO. **WYOMING.**

e and mine: Walcott, Carbon Co., Wyo. W. C. Sammons, president; ynor, vice-president; W. W. Petty, manager; preceding officers, C. A. O. O. Shields, A. C. Wagner and J. R. Dodd, directors; Jens Hansen, ndent. Organized circa January, 1907, with capitalization $1,000,000. ls, 7 claims, known as the Elkhart mine, in the vicinity of Elk Moun-ing an 80′ shaft said to show a good sized ore body, of about 3% copper Equipment includes a small steam plant and hoist. Presumably idle.

RF CONSOLIDATED MINING CO. **COLORADO.**

e: 725 Colorado Bldg., Denver, Colo. Mine office: Georgetown. eek Co., Colo. John W. Wheeler, president; Fred W. Webber, vice-; Edw. J. Wilcox, secretary and treasurer; D. F. Spouse, manager, at

last accounts. Organized 1908, as a reconstruction of the Waldorf Mining & Milling Co., with capitalization $3,600,000, shares $1 par, in $400,000 of 7% cumulative preferred stock and $2,300,000 common stock. A report, filed with the state of Colorado, February, 1910, gave an outstanding indebtedness of $58,895.

Lands, circa 600 acres, about half patented, including the Tobin mine in the East Argentine district. The property is developed by the Tobin and Wilcox tunnels, showing a vein having a 4′ paystreak of auriferous copper ore.

Equipment includes a 125-ton mill, at the portal of the Wilcox tunnel, which is idle winters, owing to scarcity of water. September, 1910, the property was said to be shipping about one carload of smelting ore and concentrates daily, with a force of circa 40 men.

WALDORF MINING & MILLING CO. COLORADO.

Dead. Was reorganized, 1908, as the Waldorf Consolidated Mining Co. Formerly at Georgetown, Clear Creek Co., Colo.

WALDO SMELTING & REFINING CO. OREGON.

Office: P. O. Box 1487, Colorado Springs, Colo. Mine office: Takilma, Josephine Co., Ore. Spencer Penrose, president; Chas. L. Tutt, Jr., vice-president and secretary; J. A. Hull, treasurer; preceding officers, J. A. Hayes, J. O'B. Gunn and Col. T. Waln-Morgan Draper, directors; E. W. Walter, general manager; E. C. Tucker, superintendent, at last accounts. Organized Dec. 3, 1901, under laws of Colorado, with capitalization $3,000,000, shares $1 par. Is closely connected in ownership and management with the Takilma Smelting Co., and owns a share interest therein.

Lands, 20 claims, patented, area 400 acres, with a millsite, and 650 acres of placer lands, near the Queen of Bronze mine, about 40 miles from the Southern Pacific railway, showing 5 fissure veins, of about 10′ average width, carrying sulphide ores said to average 12% copper and $3 gold per ton. The mine has a shaft and 3 tunnels. The Copper King shaft, about 200′ deep, has an 80′ crosscut-drift, showing a good ore body. The 700′ Lyttle tunnel and the 400′ No. 2 tunnel, on the same claim, show good ore bodies. The 310′ Cowboy tunnel connects with the incline shaft, 160′ below surface, and was planned to be extended to intersect known ore bodies. Management considered good and property promising. Idle.

GEWERKSCHAFT WALDSTOLLN. GERMANY.

Dead. Formerly at Dermbach, Weimar, Germany. Described Vol. VI.

WALES COPPER MINING CO. ALASKA.

Dead. Was merged, 1904, in Hadley Consolidated Copper Co. Formerly at Hadley, Prince of Wales Island, Alaska. Described Vol. IV.

WALKER LAKE COPPER-GOLD CO. NEVADA.

Dead. Formerly at Dutch Creek, Esmeralda Co., Nev. Described Vol. VIII.

WALKER LAKE COPPER MINING & SMELTING CO. NEVADA.

Dead. Was a bad egg. Formerly at Hawthorne, Esmeralda Co., Nev. Described Vol. VIII.

WALKER LAKE EXPLORATION & DEVELOPMENT CO. NEVADA.

Mine office: Hawthorne, Esmeralda Co., Nev. Frank House, general manager; Andrew Bain, superintendent, at last accounts. Lands, on Cat Creek, 8 miles from Hawthorne, show a vein of 9′ estimated average width, carrying native copper. Presumably idle.

WALKER LAKE INDIAN RESERVATION MINING CO. NEVADA.

Dead. Formerly at Dutch Creek, Esmeralda Co., Nev. Described Vol. VIII.

WALKER MINING CO. CALIFORNIA.

Office: Main and Third South Sts., Salt Lake City, Utah. Letters returned unclaimed from former mine office, Plumas, Genesee Co., Cal. Joe. L. Walker, president; Geo. L. Bemis, vice-president; Chas. H. Post, secretary and

; preceding officers, J. H. Beifus, and Wm. Pischel, directors. Organ-ember, 1909, under laws of Utah, with capitalization $100,000, shares par; issued, $750,000. Is controlled, through ownership of 80% of ock, by President Walker. Annual meeting, first Tuesday in Sep-

ls, 16 claims, 10 in process of patenting, heavily timbered, with a good ver available, in an unorganized mining district, circa 18 miles northeast ı, on the Western Pacific railway. The property shows a country-rock l diorite, and has a big gossan outcrop, up to several hundred feet in ossing 10 claims, with NW. strike and average dip of 80°, traceable ıderlaid by a vein of 27′ estimated average width, carrying a very shal- of oxidation, succeeded by ore, including some secondary sulphides, ly silicious chalcopyrite, estimated by the management to average 6% oz. silver and $1 gold per ton. Development is by shafts of 70′, 35′, 35′ ıpaced at 300′ intervals. The 70′ shaft has a 27′ crosscut at the bot-ving a wide ore body, with an 8′ paystreak giving assays up to 4.5% to 5 oz. silver and $1 to $2 gold per ton, the balance of the crosscut ›re of about 2.75% copper tenor, with small gold and silver values. pment includes a small steam plant with a 20-h. p. hoist, and buildings 20x40′ wooden carpenter-shop, office, boarding-house and a small saw-e company has expended about $30,000. Idle, except for annual ıt work.

OS A. WALL. **UTAH.**

:: Utah Savings & Trust Bldg., Salt Lake City, Utah. Mine office: Canyon, Salt Lake Co., Utah. Frederick Bemis, superintendent. includes the Starlus and Kempton mines.

Kempton group, of circa 100 acres area, adjoining the Boston Consol-tah Apex and Yampa mines, carries copper and lead ores, and was in for many years, between Col. Wall and the United States Mining Co. pton carries auriferous and argentiferous lead and copper sulphides, es mainly in lead.

Starlus mine has 8 claims, patented, area 160 acres, lying just northeast dings of the Utah Copper Co., and Col. Wall claims apex rights to a the ore of the Utah Copper Co., which contention would seem poorly in the case of a body of disseminated ore that is practically a blanket in actual truth is the country-rock itself. The Starlus is developed ine shaft and numerous tunnels, with crosscuts and upraises, and has)00′ of workings, developing considerable ore giving assays of 3 to 10% Equipment includes a hoist.

.25-ton mill, at the Kempton mine, was rebuilt 1905, and was again en-l remodeled, 1910, at a cost of circa $50,000, and is equipped through-machinery of Col. Wall's own devising. The mill has a set of Wall l rolls, a set of Wall steel rolls for middlings, 3 sets of Wall jigs, 2 Wall concentrates, 2 Wilfley tables, and Wall washers, of trough form, with d sprayers, concentrates being discharged through the bottom and ı the top.

Y COPPER MINES, LTD. **AUSTRALIA.**

: 17 Abchurch Lane, London, E. C., Eng. Mine office: North-Western Australia. B. Argall and A. E. Powell, directors; E. Funnel, Organized Feb. 24, 1909, under laws of Great Britain, with capital-),000, shares 1s. par. Lands, 100 acres, freehold, known as the Wheal Extended mine, formerly held by Wheal Fortune Extended, Ltd. The claims to have a lead vein of 3′ 6″ width, and to have raised therefrom ore returning 70% lead, and also claims to have ore running as high opper. Company's prospectus claimed entirely too much, and the ›n is not regarded favorably. Idle and presumably moribund.

WALLACE & MISSOULA MINING CO., LTD. IDAHO.

Letter returned unclaimed from former office and mine, Wallace, Shoshone Co., Idaho. P. M. Riley, president; J. H. Scott, vice-president; Edw. Blackman, treasurer; preceding officers, Jos. Thomas and Jas. A. Wayne, directors. Organized 1907, under laws of Idaho, with capitalization $1,000,000, shares $1 par. Idle and presumably moribund.

WALLAPAI COPPER CO. ARIZONA.

Dead. Formerly at Wickenburg, Maricopa Co., Aris. Described Vol. VIII.

WALLAROO CENTRAL COPPER MINING CO., N. L. AUSTRALIA.

Office and mine: Kadina, Daly Co., South Australia. E. A. Beare, chairman. Organized as successor of Wallaroo Central Mining Syndicate, and received a £500 subsidy from the South Australian government, 1906. Lands adjacent to the Wallaroo mine, formerly known as the Bingo mine, had a 100' shaft, which had been deepened to 123', at the end of 1908. The old workings had a vein of 7' to 8' width, carrying gray copper ore, said to assay up to 40% copper, but the vein was lost at depth. Diamond drilling has shown copper sulphides. Idle, in bad shape financially, and reconstruction or bankruptcy apparently inevitable.

WALLAROO EXTENDED COPPER MINING CO., LTD. AUSTRALIA.

Mine office: Kadina, Daly Co., South Australia. G. T. Lane, chairman. Organized under laws of South Australia, with capitalization £3,250, shares £1 par, subdivided, 1909, into 13,000 shares of 5s. par. Lands adjoin the western boundary of the Wallaroo mine, west of Wallaroo and circa 3 miles from Kadina. The formation is badly broken, and the property shows numerous prospecting trenches, pits and shallow shafts, sunk in early days, in unsuccessful efforts to locate the extension of the ore body on the Wallaroo mine. The mine has 2 shafts, No. 1 of 102' and No. 2 of 86', showing a narrow and irregular vein, of about 4' average width, carrying occasional bunches of chalcopyrite and bornite, in a broken formation. Presumably idle.

WALLAROO & MOONTA MINING & SMELTING CO., LTD. AUSTRALIA.

Office: Steamship Bldgs., Currie St., Adelaide, South Australia. Mine offices: Wallaroo, Daly Co., South Australia, and Moonta, Daly Co., South Australia. Operating and works office: Port Wallaroo, Daly Co., South Australia. Employed 1,570 men, Dec. 31, 1910, of whom 735 were at the Wallaroo mines, 490 at the Moonta mines and 345 at the works. Jas. Harvey, chairman; preceding officer, Sir Lancelot Stirling, Hon. J. J. Duncan, J. R. Corpe and Simpson Newland, directors; David Davidson, secretary; H. Lipson Hancock, general manager; Jas. Pryor, assistant general manager; David H. Ladd, smelter superintendent. Union Bank of Australia, Ltd., Australia, bankers; Elder Smith & Co., Ltd., London agents.

Organized 1899, under laws of South Australia, as a merger of the Moonta and Wallaroo companies, with capitalization £400,000, shares £2 par; issued, £320,000. To end of 1910 the company paid 37 dividends, aggregating £500,000, dividends having been £80,000 in 1906, £140,000 in 1907, £24,000 in 1909, and £16,000 in 1910. The Wallaroo company, previous to the merger, produced copper to the value of £2,229,096, paying dividends of £430,254 therefrom, and the Moonta company, preceding the merger, made copper to the value of £5,396,146, paying dividends of £1,168,000 therefrom, giving the property a total dividend record, to Dec. 31, 1910, of £2,098,254, from about 50 years of operation. Net profits were £35,534 in 1909, and in 1910 were £21,824, exclusive of a loss of £17,688 caused by suspension of operations due to a strike in the Newcastle collieries, the company ending 1910 with liquid assets of £127,366, and liabilities of £19,963, leaving a balance of assets over liabilities of £107,403, 12s. 3d., or nearly 10s. 9d. per share of issued stock. Liberal allowances are

arly for depreciation, these amounting to £22,577 1s. 7d. in 1908, with llowance for depreciation, to end of that year, of £172,765 4s. 4d.
ids are extensive, including the Wallaroo and Moonta groups, about 10 art, with various smaller properties, and the site of the reduction plant Wallaroo, all in Yorke's Peninsula, on Spencer Gulf. The Wallaroo s discovered 1860, and the Moonta 1861, and both mines have been l, practically continuously, since 1863.
mines having been opened nearly a half century ago, when mining was crude, there are entirely too many shafts for economical ore extrac- l the policy of the present management has been, and continues to be, ie of reducing the number of working shafts, and greatly increasing the capacity of such shafts as are retained in commission. The manage- y wisely took advantage of two years of high prices for copper to press und development, and add largely to surface equipment. New work- age about 1 mile yearly. Waste-rock is used for filling depleted stopes, amount of cull material sent underground was circa 40,000 long tons and about 80,000 long tons in 1910. The properties suffer from air- d earth-shocks, similar to those occurring at some of the Lake Superior lines.

Wallaroo group of mines, 6 miles east of Port Wallaroo, includes the an adjoining property, the entire tract having an area of circa 1,500 The property shows schists and slates, mainly metamorphosed mica- Cambrian or pre-Cambrian age, carrying 6 practically parallel veins, generally ESE. strike, with irregular dip, the veins ranging 6′ to 33′ and being connected in places by oblique veins. These more or less us veins of altered schist continue for length of nearly 2 miles, and are o depth of circa 2,500′, but the bulk of the veins cut out at depth, and depth the length of the pay-shoot is only about 3,000′, with 600′ f mineralised vein matter that does not pay for extraction, at the present copper, but which doubtless will be available for treatment later. erage values are maintained in the deepest workings. The gossan little atacamite and copper carbonates, succeeded by a leached zone of depth, followed by native copper, cuprite, melaconite, azurite, malachite opyrit but the oxidised ores were worked out many years ago. At e ore is mainly chalcopyrite, associated with pyrite, hematite and l molybdenit with quartzose gangue containing calcspar and some country-rock. The ore is essentially slightly auriferous and argentif- alcopyrite, ranging 3 to 4% in copper tenor, as mined, but is hand- nd concentrated about 4 into 1, before sent to the smelter. Ore is won y overhand stoping, and wide stopes are carefully timbered by wooden ith waste filling, on either side of the drifts. The Wallaroo and Kurilla intly, have been opened by a number of shafts, mainly inclined on the h circa 35 miles of workings, many of the shafts being old and abandoned. ipal shafts are Taylor's, Young's, Office, Boor's and Elder's, the first r hoisting, having mainly 4-ton skips.

or's shaft, 2,499′ deep, is the principal opening of the mine. The old badly injured by fire, 1904, and was replaced by a new vertical shaft ace, connecting at depth of 840′ with the old workings. The fire did nage, destroying the pumping apparatus to a depth of 2,000′, but, by orts, pumps were installed with compressed air power, since replaced by umps. Extensive storage-bins have been installed between the various his shaft.

g's shaft is 2,036′ in depth, and also has storage-bins, similar to those 's shaft. The Office shaft, 1,976′ in depth, has not been deepened for ears. Boor's shaft, 1,470′ deep at the end of 1910, has a big Waddle uction exhausting foul air from the mine, this method of ventilation

rendering stoping possible where work would be out of the question otherwise.

The Wallaroo mine is very wet, making about 250,000 gallons of water daily, and there are 2 pumping installations, one for regular and one for emergency use. The regular installation has 3 stations, on the 750′, 1,230′ and 1,830′ levels, equipped with Worthington vertical 3-throw plunger pumps driven by direct-connected British-Westinghouse constant-speed 3-phase motors. The emergency pumping plant has stations on the 1,230′ and 1,830′ levels, with Worthington vertical 3-throw pumps, coupled to 60-h. p. 3-phase variable-speed motors by double spur gearing, these pumps starting and stopping automatically, under control of float attachments in the sumps that actuate a liquid starter.

The Kurilla mine, practically a part of the Wallaroo, is opened to a depth of 1,170′, on a vein, parallel to the main vein of the Wallaroo, and has an ore body of 10′ to 12′ width, which is bunchy, carrying high-grade shoots of ore averaging about 11% in copper tenor, after hand-cobbing. Work was discontinued in the Kurilla mine, 1910.

The Moonta group includes the Moonta, Moonta Central and North Yelta mines, and has an area of circa 2,700 acres, leasehold from the Crown. The country-rock is an intensely hard felsite-porphyry, having a specific gravity of 2.67, which does not outcrop, being covered by silicious limestone containing circa 15% silica, which weathers into spherical masses. The Moonta has 2 veins, of 6″ to 30′ width, with 5 roughly parallel main veins, having a general strike of N. 20° E., and numerous stringers and laterals, there also being a series of cross-fissures. The main ore bodies are fairly regular, and frequently carry well-defined veins of quartz on the footwall. The 5 main veins showed considerable atacamite in the upper workings, succeeded by a barren zone of 60′ to 125′ depth, below which were found small quantities of oxidized ores, succeeded by chalcopyrite and occasional bornite, associated with pyrite, with quartz gangue, chalcopyrite occurring in the quartz, and also in the country-rock, and, as at the Wallaroo, the ore appears to be deposited along parallel stress planes in the rock. The Moonta ores were rich, and for years averaged about 20% in copper tenor, after hand-cobbing, but are now dressed to about 13 to 14% average copper tenor. The Moonta has been opened to 2,500′ depth, but shows very little ore below 2,000′, and most of the veins have been worked out quite thoroughly.

The Moonta has about 50 working and trial shafts, the mine having been opened in a period when mining practice was vastly different from that of the present day, consequently most of the former working shafts have been abandoned, and extraction now is mainly through Taylor's, Warmington's and Treuer's shafts. Most of the shafts are vertical for a short depth, thence deflected to follow the dip of the veins, along the footwall. The mine is opened to a depth of 2,500′ by Taylor's shaft. Treuer's shaft was 720′ deep, and Warmington's shaft was 420′ deep, at the end of 1909. The Moonta mines have upwards of 40 miles of workings, and formerly both overhead and underhand stoping were employed, though only overhead stoping is in present use.

The Moonta Central mine was unwatered, 1907, to the 180-fathom level, the workings being found in good shape, and the mine produced a little fluxing ore, but was closed down, April, 1908, and allowed to fill again.

The main shaft of the North Yelta mine was deepened 120′ in 1907, but work was suspended November, 1907, and the mine allowed to fill, and has remained idle since.

The central power plant, at the Wallaroo, enlarged 1907, has effected a very great saving in operating costs, the former equipment including numerous small isolated installations of machinery, all more or less antiquated in design, and uneconomical in operation. For some years the management has followed the policy of consolidating and eliminating the old and inefficient plants. Some

was experienced, 1907–1908, owing to the poor supply of Beetaloo water, has been largely overcome by the installation of condensers.

ildings include a number of shops and engine-houses, and the principal ıave large and commodious changing-houses, equipped with shower ıd lockers.

ınsportation is furnished by the government railway line, which connects : Wallaroo and Moonta mines with the reduction plant at Port Wallaroo.

ere are concentrators at both groups of mines, and the process followed is essentially the same, the exceptional weight and flaky nature of the rendering concentration exceedingly difficult, but the various metal- problems have been met and conquered by persistence and technical

lt the shafts ore is dumped on grizzlies, passing to bins for various sizes, drawn off to railway trucks, and carried to the concentrators. At the ter crushing, material goes to revolving trommels, from which oversize is ınd selected by hand from traveling belts, with suitable bin arrange-

Concentrating ores, after passing half-inch mesh, are treated by Han-s, the largest jigs at the Moonta mine, treating 25 to 30 tons of material

The well-known Hancock jig, now in use throughout the world, was l by the late H. R. Hancock, former general manager of this property, se of these mines. About 12 to 15% of the material handled is slimed, oing to spitzkasten, for classification and distribution to vanners and ıbles, which yield a product of circa 10% copper tenor.

: Devon mill, at the Wallaroo mine, was enlarged, 1907, by the addition l mills and 6 Card tables, and was given one new transmission cable and onal 100-h. p. motors, with a belt-conveyor for stacking tailings from ley and Card tables, 1908.

he Moonta mines coarse material and tailings from the wash are piled in eathered and leached. Heaps range 20′ to 60′ in height, the tops of the oarser material being laid out in terraces. Ore-heaps are systematically and the leach-liquor, carrying 30 to 70 grains of copper per gallon, runs

The leach-heaps cover about 30 acres, and contain about 1,250,000 ailings, which require a considerable length of time for complete oxida- l thorough leaching. This company has purchased the tailings and the Paramatta Copper Mines, Ltd., for treatment.

: wastes and slimes go to a specially designed leaching plant, and pass a series of vats containing leach-liquor to which 12 to 20 lbs. of sulphuric ıdded for each ton of slimes treated. The slimes in the vat are agitated lving arms, the pulp, after agitation, passing to settling dams and g reservoirs. The leach-liquor is drawn off, in earthen pipes, to the :ipitating works, where it joins the liquor from the various tailings ıd copper is precipitated therefrom on scrap-iron. The material from ing dams is weathered, and given a second and occasionally a third

The average production of precipitate from these plants is 500 ; yearly.

smelter, at Port Wallaroo, 7 and 10 miles distant from the Wallaroo and mines, respectively, does some custom work, in addition to treating the 's ores, production from custom ores and mattes having amounted to g tons 17 cwt. 23 lbs. blister copper in 1907.

smelter has 2 blast-furnaces, No. 1 having been rebuilt 1907, and 4 furnaces. No. 2 furnace has been equipped with water-jackets of l plate, replacing cast-iron jackets. There are sintering pots for treat- lust and fines. Slags are granulated, and sent back to the mines for und filling, this being the first property to make such use of slag. There reverberatory furnaces, which the management is considering closing ıd sending matte direct from the blast-furnaces to the converters.

converter plant, installed 1910, is in a steel shed having a 50-ton Bab-

cock & Wilcox electric crane, of 47′ span. There are 2 Allis-Chalmers stamps operated electrically, with 5 shells, which are lined by an Ingersoll-Rand tamping machine, mounted on a jib-crane. The company also has a small electrolytic refinery, and the final product is a copper of exceptional purity, the "Wallaroo" brand of metal having a deservedly high standing among critical consumers. Copper is sold through Aron Hirsch & Sohn, under contract.

The smelter power plant has steam and electric power, with a Bellis & Morcom engine, and there are 4 Samuelson blowers for furnace blast, blast for converters being supplied by a Fraser & Chalmers blowing engine and a Reavel air-compressor. Coal is handled by a large electric gantry.

The company's private railway system connects the various mines with the works, the line, reaching all important shafts and shops, including many miles of railway, and there are 12 locomotives.

The acid works and bluestone plant, latter rebuilt 1907, are at the smelter, utilizing fumes from the burners, and considerable commercial acid is sold to a fertilizer company manufacturing superphosphate. The cost of producing acid, irrespective of depreciation charges, is about 16s. per long ton. Production of acid was 5,378 long tons, 1907, and averages about 5,000 tons yearly. Considerable bluestone is manufactured in connection with the acid plant.

Labor conditions at the mines and works of the Wallaroo & Moonta are perhaps the best to be found in Australia, where it is too commonly the case that relations between employer and employé are decidedly strained. Underground work is done mainly on contract, and there is a sliding scale of wages, by which bonuses are added automatically, as copper advances in market price, and are cut off similarly, on a declining market. The standard wages are as follows: Drill-runners, 54s. per week; other contract miners, 50s. at the Wallaroo, and 48s. at the Moonta mine. Bonuses paid to machine men and other contract miners are 2s. 5d. per week when copper sells at an average price of £55 to £60 per long ton; 4s. 10d. per week with copper at £60 to £65; 7s. 3d. per week with copper at £65 to £80; 9s. 8d. per week with copper at £80 to £95; 12s. per week with copper above £95. To other employés, on standard wages, weekly bonuses are 5% with copper at £55 to £60; 10% with copper at £60 to £65; 15% with copper at £65 to £80; 20% with copper at £80 to £95; 25% with copper above £95. This system of bonuses has given excellent results. The company keeps implicit faith with its men, and is rewarded by unusual loyalty on their part. The company sells houses to its men, on time, and upon easy terms, and the management does all in its power to improve mining conditions by making good roads, improving sanitation, encouraging the planting of trees, maintaining a library and parks, fostering musical organizations, and by endeavoring, in all other directions, to improve the mental, moral and material condition of its employés and their families.

Production, to Dec. 31, 1904, by this company, was copper valued at £4,281,342, and total value of production of the mines to that date was £12,245,554. Recent production has been as follows: 13,070,252 lbs. fine copper in 1904; 14,563,097 lbs. in 1905; 16,936,640 lbs. copper, 327 long tons bluestone, 8,250 oz. silver and 2,326 oz. gold in 1906; 19,314,480 lbs. copper, 223 long tons bluestone, 5,845 oz. silver and 2,009 oz. gold in 1907; 14,443,520 lbs. copper, 201 long tons bluestone, 7,416 oz. silver and 1,950 oz. gold in 1908; 11,860,800 lbs. copper, 299 long tons bluestone, 4,995 oz. silver and 1,819 oz. gold in 1909; 10,875,200 lbs. copper, 210 long tons bluestone, 2,011 oz. silver and 1,296 oz. gold in 1910. The property was operated only 9 months of 1910, owing to the loss of 3 months, early in the year, through the Newcastle coal strike.

The cost of finished copper was £72 11s. per long ton, equal to 15.7 cents per pound, in 1906, and cost of copper, f. o. b. ocean steamers, was £53 3s. 11d. per long ton, equal to 11.52 cents per pound, in 1909, and was £54 11s. 2d. per long ton, equal to 11.09 cents per pound, in 1910. The shareholders were

d remuneration to the directors, March, 1907, but at the end of that directors voluntarily reduced their compensation to the former figures, unt of the greatly decreased earnings due to the depression in the metal thereby setting a valuable example. The management is to be com- for the exceedingly full and informing reports furnished to its share- The mines are good, and the management is thoroughly competent gressive, and has learned how to command the loyal support of its s.

WALLA COPPER MINING CO. **WASHINGTON.**

ce: Walla Walla, Wash. Mine office: Keller, Ferry Co., Wash. ing, superintendent. Lands, 1 mile northeast of Keller, in the southern he Colville reserve, show a vein of 30′ estimated width, partially miner- ith auriferous copper ore, of fair average assay tenor, developed by an shaft and tunnel.

STREET COPPER & GOLD MINING CO. **MONTANA.**

ıe office: Boulder, Jefferson Co., Mont. Property carries gold and ıres, and in 1906 secured assays of 18% copper and 7 oz. gold per ton. eral years and apparently moribund.

AM MINE, LTD. **COLORADO.**

ıd. Formerly at Russell Gulch, Gilpin Co., Colo. Described Vol. VIII.

AKER MINING CO. **IDAHO.**

ıd. Formerly at Mullan, Shoshone Co., Idaho. Described Vol. IX.

LTA COPPER MINES, LTD. **AUSTRALIA.**

ıd. Formerly at Kadina, Daly Co., South Australia. Described Vol.

LTA MINE. **AUSTRALIA.**

ce: care of Minister of Mines, Adelaide, South Australia. Mine office: Daly Co., South Australia. The property, formerly owned by the a Copper Mines, Ltd., is now held by the state. Lands, 140 acres, a mile from Kadina, developed by á 240′ main shaft, showing a vein of 2′ ith, there also being prospecting shafts of 107′ and 60′, latter showing and irregular ore. Circa 1908 the state bored 5 holes, of 415′ to 1,400′ roving ore bodies of 18″ to 30′ width, giving assays up to 13% copper, a a trace to 9 dwts. gold per ton. Ten parties of tributors were work- 9.

UCHI MINING CO. **JAPAN.**

ıe office: Hatasako-mura, Kamoishi-gori, Iwami, Japan. Property is ibuchi mine, without power installation, employing circa 200 hands in d an average of 111 hands in 1908. Production was 38,658 lbs. fine 2,339 oz. silver, 1,594,890 lbs. copper ore and 1,486 metric tons of zinc a total value of 32,986 yen, estimated to have yielded circa 175,000 copper in 1907, and was 24,637 lbs. fine copper and 339,930 kwan copper some zinc, estimated to have yielded circa 125,000 lbs. fine copper in 1908.

MINING CO. **COLORADO.**

ce: 932 Equitable Bldg., Denver, Colo. Letter returned unclaimed mer mine office, Wapiti, Summit Co., Colo. A. J. White, superintend- ast accounts. Ores carry gold, silver, lead and copper. Has a small ator. Idle several years and apparently moribund.

H SMELTER. **AUSTRALIA.**

ıed by Melbourne & Great Northern Smelting Co., Ltd.

VELL & OSBORNE COPPER MINES CO. **ARIZONA.**

ıe: 714 International Bank Bldg., Los Angeles, Cal. Mine office: Yuma Co., Ariz. Edw. S. Osborne, president and general manager; . Wardwell, vice-president and treasurer; Fred W. Morrison, secretary; g officers, Edw. S. Osborne, Jr. and E. M. Wardwell, directors. Organ- er laws of Arizona, with capitalization $1,000,000, shares $1 par.

Lands, 9 claims, area 120 acres, 4 miles northwest of the Consolidation Copper Mines Co., in the Seneca district, 7 to 10 miles east of Parker, with a good wagon-road connection. The property shows gossans carrying specular iron, and the mine is developed by a number of shallow pits, shafts and tunnels. A 71 incline shaft shows ore assaying 4 to 32% copper, and 75 cents to $9 gold per ton. The deepest shaft was 143', at last accounts. There is a 400' tunnel showing a vein of 8' to 28' width, carrying ribs of rich oxidized ores, alternating with streaks of leached and barren limestone, the rich ores being claimed to average 15%, with a maximum assay of 42% copper. The mine has about 1,100' of workings, and was shipping ore to the Humboldt smelter, November, 1910.

WAR EAGLE CONSOLIDATED MINING & DEVELOPMENT CO., LTD. BRITISH COLUMBIA.

Dead. Was merged, circa 1910, in Consolidated Mining & Smelting Co. of Canada, Ltd. Formerly at Rossland, Trail district, B. C. Described Vol. VIII.

WAR EAGLE COPPER-GOLD MINING CO. BRITISH COLUMBIA.

Dead. Lands were sold, 1906, to Phœnix Amalgamated Copper Mines, Ltd. Formerly at Phœnix, Boundary district, B. C.

WAR EAGLE MINE. YUKON.

Mine office: White Horse, Yukon, Canada. The property is owned by Messrs. Caldwell, Points, Lucas and Kesler. Lands, 3 claims, one fractional, 6 miles from White Horse, showing a contact deposit with extreme width of 230', in limestone near a granite outcrop, carrying slightly auriferous and argentiferous chalcopyrite and bornite, with granitic gangue, giving assays of 2.7% to 46% copper. The ore zone has been traced for 1,500' by 6 pits and trenches. Development is by pits of 26' and 28', and a 140' tunnel. Buildings include a shafthouse, cookhouse, smithy and ore-bin. A little high-grade ore was shipped for test, 1905.

WARRA DIVIDEND CO., LTD. AUSTRALIA.

Office: 29 Grenfell St., Adelaide, South Australia. Mine office: Hergott Springs, South Australia. Hon. Frank Johnson, chairman; F. Stevens, secretary and treasurer. Organized January, 1907, under laws of South Australia, with capitalization £4,000, shares 10s. par, 9s. paid in; issued, £3,977. Annual meeting, in October.

Lands, 160 acres, leasehold, in the Hergott Springs district, known as the Warra Warra mine, showing kaolinized and indurated slates, sandstone and quartzite, in alternate strata, carrying native copper in fine particles, cuprite, malachite, chalcocite and chalcopyrite. The main ore body is reported to average circa 50' in width, traceable one mile, carrying ore assaying 3 to 8% copper, hand-cobbed to an average tenor of 36% for shipment. Development is by vertical shafts of 60', 65', 80', 108' and 266', and by tunnels of 80', 110' and 160'.

The property was under development by the Tasmanian Copper Co., Ltd. which abandoned the mine circa 1908, whereupon it was taken back by the owners, who planned, 1909, raising additional capital needed for development, but apparently failed to secure same. Idle.

WARRA WARRA PROPRIETARY COPPER MINES, N. L. SOUTH AUSTRALIA.

Dead. Lands were sold, January, 1907, to Warra Dividend Co., Ltd. Formerly at Hergott Springs, South Australia.

WARREN DEVELOPMENT CO. ARIZONA.

Dead. Name was changed, 1905, to Warren District Development Co. Formerly at Bisbee, Cochise Co., Ariz. Described Vol. V.

WARREN DISTRICT DEVELOPMENT CO. ARIZONA.

Office: care of C. D. Hanchette, treasurer, Hancock, Mich. Mine office:

Cochise Co., Ariz. John Funkey, president; J. A. Fuller, secretary. ed 1903, under laws of Michigan, with capitalization $100,000, shares issued, $16,000. Lands, 12 claims, area 200 acres, adjoining the Higgins Idle since organization.

N REALTY & DEVELOPMENT CO. ARIZONA.

ce: 1400 Alworth Bldg., Duluth, Minn. Mine office: Warren, Co., Ariz. Henry B. Hovland, president; Chas. A. Duncan, first vice-t; Chas. d'Autremont, Jr., second vice-president; Frederic R. Kennedy, y; preceding officers, Chester A. Congdon, Thos. F. Cole and Capt. Jas. , directors; Henry B. Paull, treasurer; John C. Greenway, general r.

anized June 29, 1905, under laws of Arizona, with capitalization), shares $15 par; issued, $1,260,000, fully paid. Controls, jointly with umet & Arizona Mining Co., Superior & Pittsburg Copper Co. and Queen Consolidated Mining Co., the Warren Co., which has a capitali-f $665,000, owning the townsite of Warren, the public utilities therein, Bisbee & Warren street railway. Shares are listed on the Duluth stock e. Annual meeting, second Tuesday in April.

ıds, circa 1,700 acres, in the Warren district, all of possible mineral ›ut held mainly for surface values. Property includes the Cunningham nd former holdings of the Calumet & Cochise Development Co., 3 f the latter group being of promise. Considerable diamond drilling was)07-1908, one hole, drilled 3,200′ vertically, being said to be the deepest Inited States.

e Lone Star shaft, started 1905, on the Lone Star claim, circa 2½ miles st of the Junction shaft of the Superior & Pittsburg, has 3 compartments, 44′ deep, sunk in limestone throughout. Judging from development to hward, payable ore, if existing, cannot be expected at much less than epth. Management considered good and property valuable, primarily urface rights, with a possibility of making a mine on 3 claims of the t & Cochise group. The mine has been idle since November, 1908.

OR COPPER CO. ARIZONA.

ice: 907 Provident Bldg., Philadelphia, Pa. Mine office: Black , Gila Co., Ariz. Spencer D. Wright, president; Henry A. Fry, vice-ıt; D. H. Paris, secretary; H. S. Hopper, treasurer; preceding officers directors; Ernest M. White, superintendent. Organized March 10, 1905, aws of Delaware, with capitalization $1,600,000, shares $10 par, in 0 cumulative 7% preferred stock and $850,000 common stock, as suc-f Black Warrior Copper Co., Amalgamated, which came to grief. Bonds, issued, at 6%, with interest paid. The lands, formerly described his title, are described in this volume under title of Warrior Development ich holds the property under a bond dated Oct. 9, 1909, running for 3 ıt the price of $1,250,000, on which $100,000 was paid, Oct. 14, 1909. ion was 1,397,612 lbs. fine copper and 325 oz. silver in 1907; 1,099,234 per in 1908; 3,594,084 lbs. in 1909.

OR DEVELOPMENT CO. ARIZONA.

ice: 505 Lonsdale Bldg., Duluth, Minn. Operating office: Globe, ., Ariz. Mine office: Black Warrior, Gila Co., Ariz. Henry B. Hov-resident; Hoval A. Smith, vice-president; Harvey P. Smith, secretary; l McCarthy, general manager; David L. Fairchild, secretary; preceding Edw. C. Congdon and Samuel R. Kaufman, directors; Adolphus Ball, tendent. Organized Oct. 22, 1909, under laws of Arizona, with capitali-$500,000, shares $10 par, in $50,000 full paid and $450,000 of stock $4 ssued, $451,500. Boston Safe Deposit & Trust Co., transfer agent. are listed on the Boston and Duluth curbs. Annual meeting, second y in September.

The company holds a $1,250,000 three-year bond and lease, dated Oct. 9, 1909, on the property of the Warrior Copper Co., which is described under this title. An initial payment of $100,000 was made, and further payments required under the bond were as follows: $2,220 June 30, 1911, $13,220 Dec. 31, 1911; $2,220 June 30, 1912; $1,120,000 Jan. 1, 1913. The final payment may be made at the option of this company, either $270,000 in cash and $850,000 in bonds, or $770,000 in cash and $350,000 in bonds, latter convertible into stock at par, in a company having 250,000 shares of $10 par value. The company's receipts, from Oct. 14, 1909, to Dec. 31, 1910, were $160,600, for 40,150 shares of $4 paid stock, sold at $4; $2,667.30 from miscellaneous revenues, presumably mainly interest, and $282,786.75 from ore shipments. The company ended 1910 with a cash balance on hand of $30,128.52.

Lands are 71 claims, area 1,158 acres, including the Black Warrior group of 29 claims, 14 patented, area 430 acres, the Lost Gulch group of 31 claims, 3 patented, area 561 acres; the Continental group of 4 claims, unpatented, area 61 acres, and 7 additional claims area 105 acres, purchased since organization. The principal property is the Black Warrior mine, a producer of high grade ore since 1904, located about 7 miles northwest of Globe.

The Black Warrior property shows highly altered schist, dacite tuff, diabase and conglomerate, the greater part of the area being covered by schist, which is the oldest and most important formation. The diabase occurs as intrusive dikes in schist, and the dacite is a surface flow over both schist and diabase. There has been widespread and complicated faulting, leaving the schist and diabase highly shattered, and in excellent condition for the reception of ore deposits. The Warrior ore body has a generally EW. trend, and W. pitch. The ore body averages about 50′ to 60′ in width, though a width of 100′ is shown at a number of points. This property includes the Montgomery group, which in turn includes the Montana and Dadeville mines, adjoining claims, developed by tunnels of circa 1,000′ and 1,200′ length, and the mine had 3,000′ of workings, 1906, since materially increased, developing extensive bodies of copper silicates and hydrated copper oxides, of excellent average tenor, the ores shipped by this company 1909–1910, having an average assay of 9.65% copper tenor. The Black Warrior mine is developed by the Winnie shaft, 500′ from the western boundary, and tunnels of circa 1,000′ and 1,200′ length, opening the mine to a depth of 300′, with 5 levels, spaced at 50′ intervals, the mine showing a large tonnage of high grade ore, giving assays of 8 to 25% copper, between the 200′ and 300′ levels. The 300′ level is being driven west to connect with the Winnie shaft. Considerable churn drilling was done 1910–1911, one hole in the vicinity of the Winnie shaft being sunk 506′ in schist, showing mineralization, and a 580′ drill hole proved the existence of chalcopyrite, disseminated in schist, though below commercial tenor. The western portion of the property was being tested by churn drill, May, 1911.

The Lost Gulch shows a highly altered monzonite-porphyry covering the larger part of the area, with extensive areas also of dacite and limestone, and smaller areas of diabase, general geological conditions being much the same as at the Black Warrior. This group shows heavy impregnations of iron oxide, accompanied by considerable quantities of copper carbonates.

Equipment includes a steam plant, burning petroleum. Buildings include an assay office, engineering office, smithy, carpenter-shop and several dwellings, and there is a 300-ton shipping bin.

The reduction plant formerly included a 100-ton concentrator and a 50-ton matting furnace, which have been partially demolished, being of small present value, and a 300-ton leaching plant, which was burned May, 1911.

A force of 75 to 100 men is employed, and the mine has been producing steadily, under the present management. In the 7 years of production, 1904–1910, inclusive, the mine shipped 66,158 tons of ore averaging 9.41% copper by assay, yielding 12,556,434 lbs. fine copper. Production by the former company

325 oz. silver in 1907; 1,099,234 lbs. copper in
ion by the present company was 797,800
f ore, averaging 9.66% copper, yielding
ped, under a long term contract, to
d to the Old Dominion smelter,
. Shipments May, 1911, were
l Paso smelter. Average cost
ch 3.924 cents were for smelting,
.pments of December, 1910, amount-
an approximate profit of $3.79 per ton.
.anagement good.

COLORADO.

ormerly at Fort Garland, Costilla Co., Colo.

PPER CO., N. L. **AUSTRALIA.**

eded, Aug. 18, 1909, by Warroo Gold & Copper Mines,
. Stanthorpe, Bentinck Co., Queensland, Australia. De-

.D & COPPER MINES, N. L. **AUSTRALIA.**

.oskin's Bldg., Spring St., Sydney, N. S. W., Australia. Mine
thorpe, Bentinck Co., Queensland, Australia. W. A. Benn, chair-
ing officer, A. J. Dixon and E. M. Mitchell, directors; J. C. Benn,
Selwyn R. Mort, manager. Organized Aug. 18, 1909, under laws of
h Wales, as successor of Warroo Gold & Copper Co., N. L., with
ition £20,000, shares 10s. par. Has authorized a bond issue of £2,500.
ds, 50 acres, leasehold, in tracts of 10 and 40 acres, latter having a 3'
yritic quartz, carrying a little gold, developed by a 200' main shaft, the
vels showing mainly gold values, and the 200', or bottom level, showing
opper values, with frequent assays of 10 to 12% copper. The mine is
d to have developed 3,000 to 4,000 long tons of gold ore, averaging 55s.
long ton, and 2,500 long tons of auriferous copper ore, estimated at
ue per ton. The 10-acre lease has a 110' shaft, showing a 3' to 4' vein,
ore assaying 8% copper and 1 oz. 6 dwts. gold per long ton.
ipment includes a steam plant, with a double-cylinder hoist, and build-
ide a smithy and changing-house.
smelter was blown in late October, 1910, but suspended shortly, for
The plant has a McMurtry sintering pot, replacing heap-roasting.
est limestone for fluxing is 20 miles distant, and costly.

R & CO. **SIBERIA.**

ks office: Karkuralinski, Semipalatinsk, Siberia. Property is a
plant, known as the Dzhiltav works, including a smelter and electro-
iery, latter put in commission Oct. 15, 1908, apparently being the only
ic refinery in Siberia. The plant is much favored by the high pro-
ariff on copper levied by the Russian government. Production was
s. fine copper in 1908, and 139,287 lbs. in 1909.

OOP MINING CO. **IDAHO.**

er returned from former office, Spokane, Wash. Mine office: Larson,
Co., Idaho. W. M. Lingenfelter, president; A. L. Tinsley, secretary;
pping, manager. Lands, 6 claims, east of the Snowstorm mine, in
er district, mainly in Idaho, but partly in Montana, including a small
ver. Property, hoped to carry about one mile of the supposed extension
nowstorm vein, has a 600' tunnel, showing stringers of chalcopyrite and

OLIDATED MINING CO. **UTAH.**

y at Milford, Beaver Co., Utah. Described Vol. V.

WASATCH COPPER CO. UTAH.

Office: First National Bank Bldg., Ogden, Utah. Letters returned unclaimed from former mine office, Brigham, Box Elder Co., Utah. David S. Tracy, president; Lee Harris, secretary and treasurer; W. D. Pyper, general manager; preceding officers, N. J. Harris, Alex Taylor, Harley Taylor and Caleb Parry, directors. Organized May 14, 1906, under laws of Utah, with capitalization $600,000, shares $1 par. Lands, 7 claims, area 140 acres, circa 3 miles north of Brigham, having a 75′ tunnel and 75′ incline shaft, latter showing auriferous iron ore and copper. Idle several years and apparently moribund.

WASATCH COPPER MINING CO. UTAH.

Dead. Former office was Denver, Colo. J. L. Ross was president. Organized October, 1906, under laws of Arizona, with capitalization $1,200,000. Lands were circa 200 acres, claimed to show a 150′ vein, traceable several hundred feet, opened by a 35′ shaft, developing ore assaying up to 40% copper. Formerly at Pinto, Washington Co., Utah.

WASATCH KING MINING CO. UTAH.

Office: 2134 Seventh Ave., Troy, N. Y. Mine office: Milford, Beaver Co., Utah. Jos. A. Leggett, president; C. W. Cool, vice-president; Arthur J. Burch, secretary; Fred E. Wells, treasurer; J. C. Bromfield, superintendent; preceding officers are the directors. Organized May 25, 1901, under laws of Utah, with capitalization $300,000, shares $1 par, nonassessable; issued, $280,000. Annual meeting, second Tuesday in June. Lands, 7 claims, area circa 140 acres, known as the Wasatch King mine, near the holdings of the Majestic Mines Co., 10 miles northwest of Milford, developed by a 560′ tunnel. Idle several years, owing to lack of cash.

WASATCH MINING & MILLING CO. UTAH.

Dead. Was merged, Sept. 1, 1908, in Utah United Copper Co. Formerly at Milford, Beaver Co., Utah.

WASATCH-UTAH MINING CO. UTAH.

Office: 221 Atlas Block, Salt Lake City, Utah. Mine office: Brighton, Salt Lake Co., Utah. A. W. Nieman, president and manager; H. F. Wullstein, vice-president; F. L. Palmquist, secretary and treasurer; E. E. Price, superintendent. Organized Oct. 6, 1908, under laws of Nevada, with capitalization $1,000,000, shares $1 par, assessable.

Lands, 51 claims, 14 patented, known as the Consolidated Jefferson [illegible] 9 miles from a railway, near the mouth of Little Cottonwood Cañon. The [illegible] has a 1,400′ tunnel, with about a quarter-mile of laterals, showing auriferous [illegible] argentiferous chalcopyrite, with principal values in gold, and 3 carload shipments, made during the last quarter of 1909, gave smelter returns of 2.6% copper and $41 gold per ton.

Equipment includes a steam plant, with an air-compressor. Buildings are boarding-house, smithy and stable, and there is a mill, variously reported as having 2 and 5 stamps, of about 7 tons daily capacity. A small production was secured, 1910.

WASHINGTON-ARIZONA MINING CO. ARIZONA

Mine office: Poland, Yavapai Co., Ariz. Mark Bradley, superintendent, at last accounts. Lands include the Express mine, in the Big Bug district, formerly held by those notorious mining fakers, Douglas, Lacy & Co. [illegible] has an 800′ tunnel, cutting a vein of auriferous copper ore with [illegible] Shipped, 1906, circa 200 tons of ore. Idle several years.

WASHINGTON CONSOLIDATED COPPER CO. WASHINGTON

Dead. Was organized circa August, 1907, as a merger of the Mineral [illegible] Mining Co. and adjoining properties. Lands, said to carry 8 known veins, developed by several shallow shafts, and tunnels of 400′ and 1,500′. Was succeeded, March, 1909, by Penn-Wash Consolidated Mines Co. Post-office, Conconully, Okanogan Co., Wash.

INGTON CO-OPERATIVE MINING SYNDICATE. WASHINGTON.
ne office: Fairfax, Pierce Co., Wash. Lands, 2 claims, 17 miles by
)m Fairfax, said to show a 25′ vein, with a 3′ paystreak carrying dissem-
chalcopyrite, assaying 5 to 33% copper, 5 to 8 oz. silver and $2 gold per
las an available water-power. Was in hands of a receiver, until com-
coal lands, near Fairfax, were sold to the Western Iron, Coal & Coke Co.
ne years and apparently moribund.

INGTON COPPER & MILLING CO. WASHINGTON.
ad. Was a rank fraud, promoted by the notorious L. E. Pike & Co.
y at Eatonville, Pierce Co., Wash. Described Vol. VIII.

NGTON COPPER MINING CO. MICHIGAN.
ice: Hancock, Mich. Letter returned unclaimed from former mine
)elaware Mine, Keweenaw Co., Mich. Spencer R. Hill, vice-president;
. Wright, Jr., secretary and treasurer; preceding officers and Capt. Thos.
ı, directors. Organized under laws of Michigan, with capitalization
)00, shares $25 par; issued, $1,500,000. Cash on hand, Jan. 1, 1909, was
Is controlled, through ownership of a majority of issued stock, by the
aw Copper Co. Annual meeting, fourth Tuesday in March. Lands,
res, on the western shore of Mosquito Lake, on which desultory work has
ne, at intervals, in the past. Idle since 1901.

NGTON-IOWA COPPER MINING CO. WASHINGTON.
ne office: Mineral, Lewis Co., Wash. G. A. Rinehart, E. R. Hewitt
B. Evans, directors. Lands, lying on the eastern fork of Silver Creek, 2
ove Mineral and 14 miles northwest of Index, adjoin the Edison Mining
lopment Co., and both properties are worked under one management.
re said to show 5 large veins, carrying an auriferous, argentiferous and
at arsenical sulphide complex of chalcopyrite, galena, sphalerite and
with quartz gangue. Development is through the Bonanza crosscut
of about 1,200′ length, planned to be driven circa 3,000′, which is said to
t 4 different veins, and is expected to cut 5 additional veins. Equipment
an air-compressor, and the management plans a 3,000′ aërial tram.
veloping steadily, 1910.

NGTON MINES CO. MÉXICO.
ce: Douglas, Ariz. Mine office: Huépac, Arispe, Sonora, Mex.
ostwick, general manager; A. R. Dickson, assistant manager; Gilbert
, superintendent. Organized circa 1910. Jas. Douglas and Dr. L. D.
paid $35,000 on a bond, and expended about $40,000 on the property,
endered the bond, and the property was said to have been bonded, early
the Mexican-American Smelting & Refining Co., Ltd. The mine has 3
one of considerable length, with circa 3,000′ of workings, developing an
claimed to be similar to the deposit of the Pilares mine of the Mocte-
)pper Co., and the mine has been claimed to show circa 350,000 tons of
% copper tenor, which estimate seems high. Equipment includes a
)am plant.

NGTON-NEVADA MINING & MILLING CO. NEVADA.
ıd. Former office was Goldfield, Nev. L. E. Campbell was general
r. Lands were 22 claims, area 400 acres, developed by numerous shallow
ınd 6 short tunnels. Mine, worked 1874–1877, was reopened 1906.
y was sold, June, 1910, to the Syncline Gold-Silver-Copper Mining Co.
y at Ida, Esmeralda Co., Nev.

NG[illegible] & REFINING CO. WASHINGTON.
[illegible] Wash. Organized 1904, with capitaliza-
[illegible], at West Fork, on the San Poil
[illegible] of the Belcher Mining Co.
[illegible], and company appar-

WASHINGTON-SONORA GOLD & COPPER CO. MEXICO.

Dead. Formerly at Magdalena, Sonora, Mex. Described Vol. VIII.

WASHINGTON TUNNEL & COPPER CO. WASHINGTON.

Dead. Formerly at Conconully, Okanogan Co., Wash. Described Vol. VIII.

WASHOE COPPER CO. MONTANA.

Office: 42 Broadway, New York, N. Y. Former mine office was Butte. Silver Bow Co., Mont. Fredk. P. Addicks, president; Benj. B. Thayer, vice-president; A. H. Melin, treasurer and assistant secretary; preceding officers John D. Ryan and H. I. Meehan, directors; G. D. Stivers, secretary. Capitalization $20,000,000, shares $10 par; issued, $3,046,400. Property was sold, May 31, 1910, to Anaconda Copper Mining Co., for 380,000 shares of Anaconda stock. Circa June, 1910, this company discharged, in demand and promissory notes, $8,036,000, at 5%, held by Amalgamated Copper Co., these including a loan of $2,700,000 for construction of the Washoe works, and apparently the Washoe company turned over to the Amalgamated company 160,000 shares of Anaconda stock in payment of its debts. For year 1909 the gross income was $17,968,446, with net profit of $1,732,673 and dividends of $555,968, company ending the year with a surplus of $391,131. This large income was due to the operations of the Washoe smelter. Figures to the authorities of Silver Bow county, Montana, gave net earnings of $153,444 for the year ending June 1, 1909, and $172,105 for year ending June 1, 1910. The company is to be dissolved, and its assets, now consisting solely of Anaconda stock, distributed pro rata among shareholders.

Recent production has been as follows: 6,438,420 lbs. fine copper in 1907; 8,569,170 lbs. in 1908; 11,669,970 lbs. in 1909. Property formerly owned by the company was very fully described Vol. VIII.

WASHOE SMELTER. MONTANA.

Owned by Anaconda Copper Mining Co., at Anaconda, Deer Lodge Co., Mont.

WASHOUGAL GOLD & COPPER MINING CO. WASHINGTON.

Office: 5312 Maple Ave., St. Louis, Mo. Mine office: Washougal, Clarke Co., Wash. F. A. Mabee, president; John Scharboarer, vice-president; J. B. Jordan and T. A. Altman, secretaries; Dr. Otta Sutter, treasurer; preceding officers constitute the directorate; A. D. Wright, general manager; J. P. Cam[illegible] assistant manager; Orrvis Wright, mine superintendent. Organized 1902, under laws of South Dakota, with capitalization $1,000,000, shares $1 par.

Lands, 560 acres, well timbered, held on a 30-year lease, from the state, near Mt. St. Helens, in the Bald Mountain district, on the upper Washougal River, showing mainly granite, carrying several fissure veins, of nearly vertical dip, of which one, of 6' estimated average width, developed by 2 tunnels, carries auriferous and argentiferous copper, lead and zinc ores, estimated to average 10 to 20% copper, 15% lead and zinc, 2 to 70 oz. silver and $1 to $15 gold per ton.

Equipment includes gasoline hoists and a 3-drill Leyner air-compressor. A hydro-electric plant, installed 1908, has a Pelton wheel, developing [illegible] h. p., under a 500' head. There also is a small sawmill and a brickyard. The company was said to be building a mill, August, 1910, and was said, April, 1911, to have an Allis-Chalmers blast-furnace on the ground, for instal[illegible] apparently no smelter has been built.

WAUCHUSETT MINING CO.

Letter returned unclaimed from former office, Fitch[illegible] office: Orogrande, Otero Co., N. M. John W. Knibbs, president and general manager; Col. J. A. Prescott, secretary; Ch[illegible] tendent; preceding officers, Theo. Parker, Dr. W. W. [illegible] and G. E. Moffett, directors. Lands include property [illegible] lease from the Boston-Jarilla Copper Co., just west of the

ped by shafts showing auriferous and argentiferous copper ore. The ny also had, at last accounts, a bond and lease on the War Dog group of 3 and was said, February, 1909, to have a 5-year bond and lease on the r group of the Eureka Mines Co. Presumably idle.

EGAN & WASHINGTON MINING SMELTING CO. — **WASHINGTON.**

ead. Lands were sold, for debt, January, 1908, to Stephen H. Kennedy. ly at Bossburg, Stevens Co., Wash.

LOWE MINING CO. — **COLORADO.**

ine and works office: Silverton, San Juan Co., Colo. A. A. Lamont, tendent, at last accounts. Lands, bought circa November, 1909, of the & Silverton Mining & Reduction Co., include property in Illinois Gulch, north of Silverton, carrying auriferous lead and copper ores, and the mine and mill, on King Solomon Mountain, the latter variously reported ng 10 stamps and 40 stamps. Equipment includes steam power, and ntly the company owns the Silverton smelter also.

ER MOUNTAIN MINING CO. — **ARIZONA.**

fice: North American Bldg., Philadelphia, Pa. Letter returned un- from former mine office, Congress, Yavapai Co., Ariz. W. C. De d, president; S. S. White, vice-president; Edw. P. Vogel, secretary and er. Organized July 18, 1908, under laws of Arizona, as successor of the Mines Co., with capitalization $2,000,000, shares $1 par, nonassessable. 16 claims, area 336 acres, in the Weaver district, showing auriferous and ferous copper and lead sulphides. Management reports the property to er lease. Idle.

R COUNTY MINING & MILLING CO. — **UTAH.**

ead. Was succeeded January, 1908, by Del Verde Tunnel Co. Formerly en, Weber Co., Utah. Described Vol. VIII.

TER MINING CO. — **UTAH.**

ead. Formerly at Marysvale, Piute Co., Utah. Described Vol. VIII.

MACGREGOR MINE. — **AUSTRALIA.**

rned by MacGregor-Cloncurry Copper Mines, Ltd.

RTHALER BERGWERKE G. m. b. H. — **GERMANY.**

ead. Was absorbed, October, 1906, by Silberbergwerke St. Sylvester, ock interest. Formerly at Markirch, Elsass, Germany. Described Vol.

ER COPPER CO. — **IDAHO.**

ice: Salt Lake City, Utah. Letter returned unclaimed from former fice, Dubois, Frémont Co., Idaho. Jesse Knight, president; preceding S. S. Pond, W. B. Andrew, J. W. Cahoon and Hon. C. Day, directors. perty was mortgaged to W. H. Timlin, with a total obligation of $26,800, eceiver was asked, July, 1909. Management was entirely changed, circa 910.

nds, originally were 18 claims, area 360 acres, said to have been increased, 44 claims, area 880 acres, including the Paymaster mine, on Birch Creek, kull Cañon district. The property shows a contact zone of 100′ to 200′ between quartzite and limestone, carrying high-grade ore in pockets and sures, latter of 3″ to 2′ in width, running at right angles to the main deposit. Development is by [illegible] and 3 [illegible], 2 longest of 300′ Considerable ore was shipped [illegible], with a pro- of circa 200,000 lbs. [illegible]

SS y CA. — **PERU.**

ne office: Nueva [illegible] mine. 50 g argentiferous [illegible] 1908. The firm [illegible]

WELDON GOLD & COPPER CO. ARIZONA.

Office: Tucson, Ariz. Mine office: Weldon, Pima Co., Ariz. Jas. A. Greene, vice-president; Ferris S. Fitch, secretary, treasurer and general manager; preceding officers, Hon. Samuel W. Smith, Frederick M. Alger and Frank R. Osborne, directors; Luke Turnbull, superintendent; J. M. Martines, mine superintendent, at last accounts; Clare Turnbull, mill superintendent, at last accounts; J. B. Tomlinson, consulting engineer.

Organized Jan. 26, 1901, under laws of Arizona, with capitalization $2,500,000, shares $1 par; issued, $2,175,000. The company was said, August, 1907, to have expended upwards of $100,000. Has circa 450 shareholders. Annual meeting, first Monday in February.

Lands, 49 claims, partly patented, area 980 acres, and 3 millsites, with total area of 1,020 acres, in the Quijotoa district, circa 40 miles from the Arizona & Southern railway, showing granite, andesite, shales and limestone, reported to carry 8 contact deposits, between granite and andesite, two said to be traceable 2 miles, of which one, of 200′ claimed average width, carries mainly gold values. The copper ore body shows malachite near surface, succeeded by auriferous chalcopyrite, associated with sphalerite, galena and pyrite, with a brecciated quartz gangue, giving assays of 10 to 30% copper and 5 to 70% lead. Ore values, as a whole, apparently are more in gold, silver and lead than in copper.

Development includes an old 1,800′ crosscut tunnel, not used by present company, driven, circa 1880, by the Peer & Peerless Mining Co. New development consists of shafts of 330′, 200′, 150′, 100′, 112′, 85′ and 60′, and tunnels of 430′, 275′, 200′, 100′, 132′, 101′, 123′, 100′, 200′ and 100′, with total workings of circa 4,500′, at end 1906, estimated to show 1,000,000 tons of ore, which estimate is excessive, with 90,000 tons blocked out for stoping.

Equipment was reported by the company to include a steam and gasoline installation, aggregating 500 h. p. at the mine and mill. There are two 45-h. p. hoists, good for 700′ depth, and Fairbanks & Morse and Leyner air-compressors of 5 drills aggregate capacity.

There are 17 buildings, including an 18x20′ wooden machine-shop, boiler-house, carpenter-shop, smithy, boarding-house, laboratory and a general store.

The 100-ton stamp-mill and concentrator, 75x100′ in size, of wood, sheathed with iron, has 30 gravity stamps and a 250-h. p. engine. Equipment of the concentrator includes 4 Blake and Samson crushers, one 50-ton Elspas centrifugal crusher, and 3 Standard tables. In 1907 the company installed the Hendryx electro-cyanide process, consisting of an agitator, filter and precipitator, and mill was claimed January, 1907, to be running double shifts, making about 2 tons of concentrates daily, according to the company's annual report, but official returns of the Territory of Arizona, covering the year 1907, do not show any production of copper, silver or gold by this company.

The property was attached, under a debt of $1,000, and was advertised for sale on July 25, 1910, but some sort of a settlement was made the day previous to date of sale. Property is now said to be under the management of the Wagner Development Co. Is not regarded favorably, notwithstanding the fact that some men of excellent standing are included in the directorate.

WELLINGTON COPPER MINING CO. NEW MEXICO.

Mine office: Cutter, Sierra Co., N. M. Organized circa November, 1907, under laws of New Mexico, with capitalization $3,000,000, by Edw. F. Cutter, J. A. Sherman and Jas. F. Kindall. Presumably idle.

WELLS BAY MINING CO. OF ALASKA. ALASKA.

Office: 1328 Broadway, New York, N. Y. Mine office: Valdez, [illegible] William Sound district, Alaska. Samuel H. Rapp, president; G. A. Le[illegible] vice-president; Wm. Glendenning, second vice-president and manager; [illegible] Samuel Rapp, treasurer; preceding officers, Emil Steffens, Chas. H[illegible]

. Gray and Harry W. Davis, directors. Organized under laws of Dela-
ith capitalization $1,500,000.
ds, 12 claims, on Glendenning Bay, an arm of Wells Bay. On Dec, 1,
velopment included the 220′ Jennie R. tunnel, with 28′ and 39′ tunnels
/innie L. claim, and a 25′ shaft on the Bertha R. claim, reported by the
nent to show ore giving good assay values in copper and gold. It is
that the Jennie R. tunnel, at a distance of 200′ from the portal, and at
250′, gave ore assaying 18% copper, which presumably was from care-
:cted samples. The management claims to have samples assaying up to
ton in gold and silver, but states that to claim such averages would be
ng. The company claims that the gold and silver in its ores will more
· for the copper, which of course will not be the case, as it happens not to
:ase with any copper mine in the world. Buildings include 16x32′
ıse, 16x20′ smithy, 18x40′ woodshed and 12x16′ cabin.
company's prospectus is filled with glittering generalities, and the man-
sent out a circular letter, Oct. 7, 1910, stating that previous to the June
g the Wells Bay Mining Co., of Alaska, "resolved itself into a copper
turing proposition, because ore was found in abundance," which was
·emarkable statement, as, so far as known, the company had produced
:r whatever, at that date. The circular letter in question calls attention
nuch richer the ore of this property is than that of the Calumet & Hecla,
& Montana, Anaconda and United Verde mines, but neglects to call at-
to how much more ore the properties in question have than the Wells
. In this letter the company offered stock at 45 cents per share, stating
; was the last opportunity of obtaining shares in this producing property,
›ring the word "producing," which use of the word was absolutely
ng and unfair. The company stated, October, 1910, that it was pre-
ship ore "today," only awaiting the building of the docks. On a similar
might be claimed, as truthfully, that the people of Yuma are prepared
, "today," merely awaiting the freezing over of the Colorado River.
npany claimed that it had large quantities of ore piled on the shores
Jenning Bay, which statement appears open to doubt, considering the
amount of development secured. Is not regarded favorably.

/OOD COPPER SYNDICATE. **AUSTRALIA.**

ıe office: Lucknow, N. S. W., Australia. Property is in Wellwood pad-
range division, near Lucknow, and prospecting work was begun thereon,
07. Presumably idle. .

[COPPER MINING SYNDICATE, LTD. **WALES.**

ıd. Was liquidated, voluntarily, 1909. Formerly at Talybont, Cardi-
:, Wales. Described Vol. VIII.

ENDALE GOLD MINING CO. **ARIZONA.**

ne office: Wendendale, Yuma Co., Ariz. Otis E. Young, manager.
in the Cunningham Pass district, are developed by a shaft, showing ore
/e returns of 13% copper and $12 gold per ton, from a test smelter ship-
906. Equipment includes a small gasoline plant. Idle several years.

IGO COPPER CO., LTD. **MICHIGAN.**

ed. Was an offspring of, and, July, 1901, was absorbed by the Isle Royale
:orporation, Ltd. Formerly at Washington Harbor, Isle Royale Co.,
Fully described Vol. II.

WORTH COPPER CO., LTD. **NOVA SCOTIA.**

ne office: Wentworth, Cumberland Co., N. S. Organized circa Feb-
1907, to take over lands, bought at foreclosure sale, of Cumberland
Co. Apparently idle since organization.

EN[illegible] MINING & MILLING CO. **IDAHO.**

ica[illegible] returned unclaimed from former mine office,
, [illegible] W. Hunt, president; Stephen A. Powell,

secretary; Horace E. Neal, treasurer; L. C. Van Riper, manager, at last accounts. Capitalization $5,000,000, shares $1 par. Lands, 9 lode claims and 2 placer claims, area 240 acres, in the Big Creek district, showing a mineral zone of circa 250′ width, carrying ore having mainly gold values, with small quantities of lead and copper. Equipment includes steam power, and there is a 30-stamp mill. Idle.

WESSEL COPPER MINING & MILLING CO. ARIZONA.

Letter returned unclaimed from former office, St. Louis, Mo. Mine office: Casa Grande, Pinal Co., Ariz. R. J. Wessel, president and general manager; N. Ruppener, vice-president; H. J. Praechter, secretary and treasurer. Lands known as the American Boy mine, 2 miles north of Toltec, have a 97′ shaft, showing a 10′ vein carrying ore giving assays of 10 to 14% copper, and circa $2 gold per ton, with occasional small silver values. Equipment includes a steam plant, with a hoist and air-compressor. Presumably idle.

WEST BINGHAM COPPER CO. UTAH.

Dead. Former office was 1104–43 Exchange Place, New York, N. Y. Stock was put out, 1906, by Hubbard & Hart, fiscal agents. No trace of operations ever secured, and apparently the company was a pure bit of stockjobbery. Formerly at Bingham Canyon, Salt Lake Co., Utah.

WEST BRITISH DEVELOPMENT SYNDICATE, LTD. IRELAND.

Office: 709 Tower Bldgs., Liverpool, Eng. Mine office: Crookhaven, Co. Cork, Ireland. Harry V. Kilvert, J. P., chairman; Thos. L. Miller and H. W. Wilson, managing directors; R. Shacklady, secretary; T. Holmes, mine manager. Organized Aug. 16, 1905, under laws of Great Britain, with capitalization £31,500, in £30,000 of 6% cumulative preference shares of £1 par, and 30,000 deferred shares of 1s. par. Property is the Browhead mine, at Crookhaven, carrying copper and lead ores, and leasehold lands at Berehaven and Cahermore. Presumably idle.

WEST BUTTE MINING CO. MONTANA.

Letter returned unclaimed from former office and mine, Butte, Silver Bow Co., Mont. Chas. Schmidt, president; W. McConnell, vice-president; Carroll G. Dolman, secretary and treasurer. Organized Jan. 31, 1906, under laws of Montana, with capitalization $3,000,000, shares $5 par. Property was options on the Columbia and Montrose claims, in the western part of the Butte district, the Columbia claim, area 9.32 acres, having a 144′ shaft, claimed to have produced about $100,000 worth of silver ore, many years ago. Idle several years and apparently moribund.

WEST CANANEA COPPER CO. MÉXICO.

Dead. Property was bonded, circa 1909, to the Copper Queen Consolidated Mining Co., which threw up the bond circa June, 1909. Formerly at La Cananea, Arizpe, Sonora, Mex. Described Vol. VIII.

WEST CARBERY COPPER ESTATES, LTD. IRELAND.

Office: 10 Bush Lane, London, E. C., Eng. Mine office: West Carbery, Co. Cork, Ireland. A. S. Caldwell and Dr. A. Drysdale, directors; A. Collins, secretary. Organized Jan. 28, 1908, under laws of Great Britain, with capitalization £52,000, in £50,000 "A" shares of £1 par, and £40,000 "B" shares of 1s. par; issued, £2,402 "A" shares, fully paid. Lands, leasehold are at Ballycummisk, Foilnamuck, Rossbrin, Cappaghnacallee and Cappahdlue, all in the Barony of West Carbery. Presumably idle.

WEST CLONCURRY COPPER CO., LTD. AUSTRALIA.

Dead. Was wound up, August, 1907. Formerly at Cloncurry, Mount Oxfield Co., Queensland, Australia. Described Vol. VIII.

WEST COAST MINING & SMELTING CO. MÉX.

Office: 1419 Pennsylvania Bldg., Philadelphia, Pa. Mine office: [illegible] rito, Sinaloa, Mex. Howard L. Haines, president; Robt. C. Thom[illegible] president; Chas. M. Hicks, secretary; Henry B. Neely, treasurer; [illegible]

, Col. Jas. B. Coryell, Geo. B. Wilson and Tristram C. Colket, directors; W. Hicks, general manager; E. H. Hines, superintendent. Organized under laws of Maine, with capitalization $2,500,000, shares $1 par, non- able, in $500,000 of 7% cumulative preferred stock and $2,000,000 of com- ock; issued, $50,000 preferred and $1,200,000 common, at last accounts, ber, 1908. Colonial Trust Co., registrar.

nds, 6 groups, area 387 acres, 5 to 20 miles from Mocorito, and 12 to 40 from Carbó. Principal property is Los Tajos group, area 357 acres, ng the San Antonio, San Manuel, Los Tajos and Ampliacion de Los laims, showing andesite, carrying 3 fissure veins, with NE. strike, of about nated average width, carrying chalcopyrite, estimated by the company to e 5% copper, 4 oz. silver and $2.50 gold per ton. The River mine, of Los group, has a 150′ shaft, on a vein of 5′ to 8′ reported width, carrying ore 910, to average about 5% copper and $3 per ton in combined gold and values. In 1908 the mines had tunnels of 231′, 1,226′, 122′, 320′, 210′ ′, with circa 2,500′ of drifts on veins. The property was claimed, 1907, e in sight circa 200,000 tons of ore, of circa $30 per ton average value estimate seems high.

quipment includes a 70-h. p. steam plant, having a small Ingersoll-Rand air- ssor and 6 Rand drills. There are several buildings. The 30-ton experi- concentrator has a 7x10″ Blake crusher, 2 rolls, 2 Bartlett tables and 3 . The smelter, at the mine, has a 50-ton water-jacket blast-furnace, and nagement planned building a 1,000-ton smelter, in 200-ton units. The ny stated, August, 1908, that it was expected to begin production Janu- 09, but the smelter was blown in circa July, 1910.

COLUMBUS COPPER CO. **UTAH.**

ead. Formerly at Alta, Salt Lake Co., Utah. Described Vol. VIII.

COLUSA MINE. **MONTANA.**

wned by Anaconda Copper Mining Co., at Butte, Silver Bow Co., Mont.

ERN CONSOLIDATED MINING CO. **MEXICO.**

ead. Formerly at Hermosillo, Sonora, Mex. Described Vol. VIII.

ERN COPPER CO. **ARIZONA.**

ead. Formerly at Globe, Gila Co., Ariz. Described Vol. VIII.

ERN COPPER CO. **MONTANA.**

fice: 452 Arcade Annex, Seattle, Wash. Letter returned unclaimed rmer mine office, Cooke, Park Co., Mont. Dr. G. L. Tanzer, president neral manager; J. J. Black, secretary. Organized August, 1909, to absorb w World Reduction & Power Co., and shareholders of the latter have t suit against Messrs. Tanzer, Black, et al., for heavy damages, alleging tes of the New World Reduction & Power Co. were given the Western Co. without consideration, with the deliberate intent of wrecking the . In May, 1910, this company was offering a block of 50,000 shares of t 50 cents per share. Apparently this company holds no lands, having o swallow the property intended. Is regarded with suspicion. Idle.

ERN COPPER CO. **MONTANA.**

fice: Calumet State Bank Bldg., Calumet, Mich. Letter returned ned from former mine office, Butte, Silver Bow Co., Mont. Organized ugust, 1908, with capitalization $1,000,000, shares $5 par, as a reconstruc- Calumet & Butte Mining Co., and exchanged new stock for old, on a new stock being marked $2 paid in. Merchants & Miners Bank, Calu- ansfer agent.

nds, 14 claims, area 166 acres, near Columbia Gardens, including 2 known as the Albert and Richelieu, near the Altoona, on which the old y spent about $100,000. Development is by 2 shafts, deepest 530′, rosscut started on the 500′ level. The mine has about 3,000′ of workings,

showing native copper, azurite, and malachite. Shipped, 1907, a little ore taken from shallow workings, averaging about 12% copper. Idle since circa 1908.

WESTERN COPPER CO., LTD. NEWFOUNDLAND.

Mine office: York Harbour, Birchy Cove, Bay of Islands, Nfld. H. V. Smythe, general manager, at last accounts. Lands, 4 claims, area 6,400 acres, and 26,880 acres of timber lands, giving total holdings of 33,280 acres. Mining lands are located back of the Bay of Islands, on the western coast of Newfoundland. In addition to the York Harbour mine, the company holds 2 additional areas, having extensive surface indications of copper. Country-rock is diorite, carrying 12 known fissure veins in serpentine, of which 5, including one of 50' width, have been more or less developed. The country-rock is a dark green to black serpentine, having a generally NE. trend, with dip of about 73° SE. carrying superimposed lenticular masses of low-grade chalcopyrite, practically conformable in trend and dip, the lenses having been found much crushed or broken near surface, but occurring in solid masses of many thousand tons at depth.

The York Harbour mine, at the head of Eagle Nest brook, about 4,000' from the bay, at an elevation of about 1,000' above tidewater, carries cupriferous pyrite, giving assays of 3 to 18% copper, with occasional zinc, up to 50% sulphur, 0.5 to 4 oz. silver and 40 cents to $1.40 gold per ton. The ore is compact and close-grained, with average values of circa 4.5% copper and 38 to 41% sulphur, the sulphur being valuable for use in the manufacture of acid, after the extraction of copper values. Development is by shafts of 54', 64', 70' and 360', with about one-half mile of workings, placing about 40,000 tons of ore in sight, and a new series of lenses was under development, circa 1907. The 360' main shaft is sunk at an angle of 72° to the SE., practically the same as the dip of the ore lenses. Levels are opened at 60' intervals, with drifts driven southwest, along the strike of the ore bodies. Two shafts are used for pumping and ventilating purposes only. Extraction was carried on by overhead stopes, averaging 10' to 30' in width, and timbering is with 12x12" sticks, in square sets.

The shafthouse has a crusher of 500 tons daily capacity, reducing ore to size passing a 6" ring, whence it goes into cars on the main tramway, which is 5,400' long, with an elevation of 1,000', having a 36" gauge track, trains consisting of two 3-ton self-dumping steel cars, which are lowered by a hoist, and deliver ore into a 2,000-ton pocket on the bay, to a double-tracked tunnel, both sides of which are fitted with chute-gates, connecting with the superstructure of the pier, over which one-ton cars are trammed, delivering ore into the hold of the steamer. Loading facilities are equal to handling circa 700 tons daily.

Equipment includes a 250-h. p. steam plant, with a 50-h. p. Flory hoist and an 8-drill Norwalk high-altitude air-compressor. Buildings include an engine-house, boiler-house, sawmill and 15 dwellings.

The property was taken over by the York Harbour Mine (Newfoundland) Ltd., organized Oct. 7, 1909, for the purpose, but apparently title had not been transferred, at last accounts. A small production was secured, 1910. Property considered promising.

WESTERN EXPLORATION CO. CALIFORNIA.

Dead. Formerly at Winthrop, Shasta Co., Cal. Described Vol. VI.

WESTERN EXPLORATION CO. NEVADA.

Dead. Former office was Butte, Mont. Was organized 1905, and reorganized 1906, under title of Globe Mines Exploration Co. Formerly at Ely, White Pine Co., Nev.

WESTERN MINES DEVELOPMENT CO. ARIZONA.

Letters returned unclaimed from former mine office, Swansea, Yuma Co., Ariz. C. C. Davis, president; W. C. Rowland, vice-president; R. W. Baxter

ry, treasurer and general manager; preceding officers, Fred A. Mueller and ones, directors. Organized April, 1909. Lands, known as the Central lying between the Clara and Moro groups of the Clara Consolidated, are 3 rom Swansea, 22 miles from Bouse, and about 5 miles from the Bill as Fork River, the nearest source of water supply. The property, ed by tunnel, shows free gold and auriferous copper ore. Idle and pre- y moribund.

ERN MINING CO. **COLORADO.**

ad. Formerly at Lake City, Hinsdale Co., Colo. Described Vol. VIII.

ERN MINING CO. **MONTANA.**

ad. Formerly at Apex, Beaverhead Co., Mont. Fully described Vol. VIII.

ERN MINING & DEVELOPMENT CO. **ARIZONA.**

ad. Formerly at Planet, Yuma Co., Ariz. Described Vol. VIII.

ERN MINING & DEVELOPMENT CO. **COLORADO.**

fice: 42 Home Bank Bldg., Detroit, Mich. Letter returned unclaimed rmer mine office, Pearl, Larimer Co., Colo. A. C. Stellwagen, president; Henninger, vice-president; J. D. Mackay, secretary and treasurer; C. E. , general manager; Harold Wilson, superintendent, at last accounts. y was a lease, expiring 1906, on the holdings of the Pearl Copper Mining ting Co. Idle some years, and apparently moribund.

ERN MINING & LEASING CO. **UTAH.**

fice: 1111 Newhouse Bldg., Salt Lake City, Utah. Letter returned ned from former mine office, Frisco, Beaver Co., Utah. C. C. Parsons, e-president and treasurer; L. L. Nettleton, secretary; preceding officers, Graham and E. Ben Brown, directors. Organized circa September, nder laws of Utah, with capitalization $25,000, shares $1 par. Property ond and lease on the Comet group, in the Frisco district. Company was have been organized to take over the Nevada-Utah Mines & Smelters ation. Idle and presumably moribund.

ERN MINING & MILLING CO. **UTAH.**

fice: 422 McCornick Bldg., Salt Lake City, Utah. Mine office: Lin- ooele Co., Utah. A. B. Hirth, president; E. D. Haskins, vice-president; lurd, secretary; W. A. Cooke, treasurer; John B. Taylor, superintendent. zed 1897, and reorganized 1905, under laws of Utah, with capitalization 00, shares $1 par, assessable, with 2 assessments levied; issued, $200,000. se corporation, having only 9 shareholders.

nds, 20 claims, 19 patented, area 215 acres, in the Pine Cañon district, western slope of the Oquirrh Mountains, 10 miles from a railway. The y has about 1,000′ of workings, showing auriferous and argentiferous and lead ores. Equipment includes a steam plant, and buildings include ling-house and smithy. Was developing with a force of 4 men, early 1911.

ERN MINING & STEEL CORPORATION. **CALIFORNIA.**

ad. Formerly at San Luis Obispo, San Luis Obispo Co., Cal.

ERN MONTANA MINING CO. **MONTANA.**

ad. Former office was Park Bldg., Pittsburg, Pa. A. H. Gray was nt and general manager; C. L. Butterfield, financial agent. Was organ- 05. Lands included the Exchequer and Snowdrift mines, lying north of hmond and Monitor, having a 10′ fissure vein, developed by a 600′ tunnel, g bunches of malachite and pyrite. Formerly at Saltese, Missoula Co.,

ERN NEVADA COPPER CO. **NEVADA.**

fice: Newhouse Bldg., Salt Lake City, Utah. Mine office: Yerington, Co., Nev. Col. C. Edw. Loose, president; J. E. Hoban, vice-president; Knox, treasurer; preceding officers, Samuel Newhouse, Hon. Reed Smoot . H. Peery, directors; John Josten, secretary; Maurice M. Johnson, gen- anager; Frank B. Cook, assistant manager; R. H. Britt, superintendent.

Organized November, 1906, under laws of Arizona, with capitalisation $6,500,000 shares $5 par. Shares are listed on the Salt Lake stock exchange.

Lands, 8 claims, patented, area 150 acres, known as the Dyer group, with water-rights and a smelter-site on Walker River, near the mine. Lands, are south of the Yerington-Malachite mine, are said to be in the same contact zone as the Mason Valley mine, one mile northward, and show a replacement contact deposit of circa 25′ width, between granite and limestone, with strong mineralization in the lime, the ore body, having a NS. strike with dip of 65°, carrying argentiferous azurite, malachite, chalcocite and chalcopyrite, estimated by the company to average 5% copper, and the mine is said to have produced ore, in quantities, of a copper tenor up to 20%, but the estimated average value is much too high. The limestone, on the east of the vein, is mineralized for a distance of about 75′ from the contact, though not commercially, except for an average of about one-third of that distance. The mine has a 500′ shaft and 2 tunnels, the upper being a drift tunnel of circa 500′, and the lower, 140′ vertically below the upper, a crosscut of 1,014′ length, showing ore of 2 to 5% copper tenor. The mine is said to have upwards of one mile of workings, estimated to show 100,000 tons of ore.

Equipment includes a 150-h. p. plant, having a 25-h. p. hoist, good for 500′ depth, and a 5-drill two-stage air-compressor. There are 5 buildings. Property considered promising. Presumably idle.

WESTERN PACIFIC COPPER CO. UTAH.

Office: 208-69 East Third South St., Salt Lake City, Utah. Mine office: Callao, Juab Co., Utah. E. J. Yard, president; Jackson H. McCrystal, vice-president and general manager; Elroy M. Clark, secretary and treasurer; preceding officers, C. O. Baxter and Jos. W. Gwynn, directors. Lands, 320 acres, adjoining the Western Utah Copper Co., in the Willow Springs division of the Deep Creek district, in Tooele County, just over the Juab County line. The mine has a shaft and tunnel, developing argentiferous copper and lead ores, and has made occasional small shipments, ore shipped to end of 1907 averaging about 13% copper, 25% lead and 22% iron, with several ounces of silver per ton, and several small shipments, made 1910, returned up to 13% copper, 25% lead, ore carrying up to 24% iron, with small silver gold and values. Equipment includes a steam plant and air-compressor.

WESTERN PACIFIC GOLD & COPPER MINING & MILLING CO. UTAH.

Office: Salt Lake City, Utah. Letter returned unclaimed from former mine office, Ogden, Weber Co., Utah. Thos. F. Feeney, president. Capitalization $1,000,000, shares $1 par. Stock is listed on Salt Lake stock exchange. Lands, 12 claims, 2½ miles from a railroad, in the Sierra Madre district, having a 150′ incline shaft with 530′ of tunnels, showing low-grade sulphide copper ore carrying gold and silver values. Idle.

WESTERN QUEEN MINES CO. ARIZONA.

Mine office: Turkey, Yavapai Co., Ariz. Dr. J. B. McNally, president and general manager; John McKenzie, superintendent, at last accounts. Lands, 4 miles from a railroad, lying next west of the Corona Consolidated, have a 400′ shaft, sunk by former owners, showing a vein with a 6″ to 3′ paystreak carrying up to 1,400 oz. silver per ton, balance being low-grade auriferous and cupriferous copper ore. Has shipped ore returning 22% lead and 5% copper. Has steam power. Idle.

WESTERN SLOPE COPPER MINING & SMELTING CO. COLORADO.

Office: Thompson Bldg., Butler, Pa. Mine office: Grand Junction, Mesa Co., Colo. J. S. Shaw, president and general manager; Geo. A. Trefz, vice-president; A. F. Regal, secretary; D. L. Cleeland, treasurer; preceding officers, Henry R. Rhone, F. C. Creber, P. L. King, Dr. E. L. Wasson and W. R. Cowden, directors; J. B. Fonder, superintendent; C. T. Miller, consulting engineer. Organized July 25, 1900, under laws of Colorado, with capital

), shares $1 par, nonassessable; issued, circa $555,000. Bonds, $50,000
ed, at 6%, but none issued, at last accounts. The old management
ular quarterly dividends of one-half per cent., which were unearned,
ddling stock, but was ousted, 1908, and the company given a complete
tary change in management. Annual meeting, Aug. 2d, each year.
ds, 13 claims, 8 patented, area 130 acres, with about 100 acres timbered,
Jnaweep district, 23 miles southeast of Grand Junction and 12 miles
hitewater, the nearest rail point on the Denver & Rio Grande line. The
shows granite, diorite, sandstone and limestone, carrying 6 known veins,
2, under development, have paystreaks of 8″ to 4′, carrying malachite,
and chalcopyrite, from which 17 carloads of ore, shipped some years ago,
urns of 11 to 18% copper, 2 to 10 oz. silver and $1 to $5 gold per ton.
ment is by shafts of 250′, 165′, 160′, 40′, 69′ and 72′, with tunnels of
5′ and 35′, the mine having 1,686′ of workings.
uipment includes a 50-h. p. steam plant, with a 40-h. p. hoist good for
epth, and there are 4 mine buildings, of logs and lumber. There is a
natting furnace, at the mine, blown in June, 1905, by the old manage-
The new management plans adding an air-compressor and pushing
nent with a force of 3 shifts daily. Property considered promising.

RN SMELTERS CORPORATION. **NEVADA.**

ce and works: 310 North Carson St., Carson City, Ormsby Co., Nev.
Yerington, president; P. B. Ellis, vice-president; O. W. Tennant, sec-
nd treasurer; preceding officers, E. B. Yerington, W. E. Sharon and Wm.
lirectors; Jas. W. Boileau, consulting engineer; W. E. Patterson, super-
nt. Organized under laws of Arizona, with capitalization $5,000,000,
5 par, and reorganized, July 16, 1909, under laws of Nevada, with cap-
on $2,500,000, shares $5 par, nonassessable.
ds are 280 acres, 200 acres patented, carrying iron ore and limestone for
with water-rights and a millsite. The company owns the old Merrimac
Carson Cañon, with water-rights on the Carson River, which traverses
and holds an option on the Brunswick mill, having 76 stamps and a good
wer, with present value mainly in the latter. The property is served
nain line of the Virginia & Truckee railway, which connects with the
n Pacific.
smelter, on which work was begun March 15, 1910, with the intention
ng in the plant early 1911, includes a 65x106′ furnace building, covering
-furnace and converter departments, planned to have a 250-ton Allis-
s blast-furnace, with a 50-ton traveling crane and 10-ton auxiliary hoist.
verter department is planned to have 2 stands with five 8x10′ cast-steel
perated electrically. The 32x60′ power-house, having electric power,
ed to have a Connersville blower. Other buildings planned are a 24x60′
21x21′ laboratory and a boarding-house. The company plans doing a
custom business on ores of the Yerington district.

RN THARSIS MINING CO., N. L. **TASMANIA.**

d. Formerly at Gormanston, Montagu Co., Tasmania.

RN TIN & COPPER SYNDICATE, LTD. **ENGLAND.**

d. Formerly at Redruth, Cornwall, England. Described Vol. IX.

RN UTAH COPPER CO. **UTAH.**

e: 401 Dooly Bldg., Salt Lake City, Utah. Mine office: Ibapah,
Co., Utah. W. S. McCornick, president; Capt. Duncan MacVichie,
ident; Herman H. Green, secretary and treasurer; preceding officers,
hite, F. Augustus Heinze, Henry M. Sweet and Hon. John A. Street,
; John Bergh, superintendent. Organized circa October, 1906, under
Wyoming, with capitalization $7,500,000, shares $5 par, nonassessable.
re listed on the

Lands, 51 claims, 20, of 364 acres area, patented, and a 340-acre ranch. Mining property is known as the Gold Hill mine, on Gold Hill, in the Clifton section of the Deep Creek district, some distance from Wendover, the nearest rail point, on the Western Pacific, and the company is considerably hampered by lack of adequate transportation facilities. The property shows a prominent iron gossan, and has copper and lead veins, and formerly was claimed to show a 12′ to 15′ vein, with a 3′ paystreak assaying up to 20% copper, 6 to 22 oz. silver and $11 to $14 gold per ton, and the vein now is claimed to be 85′ wide, on the 150′ level, with ore averaging 5% copper. The mine is claimed to have 100,000 tons of ore blocked out. Development is by 14 trenches, pits and shafts, including a 600′ shaft and a long tunnel, with upwards of 1 mile of workings, the tunnel showing a vein of about 20′ width, of which a 5′ footwall paystreak carries argentiferous lead sulphides, balance of vein being mainly iron oxide. Closed down late 1907, owing to lack of funds, but was developing, with a small force, late 1910. Property considered promising.

WESTERN ZINC MINING CO. CALIFORNIA.

Office: French-American Bank Bldg., San Francisco, Cal. Mine office: Ingot, Shasta Co., Cal. C. D. Maze, manager. Lands include the Silverado mine, at Orange, Orange County, California. The Shasta County property, 2 patented claims, known as the Donkey mine, 1½ miles from the Afterthought, is supposed to carry a continuation of the Afterthought ore body, which is a sulphide complex of auriferous and argentiferous chalcopyrite, galena and sphalerite. Property is an old mine, on which some work has been done at intervals in the past, having a 250′ shaft. Ore is treated at the Reynolds chemical works, in South San Francisco, having a capacity of 15 tons daily, owned by the same company.

WEST FORK GOLD-COPPER MINING CO. IDAHO.

Dead. Was a rank bit of stockjobbery, promoted by the notorious L. F. Pike. Formerly at Grangeville, Idaho Co., Idaho.

WEST GREY ROCK MINE. MONTANA.

Owned by Anaconda Copper Mining Co., at Butte, Silver Bow Co., Mont.

WEST JORDAN SMELTER. UTAH.

Owned by United States Smelting Co., at West Jordan, Salt Lake Co., Utah.

WEST LE ROI MINING CO., LTD. BRITISH COLUMBIA.

Dead. Lands were sold June 1, 1900, to Le Roi No. 2, Ltd., and company wound up, compulsorily, November, 1901. Formerly at Rossland, Trail district, B. C.

WEST LYELL EXTENDED MINING CO., N. L. TASMANIA.

Dead. Former office was 92 Queen St., Melbourne, Australia. E. D. McKie was manager. Capitalization was £15,000, shares £5 par. Lands were circa 20 acres, leasehold, on which a little work was done, 1904. Formerly at Gormanston, Montagu Co., Tasmania.

WEST MINNESOTA MINING CO. MICHIGAN.

Office: 14–68 Devonshire St., Boston, Mass. Mine office: [illegible] Ontonagon Co., Mich. Francis H. Whitman, president; Arthur C. Fabian, secretary. Organized under laws of Michigan, with capitalization $500,000, $25 par, having been set off by the Minesota Mining Co. To Dec. 31, 1907, company had levied assessments of circa $45,000. Lands, circa 350 acres, lying mainly west of the Ontonagon River, being the SE. ¼ and E. ½ of the NE. ¼, and the fractional W. ½ of the NE. ¼ of Section 18, and the NE. ¼ and ½ of the NW. ¼ of Section 19, T. 50 N., R. 39, W. About $10,000 was expended in exploratory work, previous to 1854, without success, development having been confined to the NE. ¼ of Section 19, on the line of the supposed strike of the contact vein of the Minesota and National mines. Idle early in 1910.

WESTMORELAND COPPER CO. NEW BRUNSWICK.

Dead. Formerly at Dorchester, Westmoreland Co., N. B.

T MOUNTAIN MINING COMPANY OF ARIZONA. **UTAH.**
)ead. Lands were lost, and money was refunded to those who bought
Formerly at Bingham Canyon, Salt Lake Co., Utah. Described Vol. V.

T MOUNT LYELL COPPER, GOLD & SILVER **TASMANIA.**
IINING CO., TASMANIA, LTD.
)ead. Was succeeded, Oct. 7, 1897, by Copper Mines of Mount Lyell
Ltd., also dead. Formerly at Gormanston, Montagu Co., Tasmania.

T MOUNT LYELL, LTD. **TASMANIA.**
'ffice: 20 Bucklersbury, London, E. C., Eng. Operating office: Hobart,
ania. Mine office: Gormanston, Montagu Co., Tasmania. R. E.
chairman; preceding officer, J. H. Wolf and J. E. Franck, directors; W. H.
rd, secretary; Thos. Griffiths, superintendent. Organized Oct. 2, 1907,
laws of Great Britain, as a reconstruction of the Copper Mines of Mount
West, Ltd., with capitalization £100,000, shares £1 par.
ands, 8 leases, area 84 acres, formerly held by the West Mount Lyell
:r, Gold & Silver Mining Co. Tasmania, Ltd., adjoining holdings of the
t Lyell Mining & Railway Co., Ltd., showing several wide ore bodies,
; assays of 3 to 7% copper, with small gold and silver values. Develop-
is by 2 tunnels, principal being the Razorback, which was extended 50′ in
The company also has acquired gold mining claims in the Huaraki dis-
)f New Zealand.

T PENNSYLVANIA MINE. **MONTANA.**
wned by Anaconda Copper Mining Co., at Butte, Silver Bow Co., Mont.

T QUINCY MINING CO. **UTAH.**
)ead. Was merged, 1910, in Quincy-Thompson Consolidated Mining Co.
:rly at Park City, Summit Co., Utah. Fully described Vol. VIII.

:RALIAN COPPER MINE, LTD. **AUSTRALIA.**
)ead. Was reorganized, circa 1899, as Balla Balla Copper Mines, Ltd.
:rly at Port Balla Balla, Western Australia.

: ST. DAVID'S GOLD & COPPER MINES, LTD. **WALES.**
)ead. Formerly at Barmouth, Merionethshire, Wales.

: SIDE MINING CO. **WASHINGTON.**
)ead. Formerly at Berlin, King Co., Wash. Described Vol. II.

T SLOPE MINING & MILLING CO. **UTAH.**
)ead. Formerly at La Sal, Grand Co., Utah. Described Vol. III.

T STEWART MINE. **MONTANA.**
wned by Anaconda Copper Mining Co., at Butte, Silver Bow Co., Mont.

T VIRGINIA & MONTANA MINING CO. **MONTANA.**
)ead. Formerly at Helena, Lewis & Clark Co., Mont. Described Vol. VIII.

T VIRGINIA-WYOMING COPPER MINING CO. **WYOMING.**
ffice: Parkersburg, W. Va. Mine offi Carbon Co., Wyo.
Newberger, president and general mana nberger, secre-
Geo. Newberger, treasurer; John W
.or, assistant superintendent; Geo. H.
'ebruary, 1907, under laws of Wyomi
\$1 par; issued, \$1,242,000, at last accou
o plan reducing the capitalization to
.ay in February.
.ands, 7 claims, area 102 acres, one-half m
in the Battle Lake district. Litigation
.ny's favor, 1908. The property is said to sho
)ntact deposits between diorite and quartzite,
of 5′ to 6′ average width, traceable circa 3,000′
.ted to average 8% copper, 0.5 oz. silver and 0.5
opment is by a 150′ shaft and a tunnel that was 250′

Equipment includes a 45-h. p. steam hoist and a 4-drill air-compressor, and there are 2 mine buildings. Presumably idle.

WEST YERINGTON COPPER MINING CO. NEVADA.

Dead. Formerly at Yerington, Lyon Co., Nev. Described Vol. VIII.

WHALEN CONSOLIDATED COPPER MINING & SMELTING CO. NEVADA.

Dead. Was a swindle, perpetrated by Wm. Whalen. Formerly at Palisade, Eureka Co., Nev. Described Vol. IV.

WHAT CHEER COPPER MINING CO. WYOMING.

Office: 171 Westminster St., Providence, R. I. Letter returned unclaimed from former mine office, Riverside, Carbon Co., Wyo. Jacob Stevens, president; J. Frank Baird, vice-president; Oliver S. Alers, secretary and manager; Isaac L. Goff, treasurer; preceding officers, Antonio Spencer, Wm. C. Pierce and Wendell Latham, directors. Organized under laws of Wyoming, with capitalization $600,000.

Lands, 4 claims, near the Ætna mine, on Dunkards Creek, near Purgatory Gulch, opened by a 65′ two-compartment shaft, and a 337′ tunnel, showing copper carbonates and stringers of chalcocite, with good gold and silver values, in a 5′ vein having a talcose gangue. Equipment includes a steam plant and a small sawmill. Presumably idle.

WHEAL ELLEN MINE. SOUTH AUSTRALIA.

Mine office: Woodchester, South Australia. Bought, 1908, the mining plant of the Strathalbyn Mining Co., and planned resumption circa July, 1909, but apparently failed to resume. Presumably idle.

WHEAL FORTUNE EXTENDED, LTD. AUSTRALIA.

Dead. Sold lands, 1909, to Wallaby Copper Mines, Ltd. Formerly at Northampton, Western Australia. Described Vol. VIII.

WHEALKATE MINING CO. MICHIGAN.

Office and mine: Houghton, Houghton Co., Mich. Nathan F. Leopold, president; R. R. Goodell, vice-president; Reginald C. Pryor, secretary; Albert F. Leopold, treasurer. Organized November, 1902, under laws of Michigan, with capitalization $50,000, shares $25 par. Lands, 240 acres, including the old Wheal Kate mine, on which a little sadly misdirected work was done, many years ago. Is primarily a land and townsite company, but owns mineral lands in Section 17, carrying the southern extension of the Isle Royale and other cupriferous beds of the Keweenawan series. Did some diamond drilling, 1907; since idle.

WHEAL TURNER COPPER MINING CO., LTD. AUSTRALIA.

Mine office: Yudnamutana, South Australia. Lands, known as the Red Bluff mine, 6 miles northwest of Yudnamutana, and 50 miles east of Farina, the nearest railroad point, show 8 veins, with northeasterly strike, carrying cuprite, azurite, malachite, chalcocite and tetrahedrite, with quartz gangue and an iron gossan. Hand-dressed samples gave a bulk assay of circa 25% copper. Development is by 4 shallow shafts, deepest 54′. In 1905 had an aid of £1,000 from the state, and prospected on the proposed railway line to the Queensland border. Idle.

WHIM WELL COPPER MINES, LTD. AUSTRALIA.

Office: 62 London Wall, London, E. C., Eng. Mine office: Whim Creek, West Pilbarra Goldfield, Western Australia. Edgar Anderson, chairman and managing director; preceding officer, S. Caldwell, Sidney Fawns, J. Cordin and H. J. Silverlock, directors; Henry Bacon, secretary; Herbert R. Sleeman, general manager; C. W. H. Saunders, mine superintendent; H. J. Robertson, chief engineer; F. B. Kenny, metallurgist, R. T. Parks, drill foreman. Organized July 4, 1906, under laws of Great Britain, as a reconstruction of an old company of the same name, with capitalization £150,000, increased, Jan. 7, 1910, to £200,000, shares £1 par; issued; £142,000, fully paid. To Dec. 31, 1910, the company had expended £60,000 on development and equipment. Net profits

15,804 in 1909, and dividends were 15% for 1909, with a 7½% interim
d, 1910.
nds, 292 acres, being 100 acres freehold and 192 acres leasehold, known as
im Creek mine, 12 miles from Port Balla Balla, with water-rights on Balla
Creek, various town lots, a leased jetty at Port Balla Balla and a 30-acre
-site at Corringinna Pool, a freshwater lake near Balla Balla. The prop
ludes leasehold lands carrying iron ore and limestone for fluxing.
e Whim Creek mine, opened 1886 and operated by a Melbourne com-
ntil closed 1901, and reopened, 1906, by this company, shows shales and
latter partly chloritic, but mainly hornblendic, carrying irregular tabular
iations of chalcocite, in silicious kaolinized strata having an approxi-
EW. strike and dip of about 15° N., the ore body being very flat, and
ing to bedding of the enclosing slates, which are considerably crumpled.
e mainly malachite and chalcocite, but also include cuprite, melaconite,
bornite and chrysocolla in the upper levels, the ore bodies ranging from a
hes to 40′ in width, with average width estimated by the management at
the ore zone is traceable 3,000′. The property has been tested, to some
by diamond drilling, 10 holes aggregating 2,000′ in depth having been
1907–1909, disclosing an ore zone up to 100′ in width, carrying sulphide
1 to 10% copper tenor.
e mine was poorly developed under the former ownership, but has been
to better advantage by the present management, and is developed,
he water-level, by means of 5 crosscut tunnels and a drift tunnel with
f drifts, giving estimated ore reserves of 70,000 long tons blocked out for
with circa 50,000 tons additional, of 5 to 6% copper tenor, at grass
total of about 500,000 tons of ore being inferrable above the water-level.
e ores are being developed by a 3-compartment main shaft that was 120′
arch, 1911, cutting the ore body at 94′, giving an average assay of 10%,
aximum assay of 32% copper.
e power equipment includes 6 small steam units, and 3 small gasoline
The water is either alkaline or sulphurous, each destructive to the boilers
ut a judicious mixture gives feed-water causing very little corrosion in
ers.
e mill, of 50 long tons daily capacity, has a Gates crusher, and is merely a
; and sorting plant, but a concentrator of 150 to 200 tons daily capacity is
onstruction, and should be in commission by the end of 1911. The
y bought a 30-ton blast-furnace at the Mons Cupri mine, 1909, but this
a blast.
e company's private railway, of 14 miles length, runs from
lla Balla, and has 2 locomotives and neces
quipment costing about £20,000. The com
otor tug for lighterage, and ore is exported
are employed.
duction was 911,232 lbs. fine copper in 19
ng tons ore shipped, giving average assays
6 lbs. fine copper in 1909, and circa 1,150,000
is producing the richest average grade of co
Australia, and is considered promising.

LE MOUNTAIN GOLD & COPPER CO.

ce: 803–405 South Hill St., Los Angeles, Cal.
from former mine office, Needles, San Bernardino
perintendent, at last accounts. Lands, 21 claims, on
ith of Needles, 7 miles from a railway, showing 4 pa
aimed width, carrying promising copper and gold ores
by a 180′ two-compartment vertical shaft, cutting an 11
ng assays of about 5% copper and $20 gold per ton. O

cludes a 15-h. p. Fairbanks-Morse gasoline hoist and an air-compressor, and there are 4 buildings. Small shipments, early 1908, to the Needles smelter returned 10.8% copper, 2 oz. silver and $20 gold per ton. Idle since circa 1908.

WHIPSAW COPPER CO. ARIZONA.

Dead. Formerly at Prescott, Yavapai Co., Ariz.

WHITE BEAR CONSOLIDATED GOLD MINES, LTD. BRITISH COLUMBIA.

Dead. Was reorganized, circa 1908, as Consolidated White Bear Mining Co., Ltd. Formerly at Rossland, Trail district, B. C. Described Vol. VII.

WHITE CANYON COPPER CO. UTAH.

Office: 624 Peyton Blk., Spokane, Wash. Capt. H. M. McKerr-Kasten president; Capt. A. E. Wayland, secretary. The company claims to own 13 claims in San Juan County, Utah, and claimed to plan installing a leaching plant thereon, during 1908, and claimed, early 1911, that a leaching plant was on the property, but not installed. Despite repeated attempts to secure a post-office address for the alleged holdings of this company, it has been impossible to induce the management to give any definite information regarding the exact location of its alleged lands, in consequence of which undue reticence, compared most unfavorably with the large size of the company's advertisements offering stock for sale, this company is regarded with considerable suspicion.

WHITE CHIEF MINING & MILLING CO. MEXICO.

Dead. Formerly at Chinipas, Arteaga, Chihuahua, Mex. Described Vol. VIII.

WHITE EAGLE COPPER MINING CO. TEXAS.

Dead. Lands were sold for debt. Formerly at Burnet, Burnet Co., Tex. Described Vol. III.

WHITE EAGLE MINING CO. ARIZONA.

Mine office: Parker, Yuma Co., Ariz. J. D. Spargo, superintendent; J. E. Watson, consulting engineer. Lands, 9 claims, at Enpire Flat, near Earp Landing, 3½ miles from the Colorado River, in the Seneca district, having a 260′ shaft, showing a vein with a 10′ paystreak carrying ore giving good assays in gold and copper. Idle since circa 1907.

WHITE GIANT MINING & SMELTING CO. ARIZONA.

Dead. Formerly at Jerome, Yavapai Co., Ariz. Described Vol. VIII.

WHITE HORSE MINING CO. ARIZONA.

Office: 20 Broad St., New York, N. Y. Mine office: Prescott, Yavapai Co., Ariz. H. R. Frost, president; preceding officer, L. D. C. Ferguson. Maj. R. G. Vassar, S. P. Ostrom and M. J. McGibbon, directors. Capitalization $2,000,000, shares $1 par. Bonds, $50,000. Lands, circa 200 acres, known as the Fuller group, at Squaw Creek, also a group of claims in the Walker district. Development is by 2 shafts and a tunnel. Equipment includes a 10-stamp mill. J. F. Wisner was fiscal agent. Presumably idle.

WHITE KNOB COPPER CO., LTD. IDAHO.

Office: 36 Wall St., New York, N. Y. Mine office: Mackay, Custer Co., Idaho. Wilbur K. Mathews, president; A. M. Poole, secretary and treasurer. Organized originally under laws of West Virginia, as White Knob Mining Co., reorganized Apr. 24, 1900, under laws of New Jersey, with present title; again reorganized, January, 1903, under same charter and title; again reconstructed, 1904, with capitalization $2,600,000, shares $10 par; again reconstructed, practically succeeded, circa January, 1905, by the White Knob Copper & Development Co., Ltd., but apparently the White Knob Copper Co., Ltd., retains corporate existence, though, if so, it is a mere shell, as the mine has been sold to the Empire Copper Co., and the remaining assets apparently are held by White Knob Copper & Development Co., Ltd. For further particulars see White Knob Copper & Development Co., Ltd., in this volume, and White Knob Copper Co.

Vol. VI, which descriptions explain, in detail, the miserable flounderings company and its predecessors.

E KNOB COPPER & DEVELOPMENT CO., LTD. **IDAHO.**

fice: 36 Wall St., New York, N. Y. Mine office: Mackay, Custer Co., Wilbur K. Mathews, president; Arthur Kennedy, vice-president; Geo. ee, secretary and treasurer; preceding officers, Chas. H. Dupee and C. H. l, directors. Organized Apr. 6, 1905, under laws of Maine, as successor e Knob Copper Co., Ltd., with capitalization $6,000,000, shares $10 par, 0,000 of 7% cumulative preferred stock and $4,000,000 of common stock, ferred being convertible into common, at the option of the shareholders; sued. Idle some years and presumably moribund. Very fully de- Vol. IX.

E KNOB MINING CO. **IDAHO.**

ad. Was reorganized, 1900, as White Knob Copper Co., Ltd. For- t Mackay, Custer Co., Idaho.

E MOUNTAIN COPPER CO. **CALIFORNIA.**

ad. Former office was Los Angeles, Cal. F. S. Gordon was manager. were claimed to be 160 acres, near the head of Mazourka Cañon, on the side of White Mountains, 10 miles from Independence. The property imed to have a vein of 10′ to 40′ width, claimed to assay 7 to 9% copper, ld and silver values. The company claimed, in its advertisements, 1909, y actual test, copper could be produced, by a leaching process, for 4½ er pound, and the company was claimed, in the press, June, 1910, to be g a 50-ton leaching plant, which apparently was entirely mythical. The y was promoted by the Southwestern Securities Co., of Los Angeles, and tly was a deliberate swindle. Formerly at Independence, Inyo Co., Cal.

E PINE COPPER CO. **MICHIGAN.**

ice: 12 Ashburton Place, Boston, Mass. Mine office: Ontonagon, gon Co., Mich. Quincy A. Shaw, president; Geo. A. Flagg, secretary; cNaughton, general manager; Thos. H. Wilcox, superintendent. Organ- ca May, 1909, with capitalization $5,000,000, shares $25 par, and appar- as both common and preferred stock, being controlled by the Calumet & Mining Co. through the ownership of 465 shares of preferred stock. derstood that the Calumet & Hecla owns practically a half interest in the y, secured at a cost of about $100,000.

nds include the old White Pine mine, area 80 acres, in Section 5, T. 50 N., ., circa 3 miles east of the Nonesuch mine, and surrounding lands to the outh and west, formerly owned by the Keweenaw Association and others, ther than the White Pine having been furnished for shares, and in con- on of the Calumet & Hecla advancing money for development. The y does not include the Union and Nonesuch mines.

e property shows eruptive rocks, with interbedded sandstones and con- tes of the secondary Keweenawan series, and what are termed epidote y Dr. F. E. Wright, but what perhaps are epidotal melaphyrs, travers- face of the escarpment, in a plane almost parallel to the dip and strike of ded formation, the epidotal veins showing evidence of slight faulting, favorable conditions for the precipitation of copper from mineralized s. There is evidence of a second set of minor and nearly vertical epi- eins, which are barren of copper. The sandstone below the melaphyr, buried underneath the talus from the escarpment, is a fine-grained dark nost quartsitic sandstone, jointed and having numerous calcite veins asional threads of malachite penetrating the sandstone from the contact, tending downward but a few feet, and evidently resulting from deposition ove. Copper also occurs as native metal, in a very fine-grained sand- [illegible] and as copper ore. The dip of the bedded formation is [illegible] 25° with the horizon. The so-called Nonesuch lode,

at the White Pine property, has an average width of about 17′, and a peculiarly variable dip, usually very flat, but sometimes quite steep. This bed carries rich native copper, but the metal is very flaky, as a rule.

The White Pine has been under development since 1907, and 110 diamond drill holes have been bored. The mine has a vertical shaft, 200′ deep at the end of 1909, with some lateral workings. The property is decidedly interesting from a geological and mining standpoint, but it is difficult to estimate its value for the occurrence of copper is under such entirely different conditions than those noted in the main Keweenawan series, and so little effective work has been done in the secondary series, that the property must be considered an interesting exploration, rather than a mine.

WHITE PINE COPPER CO. NEVADA.

Dead. Was merged, Nov. 17, 1904, in Nevada Consolidated Copper Co. Formerly at Ely, White Pine Co., Nev.

WHITE QUAIL COPPER CO. COLORADO.

Dead. Was merged Oct. 21, 1907, in Doyle Consolidated Mines Co. Formerly at Hesperus, La Plata Co., Colo.

WHITE ROCK COPPER MINING CO. CALIFORNIA.

Dead. Formerly at Lewis, Mariposa Co., Cal. Described Vol. VI.

WHITE ROCK MINING CO. UTAH.

Letter returned unclaimed from former office, Salt Lake City, Utah. Mine office: Milford, Beaver Co., Utah. C. H. Thomson, president; L. Anderson, secretary; H. P. Clark, treasurer; Geo. Weston, superintendent. Lands, 14 claims, adjoining the Harrington-Hickory holdings of the Majestic Mines Co., 5 miles northwest of Milford. Development is by a 150′ incline shaft, started May, 1910, on a fissure vein of 8″ to 24″ width, in quartzite, with 280′ of workings at end of 1910, showing ore giving assays of 3.67% copper, 63.6% lead and 154 oz. silver per ton. Two carloads of ore shipped gave returns of 46.5% lead and 26 oz. silver per ton.

WHITE STAR MINING CO. UTAH.

Office: 408 South State St., Salt Lake City, Utah. Mine office: Eureka, Juab Co., Utah. Richard B. Shepard, president and general manager; P. A. Sörenson, vice-president; Emma C. Shepard, secretary; Bernard Rich, treasurer; preceding officers and Harry Rich, directors. Organized 1898, under laws of Utah, with capitalization $30,000, shares 10 cents par, assessable, with 4 assessments levied. Lands, 4 claims, patented, area 80 acres, 3 miles from Eureka, the nearest rail point. The mine has a 100′ shaft and 100′ tunnel. Idle.

WHITETAIL COPPER MINING CO. ARIZONA.

Office: Stanton, Tex. Mine office: Paradise, Cochise Co., Ariz. J. F. Chadwick, president and general manager; John L. Larrieu, vice-president; E. P. A. Larrieu, secretary; F. L. Conyers, treasurer; preceding officers and T. Kelly, J. A. Howell and J. F. Mahoney, directors; H. M. Davis, superintendent. Organized December, 1909, with capitalization $1,000,000, shares $2 par.

Lands, 25 claims, including the Doran & Gallagher group of 10 claims, carrying a 4′ vein of auriferous copper ore, developed by a 120′ vertical shaft, other shafts of 45′, 50′ and 65′, and a 250′ tunnel, showing ore assaying 4% and upwards in copper, the mine having about 1,000′ of workings, Sept., 1910. Buildings include an office, boarding-house, bunkhouse, stable, store and several dwellings. The company is said to plan a 50-ton mill.

WHITE TANKS MINING CORPORATION. ARIZONA.

Dead. Formerly at Wickenburg, Maricopa Co., Ariz. Described Vol. [illegible]

WHITEWATER MINING CO. NEW MEXICO.

Mine office: Tyrone, Grant Co., N. M. Idle some years and apparently moribund.

WHITNEY REDUCTION CO. NORTH CAROLINA.

Dead. Lands, just north of and adjoining [illegible]

ɔposedly carrying similar ore, were slightly explored, 1903, showing a ıriferous copper ore, with values mainly in gold. Lands passed to the Carolina Electric & Power Co. Formerly at Gold Hill, Rowan Co., N. C.

:NBURG REDUCTION CO. **ARIZONA.**

ad. Chas. F. Brant was superintendent; Jonathan Gordon, metallurıgineer. The company planned building a custom sampling mill, at burg, but apparently failed to get beyond the point of planning. Fort Wickenburg, Maricopa Co., Ariz.

:NBURG SMELTING & REFINING CO. **ARIZONA.**

ad. Property was a small smelter, having a 40-ton blast-furnace, blown mber, 1903, doing a general custom business, but which was in blast for a me only. Formerly at Wickenburg, Maricopa Co., Ariz.

OW MINING CO. **UTAH.**

ce: Salt Lake City, Utah. Mine office: Eureka, Juab Co., Utah. aldwell, president; A. J. Weber, secretary; M. W. Bird, treasurer; preɔfficers, H. M. Dinwoody and W. F. Giles, directors. Capitalization), originally in 500,000 shares of $1 par, changed, March, 1909, to 0 shares, par 50 cents. Lands, 6 claims, north of Eureka Lily and east Development Co., having a 527′ shaft. Idle.

COPPER SYNDICATE, LTD. **BULGARIA.**

ce: 57 Bishopsgate St. Within, London, E. C., Eng. Mine office: ıchik, Vidin, Bulgaria. Wm. Herbert Fowler, J. P., chairman; precer, Lionel Wormser Harris, Jos. Kenarlekdji and H. Hoffman, directors; Thorp, secretary; Llewellyn Lewis, mine superintendent; R. Sache, conngineer. Organized June 24, 1907, under laws of Great Britain, with ıation £20,000, shares £1 par; issued, £17,707, fully paid.

ıds, 2 groups, area 800 hectares, including the Chtastic mine, area 250 , held under lease from the crown. The Chtastie, near Belogradchik, anite and serpentine, carrying 2 lenticular ore bodies, with NW. strike of 80°, of which one, traceable 600′, has a lens of 15′ width, carrying a laconite, but mainly chalcopyrite, assaying up to 18% copper, 8 oz. silver vts. gold per ton, estimated, by the management, to average about 8%

The mine was discovered, 1900, by a Turk, opened 1901, by the nd worked for 7 years before bought by this company. Development is s of 156′ and 156′, having crosscuts of 40, 25, 20, 150 and 120 meters, ein, with about 450 meters of laterals, estimated by the former owner 5,000 tons of ore, and estimated by the present company to give about ns of ore blocked out for stoping.

ıipment includes a 16-h. p. steam plant with a 7-h. p. hoist, and there are buildings. A railway, under construction from Vidin to the Danube, is to have a station 8 miles from the mine. Production was 560 long tons ipped to England, yielding 219,520 lbs. fine copper, in 1909, with no pro-1910. The management plans deepening No. 3 shaft by 50 meters, and ng underground work systematically.

ILL MINE. **MONTANA.**

ıed by Anaconda Copper Mining Co., at Butte, Silver Bow Co., Mont.

ROSE MINING CO. **CALIFORNIA.**

ce: 141 Milk St., Boston, Mass. Letter returned unclaimed from ıine office, Skidoo, Inyo Co., Cal. E. E. Babb, president; C. A. Scott, ident; W. W. Curtis, secretary and treasurer; E. H. Goodpaster, super-t, at last accounts. Organized under laws of South Dakota, with capi-n $1,000,000, shares $1 par. Lands in the Skidoo and Needles districts anamint Mountains, have 2 sh[illegible] ing argentiferous and ıs copper ore, giving go[illegible] ected samples. presumably [illegible]

WILHELMI SILVER & COPPER CO. MEXICO

Mine office: Velardeña, Cuencamé, Durango, Mex. R. Tipton, general manager; Louis Sandberg, superintendent. Organized under laws of Arizona with capitalization $3,000,000. Lands, circa 1,500 acres, include the Santa Eulalia, Loma, Cucharefia and other properties, and the company formerly held an option on the Santa Ines mine. The properties show auriferous and argentiferous lead and copper ores, developed by a shaft, known as the Santa Eulalia and 2 tunnels were started, early 1909, planned to be driven nearly 2 miles, cutting 10 veins, to a junction with the Santa Eulalia shaft, at circa 2,000′ depth. The company's plans seem to have been entirely too ambitious. Idle since circa September, 1909.

WILLARD-ELY COPPER CO. NEVADA

Office: 32 Liberty St., New York, N. Y. Letters returned unclaimed from former mine office, Ely, White Pine Co., Nev. Organized circa 1906, as successor of McKinley Mines Co., which succeeded the McKinley Mining & Smelting Co., which succeeded the Canton Mining Co., these being the only successes noted in connection with this chain of promotions. Lands, 5 claims known as the Aurora group, scattered and apparently poorly located. The Aurora, formerly worked as a gold mine, but showing copper ores in lower workings, has a 300′ main shaft, with about 1,000′ of drifts. Idle some years, and, by reason of its bad antecedents, is regarded unfavorably.

WILLCOCKS'S CLONCURRY SYNDICATE. AUSTRALIA

Dead. Was succeeded by Willcocks's Copper Mines, Ltd. Formerly as Cloncurry, Beaconsfield Co., Queensland, Australia. Described Vol. VIII.

WILLCOCKS'S COPPER MINES, LTD. AUSTRALIA

Office: Brisbane, Queensland, Australia. Mine office: Cloncurry, Beaconsfield Co., Queensland, Australia. Thos. Welsby, secretary; Cecil Rae, smelter superintendent, at last accounts. Organized under laws of Queensland as successor of Willcocks's Cloncurry Syndicate, with capitalization £112,000 shares £1 par; issued, £84,000, 18s. 11d. paid in.

Lands, 320 acres, in the vicinity of Duck Creek, including the Jessie, Secret, Rosebud, Coronet and Timberoo mines. The Jessie mine has a 175′ shaft with bottom level at 163′; the Rosebud mine has a 114′ shaft; the Timberoo mine has a 110′ shaft; the Coronet mine has a 100′ shaft, and the Secret mine has opencast workings.

A small smelter, with a reverberatory matting furnace only, was built 1907 and blown in 1908, treating a little ore averaging about 20% in copper tenor after selection, making high-grade matte, but was idle 1910, though the mine made small shipments of copper ore, 1910.

WILLEY-CANANEA COPPER CO. MEXICO

Dead. Property passed, 1910, to Arizona-Cananea Mines Corporation. Formerly at La Cananea, Arizpe, Sonora, Mex. Fully described Vol. IX.

WILLIAM PENN MINING CO. WYOMING

Office: Lewisburg, Pa. Letter returned unclaimed from former mine office, Encampment, Carbon Co., Wyo. J. E. Hedding, president; J. W. Van Valzale, secretary and treasurer; S. E. Phelps, manager, at last accounts. Organized, 1903, under laws of Wyoming, with capitalization $1,000,000, shares $1 par. Lands, 3 claims, area 60 acres, in the Upper Platte district, showing a 4′ vein carrying carbonate ores and chalcopyrite, opened by a 75′ shaft. Idle since circa 1903, and moribund.

WILLIAMS-ELY COPPER CO. NEVADA

Dead. E. M. White was president; C. F. Tennant, treasurer; W. H. Scovan, clerk. Organized February, 1907, under laws of Maine, with capitalization $1,000,000. Lands, adjoining the Turner-Ely Copper Co., immediately west of Lane City, were said to carry porphyry ore, and it was claimed that

igs showed sulphide ore of 8 to 12% copper tenor, near surface. For-
at Ely, White Pine Co., Nev.

AMS, FOSTER & CO. & PASCOE, GRENFELL SONS, LTD. **WALES.**

ffice: Leadenhall Bldgs., Whittington Ave., London, E. C., Eng. Works Swansea, Glamorganshire, Wales. Is controlled by Henry R. Merton & id the Metallurgische Gesellschaft A. G. The company is a merger, d 1892, of the two old firms of Williams, Foster & Co., owning the Morfa works, and Pascoe, Grenfell & Sons, Ltd., owning the Middle Bank and Bank copper works, old and successful copper smelters, at Landore, near ea. The firm has zinc and copper smelters at Middle Bank and Upper and both works were remodeled extensively, circa 1907.

AMS LUMAN MINING CO. **WYOMING.**

fice: Buffalo, Wyo. Mine office: Depass, Frémont Co., Wyo. Thos. th, president and general manager; Theophilus Conzelman, vice-presi- W. J. Thom, secretary and treasurer; preceding officers, Wm. Rea, Jr. chard Young, directors; Thos. G. Smith, manager; M. E. Connell, super- ent, at last accounts. Organized May 2, 1908, under laws of Wyoming, pitalization $2,500,000, shares $1 par; issued, $2,000,000. Annual meet- ond Tuesday in September.

nds, originally 9 claims, patented, area 130 acres, are said to have been ed, circa 1910. Property, 16 miles from a railway, in the Copper Moun- trict, shows 8 fissure veins in granite, diorite and altered schists, the main ing an ore zone of 50′ to 60′ width, traceable circa 3,400′, in crushed sured diorite, much altered, having a 2′ paystreak carrying free gold, ore, and native copper in thin sheets and nuggets, the ores being cuprite, nite, malachite and chalcocite, giving assays of 10 to 80% copper, 5 to 10 er and $2 to $8 gold per ton. Development is by an 820′ shaft, showing es on the 800′ level, at the bottom, with other shafts of 52′ and 30′. also are tunnels of 513′, 300′, 70′ and 80′, and the mine had circa 1,800′ cings at the end of 1908. The 300′ level, November, 1910, gave a good g of melaconite, cuprite and native copper, and several test shipments ters gave good returns.

quipment includes an 80-h. p. gasoline plant, with a 15-h. p. hoist and a air-compressor, and electric current is taken, over a 16-mile transmission om the Asmus Boysen dam. There are 12 mine buildings, including and 14x16′ shops. The company is operated as a close corporation, for development having been furnished by about 10 shareholders only. nagement was said, October, 1910, to plan shipments shortly. Property red promising.

E ROSE COPPER MINING CO. **ARIZONA.**

fice and mine: Portal, Cochise Co., Ariz. M. D. Taylor, president; Towers, vice-president; C. F. McCord, secretary; preceding officers, .. Byers and G. E. Kellner, directors; F. O. Bacon, superintendent. zed Jan. 28, 1908, under laws of Arizona, with capitalization $1,000,000, $1 par.

nds, near Triangle Springs, have shafts of circa 20′ and 90′, latter said ottomed in a 12′ vein carrying slightly argentiferous chalcocite, of about pper tenor, and a little gray copper ore is shown near surface. A 30- nugget of native copper was found on the lands of this company. Idle 907, except for annual assessment work.

OW CREEK COPPER & GOLD MINING CO. **WYOMING.**

ine office: Thermopolis, Frémont Co., Wyo. Organized, early 1907. pitalization $500,000, by H. P. Minor, W. Armour Thompson, Robt. owan, Edw. E. Waltman and H. H. Bierman. No trace of operations l. Idle and apparently moribund.

WILL SMELTING CO. ARIZONA.

Dead. Formerly at Wickenburg, Maricopa Co., Ariz., and Quartzite, Yuma Co., Ariz. Described Vol. VIII.

WILMOT MINING CO. MICHIGAN.

Letters returned unclaimed from former office, Calumet, Mich., and former mine office, Ontonagon, Ontonagon Co., Mich. W. H. Garlick, president; W. B. Gouchie, secretary. Organized under laws of Michigan, with capitalization $500,000, shares $25 par. Paid dividends of $17,000, from sale of timber lands with mineral rights reserved, and has received $1,500 from assessments. Lands are mineral rights to 3,520 acres, in Ontonagon County. No mining has been done.

WILSON BAY MINING CO. ALASKA.

Office: Latouche, Latouche Island, Alaska. Idle several years.

WILTON MINING & MILLING CO. ARIZONA.

Dead. Was a stockjobbing scheme. Formerly at Huron, Yavapai Co., Ariz. Fully described Vol. VIII.

WINDFALL MINING CO. WASHINGTON.

Mine office: Chewelah, Stevens Co., Wash. C T. Rigg, superintendent, at last accounts. The property is said to show a 4′ vein, carrying auriferous and argentiferous lead and copper ores, and has 2 tunnels, one a crosscut, which, at last accounts, 1909, had not reached the vein. Presumably idle.

WINDOW MOUNTAIN COPPER MINING CO. NEW MEXICO.

Dead. Formerly at Deming, Luna Co., N. M. Described Vol. VIII

WINDSOR MINING, MILLING & SMELTING CO. ARIZONA.

Office: Superior, Pinal Co., Ariz. Wm. C. Windsor, manager. Organized 1906, under laws of Maine, with capitalization $1,000,000, shares $1 par. Lands, 6 claims, known as the Windsor & Lobb group, and 4 millsites, on Queen Creek, former supposed to carry the southern extension of the ore body of the Lake Superior & Arizona mine. Development is by several short tunnels, and 3 shafts, of circa 60′ depth each, bottomed in auriferous and argentiferous copper ore, said to occur in limestone, between a quartzite foot and a trachite hanging, which description seems a trifle hazy.

WINNEBAGO MINING CO. COLORADO.

Mine office: Central City, Gilpin Co., Colo. Property includes the Winnebago and adjoining claims, carrying argentiferous and auriferous copper ore, and about 10 men were employed 1904. Equipment includes a small steam plant. Presumably idle.

WINNIPEG MINES, LTD. BRITISH COLUMBIA.

Dead. Formerly at Phœnix, Boundary district, B. C. Described Vol. V

WINNIPEG MINING CO. WASHINGTON.

Mine office: Republic, Ferry Co., Wash. E. R. Fraser, general manager; preceding officer, C. W Clark, Archibald Wright, W. R. McCracken and Chas. Garber, directors; Jos. L. Lancaster, superintendent, at last accounts. Lands, 8 claims, including the Hawkeye mine, adjoining the Belcher, on Lambert Creek. Mine has a 240′ incline shaft, connecting with a 1,070′ tunnel, showing a vein of 70′ estimated width, carrying auriferous and argentiferous chalcopyrite, associated with considerable quantities of limonite, with smaller amounts of siderite, tetrahedrite, magnetite, pyrrhotite and marcasite. Has an ore-bin on the Belcher railway, 600′ from the tower tunnel, facilitating shipment. Has electric power and an 8-drill Leyner air-compressor. First shipment, in circa August, 1907, returned about 3% copper, ore carrying 35 to 40% [illegible]. Idle since December, 1907.

WINONA COPPER CO. MICH[illegible]

Office: 713–199 Washington St., Boston, Mass. Operations [illegible]ton, Mich. Mine office: Winona, Houghton Co., Mich. [illegible] president; E. B. O'Connor, treasurer; Dr. Lucius L. Hub[illegible]

- Seeber, superintendent; Allan Eddyvean, mill superintendent; John mining captain; Frank Lukey, clerk.

rganized 1898, under laws of Michigan, with capitalization $2,500,000, $25 par; paid in, $22, stock having been floated at $8, with assessments of 902, $1 in 1903, $1 in 1905, $3 in 1906, $2 in 1907, $1 in 1908, $3 in 1909, 910. Company ended 1910 with surplus assets of $85,733. At the annual g of March, 1911, the stockholders voted to increase the capitalization 00,000, shares $25 par, and to exchange 66,667 shares of the new stock for ire share capitalization of the King Philip Copper Co., this merger being basis of 60% for the property of the Winona and 40% for the property of g Philip, leaving 33,333 shares of the new stock in the Winona treasury. Safe Deposit & Trust Co., registrar; American Loan & Trust Co., transfer agent. Shares are listed on the Boston stock exchange. Anneeting, last Tuesday in March.

nds, 1,568 acres, in a main tract of 1,440 acres, and a smaller tract of 128 rmer being in Sections 19, 20, 29 and 36, T. 52 N., R. 36 W., with timber o 1,768 acres additional, lying 3 to 5 miles south of the mine. An ex- of equal parcels of land with the King Philip Copper Co., 1906, gave ed boundaries to both properties. The company also owns a millsite, nouth of the Misery River, with water available from that stream. The ed properties will have an area of 2,608 acres, with 4 active shafts. e main tract carries the outcrop of the Winona amygdaloidal bed for up- f one mile. The mine was discovered, 1864, by a line of prehistoric pits e outcrop, and a single shallow shaft was then sunk, but, owing to entire transportation facilities, little was accomplished. The property was let te, 1880, but did not furnish sufficient mass copper to pay, and was closed, ken over by the present company, April, 1898, when the old shaft was cut etimbered and deepened, and 3 new shafts sunk, on the Winona bed, gdaloid of 12′ minimum, 20′ average and 46′ maximum width, striking E., and having an average dip of about 50°. The Winona amygdaloid es the Baltic bed in some respects, and also bears considerable resem- o the Knowlton bed of the Evergreen belt, carrying considerable epidote, and quartz, with a limited amount of mass and barrel copper, the bulk etal being found as stamp-copper. Diamond-drill borings have located other cupriferous beds on the Winona tract, but none carried copper in quantities, where cut. The mine is served by a spur from the main line Copper Range railway.

e older workings show mainly mineral of the lighter grades, with some- avier copper at depth. The mine made 2,232′ of new openings in 1907, 97′ in 1910, ending that year with about 7 miles of workings. Shafts and 4 are connected on the 3d to 10th levels, inclusive, these workings ing considerable copper, the showing at the southern end of the mine uch the best secured, and there has been a steady improvement since The mine has electric pumps, and runs 7 drills on development work. . 1, the discovery shaft, in the NE. ¼ of the NE. ¼ of Section 29, T. R. 36 W., is 8x18′ inside of timbers, with 3 compartments, and is 400′ ith 4 levels opened, showing a little heavy copper and some stamp-rock orthern drifts, but is of little promise, and has been idle since circa 1901. . 2 shaft, 900′ southwest of No. 1, sunk at an angle of 72°, is 1,000′ deep, evels opened, showing good copper at depth of circa 200′, but with poor below, and has been idle since early 1906. . 3 shaft, 1,650′ southwest of No. 2, is bottomed at the 13th level. The th levels, inclusive, have [illegible] at depth of 1,272′, g alternations of good [illegible] as a whole, were ed to show rock [illegible] allowing for as stoping and [illegible] probably

should be estimated at 12 to 15 lbs. copper per ton. Work was discontinued late 1908, the shaft having sufficient openings for the present.

Equipment at No. 3 shaft includes a steel shaft-rockhouse, 40x70′ on the ground, and 106′ high, remodeled and improved, 1908, equipped with two 24x36″ Portage Lake-Farrell crushers, with room for a third, pneumatic steel gates, pneumatic trolley cranes, and grizzlies having differential slopes, the lower portions being quite flat, grizzlies feeding to crushers, with only one man required for each crusher.

No. 4 shaft, circa 1,700′ southwest of No. 3, and about 400′ from the southern boundary, ended 1910 at the 15th level. This shaft was started June 1906, on ground secured from the King Philip in rectifying boundary lines. The shaft is sunk in the footwall, and was opened by sinking and raising simultaneously. Underground work has been confined to development work in No. 4 shaft, for the past year or two, and considerable ground of promise has been opened. Connection is had with the King Philip workings on the 10th level.

No. 4 shaft is equipped with a modern steel shaft-rockhouse, having a cylindrical main bin of about 40′ diameter, built of heavy steel plate. There are two 24x36″ Portage Lake-Farrell crushers, similar to those at No. 3.

Old No. 3 shaft, 900′ north of No. 2 and about 750′ deep, shows little ground of promise, and has been idle for some years. Old No. 4 shaft, the northernmost, about 1,350′ northeast of No. 1, developed no ground of importance, and also has been idle for some years. Old No. 5 shaft, started on a wide amygdaloidal bed located by diamond-drill, did not develop good ground, and was discontinued at slight depth, some years ago.

The central power plant, near No. 3 shaft and about 1,600′ north of No. 4, is one of the most modern and complete in the Lake Superior district, and furnishes direct current for both No. 4 shaft of the Winona and No. 1 shaft of the King Philip. Equipment includes an Allis-Chalmers 250-kw. 3-phase 60-cycle 2,300-volt cross-compound a. c. generator, with a 535-h. p. induction motor direct-connected to two 250-h. p. d. c. generators, speeded at 600 r. p. m. The hoist at No. 4 Winona and No. 1 King Philip is driven by an Allis-Chalmers cross-compound condensing Corliss engine. A motor-generator set consists of a 450-h. p. 3-phase 60-cycle 2,080-volt variable speed induction motor, at 600 r. p. m., connected on either side, by flexible couplings, to two 20-ton flywheels 10′ in diameter. The momentum of the flywheels cares for variations in load, and also provides power for hoisting for one hour after the dynamo is shut down, if necessary. The motor-generator set has 2 bearings of 11x33″, and 2 bearings of 9x27″, with oil pumped through them at the rate of 16 gallons per minute, automatically filtered and water-cooled, insuring perfect lubrication. There is a 100-kw. 575-volt General Electric interpole d. c. generator, a 150-hp. motor-generator operating the electric locomotives, transforming a 2,300-volt alternating current into a 500-volt direct current. There is a 40-drill Nordberg air-compressor in the central power-house, and steam is provided by three 150-h. p. water-tube boilers, operated at 175 lbs. initial steam pressure.

The hoist at No. 4 shaft, about 1,700′ from the central plant, consists of a hoisting drum connected by double-reduction gearing with a 200-h. p. 550-volt induction hoist-motor, operated at 430 r. p. m. The hoist, good for 1,500′ depth, operates two 3½-ton skips, working in counterbalance, at a speed of 1,200′ per minute.

The engine-house, midway between shafts Nos. 1 and 2, is 40x40′, of wood frame on stone foundations, with corrugated iron siding and roof. This has a steam hoist, good for 1,500′ depth, operating No. 3 shaft, and a 12-drill Ingersoll-Sergeant class A 2-stage straight-line air-compressor, and a smaller single-stage compressor. Adjoining is the 40x48′ boiler-house, of similar construction, containing four 80-h. p. boilers, and a wooden coal-trestle, with tunnel [illegible] to the boiler-house.

ne buildings include a 20x40′ carpenter-shop, combination smithy and e-shop, a 22x34′ general store, an office building, 2 boarding-houses and 100 dwellings for employés, in a townsite platted by the company. There a sawmill, 30x70′ with a 42x66′ wing for boilers, and a 16x46′ wing con- a shingle-mill, the plant having a daily capacity of 20,000′ of sawed

e mill, owned jointly by the Winona and King Philip, built at a cost of 300,000, is located close to the King Philip boundary, near No. 4 shaft, location of the mill adjoining the mine is expected to save about 15 cents in transportation charges. The mill secures its water from the Sleeping across which a dam has been built, with a storage capacity of 60,000,000

The matter of water supply was of such prime importance that three ere devoted to very careful hydrographic surveys, as a result of which it nd that the drainage of the watershed tributary to this river yielded 00 to 3,000,000 gallons per day, which should be adequate for the require- f the mill, which will have settling tanks and clarifying devices, using the everal times over. The item of 15 cents per ton transportation charges y the new mill may seem small, at first sight, but it actually means about per pound on the cost of finished copper, and may mean the difference success or failure, so closely are costs and income adjusted in the case of ade Lake Superior copper mine. The fashion for many years past has put Lake Superior mills some miles away from the mines, on large bodies ', and, for some reasons, such locations are preferable, but in the case of ona, the management has chosen to accept the logical rather than the ible solution of its milling problem.

ck, brought to the mill by electric locomotives, is crushed in 2 Allis- rs stamps, one a simple head having a 24″ cylinder, and one a steeple- nd head with 14″ and 22″ cylinders. Equipment includes one Chilean regrinding, one Hardinge conical tube-mill, 52 Wilfley tables and 12 tanks. Under the wash-floor there are 6 large settling tanks, for the ater, which is reused after clarification. Tailings are carried, by belt- r, for a distance of 321′ from the mill, and delivered at a height of 124′ ne ground, providing for stacking tailings in a manner to cover much less the same tonnage than is required at most mills, located on extensive onts, where sands are stacked from a low discharge, with a very low slope. Slimes are delivered by a 1,200′ steel launder to a ravine beyond l discharge. Preliminary stamping with one head was begun March, t August, 1911, the mill was still in the process of testing and keying-up, duction was begun 1902, and has been as follows: 101,188 lbs. in 1902; 4 lbs. in 1903; 646,025 lbs. in 1904; nothing in 1905; 278,182 lbs. in 1906; 3 lbs. in 1907. The Winona has made two separate campaigns of pro- on both of which occasions the percentage of copper extracted ran down yable figures, returns averaging 18.95 lbs. fine copper per ton of rock . in 1904, 14.34 lbs. in 1906, and 12.59 lbs. in 1907, production having spended November, 1907. The Winona management has been criti- ely for its heavy expenditures in equipping the property with such expen- hinery, and also for locating its mill at the mine, rather than on the shore Superior. These criticisms seem based upon an entire lack of under- ; of the true situation. The mine made two separate attempts at pro- but was forced to stop, exhausted, after each attempt. Developments south of the property than in the original has been extensively opened, with a it is obvious that the develop- necessary. The magnificent tion at the minimum cost as well as by the public,

to be a mine of very low average grade, and it is obvious that every possible economy must be effected, if the mine is to be made a success, and the management is deserving of high praise, rather than of censure, for its courage in taking the course that has been taken. Notwithstanding the unsatisfactory results secured in the two previous campaigns of production, the Winona is considered to have very fair chances of making a successful low-grade mine, and the management is good.

WINONA GOLD-COPPER MINING & MILLING CO. WYOMING.

Office: 524 Gas & Electric Bldg., Denver, Colo. Mine office: Painter, Big Horn Co., Wyo. L. Cavnah, president and general manager; Geo. House, vice-president; Dr. J. H. East, second vice-president; Wm. H. McAloney, secretary and treasurer; preceding officers, Miss H. P. Straight, H. F. Tower, F. H. Weeks and W. H. Lippincott, directors; Ray Cavnah, superintendent. Organized 1903, under laws of Wyoming, with capitalization $5,000,000, shares $1 par, fully paid. Management was changed, and company practically reorganized, Dec. 12, 1905.

Lands, 25 claims, unpatented, area 440 acres, on Silver Creek, in the Bear Tooth and Sulphur Mountains, of the Sunlight district, in the northwestern corner of Big Horn county, about 12 miles east of the Yellowstone National Park. Lands, well timbered, with water power available, show granite, porphyry and andesitic breccia, carrying 6 fissure veins and 2 low-grade ore bodies. The fissure veins, in andesitic breccia, are estimated by the company as of 2′ and upward in width, carrying mainly chalcopyrite and chalcocite, with some malachite and azurite, said, by the old management, to give assays of 15 to 52% copper, 11 to 15 oz. silver and about $1 gold per ton, and formerly claimed by the present management to assay 10 to 56% copper, with an average of upwards of 40% copper and $10 to $20 silver per ton, which was a serious exaggeration, and now reported, by the management, to average 7 to 8% copper, with a paystreak carrying up to 25% copper, no silver and about $3 gold per ton. There are 3 principal fissure veins, known as the Bluff, Malachite and Greenhorn. The Bluff vein was said by the company to be 25′ wide, with a 12′ paystreak carrying average values of 15% copper, which figures were too high. The Malachite vein of 10′ to 25′ width, is said to have a paystreak 18″ wide at surface, increasing to width of 5′ at depth, giving assays of 15 to 56% copper. The company claims that its ores carry enough gold to pay the cost of mining and milling, and that the mine can produce copper practically without cost, which statement is not credited for an instant, as it does not hold good in the case of any copper mine in the world.

Development is by 2 tunnels, longest of 804′ length, planned for the main working tunnel, and the property has 1,032′ of workings. The mine was discovered 1901, opened 1906 and closed down Jan. 20, 1911, by 10′ of snow, unknown previously, but the management planned reopening as soon as the snow left.

Equipment includes a steam and electric power plant, and survey has been made for developing an available water power. There are 10 buildings for various purposes. About 15 men are employed, normally, and the management plans continued development, improving the water power, improving transportation facilities, building a smelter. The property is considered promising by Prof. H. C. B[illegible] State Geologist of Wyoming, and favorable reports have been had f[illegible]od engineers, but the company claims too high ore, claims the impo[illegible] making [illegible]r without cost, as a by-product, and makes the mista[illegible]rtisi[illegible]ing that this mine will rank with the Nevada Co[illegible] Co[illegible] which is entirely too much to claim for a prop[illegible] [illegible]opment. The mammoth claims mpany [illegible] modest development secure[illegible] f build[illegible] by a mine having less than

er-mile of workings, is not apt to make a favorable impression on men who what real copper mining and smelting means.

)NA-REX COPPER MINING CO. **WYOMING.**

)ead. Formerly at Encampment, Carbon Co., Wyo. Described Vol. VIII.

ONSIN & ARIZONA MINING CO. **ARIZONA.**

)ead. Formerly at Prescott, Yavapai Co., Ariz. Described Vol. VIII.

ONSIN COPPER CO. **IDAHO.**

)ead. Formerly at Kellogg, Shoshone Co., Idaho. Described Vol. IX.

ONSIN MINING & MILLING CO. **IDAHO.**

)ead. J. W. Ferguson was superintendent. Lands, known as the México carried argentiferous copper ore, slightly developed by a force of about 20 ;irca 1902. Equipment included a small steam plant. Formerly at Elk Idaho Co., Idaho.

ONSIN MINING, MILLING & DEVELOPMENT CO. **IDAHO.**

)ead. J. W. Bishop was superintendent. Mine, slightly developed, ; 1908, showed some copper ore, and had a small steam plant. Formerly cktail, Bonner Co., Idaho.

ONSIN MONTANA MINING CO. **MONTANA.**

ffice: Downing, Wis. Mine office: Superior, Missoula Co., Mont. Nichols, president and general manager; D. McDonald, vice-president; Coolidge, secretary; Dr. P. A. Beebe, treasurer; preceding officers and Cleveland, directors. Organized Jan. 29, 1906, under laws of Wisconsin, capitalization $50,000, shares 5 cents par; issued, $36,820. Annual ıg, first Tuesday in February.

ands, 16 claims, area 320 acres, and a 5-acre millsite, in T. 15 N., R. 25 ıe mile from the Missoula River and about 14 miles up the river from or. Property shows limestone, slate and quartz, carrying 3 fissure veins, ch 2 are under development, one, of 70′ estimated width, having a 7′ pay- carrying azurite and chalcopyrite giving assays of 2 to 25% copper, esti- by the management to average 15% copper, without reported gold or values. Development is by a 24′ shaft, and tunnels of 85′, 700′, 250′ and th about 100′ of other laterals.

ONSIN-WYOMING COPPER MINING CO. **WYOMING.**

ead. Formerly at Encampment, Carbon Co., Wyo. Described Vol. VI.

ENER BERG- UND HÜTTENWERKE AKTIEN-ESELLSCHAFT. **GERMANY.**

ɛtter returned unclaimed from former office, Köln, Germany. Mine Wissen-am-Sieg, Rheinprovinz, Prussia, Germany. Employs circa men. Fr. Haumann, Wilh. Marx and Alb. Knaff, executive committee; v. d. Zypen, Eugen v. d. Zypen and Herr Hagen, general managers. ;zed Oct. 20, 1903, under laws of Germany, with capitalization 8,000,000 , increased later to 10,000,000 marks. The company is an extensive pro- of iron ore, and incidentally secures a trivial copper output, mines owned)erated including the Vereinigung St. Andreas, Hohegrethe and Peters- ron mines. The company also owns an ore concentrating plant, 5 blast- es and a steel mill. The production was 109,483 metric tons of spathic ·e, and 1,092 metric tons of 10% copper ore in 1903; 185,000 tons iron ore)0 tons of 10% copper ore, equal to circa 125,000 lbs. fine copper in 1908.

BAU UND EISENHÜTTEN GEWERKSCHAFT 'ITKOWITZ. **AUSTRIA.**

ffice: Fichtegasse 10, Vienna I, Austria. Mine office: Witkowitz, ı, Austria. The mine secures a very small production of pyritic copper .rrying values mainly in sulphur, but the principal operations are for iron.)mpany has a small reduction plant, with an electrolytic refinery, having .ks with electrodes arranged on the multiple plan, daily capacity being 600 pounds of finished copper. Presumably idle.

WIZARD COPPER MINING CO. WASHINGTON.

Dead. L. Bryant was manager; H. A. Van Buskirk, superintendent. Mine was developed by a 520′ tunnel, on a vein of 25′ estimated average width, carrying a 3′ paystreak of smelting ore, balance of ore being claimed to be of concentrating grade. Formerly at Chewelah, Stevens Co., Wash.

WOLCOTT COPPER MINING CO. VERMONT.

Dead. Former office was Boston, Mass. Organized circa 1900, with capitalization $500,000, shares $1 par, and apparently was promoted to sell stock, as no trace of operation has been secured. Formerly at Wolcott, Lamoille Co., Vt.

WOLF CREEK COPPER MINING CO. MONTANA.

Office: Spokane, Wash. Mine office: Wolf Creek, Lewis & Clark Co., Mont. T. G. Cooper, president; C. E. Russell, vice-president and manager; R. E. Vincent, secretary and treasurer; preceding officers, A. M. Baldwin and P. S. Duchemin, directors. The mine, developed by tunnel, is said to show a fine vein of ore, carrying a 4′ paystreak giving assays of 20 to 40% copper tenor.

GEWERKSCHAFT WOLFGANG. GERMANY.

Dead. Went into bankruptcy May 14, 1910, and property was sold for 40,000 marks, to Lieut.-Gen. von Petersdorf. Office was at Neu Winterfeldstr. 31, Berlin, Germany. H. J. Herzfeld was general manager. Lands were near Langhecke and Münster, carrying copper and lead ores, partially developed. Employed about 15 men. Formerly at Essershausen, Hessen-Nassau, Germany.

WOLF PEAK GOLD & COPPER MINING CO. UTAH.

Office: Salt Lake City, Utah. Letter returned unclaimed from former mine office, Paradise, Cache Co., Utah. Wm. Young, president; Chas. F. Thyberg, vice-president; A. S. Fowler, secretary and treasurer; preceding officers, John Ciese and B. F. Johnson, directors. Organized January, 1910, under laws of Utah, with capitalization $100,000, shares 10 cents par. No trace of operations secured.

WOLFRAM COPPER CO. ARIZONA.

Dead. Former office was Prescott, Ariz. Benj. Blanchard was general manager, and presumably the promoter. Lands, near the Bill Williams Fork River, were slightly prospected, 1905, but apparently nothing of value was developed. Formerly at Parker, Yuma Co., Ariz.

WOLVERINE & ARIZONA DEVELOPMENT CO. ARIZONA.

Dead. Was reorganized, March, 1904, as Wolverine & Arizona Mining Co. Formerly at Bisbee, Cochise Co., Ariz. Very fully described Vol. I.

WOLVERINE & ARIZONA MINING CO. ARIZONA.

Office: Laurium, Mich. Mine office: 61 Mason Hill, Bisbee, Cochise Co., Ariz. John Daniell, president; Paul P. Roehm, vice-president; Edw. U. [illegible], second vice-president; W. Frank James, treasurer; preceding officers, C. Chynoweth, Benj. F. Chynoweth, W. H. Brophy, Fred C. Smith and Michael Cunningham, directors; Chas. Chynoweth, secretary; W. H. Roberts, superintendent.

Organized March, 1904, under laws of Arizona, as successor of Wolverine Arizona Development Co., with capitalization $3,000,000, shares $15 par, issued 97,156 shares, par value $1,457,340, subject to assessment, and 21,792 shares, par value $326,880, of full-paid stock. Levied 25-cent assessments March 19, June 19, Sept. 17, 1906; June 17, 1907; Nov. 18, 1907. Ended fiscal year Sept. 30, 1909, with surplus assets of $10,533.61, and ended fiscal year Sept. 30, 1910, with current assets of $26,617.19 and liabilities of only $1,200, leaving surplus assets of $25,417.19. Receipts for fiscal year 1910 included $39,962.89 from sales of copper ore, and $273.47 from sales of silver-lead ore, with total disbursements $22,008.32, of which $3,200 was for bills payable. Annual meeting, third Wednesday in November.

ınds, 9 claims, area circa 160 acres, known as the Cairo, Memphis, Ken-
Georgia, Louisiana, Chicago, Warren, George and Broken Promise.
›ayment on lands was made Jan. 30, 1907. The Georgia claim lies 600′
ınds of the Calumet & Arizona, and is about 3,000′ from the Irish Mag
f that company, and from the Spray and Holbrook shafts of the Copper
The Uncle Sam and White Tail Deer claims of the Copper Queen are
ıt to the Wolverine & Arizona.
ıe lands of the Wolverine & Arizona lie partially on the high hill west of
but development was begun on the talus of the 500′ mural escarpment
'orms the western side of the hill. The Broken Promise shaft, 700′ deep,
compartments, each 5x4′ 6″, well timbered, cut limestone showing con-
le iron, and proved very wet at depth. A drift on the 500′ level, running
ward the Pittsburg & Duluth group of the Superior & Pittsburg Copper
t leached ore and ledge-matter carrying traces of copper. Drifts running
r directions showed leached ore in encouraging quantities, but no ore of
rade was developed from the Broken Promise shaft, until 1908, when the
ıt an 18″ vein of silver-lead ore, estimated at $56 value per ton, near the
of the Warren or Bootleg claim, and the drift was continued into and
h the George claim, in the hope of finding oxidized ores that should lie
the sulphide ore bodies found in the Shattuck-Arizona mine adjoining,
hout success, and this work was abandoned, 1909. During 1908 work was
ded on the 500′ level, to avoid water, which apparently was a mistaken
as the principal ore bodies must be gone after at depth.
:ploratory work to the west of the cliff proving disappointing, diamond
rings of 2,694′ aggregate depth were made, 1906, on the hill, the last hole,
h of 410′, passing through 50′ of oxidized ore, of 4 to 10% copper tenor.
e body so located being inaccessible from the Broken Promise shaft, ex-
.der tremendous disadvantages, arrangements were made for the use of the
s tunnel, starting on the Twilight claim, to reach this ground from the
side of the hill, as the ore found was located on 2 claims near the Shattuck-
ı. Under this arrangement the old Higgins tunnel was extended 310′,
h Higgins ground, to the Wolverine boundary, and then continued, in a
·ly direction, on Wolverine lands. The Higgins tunnel was 3,200′ long
1910. An incline was started October, 1907, at a distance of circa 2,700′
ıe portal of the Higgins tunnel, and oxidized ore of about 8% average
tenor was developed, 1908, and the mine had about 2,000′ of workings at
l of 1909. The ore body developed by the incline from the Higgins tun-
ır the Shattuck-Arizona boundary, has improved in tenor, and the ore, all
d, averages about 10% copper. With a force of only 5 or 6 men, irreg-
ipments up to 250 tons monthly, of oxidized ore, ranging up to 11% in
tenor, were made to the Douglas smelter in 1910, and a considerable body
-grade ore has been developed. Lessees also have developed a silver-
e body, from which small shipments were made, 1910, extraction being
h an 80′ incline winze and a 40′ vertical winze.
ıuipment includes a 260-h. p. steam plant, with 2 single-drum hoists
-drill air-compressor. Buildings include a 25x50′ engine-house and office,
›use, boarding-house and a 10,000-gallon water-tank, water being pumped
Jaco, 8 miles distant. All surface improvements are at the Broken
e shaft.
oduction was 301,274 lbs. fine copper in 1909. The property has shown
sibilities by acquiring a considerable cash surplus, from ore shipments
with a force of only 5 or 6 workmen, during a time of very low metal
The property is considered valuable, and is believed to have the mak-
a good mine, but should be operated on a larger scale.

ERINE COPPER MINING CO. **MICHIGAN.**

fice: 15 William St., New York, N. Y. Mine office: Kearsarge,

Houghton Co., Mich. Employs circa 500 men. Jos. E. Gay, president; J. Wheeler Hardley, secretary; John R. Stanton, treasurer; preceding officers, also E. B. Hinsdale and Samuel L. Smith, directors; Fred Smith, superintendent; Willard J. Smith, assistant superintendent; Chas. L. Noetzel, clerk; David L. Vivian, mill superintendent; Wm. Pollard, mining captain; F. Wm. Hartmann, engineer; A. B. Holtenhoff, master mechanic.

Organized 1890, under laws of Michigan, with capitalization $1,500,000, shares $25 par. The company owns $80,000 stock in the Michigan Smelting Co. Fiscal year ends June 30th. Adams Trust Co., Boston, registrar; American Loan & Trust Co., Boston, transfer agent. Annual meeting, first Monday in August.

The first dividend was paid Oct. 1, 1908, and 25 dividend disbursements, to end of 1910, aggregated $6,300,000. Recent dividends, for calendar years, have been as follows: $330,000 in 1903; $450,000 in 1904; $660,000 in 1905; $1,020,000 in 1906; $1,050,000 in 1907; $600,000 in 1908; $600,000 in 1909; $600,000 in 1910. A $300,000 semi-annual dividend was paid March, 1911. Net earnings for fiscal years have been as follows: $557,240 in 1904; $741,234 in 1905; $1,007,820 in 1906; $1,703,304 in 1907; $1,244,443.71 gross and $559,402.17 net in 1908.

The Wolverine mine, opened, 1882, by local capital, was not successful and the company was reorganized, 1890, under the present title and management, when new machinery was secured and work resumed. The previous ill-success of the mine rendered investors dubious of its future, and cash for its development was secured with difficulty. Lack of funds imperatively demanded was met, by the late John Stanton, with a heavy loan, advanced from his own pocket, at a time when other shareholders were unwilling to risk a dollar, and it is due to Mr. Stanton's courage that the Wolverine now is, in proportion to its size, the most profitable copper mine in the Lake Superior district. Under Mr. Stanton's management milling was discontinued immediately, and was not resumed until 18 months of undergound development had given adequate reserves of stamp-rock. By reason of the sound policy pursued, the mine begun making small profits from the resumption of stamping, in 1892.

Lands, 320 acres, being 280 acres freehold, and 40 acres of mineral rights adjoining the main tract, the lands carrying 3,100′ of the strike of the Kearsarge amygdaloidal bed, on which the mine is opened. Neighboring properties are the North Kearsarge on the north, Mayflower on the east, Mayflower and South Kearsarge on the south, and Centennial on the west.

The Kearsarge bed averages about 16′ in width on the Wolverine property, and this is the richest amygdaloidal mine in the Lake Superior district, and is second in richness only to the Calumet & Hecla among all Lake Superior copper mines. The upper workings were lean, returning 16 to 17 lbs. fine copper only, 1892, but no stoping is in progress above the 15th level, below which the bed shows little or no diminution of value with depth. All lower levels are opened at 100′ intervals, but some of the upper levels were opened at 75′ to 80′ intervals. All shafts are sunk at an angle of 41°, and all skip-tracks have been given cross-ties, in place of longitudinal stringers, following the plan introduced in the Calumet & Hecla, which unquestionably is an improvement, as it permits the use of a cheaper grade of timber, and allows quicker repairs. Owing to the uniformity of the cupriferous bed, all levels, from the first to the 23d, inclusive, are opened through the entire property, connecting all 4 shafts to the bottoms of Nos. 1 and 2, and connecting Nos. 3 and 4 only below the 17th level. Man-cars are installed in shafts Nos. 2, 3 and 4. About one mile of new openings is made yearly, with ground blocked out for about 5 years production, at the rate of 10,000,000 lbs. fine copper yearly, with upwards of 20 years of life ahead of the mine. About 30 power drills are employed, of which two-thirds are stoping, and one-third are employed in opening work.

The system of underground rock-handling, introduced circa 1905, saves con-
ı and cash. Tram-cars to the average number of 10 are kept on each level.
ımers leave filled cars at the shaft, and 2 men attend to the dumping in each
, these starting at the topmost level where stoping is in progress, and
ng downward, dumping all loaded cars on each level, in order, then riding,
ips, to the topmost producing level, and repeating the work. By this sys-
ll signaling in each shaft is in the hands of 2 men, and the engineers in
e of the hoists know exactly what is going on underground.

The mine has 5 Knowles electric pumps, of which 3 are in No. 2 shaft, and
ach in Nos. 3 and 4, three of these pumps having an average lift of more
1,000′ each. Current is taken from the Houghton County Electric Light
nd the electric pumps have given much relief to the air-compressors. The
has the Johnson electric hoisting signal system, having been the first Lake
ior copper property to install electric signals throughout.

The use of diamond drills, in the older workings, near surface, has located
good copper ground in a portion of the mine heretofore considered worth-
Attention also has been given to the parallel cupriferous strata. An
:atory crosscut was driven, on the 14th level, some years ago, for about
across the formation, both east and west, from the workings on the
arge bed, reaching as far west as the Kearsarge conglomerate, which was
ıtely barren where cut, though known to carry some copper on the Ahmeek
Seneca properties, to the northward. An exploratory crosscut is being
ı east on the 28th level, and will reach the boundary line at 2,800′ distance
the point of intersection of the Kearsarge bed, the primary object of this
ut being to test a bed of rather promising character, opened by the
Colony, some years ago. This crosscut was circa 1,000′ long, June, 1911.
ying about 80′ west of the Kearsarge bed is the so-called West lode,
d by a crosscut on the 13th level, with a little work done 1903, giving one
stope. The West lode also gave a little encouragement where opened by a
ut on the 14th level, and may be tested further, in the future.

The Wolverine lands carry about 60 acres of the Osceola amygdaloidal bed,
, shaft thereon, started late 1910, was about 300′ deep June, 1911, with
300′ of drifts run on the 260′ level, giving results of a negative nature.
No. 1 shaft, at the north, near the Kearsarge line, ran into the boundary
ıllow depth, and tributary ground having been worked out, this shaft was
loned, some years ago.

No. 2 shaft, next south, is permanently bottomed at the boundary line, at a
of 1,700′ and is used exclusively for handling men and supplies. The
e house has a duplex-cylinder hoist with straight-face drum.

No. 3 shaft, sunk in the footwall, is bottomed at the 37th level, and can be
3 additional lifts before reaching the limit of possible depth, circa 4,000′,
change of land between the Wolverine and North Kearsarge mine of the
la Consolidated having permitted the sinking of this shaft considerably
r than would have been the case otherwise. Shafts Nos. 3 and 4 are con-
d by drifts down to and including the 33d level. Equipment of No. 3
les a steel shaft-rockhouse, duplicating that of Mohawk No. 4 in design
quipment. No. 3 shaft has a duplex-cylinder hoist, which was given a new
raight-face drum, circa 1910, to permit hoisting from the maximum depth
the shaft can attain.

No. 4 shaft, sunk 45′ in the foot, to guard against drawing, was at the
level, June, 1911, and can be sunk to the 42d level before reaching the Cen-
al boundary. Equipment includes an engine-house of mine-rock with red
tone trimmings, built 1906, housing a 14x60″ Nordberg duplex-cylinder
with double conical drum having a maximum diameter of 18′, capable of
g 4-ton skips from 1 mile depth, with a 1¼″ steel cable. No. 4 engine-
e has a large electric transformer. There are 20-drill and 22-drill Rand air-

compressors, and the boiler-house has 3 Stirling water-tube boilers, with American automatic stokers and a Green fuel economizer.

The principal mine buildings are at No. 4 shaft, and there is a model changing-house at No. 3 shaft. A private telephone system, with 20 instruments, connects the underground pump-stations and principal buildings on surface, the central exchange being in No. 3 engine-house. The company maintains a 6-ward hospital, with medical, surgical and nursing staff, for employés and their families, and owns a large number of substantial dwellings, the mine location being exceptionally neat and prosperous in appearance.

Rock is transported between the mine and mill by the Mohawk & Traverse Bay railroad, with a down-grade haul of 13 miles.

The mill, completed 1902, is near the mouth of Tobacco River, on Traverse Bay, Lake Superior, and adjoins the Mohawk mill, both being served by a single pump, and managed by a joint superintendent. The mill, 180x206′ in size, of steel on stone foundations, standing 37′ above the lake, has 2 Nordberg heads, both compounded, 1908-1909. The mill makes extensive use of Wilfley tables, and has a completely appointed machine-shop. Mineral from the heads and wash is sluiced to the basement through iron pipes, going for reduction to the works of the Michigan Smelting Co., at Houghton. To care for tailings there has been installed a Jackson tailings system, which provides for settling out the water and stacking the tailings 800′ from the mill, by a belt-conveyor, this system giving very satisfactory results.

The 42x58′ boiler-house, just south of the mill, with stone walls and a steel truss roof, houses a battery of 200-h. p. Stirling water-tube boilers, equipped with American automatic stokers. Coal goes through a lump-crusher, thence to hoppers having 24 hours storage capacity.

The pump-house, owned and operated jointly by the Wolverine and Mohawk, has a 20,000,000-gallon Snow horizontal triple-expansion pump, with 18″, 33″ and 54″ steam-cylinders, and 22″ water plungers, with 36″ stroke, and there is an auxiliary 8,000,000-gallon Nordberg triple-expansion water-end pump, with 3 plungers. The pump-house is located on the river, near its mouth, the intake pipe being protected by timber cribs running 300′ into the lake, preventing clogging from floating bark and anchor ice.

In connection with the mills there is a wharf, owned jointly by the Wolverine and Mohawk, fitted with coal-hoists. A 40-acre townsite, platted near the mills, is named Gay, in deserved honor of Jos. E. Gay, the president of the company, long and honorably identified with honest and successful copper mining enterprises in the Lake Superior district.

Production, for calendar years, was 2,316,296 lbs. copper in 1897; 4,789,829 lbs. in 1900; 9,024,034 lbs. in 1903; 9,764,455 lbs. in 1904; 9,464,418 lbs. in 1905; 9,681,706 lbs. in 1906; 9,272,351 lbs. in 1907; 9,681,706 lbs. in 1908. Production for the company's fiscal years, ending June 30th, was 9,372,982 lbs. in 1907; 367,795 tons of rock, of which 18,935 tons, or 5.15%, were discarded, yielding 12,117,000 lbs. mineral, that returned 9,356,123 lbs. fine copper, an average of 1.341%, or 36.82 lbs. fine copper per ton, in 1908; 9,965,749 lbs. fine copper in 1909; 405,790 tons of rock, of which only 3.68% was discarded, yielding 9,757,101 lbs. fine copper, an average of 24.96 lbs. per ton in 1910. The rock stamped May, 1911, returned 29.36 lbs. fine copper, the highest yield for several years. Costs for fiscal years were $1.62 per ton for rock hoisted, $1.71 per ton for rock stamped, 6.379 cents per pound for copper at the mine, and 7.321 cents per pound for copper delivered, with all charges included, in 1908; $1.52 per ton of rock hoisted, with a total cost of 7.375 cents per pound for finished copper delivered in 1909; $1.55 per ton of rock hoisted, $1.61 per ton of rock stamped, with a total cost of 7.413 cents per pound, exclusive of construction, for the fiscal year 1910, the Wolverine continuing, as for many years past, the lowest cost copper producer of Lake Superior. The property is valuable, with a fine dividend

and assurance of further large dividends, and the management, both and local, is of the very best.

ERINE COPPER MINING CO., LTD. **IDAHO.**

ad. Formerly at Mullan, Shoshone Co., Idaho. Described Vol. VIII.

ERINE MINING CO. **UTAH.**

ad. Was wound up, by receiver, circa 1908. Formerly at Park City, t Co., Utah. Fully described Vol. VI.

ERINE MINING & LEASING CO. **COLORADO.**

ice: Niles, Mich. Mine office: Pearl, Larimer Co., Colo. W. S. president; Edwin Miller, vice-president; Dr. Z. L. Baldwin, secretary; . Lobdell, chairman executive committee. Is a development company, ed of shareholders of Coldwater Copper Mining Co., and took over the ter mine, circa 1903, under a 3 to 5 year lease. Idle some years and nd.

ERINE & WESTERN DEVELOPMENT CO. **OREGON.**

ad. Formerly at Roseburg, Douglas Co., Ore. Described Vol. VI.

ERFUL MINING CO. **IDAHO.**

tters returned repeatedly from former mine office, Mullan, Shoshone aho, but company still active, notwithstanding the inability of the post- at Mullan to deliver mail. A. H. Featherstone, secretary. Stock is ole. Lands, 4 claims, patented, lying next west of the Bullion mine, on ern slope of Stevens Peak, having a 1,200′ crosscut tunnel developing a d to give a fair showing of galena and copper ore, and, late 1910, the work- ; a 6′ vein of ore giving assays of 15 to 20% copper tenor.

LAWN COPPER MINING CO. **UTAH.**

ice: 305 Atlas Blk., Salt Lake City, Utah. Mine office: Brighton, ke Co., Utah. H. W. Lawrence, president; A. C. Ellis, Jr., vice-presi- eorge N. Lawrence, secretary and treasurer. Organized 1899, under Utah, with capitalization $500,000, shares $1 par, assessable. Lands, , patented, in the Big Cottonwood district, 18 miles from a railroad, hav- ut 3,500′ of workings, said to show a 12′ vein carrying auriferous and erous lead and copper ores. Presumably idle.

LEY MINING CO. **ARIZONA.**

ne office: Kelvin, Pinal Co., Ariz. Lands were 17 claims, between the Mountain and Troy-Manhattan, taken over, 1906, under a $60,000 bond e. Idle some years and presumably moribund.

'S FAIR MINE. **ARIZONA.**

ce: care of Frank & Josephine Powers, owners, Nogales, Ariz. Mine Patagonia, Santa Cruz Co., Ariz. Lands, 13 claims, near Harshaw, Patagonia, in the eastern end of the Salero Mountains. The mine has ain shaft, with about 2 miles of workings, developing an 8′ ore body, ; highly argentiferous lead carbonates and sulphides near surface, g at depth to argentiferous sulphides, with values mainly in silver. The s been a shipper, since circa 1893, of high-grade silver ore, in carload ging from $250 to $350 in value, and one 20-ton carload gave net smelter of $15,000. The mine is popularly reputed to have produced about) worth of ore. Equipment includes a steam plant. Production was os. fine copper, 106,627 oz. silver and 25 oz. gold in 1907, but operations pended Oct. 5, 1907, on account of the low prices of silver and copper, and remained idle until late 1910, when shipments were resumed, on a small

'S FAIR MINING CO. **ARIZONA.**

id. Formerly at Patagonia, Santa Cruz Co., Ariz.

T & LAWRENCE MINING CO. **CALIFORNIA.**

id. Was a swindle. Formerly at Doyle, Riverside Co., Cal. De- Vol. VIII.

WRIGHT-RUSSELL COPPER MINING CO. WYOMING.

Office: 109 South 11th St., Lincoln, Neb. Letter returned unclaimed from former mine office, Battle, Carbon Co., Wyo. J. H. Westcott, president; W. H. Dorgan, vice-president; John P. Dorgan, secretary; John B. Wright, treasurer; H. M. Rice, general manager, at last accounts. Capitalization $1,000,000. Idle some years and apparently moribund.

W. S. FLETCHER MINING & SMELTING CO. ARIZONA & CALIFORNIA.

Dead. Was succeeded, March, 1905, by Arizona-Mexican Mining & Smelting Co. Formerly at Kingman, Mohave Co., Ariz., and Needles, San Bernardino Co., Cal. Described Vol. V.

WYACCA MINE. AUSTRALIA.

Letter returned unclaimed from former office, Broken Hill Chambers, Adelaide, South Australia. Mine office: Blinman, Flinders Co., South Australia. E. Pearce, manager, at last accounts. Lands are Section 1, in the Hundred of Basedow, 8 miles southwest of the Blinman mine, and about 260 miles north of Adelaide, showing several narrow veins of 1″ to 26″ width, the main vein carrying 1″ to 8″ of rich ore, including cuprite, melaconite and chalcopyrite, with calcspar and spathic iron gangue, developed by several opencuts, a 120′ vertical shaft and a 145′ incline shaft. Idle some years.

WYANDOT COPPER CO. MICHIGAN.

Office: 68 Devonshire St., Boston, Mass. Operating office: Houghton, Mich. Mine office: Winona, Houghton Co., Mich. John C. Watson, president; M. A. O'Neil, vice-president; Chas. E. Adams, secretary and treasurer; Frank L. Van Orden, manager; preceding officers, and Jos. Dorr, directors; Louis LaRochelle, mining captain. Organized Feb. 3, 1899, under laws of Michigan, with capitalization $2,500,000, shares $25 par; paid in, $8. Has levied assessments of $200,000 since organization. Disbursements, for fiscal year ending March 30, 1908, were $25,905, and the company ended its fiscal years, March 31st, with cash assets of $52,711 in 1910, and $34,091 in 1911. Shares are listed on the Boston stock exchange. State Street Trust Co., Boston, registrar; Federal Trust Co., Boston, transfer agent. Annual meeting, second Monday in May.

Lands, 1,065 acres, adjoining the Winona, in Sections 16, 20 and 21, Town 52 North, Range 36 West. Exploratory work, begun February, 1899, has been continued uninterruptedly, though hampered by the great disadvantage of a heavy overburden. Early work was done in search of the Winona bed, and efforts were made later to locate the southern extension of the Baltic amygdaloid, after which attention was turned again to the Winona bed, and latterly has been directed toward locating the extension of the Lake bed. The average strike of the Keweenawan formation is N. 53° E., with an average dip of 65°, and the Wyandot lands carry the strike of the Keweenawan bedded series for about 1½ miles. The mine has 11 shafts, some of which are merely pits, with 2 shafts of considerable depth.

No. 1 shaft, 1,000′ deep, located in the SE. ¼ of Section 21, T. 52 N., R. 36 W., is sunk in the footwall of the Winona bed, and there is a parallel underlying amygdaloidal bed 60′ distant, both broken, and of small promise, though showing occasional patches of well mineralized ground.

No. 11 exploratory shaft, 8x10′, inside measurement, was sunk 350′ on a stratum paralleling the Winona bed, at a distance of 1,200′. This bed gave encouragement, when first opened, and diamond-drill holes gave good cores, but work was suspended, until 1907, when the shaft was unwatered and deepened. This shaft, located in the SE. ¼ of Section 21, T. 52 N., R. 36 W., was deepened, 1908, to 700′, and a crosscut, driven to the southeast, passed, late 1908, through an epidotal amygdaloid of circa 50′ width, carrying finely disseminated copper of promising appearance. There also is a footwall shoot of 6″ to 4′ width, heavily mineralized, where cut. The epidotal bed, apparently about 20′

h, showed very little copper until the footwall was reached, where there
ınd 6″ to 12″ of heavy mass and barrel copper, at the point cut, but drifts
ınd south show copper more evenly disseminated through the bed, mainly
ıp-copper, rather than barrel work. A crosscut was driven southeast
ıe bottom of No. 11 shaft, for a distance of 1,750′. The crosscuts in
11 have penetrated 9 distinct amygdaloidal beds, of which Nos. 3 and
ıe only ones showing copper in quantities of any promise, and consider-
ifting has been done on both. No. 3 bed disclosed considerable mass
rrel copper, but No. 8 is considered the more promising. Work was
ınued June, 1910, but the shaft is being kept free from water, and work
resumed on immediate notice.

cellaneous work of the past includes a 102′ shaft, sunk on a lean cuprifer-
glomerate underlying the Winona bed; a 300′ shaft sunk on an amygda-
ıtified as the Elm River, which gave no promising ground, and some work
e also, 1904–1905, on the Misery River bed, in Section 16, T. 52 N., R.
n a 20′ amygdaloid carrying fine copper, but nothing of value was devel-

Some years ago a vertical shaft was sunk on lands held under option, near
; quarter post of Section 28, T. 52 N., R. 36 W., to depth of 250′, and
s driven both east and west with about one-half mile of workings. This
)ssed the horizon of the Baltic bed, but what was deemed the Baltic
oid was found highly altered, and worthless, as was the whole country
eighborhood.

ensive diamond drilling has been done, and a core, taken 1904, from the
ical horizon of the Lake bed, showed a little copper, but was not con-
mportant, at that time. The ground is being gone over again, with a
drill, the work being done in a thoroughly systematic manner, and
drilling was done, 1910, in Sections 16 and 21. Holes Nos. 21 and 22
)eds offering encouragement, and some trenching was done on one of
is being 48′ wide, and carrying a little copper from foot to hanging.
trench, 1,500′ northeast, disclosed the bed under only 16′ of overbur-
a shaft, known as the Section 16 shaft, was started, at an angle of 65°,
35′ deep March, 1911. A crosscut at depth of 65′ shows the bed to be
carrying finely disseminated copper for about 10′, with small masses
footwall.

pment includes a steam plant with Lidgerwood hoist, good for 1,000′,
soll-Sergeant and 2 Rand air-compressors, of 12 drills aggregate capac-
ldings include a machine-shop, smithy, warehouse, barns and about
ngs. The Wyandot has worked faithfully for more than a decade,
st discouraging circumstances, but with great economy and persistence,
are at least two points, one on No. 8 bed of No. 11 shaft, and one
tion 16 shaft, where the present showing is of an encouraging nature.

IG & ALABAMA MINING CO. **WYOMING.**

. P. E. Kinnaman was superintendent. Property was a copper
having very limited development, on which the last work was done
. Formerly at Tie Siding, Albany Co., Wyo.

IG & COLORADO COPPER CO. **WYOMING.**

. Lands were in the Douglas Mountains, south of Rock Springs, and
ty was under development, with a small force, 1903–1905. A test
circa 1903, gave smelter returns of $24.78 per ton. Formerly at Rock
weetwater Co., Wyo.

G CONSOLIDATED COPPER CO. **WYOMING.**

Former offices were 27 State St., Boston, Mass., and 7 Water St.,
lass. Brackley Shaw was president; Edmund H. Noyes, secretary;
in, treasurer. Lands, near Encampment, known as the Cox mine,
tly developed, circa 1904, and the company also held lands, appar-

WRIGHT-RUSSELL COPPER MINING CO.

Office: 109 South 11th St., Lincoln, Neb. Le
from former mine office, Battle, Carbon Co., Wyo.
W. H. Dorgan, vice-president; John P. Dorgan,
treasurer; H. M. Rice, general manager, at
$1,000,000. Idle some years and apparently

W. S. FLETCHER MINING & SMELTING C

Dead. Was succeeded, March, 1905, b
ing Co. Formerly at Kingman, Mohave
dino Co., Cal. Described Vol. V.

WYACCA MINE.

Letter returned unclaimed fr
Adelaide, South Australia. Mi
Australia. E. Pearce, manager,
Hundred of Basedow, 8 miles
miles north of Adelaide, show
main vein carrying 1" to 8"
copyrite, with calcspar and
a 120' vertical shaft and a

WYANDOT COPPER C

Office: 68 Devons
Mich. Mine office:
dent; M. A. O'Neil,
Frank L. Van Ord
Louis LaRochelle,
Michigan, with ca
levied assessment
year ending Mar
years, March 3
Shares are list
ton, registrar;
second Mond

Lands, 1.
52 North, R
continued u
heavy overb
efforts were
after which
directed to
the Kewe
Wyandot
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No.
36 W.,
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Formerly at

WYOMING.

under laws of
was done
Encampment,

WYOMING.

mine office,
; Al Rohr, vice-
Sept. 3, 19
shares $1 par,

Chief and Jessie, in Hog
showing granite and
by the management
carbonates estimated
silver and $1.63 to $
shaft, and the vein
shaft, showing ore

with two 5x6' hoists
for some years past
work has been

WYOMING.

Formerly at Rawhide

WYOMING.

Mine office: South
president and treasurer
L. Rayl, secretary;
M. Remington and
Organized July, 1905,
shares $1 par, nonassessable
July.
acre placer claim
This district was a
the management
may be meant for
development. The
between granite and
prospect pits.
and 60', with
turn to pure
average of 1
Ore is reported
of zinc, 1
that it
values, but
this company

p. Fairbanks
was burned
plant,

NING CO. WYOMING.
mer office, Salt Lake City, Utah. Mine
Organized 1906, under laws of Utah.
h of Lusk, in the northern part of Albany
wing an ore body assaying 16% copper, with

CO. WYOMING.
pment, Carbon Co., Wyo. Described Vol. IX.
WYOMING.
president; B. F. Brown, secretary; C. A. Tewks-
property, slightly developed, carried auriferous and
Formerly at Kirwin, Big Horn Co., Wyo.
NING CO. WYOMING.
yo. Mine office: Jelm, Albany Co., Wyo. Louis
rer and general manager; L. A. Hancock, secretary;
Downing, E. E. Fairbrother, Ole Scar and John Wenzin,
January, 1902, under laws of Wyoming, with capitaliza-
es $1 par.
ns, area 360 acres, and 20 acres of placer ground, in the Jelm
iles southwest of Laramie, the nearest rail point, having 3
rying auriferous and argentiferous copper carbonates and sul-
assay values, with a little native copper and galena. Develop-
fts of 70', 70' and 100' on a gold vein, a shaft of 100' on a vein car-
us and argentiferous copper and lead sulphides, and a 250' shaft
rous copper vein, the mine also having tunnels of 70' and 250'.
is wet, needing pumps. The company is out of funds, in debt, idle
s, and apparently moribund.

IRON & COPPER CO. WYOMING.
d. Formerly at Battle, Carbon Co., Wyo. Described Vol. VIII.

AÑÍA MINERA YABRICOYA. CHILE.
ad. Formerly at Iquique, Tarapacá, Chile. Described Vol. VIII.

CIN MINING & IMPROVEMENT CO. NORTH CAROLINA.
)ead. Former office was 508 Herman Bldg., Milwaukee, Wis. Geo. H.
ble, the president and manager, was killed, 1903, by an accident at the
after which work was suspended. Property was the Tom Dixon mine,
ng auriferous copper ore, slightly developed. Formerly at Buck Shoal,
in Co., N. C.

ER CAÑON COPPER CO. ARIZONA.
)ffice: Union Trust Bldg., Detroit, Mich. Letter returned unclaimed
former mine office, Jerome, Yavapai Co., Ariz. Robert E. Plumb, presi-
Richard E. Sloan, vice-president and general manager; Geo. B. Russell,
ary; Geo. H. Russell, treasurer; C. E. Brinker, superintendent, at last
nts. Organized Apr. 11, 1903, under laws of Arizona, with capitalization
000, shares $1 par.
ands, 21 claims, area 460 acres, 4 miles southwest of Jerome, in the
Hills district, carrying 3 fissure veins in diorite, one averaging 14' width.
has shafts of 350' and 1,200', with about one-half mile of workings, esti-
l to show 40,000 tons of ore, and is claimed to have 25,000 tons blocked
or stoping, ore being bornite and chalcopyrite, estimated to average 6%
r, 8 oz. silver and $2 gold per ton. Equipment includes a 240-h. p. steam
, with a 140-h. p. hoist and a 10-drill Sullivan air-compressor. A 60-ton
ntrator 30x104', of wood and iron, has a No. 2 Austin centrifugal crusher, 2
of rolls and 5 Wilfley and Bartlett tables. Has been a small producer for
al years. Production, 1907, was 145,849 lbs. fine copper, and 3,893 oz.
. Property considered promising. Idle and presumably moribund.

YAKUKI MINE CO. **JAPAN.**

Mine office: Ono-mura, Iwaki-gori, Iwaki, Japan. Kurasaburo Kawabe, owner. The property, having only a 15-h. p. installation, employed an average of 109 persons, 1908. Production was 394,490 lbs. fine copper, 167,454 momme silver and 8,015 momme gold in 1907; 251,738 lbs. copper in 1908.

YAKUOJI MINE. **JAPAN.**

Mine office: Ayagi-mura, Mine-gori, Nagato, Japan. Kurasaburo Kawabe, owner. Equipment includes a 20-h. p. power plant. Mine employed, 1908, an average of 191 hands, when production was 117,996 lbs. fine copper, and 236,082 kwan copper ore.

YALE GOLD-COPPER MINING CO. **BRITISH COLUMBIA.**

Dead. Tom C. Gray was president; Geo. Talbot, secretary. Capitalization was $1,000,000. The company held lands near Rossland, circa 1896, but secured only limited development thereon. Formerly at Rossland, Trail district, B. C.

YALE MINING CO., LTD. **BRITISH COLUMBIA.**

Dead. Property was sold, circa 1909, to Hedley Gold Mining Co. Formerly at Hedley, Boundary district, B. C. Described Vol. VIII.

YAMAGATATOKITO MINE. **JAPAN.**

Mine office: Nanataki-mura, Kazuno-gori, Rikuchu, Japan. Yusaburo Yamagata, owner. Equipment includes a 237-h. p. plant, and forces averaged 539 persons, 1907. Production was 641,120 lbs. fine copper in 1906; 12,495 tons of copper ore valued at 232,274 yen, estimated to carry 650,000 lbs. fine copper, in 1907.

YAMATE MINE. **JAPAN.**

Letter returned unclaimed from former mine office, Takigawa-mura, Kume-gori, Mimasaka, Japan. Chobei Nomura, owner. The property is a very ancient mine, having a fissure vein in quartz-diorite, carrying a slightly argentiferous sulphide complex of chalcopyrite, galena and sphalerite, with arenaceous clay gangue, the best grade of ore yielding 10 to 13% copper. Average forces were 56 persons, 1908. Production was 99,679 lbs. fine copper and 3,044 momme silver 1899; 84,856 lbs. fine copper in 1907; 69,022 lbs. copper and 19,836 momme silver in 1908.

YAMPA MINE. **UTAH.**

Owned by Tintic Mining & Development Co., at Bingham Canyon, Salt Lake Co., Utah.

YAMPA SMELTING CO. **UTAH.**

Office: 747 Fifth Ave., New York, N. Y. Operating office: 213 Dooly Block, Salt Lake City, Utah. Works office: Bingham Canyon, Salt Lake Co., Utah. Henry Stern, president; J. W. D. Moodie, general manager; Frank J. Murphy, superintendent, at last accounts. Organized 1903, with capitalization $100,000, and is controlled, through stock ownership, by the Tintic Co. Property was mortgaged, August, 1909, for $450,000, jointly with the property of the Tintic Mining & Development Co. and the West Mountain Tramway Co., to secure a $675,000 issue of 8% gold bonds.

Property is a smelter, at Yampa, in lower Bingham Canyon, built 1904, and enlarged, 1906, to circa 1,000 tons daily capacity. The works are connected with the Yampa mine by the aërial tram of the West Mountain Tramway Co. The plant includes ore-bins, a calcining building, blast-furnace building, converter building and power plant, all main buildings having steel frames.

The calcining department has eight 125-ton McDougall calciners, each with 6 superimposed hearths having sets of rabbling arms and rakes, and an 18x30x30' dust-chamber, connecting with a 120' brick stack.

The furnace building has 3 blast-furnaces, and a main stack with extreme elevation of 287' above the tuyeres. There are also 3 reverberatory furnaces, each having separate brick stacks.

nverter department, installed 1907, has 2 stands, electrically oper-
ix 84x126″ shells, converting matte of 50% average tenor to blister
merly shipped for refining to the works at Chrome, N. J., but
er was shut down, 1909, and matte sent thereafter to the Garfield
he plant formerly employed about 200 men, but was closed down
), not having been a money maker. The smelter is good for a small
cannot compete commercially with custom smelters having a wide
s for furnace mixtures, and there seems small likelihood of resumption.
was 4,699,765 lbs. fine copper in 1906; 5,001,255 lbs. in 1907;
000 lbs. in 1908; circa 6,500,000 lbs. in 1909.

CONSOLIDATED MINING, MILLING & SMELLING CO. **COLORADO.**

Henry I. Seeman was manager. The property included a mine
ferous and argentiferous lead and copper ores, and a 5-stamp mill.
ıy was merged, circa 1908, in the Continental Mines, Power & Reduc-
ormerly at Yankee, Clear Creek Co., Colo.

DOODLE MINING CO. **ARIZONA.**

ffice: Johnson, Cochise Co., Ariz. J. P. Richardson, manager, at
s. The mine has shafts of circa 100′ and 200′, also a tunnel showing
azurite, associated with hematite. Idle.

ÑON COPPER CO. **MÉXICO.**

408 Gumbel Bldg., Kansas City, Mo. Mine office: Suaqui de
s, Sonora, Mex. A. J. Davies, president; S. M. Major, vice-presi-
. Kerr, secretary; Frank B. Foster, treasurer; T. W. Foster, general
receding officers, J. B. Ross and Wm. Herbert Collins, directors;
en, superintendent. Organized under laws of Arizona, with capitali-
0,000, shares $1 par.

60 pertenencias, area 148 acres, known as the Todos Santos and
blic mines, and a 50-acre smelter-site. The property has 6 contact
tween limestone and porphyry, of which 2, under development, of
ed average width, carry argentiferous copper and lead ores, former
average assays of 7% copper and 50 oz. silver, and latter said to assay
nd 30 oz. silver, with a trace of gold. The principal property is an
posed to be several hundred years of age, showing considerable dis-
f low tenor on the dumps, remaining from old operations. Develop-
4 tunnels and 7 or 8 shafts, and the management planned driving a
to crosscut all known veins.
ıent includes a steam plant and air-compressor, and there is a small
ving a 10-ton reverberatory furnace. Buildings include a small
laboratory, machine-shop and general store. Was developing, with
e, at last accounts.

PPER CO. **MÉXICO.**

1 Madison Ave., New York, N. Y. Letter returned unclaimed
r operating office, Hermosillo, Sonora, Mex. Mine office: Suaqui
Jres, Sonora, Mex. Wm. Sauntry, president; Dr. A. E. Magoris,
nt; Hon. Geo. E. Green, secretary and treasurer; Chas. Kiser, gen-
r; Ed. Chamberlain, superintendent, at last accounts. Organized
laws of West Virginia, with capitalization $5,000,000, shares $1 par.
ıriginally were, or were claimed to be, 6,032 acres of mineral terri-
9,284 acres of timber and grazing lands, also water-rights to 25 miles
i River, the mining lands being in the vicinity of Suaqui de Batuc,
to Niño, in the Sierra Madre, circa 120 miles from Hermosillo.
claimed to show antigua workings, iron ore and indications of coal.
06, the Montaña de Cobre company was said to have acquired 1,000
s formerly held by the Yaqui Copper Co., hence area of present
ıncertain.

The company claims to have contact deposits, between granite and limestone, 80′ to 200′ wide and several miles in length, with one exposure of a quarter-mile depth on the face of a mountain, with the main ore body crossed by a smaller vein, at nearly right angles, all of these claims being preposterous. The company claims that the upper portions of veins show oxidized ores, succeeded by massive chalcocite, bornite and chalcopyrite, and claimed that average assays of a large number of samples give 14.92% copper, 6.6 oz. silver and 2.09 oz. gold per ton, which assays are without verification, and probably will continue to lack competent indorsement till the end of time.

Development, begun 1901, is by 2 shafts and 8 tunnels, and, so far as can be learned, the mine has shown practically no ore.

Improvements include an engine and boiler house, office building and store. Company planned the installation of a hydro-electric plant and a concentrator, but failed to secure same.

The Yaqui Copper Co. was organized for the purpose of selling stock, and was a deliberate swindle, the lying done by its original officers having been of a monumental nature. The company claimed possession of the largest copper vein ever located, but was unable to produce the same for the inspection of visitors competent to judge. Mr. Sauntry, the president, who was not connected with the original management, is an experienced lumberman, and an excellent judge of pine timber; the secretary and treasurer is a manufacturer of time-recording machines, and the former superintendent, who was killed by the Yaqui Indians, is said to have managed a photograph gallery with signal success. The company is exceptionally hard up, with a considerable floating debt, and is constantly pleading to shareholders for funds, and, March 31, 1908, issued a mimeographed letter to shareholders, offering the company's note for one year, in order to raise $1,600 to pay back salary due the widow of the late superintendent. So far as can be learned the property is practically valueless and the company practically bankrupt.

YAQUI DEVELOPMENT CO. MÉXICO.

Dead. Was organized by interests closely connected with the Douglas Copper Co., and held extensive tracts, including a number of old mines, in the Ures district of Sonora. Was succeeded, 1908, by Mexican Exploration & Mining Co. Formerly at Suaqui de Batuc, Ures, Sonora, Mex.

YAQUI MINING CO., S. A. MÉXICO.

Office: 42 Broadway, New York, N. Y. Mine office: Suaqui de Batuc, Ures, Sonora, Mex. Courtenay DeKalb, president and general manager. Organized under laws of México, and is controlled, through ownership of entire capital stock, by the Mexican Exploration & Mining Co., an Arizona corporation that is controlled, through stock ownership, by the Pacific Smelting & Mining Co. Property is described under title of latter.

YAQUI RIVER CONSOLIDATED GOLD & COPPER CO. MÉXICO.

Office: Nogales, Ariz. Letter returned unclaimed from former mine office, Quiriego, Alamos, Sonora, Mex. W. H. Smith, secretary; Walter W. Strickland, manager. Lands include a gold property in the Magdalena district, and a copper property about 25 miles east of Imuris, developed by a 135′ shaft, showing a 4′ vein carrying auriferous and argentiferous copper ore, said to give good assay values. Was developing, with a small force, 1909. Idle.

YAQUI RIVER EXPLORATION CO. MÉXICO.

Dead. Formerly at San Antonio de la Huerta, Ures, Sonora, Mex.

YAQUI RIVER GOLD & COPPER CO. MÉXICO.

Letter returned unclaimed from former office, Los Angeles, Cal. Mine office: Nogales, Magdalena, Sonora, Mex. Lee Reagan, president; Roy Stearns, general manager, at last accounts. Property is the Mina Verde, near Nogales, which is said to have shipped a little high-grade ore carrying value

y in gold and silver. Idle at last accounts, but said to plan resumption 1911.

JI SMELTING & REFINING CO. S. A. **MÉXICO.**

Vorks office: San Antonio de la Huerta, Ures, Sonora, Mex. Is the an operating company of the Sonora Mining & Development Co., and rty is described under title of latter. Fully described Vol. VIII.

LANGOBILLY COPPER MINING CO., N. L. **AUSTRALIA.**

Mine office: Yarrangobilly, Buccleuch Co., N. S. W., Australia. Organ- irca July, 1908, under laws of New South Wales, with capitalization 0, shares £20 par, fully issued and fully paid. Lands, 7 miles from Yarran- y, have a 3′ vein, carrying carbonate ore at surface, with occasional sul- s at shallow depth, and the property is said to have some good ore. Was ping, with a small force, at last accounts, 1909.

VELL MOUNTAIN COPPER CO. **COLORADO.**

ead. Was organized circa April, 1907, by Canadian interests. Lands, o have been bought for $60,000, were on Yarwell Mountain, and appar- little or no work was done thereon, by the company. Formerly at Steam- Springs, Routt Co., Colo.

EDAD YAURICOCHA, LIMITADA. **PERÚ.**

ffice and mine: Huarapampa, Yauyos, Lima, Perú. Mine carries iferous copper ore, and was a small producer of silver and copper, circa Presumably idle.

PAI CONSOLIDATED GOLD-SILVER-COPPER CO. **ARIZONA.**

ffice: Prescott, Ariz. Mine office: Crown King, Yavapai Co., Ariz. Frank M. Murphy, president; Orleans Longacre, Jr., manager; H. J. y, superintendent. Lands, 48 claims, partly patented, including the Old le mine, 3 miles from Crown King, opened 1875, which has produced rich res; the Wild Flower group, in the Pine Grove district; the Tiger group, in adshaw Mountains, and the Crowned King mine, in the Bradshaw Moun- bought from B. A. Turner, receiver of the old corporation, for $75,000, half 1 and half in shares. The Crowned King mine, area 18 claims, has been a erable producer, mainly of gold, in the past, and the property as a whole veral thousand feet of old workings, showing a contact vein, between yry and syenite, carrying slightly auriferous and highly argentiferous cop- es, opened by shaft. Equipment includes steam power, with an air- essor, and there is a 10-stamp mill and 100-ton concentrator.

PAI COPPER CO. **ARIZONA.**

ead. Formerly at Prescott, Yavapai Co., Ariz. Described Vol. VIII.

PAI DEVELOPMENT CO. **ARIZONA.**

ead. Former office was Calumet, Mich. E. A. McManus was presi- Ernest A. Haggott, superintendent. Organized 1904, with capitalization 00. Lands, near the Blue Bell mine, were slightly developed. Formerly yer, Yavapai Co., Ariz.

PAI METALS MINING & REDUCTION CO. **ARIZONA.**

ffice: Prescott, Ariz. Mine office: Humboldt, Yavapai Co., Ariz. Stanaland, president; Geo. B. McGarvey, vice-president and general man- . W. Hatch, secretary; T. O. Pritchard, treasurer. Organized July, 1909, laws of Arizona, with capitalization $1,500,000, shares $1 par, non- ble; issued, $1,026,450.

nds, 9 claims, 1 fractional, unpatented, area 166 acres, in 2 groups, known Copper Jacket group of 4 claims, and the San Juan group, fairly watered, nbered with some juniper, lying circa 3 miles northeast of Stoddard, and 7 miles northeast of Humboldt, in the Agua Fria district. The property granite, with some prominent limonite gossans carrying argentiferous and ous oxidized ores of copper, below which are ore bodies, reported by the ement as chimneys, in metamorphosed granite and diorite, carrying ore

estimated, by the management, to average 15% copper, 3.5 oz. silver and $2 gold per ton. Copper Jacket No. 2 claim shows outcrops of chrysocolla and chalcopyrite. The leached ores carry about 2% copper, with small gold and silver values and excess of iron, and ore has been secured assaying up to 41% copper, 6 oz. silver and 8 oz. gold per ton. Development is by a 50′ vertical shaft and a 125′ incline shaft, on Copper Jacket No. 1 claim, and there are 3 other shallow shafts, and 4 opencuts. Development was begun October, 1910, and a test smelter shipment, late 1910, gave excellent returns. Property considered promising.

NEGOCIACIÓN MINERA DE CLEMENTE YBARRA. MÉXICO.

Mine office: Promontorios, Alamos, Sonora, Mex. Clemente Ybarra, owner; Jesús María Quijada, manager. Lands include the Almada, Terito, Alvarado, Gloria, Europa and Virgin mines, carrying auriferous and argentiferous copper ores, developed by shafts and tunnels.

There are 2 small smelters, known as La Valenciana, which, 1903, produced 9,200 kgs. blister copper, and Almada y Terito, which, 1903, produced 8,000 kgs. blister copper. Property is primarily a silver mine, copper being secured as a by-product. About 100 men are employed.

YELLOW JACKET COPPER CO. OREGON.

Letter returned unclaimed from former office, Salem, Ore. Mine office Merlin, Josephine Co., Ore. Prof. C. O. Boyer, general manager. Lands 2 claims, 2 miles northeast of Merlin, having a 70′ shaft, with a drift showing bornite, said to average 16% copper. Was developing with a small force at last accounts.

YELLOW BUTTE COPPER CO. CALIFORNIA.

Dead. Former office was 1226 Eddy St., San Francisco, Cal. Hon. W. P. Veuve was president; Dr. J. D. Ball, secretary; Dr. P. A. Jordan, treasurer; L. D. Ball, general manager. Organized 1907, under laws of Arizona, with capitalization $1,500,000, shares $1 par, nonassessable. Lands were 320 acres, well timbered, on the eastern slope of Haystack Mountain, 12 miles north of Mount Shasta and 12 miles from Edgewood. The property showed a fissure vein in granite, carrying malachite at near and surface, succeeded by bornite and chalcopyrite, with quartz gangue, developed by 2 shafts, of which No. 1 was 325′ deep, January, 1909. Improvements included a 12-h. p. gasoline hoist, with an engine-house, boarding-house, bunkhouse and smithy. A little ore was shipped, early 1908, to the Kennett smelter. Formerly at Edgewood, Siskiyou Co., Cal.

YELLOWSTONE COPPER MINING CO. IDAHO.

Dead. Former office was Wallace, Idaho. Chas. Benson was president; Jas. A. Wayne, secretary; John H. Henderson, treasurer; Chas. Benson, manager. Organized circa January, 1907, with capitalization $1,250,000, shares $1 par. Lands were 3 claims, adjoining the Copper King mine, in the Hunter district, having a 150′ drift tunnel, driven circa 1907. Formerly at Mullan, Shoshone Co., Idaho.

YELTA NEW COPPER MINING CO., N. L. AUSTRALIA.

Dead. The company did some work, circa 1906, and received a subsidy of £1,000 from the South Australian government, on which nothing was repaid. Lands apparently were sold to the Paramatta Copper Mines, Ltd., also dead. Formerly at Wallaroo, Daly Co., N. S. W., Australia.

YENISEI COPPER CO., LTD. SIBERIA.

Office: 269 Broad Street Place, London, E. C., Eng. Mine office: Rudnik Julia, Abakansk, Yenisei, Siberia. R. Van Gember, chairman; A. G. Teraskoff, Russian agent; preceding officers, R. H. Pye, T. F. von Krouzet, W. Macnab, Comte R. de Maistre and A. Macnab, directors; Norman J. Wadsworth, secretary; Nicholas Henri de Goerke, general manager; Walter J. Stafford, mine superintendent, at last accounts. Organized Apr. 21, 1902, under laws of Great Britain, with capitalization £300,000, shares £1 par; is-

fully paid. Debentures, £100,000 authorized, at 6%; issued, nd there is an £18,000 note outstanding. Accounts for 1908 showed 16,690, increasing the debit balance to £45,595.

originally were 11 copper concessions, area 11,000 acres, in the dis- inoussinsk, of which 8 were abandoned, and 3, presumably of 3,000 , are still held. The property also originally included 10 coal con- nd timber-rights to about 470,000 acres.

has been done on 2 copper groups, principal development being on the , which has sundry old workings, with new shafts of 160′, 100′, 130′, 0′, the property having been estimated, June, 1906, to have ore re- 0,000 long tons, of 5.5% average copper tenor, which was an over- oth as to reserves and tenor. Ore was reported by company, 1908, 3.4% copper, with about 4% sulphur, 30% silica, 10% magnesia, oxide and 34% calcium oxide. Ore is highly silicious and difficult of and, under test of actual smelting, returned only 3.08% copper.

melter, one-fourth mile from the mine, blown in 1907, has a 36x120″ Chalmers water-jacket blast-furnace, rated at 100 tons, but which, practice, treats only 60 to 75 tons daily, burning charcoal, which is l making matte averaging 40% copper tenor, which is broken in rolls d, with 3% fuel charges, in shaft-ovens, and brought up to metal of er tenor, which is shipped to Swansea for refining, the final product er of 99.75% copper tenor.

ction was 563,319 lbs. fine copper in 1907; 24,597 long tons of ore, 856,960 lbs. fine copper, an average return of 3.37% copper, in 1908. ny has experienced serious labor troubles, and is practically bankrupt, ganization is under consideration.

ON ASSOCIATED COPPER CO. NEVADA.

Was organized 1907, under laws of Arizona, with capitalization . Apparently no work was ever undertaken. Formerly at Yering- Co., Nev.

ON-B. C. MINING CO. NEVADA.

Formerly at Wabuska, Lyon Co., Nev. Described Vol. VIII.

ON CENTRAL COPPER CO. NEVADA.

r returned unclaimed from former office, Salt Lake City, Utah. Mine erington, Lyon Co., Nev. W. Mont Ferry, president; Heber M. etary; J. J. Beatty, manager, at last accounts. The company had a debtedness, late 1910, of $60,530.52, and the property was for sale. has a 250′ three-compartment shaft, showing a 3′ to 5′ vein carrying te, claimed to assay about 10% copper, with a 4″ hanging-wall pay- melaconite giving assays up to 59.1% copper. Idle several years, annual assessment work, and practically bankrupt.

ON CONSOLIDATED COPPER CO. NEVADA.

: 701 McIntyre Bldg., Salt Lake City, Utah. Mine office: Yer- on Co., Nev. Frank J. Hagenbarth, president; Windsor V. Rice, lent; M. B. Johnson, secretary; John Dern, treasurer; preceding H. Turner. Wm. M. Keyting and J. H. Mays, directors. Organized 907, under laws of Utah, with capitalization $5,000,000, shares $5 par, ble; issued, $3,500,000. Annual meeting, second Monday in July. , 14 claims, patented, in 2 groups, known as the Copper King and eposit, the former, lying between the Bluestone and Mason Valley ghtly developed, showing auriferous copper sulphides of good assay lle.

ON COPPER CO. NEVADA.

: Newhouse Bldg., Salt Lake City, Utah. Mine office: Yering- Co., Nev. Chas. N. Strevell, president; J. H. Paterson, vice-presi- [redacted], secretary; H. P. Clark, treasurer; D. E. McPherson, resi-

dent director; A. A. Marsal, superintendent. Organized July, 1906, under laws of Utah, with capitalization $1,000,000, shares $1 par, nonassessable. Shares are listed on the Salt Lake exchange.

Lands, 12 claims, east of Yerington, said to be 8 miles from a railway, showing a prominent gossan, traceable one-half mile, covering a contact deposit between porphyry and limestone, carrying carbonate ore of 15 to 20% claimed copper tenor, from surface to a depth of 125', when succeeded by argentiferous copper sulphides. Development includes a 400' tunnel and a 400' two-compartment incline main shaft, with about 1,500' of workings. The 325' level is said to show sulphide ore of 6 to 10% copper tenor, and the 400' level is said to show a vein of 3' to 6' width, with a monzonite footwall and altered limestone hanging, carrying ore assaying 5 to 11% copper, with fair silver values. Equipment includes a 40-h. p. Fairbanks-Morse gasoline hoist, an air-compressor, and a gasoline pump working against a 300' head.

YERINGTON COPPER KING MINING CO. NEVADA.

Dead. Former office was Salt Lake City, Utah. Lands, known as the Craig group, north of the Bluestone, were said to have shipped a little high-grade ore, under a former ownership. Apparently very little work was done by this company. Formerly at Yerington, Lyon Co., Nev.

YERINGTON COPPER MERGER MINING & SMELTING CO. NEVADA.

Office: Goldfield, Nev. Mine office: Buckskin, Douglas Co., Nev. A. J. McDaniel, general manager. Organized circa September, 1910, with capitalization $5,000,000, assessable. The company is a merger of different properties, said to give extensive holdings, reported to be one-half mile to three miles in width, and about 6 miles in length, principal holdings apparently being about 4 miles from the Copper Belt railway. The property has a shaft, said to show copper ore.

YERINGTON COPPER MOUNTAIN MINING CO. NEVADA.

Office: 201 Hooper Bldg., Salt Lake City, Utah. Mine office: Yerington, Lyon Co., Nev. A. Hanauer, Jr., president; Wm. H. Tibbals, vice-president; J. H. Turner, secretary, treasurer and general manager; preceding officers, Isaac Sparey, L. A. Mehse and C. W. Hooven, directors. Organized Apr. 25, 1907, under laws of Utah, with capitalization $1,000,000, shares $1 par, nonassessable; issued, $700,000.

Lands, 10 claims, unpatented, area circa 200 acres, 4 miles from a railway, in the Mason district, showing porphyry carrying a vein with NE. strike and westerly dip, of 1' to 30' width, developed by considerable surface trenching and several short tunnels, with about 750' of workings, showing auriferous copper ore, estimated by the management to average 10 to 16% copper. The property has no machinery equipment or buildings. Idle since 1907.

YERINGTON IRONSIDES COPPER CO. NEVADA.

Office: McCornick Bank Bldg., Salt Lake City, Utah. Letter returned unclaimed from former mine office, Yerington, Lyon Co., Nev. A. Hanauer, Jr., president; Wm. H. Tibbals, vice-president; J. H. Turner, secretary; J. F. Spaulding, treasurer; preceding officers, Ralph Bettinger and Chas. T. Rockledge, directors; T. L. Walden, superintendent, at last accounts. Organized November, 1906, under laws of Utah, with capitalization $1,000,000, shares $1 par, nonassessable.

Lands, 7 claims, unpatented, area 140 acres, north of the Nevada-Douglas mine and 5 miles northwest of Yerington, having numerous pits and [illegible] with a tunnel on the Ironsides claim, and a shaft of circa 200' [illegible] 600' of workings, showing ore said to average 5 to 8% copper [illegible] 1907.

YERINGTON KNOB HILL SYNDICATE.

Dead. Former office was Salt Lake City, Utah. [illegible] slightly developed, and apparently nothing but [illegible]

assessment work, December, 1907, was said to have shown good
rly at Yerington, Lyon Co., Nev.

N MALACHITE COPPER CO. **NEVADA.**

414 Judge Bldg., Salt Lake City, Utah. Mine office: Yerington,
ev. Willard F. Snyder, president; Henry J. Meyer, vice-president;
ler, secretary and treasurer; Grant Snyder, general manager; pre-
rs and C. O. Ellingwood, directors; O. H. Sonne, superintendent.
ctober, 1906, under laws of Nevada, with capitalization $5,000,000,
r, assessable.

18 claims, 11 patented, in 2 groups, the unpatented claims being near
The main group of 11 claims, adjoining the Mason Valley mine,
eralized zone of 50′ to 200′ estimated width, between limestone and
ying some oxidized ores, but mainly chalcopyrite, estimated to
in copper tenor, with some lead ore, both lead and copper ores being
nd argentiferous. The mine has prospect pits, a tunnel and a 140′
rtment shaft, with about a quarter-mile of workings.
ient includes a 125-h. p. General Electric motor, a steam hoist good
th, a Rand Imperial air-compressor, and 7 power drills. There are
e buildings. Practically idle since 1907.

)N MINES & EXPLORATION CO. **NEVADA.**

and mine: Yerington, Lyon Co., Nev. Otto Taubert, president;
ibert, vice-president; C. S. Durand, secretary; preceding officers
looper, directors. Organized Feb. 27, 1909, under laws of Nevada,
lization $1,000,000, shares $1 par, nonassessable. Shares are listed
Lake stock exchange.

33 claims, in 4 groups, including 23 copper claims and 10 gold claims,
id Douglas counties, Nevada. The Taubert group of 16 copper
ins the Wabuska Copper Mines Co., and the Copper Flat group of 9
ile east of Yerington, adjoins the Empire Copper Mines Co., and is
Bluestone. The copper claims are developed by shafts and tunnels,
1,100′ of workings. The Mohawk gold mine, on which work was
910, is about 1½ miles northwest of Yerington, and is claimed to
rrying about $200 gold per ton. The company planned building a
dyke, Lyon Co., Nev., 1909, but apparently failed to do so.

)N MOHAWK COPPER ASSOCIATION. **NEVADA.**

Formerly at Yerington, Lyon Co., Nev. Described Vol. VIII.

)N NATIONAL COPPER CO. **NEVADA.**

Formerly at Yerington, Lyon Co., Nev. Described Vol. IX.

)N NIPPER COPPER CO. **NEVADA.**

418 Atlas Blk., Salt Lake City, Utah. Letters returned unclaimed
mine office, Yerington, Lyon Co., Nev. Stephen H. Love, presi-
Wm. B. Jeffs, vice-president and superintendent; David Kennedy,
treasurer; preceding officers, John C. Lynch, Lewis A. Jeffs, F. A.
er L. Maas and Jay T. Harris, directors. Organized circa April,
s are in Mason Pass, between the Ludwig and Yerington-Iron-
everal years and apparently moribund.

N QUEEN COPPER CO. **NEVADA.**

Formerly at Yerington, Lyon Co., Nev. Described Vol. VIII.

N RED METAL MINING CO. **NEVADA.**

Formerly at Yerington, Lyon Co., Nev. Described Vol. VIII.

N UNITED COPPER CO. **NEVADA.**

Was organized [illegible] capitalization
Apparently [illegible] Yerington,
ev.

N-UTAH **NEVADA.**

Former [illegible] [illegible]

a millsite and a water-right, circa 7 miles west of the Nevada-Douglas mine, said to show auriferous copper carbonates and sulphides, giving assays of 2 to 35% copper, and up to $126 gold per ton. Formerly at Yerington, Lyon Co., Nev.

YORK HARBOUR COPPER CO., LTD. NEWFOUNDLAND.

Dead. Was wound up, February, 1902. Formerly at York Harbour Birchy Cove, Bay of Islands, Nfld. Described Vol. III.

YORK HARBOUR MINE (NEWFOUNDLAND), LTD. NEWFOUNDLAND.

Office: 98 Leadenhall St., London, E. C., Eng. Mine office: York Harbour, Birchy Cove, Bay of Islands, Nfld. J. M. Moubray, chairman and consulting engineer; W. J. K. Chandler, secretary; preceding officers and E. Chase-Carr, directors. Organized Oct. 7, 1909, under laws of Great Britain, with capitalization £10,000, shares £20 par; issued, £7,600, fully paid. Lands are 1,600 acres, with timber-rights to a 3-mile limit around the coast. Apparently the property, which is the York Harbour mine, is still owned by the Western Copper Co., Ltd., but is under operation by this company, which reports having shipped 4,000 long tons of ore, 1910, and having developed ore reserves of 35,000 tons. Property is described under title of Western Copper Co., Ltd.

YOSEMITE COPPER CO. CALIFORNIA.

Office: 54 Porter Bldg., San José, Cal. Mine office: Bagby, Mariposa Co., Cal. Lands, about 2½ miles from Bagby, show a heavy gossan, carrying scattering oxidized ores at and near surface. The mine has a short prospect tunnel, showing slightly cupriferous pyrite, and a lower tunnel has been started 300′ vertically below the prospect tunnel. Presumably idle.

YOSEMITE COPPER MINING & REDUCTION CO. CALIFORNIA.

Dead. Formerly at Daulton, Madera Co., Cal. Described Vol. VI.

YOSEMITE MINES CO. UTAH.

Letter returned unclaimed from former office, 60 State St., Boston, Mass. Operating office: 403 Dooly Bldg., Salt Lake City, Utah. Letter returned unclaimed from former mine office, Bingham Canyon, Salt Lake Co., Utah. Jas. P. Graves, president; Geo. E. Davis, secretary; preceding officers, W. Mc. Ferry and Ernest Bamberger, directors; Imer Pett, general manager. Organized August, 1909, under laws of Maine, with capitalization $1,000,000, shares $1 par, and is controlled by the Bingham Mines Co. through ownership of large share interest.

Lands, 12 claims, patented, including the Yosemite group of 6 claims, the Cluster group of 5 claims, and the Mississippi claim, adjoining. The property are said to have produced upwards of $1,000,000 in gross values, mainly in silver-lead ore, under previous ownership, and the mines were considerable lead producers as early as 1892. The lands lie north and west of the Dalton & Lark group of the Bingham Mines Co., and carry approximately 2,400′ of the strike of the Lark vein.

Development is by an old 800′ incline shaft, which it was planned, September, 1910, reëquipping with a hoist and air-compressor. The Cluster group is developed by the 1,650′ Paradox tunnel, and there is a 1,300′ tunnel said to show a large body of good ore, with a back of about 800′, from which production is made. Values developed are mainly in silver-lead, but some good copper ore is shown, especially below water-level, and some chalcopyrite of good grade, associated with pyrite, is found on the 800′ level. The mine is quite wet, some of the old workings are caved and in bad shape. It was proposed, at time of organization, to develop the property by a branch tunnel from the Lark cotte tunnel, to give a back of 1,500′ on the dip of the vein, at the point of main and branch tunnels. Equipment includes a power plant and compressor.

YOSHIOKA MINE.

Owned by Mitsu Bishi Goshi-Kwaisha.

.NI COAL MINE CO. **JAPAN.**
office: Satokawa-mura, Nomi-gori, Kaga, Japan. The company producer of coal, and incidentally operates the Yusenji copper mine, 02. This mine had power installations aggregating 2,359 h. p., and circa 700 hands, 1908. Ore is exclusively chalcopyrite, without gold alues. Production was 921,491 lbs. fine copper in 1906; 960,052 lbs. ,355,258 lbs. in 1908.

WA MINE. **JAPAN.**
office: Iho-mura, Minami-gori, Iwashiro, Japan. Production, 1907, 3 lbs. fine copper. Presumably idle.

AUSTRALIAN MINE. **AUSTRALIA.**
office: Wrightville, Robinson Co., N. S. W., Australia. R. Woolager, at last accounts. Property, in the Cobar district, is developed the Woodduck shaft, and December, 1910, a 5′ vein, carrying cuprite edrite of high assay value, was cut, on the 140′ level, circa 400′ south odduck shaft. The property has been a small producer.

OPPER CO. **BRITISH COLUMBIA.**
Formerly at Yreka, Vancouver Island, B. C. Very fully de- l. VII.

N MINE. **NORWAY.**
care H. & F. Bachke, owners, Trondhjem, Norway. Mine office: eraker, Trondhjem, Norway. This property, in the vicinity of the strict, formerly was a large producer of cupriferous pyrite, and, at one 1867, yielded about one-third of the limited quantity of pyrites con- Europe, but has been worked in a small way only since circa 1890. was 1,300 metric tons of ore in 1903; 425 metric tons in 1907; circa 1909; circa 5,000 tons in 1910.

UEBLO MINES CO. **YUKON.**
Property was sold, circa April, 1910, to Atlas Mining Co. For- hite Horse, Yukon, Canada. Described Vol. VIII.

PPER CO. **ARIZONA.**
Shelden Bldg., Houghton, Mich. Mine office: Vicksburg, Yuma Samuel Brady, president; John L. Harris, vice-president; Courtney s, secretary; Wm. B. McLaughlin, treasurer; preceding officers, . Seaman, Allen F. Rees and Thos. C. Job, directors. Organized 9, under laws of Arizona, with capitalization $2,000,000, shares $10 , 50,000 full-paid shares and 100,000 shares $1.25 paid, a 25-cent having been levied 1910. The full-paid stock, given in part pay- nds and options, and for promotion profits, was escrowed until 1911.

nds were 31 claims, area circa 600 acres, fully described Vol. XI. ty was opened to depth of 425′, with several thousand feet of workings, s tested by diamond drill, 1910, but no ore in commercial quantities ped, and shareholders deciding against further assessment, by a vote, taken 1911, the comp[illegible] bond and lease, on 00 remained due, June 1[illegible], and is practically less.

MINE.
by Yoshitani Coal Mi[illegible] JAPAN.

KI MINE.
by Spassky Copper [illegible]

.S & DURANGO MI[illegible]
Formerly at Chalchihu[illegible]
. VII.

A MINERA ZACUALPA[illegible]
ffice: Zacualpam, Sultepe[illegible]

1907, under laws of México, with capitalisation 500,000 pesos, shares 100 pesos par, in 1,500 full-paid shares and 3,500 shares with 20 pesos paid in. Mines are San Agustin y Anexas, carrying ores of various metals. Presumably idle.

ZALAMEA COPPER CO., LTD. SPAIN.

Office: 151 Cannon St., London, E. C., Eng. Mine office: Zalamea la Real, Huelva, Spain. Arthur Lawrence, chairman; preceding officer, A. O Evans and W. C. Punchard, directors; R. Beech Hall, secretary. Organised June 6, 1906, under laws of Great Britain, with capitalisation £25,000, shares £1 par; fully issued and fully paid.

Lands, reported as 242 acres, apparently are 242 hectares, including the San Diego and San Eduardo mines, with their extensions, bought for £5,000 cash the Mimbrera and San Diego groups, and the Esperanza group. The San Eduardo group includes 5 concessions, area 54 hectares, near Aracena, showing an iron gossan, apparently but little developed.

The San Diego group, area 95 hectares, 5 kilometers from Zalamea la Real, shows a strong gossan with approximately NE. strike and N. dip. Ore is said to occur as impregnations of malachite, chalcopyrite and cupriferous pyrite, in a zone of decomposed feldspar, in a vein of 2 to 12 meters width, assaying 1 to 12% copper. The mine is developed by 2 tunnels and was worked formerly. There is a 3-kilometer ground-tram, using animal power for traction, connecting the mines with the nearest railway.

COMPANHIA DA ZAMBEZIA. PORTUGUESE EAST AFRICA.

Office: 53 Rua do Alecrim, 1o, Lisbon, Portugal. French office: 7 Rue Lafayette, Paris, France. Mine office: Tete, Zambesia, Portuguese East Africa. D. De Roma du Bocage, chairman. Organized May 20, 1892, under Portuguese royal decree, with capitalisation 2,700 contos de reis, shares 4,500 reis (£1) par; issued, 2,250 contos de reis. Property is a concession of 60,000 square miles, on either side of the Zambezi and Shire rivers, extending east of the latter to the coast, and embracing the ports of Quelimane and Chinde, in Portuguese East Africa. The concession includes gold mines, large cupriferous fields of promise, at Macomba, Marabé, Boroma and elsewhere, a very large coal basin, lead mines, mines of graphite and other mineral properties. The territory controlled adjoins Rhodesia, and is accessible by stern-wheelers, plying on the Zambezi River, and there are many wagon-roads. The whole country has been opened for free prospecting, and the mining laws are liberal, an ordinary license entitling the holder to free prospecting for one year, with permission to protect, during the same time, an area of 700 meters radius, at a cost of £1, and a special license protecting an area of circa 7,000 acres, for one year, is issued, on approval, at £10. Mining companies pay 6% of their issued capital, and private owners pay 2% of gross values of production to the company, and a small annual rent is paid for claims. The country lies 5,000′ above sea-level, having a healthy climate, and native labor is reported to be both plentiful and cheap.

ZAMBONA DEVELOPMENT CO. MÉXICO.

Office: 314 American National Bank Bldg., Los Angeles, Cal. Mine office: Minas Nuevas, Alamos, Sonora, Mex. R. R. Coleman, president and treasurer; Wm. S. Cranz, vice-president; C. W. Hayes, secretary; Amos J. Yaeger, general manager; preceding officers, Bracey Curtis, W. Molten Clark, W. F. Botsford, Stanley Hirschbaum, L. R. Patterson and Dr. Ray Ferguson, directors; Ernest J. Koch, superintendent; Ramón Paez, mine superintendent.

Property includes the Zambona, Purisima and San Antonio mines, said to have produced about $7,000,000 worth of ore, in the past, carrying native silver, argentite and argentiferous chalcocite, with values largely in silver. The mine is developed to depth of 730′, and has a long crosscut tunnel, planned to be driven 2,000′, with a double track. There remain about 200,000 tons of low-grade disseminated ore on the dumps, available for milling and cyaniding, when work is in process.

ɔment includes a steam and electric plant, a 20-stamp mill having 4 ɔn mills and 2 tube mills, and a 100-ton cyanide plant, planned to be Employed circa 450 men, at last accounts.

.D FUNDICIÓN DE ZAPALLO DE QUILE. **CHILE.**

: Ovalle, Coquimbo, Chile. Works office: El Zapallo de Quile, ɔquimbo, Chile. Organized July 12, 1904, under laws of Chile, with ;ion 53,000 pesos, shares 100 pesos par. The smelter has a reverbera- ,ce, burning wood only, and makes Chile bars of about 98% average ıor, exported through Puerto Oscuro. Production was 75,176 lbs. r in 1906; 73,673 lbs. in 1907. Idle since 1907.

I GOLD MINING CO. **MÉXICO.**

office: La Yesca, Ahuacatlán, Tepic, Mex. G. H. Buttolph, manager ounts. Property includes the Zapopán and San Miguel mines, carry- ous zinc, lead and copper sulphides, values being mainly in gold. Has 'er, with a Bryan mill and 30-ton cyanide plant, and, circa 1908, was the old dumps, carrying about 20,000 metric tons of low-grade ore.

ÍA MINERA ZAPOTECA. **MÉXICO.**

Property was sold, circa 1909, to Mutual Mining & Development ıerly at Ocotlán, Oaxaca, Mex. Described Vol. VIII.

ZA COPPER & ZINC MINES, LTD. **SPAIN.**

Was dissolved Feb. 26, 1909. Formerly at Galaroza, Huelva, escribed Vol. VI.

ÍA MINERA ZAUCUDO. **COLOMBIA.**

office: Medellin, Antioquia, Colombia. Juan de la Posado, super- at last accounts. Property includes the Zaucudo and Savalotas ducing gold, silver and copper, latter in small quantities, as a by- Has steam power and a small smelter.

SCHAFT DER ZECHE THALBURG. **GERMANY.**

Formerly at Heiligenhaus, Rheinprovinz, Prussia, Germany. De- ɔl. VI.

HERMANOS. **CHILE.**

and works: Paipote, Copiapo, Chile. Property is the Fundición 'eating custom ores from various mines, including La Pepa, Clodo- 'a and Los Ladrillos mines, ore coming mainly from the latter. The s a cylindrical water-jacket blast-furnace. Production was 112,302 ppper in 1906; 392,670 lbs. in 1907. Idle since 1907.

INING CO. **UTAH.**

Walker Bros. Bank, Salt Lake City, Utah. Letter returned un- ɯ former mine office, Ophir, Tooele Co., Utah. M. H. Walker, presi- r K. Lewis, vice-president; L. H. Farnsworth, secretary and treasurer. January, 1910, under laws of Utah, with capitalization $100,000, ıar. Lands include property at Ophir, Tooele Co., Utah; in the Blue rict of Wasatch County, Utah, and in Little Cottonwood district, Salt Lake County, Utah. All properties are idle.

ERZBERGWERKE G. m. b. H. **GERMANY.**

Was succeeded, Jan. 23, 1909, by Gewerkschaft Hohenstein. For- ltlay bei Zell a/M, Rheinprovinz, Germany. Described Vol. VIII.

. MINING CO. **UTAH.**

Former office was Salt Lake City, Utah. Property passed to the New Haven Copper & Gold Mining Co. Lands, above the Highland ɔf the Utah Consolidated, near the head of Carr Fork, carried 3 fissure ɔrphyry, and a contact deposit between quartz-porphyry and lime- eloped by tunnels. Formerly at Bingham Canyon, Salt Lake Co.,

GOLD & COPPER MINING CO. **WYOMING.**

Formerly at Encampment, Carbon Co., Wyo. Described Vol. VI.

ZENOLI SILVER-COPPER CO. NEVADA.

Office: 17 West Second South St., Salt Lake City, Utah. Mine office: Palisade, Eureka Co., Nev. H. A. Pederson, president; John A. Kirby, vice-president; Henry I. Cobb, secretary; R. K. Cobb, treasurer; preceding officers, Hyrum Hayball, H. Bullen, Jr., and W. M. Wantland, directors; P. D. Delmas, superintendent, at last accounts. Organized Nov. 20, 1907, under laws of Nevada, with capitalization $500,000, shares $1 par, assessable. Has levied 2 assessments, and paid a dividend of $4,400, December, 1908. Shares are listed on the Salt Lake and San Francisco stock exchanges.

Lands, 32 claims, surveyed for patent, in the Safford district, 1 mile from a railway, opened by a 600′ tunnel, with about 1 mile of workings, developing a vein of 2′ to 6′ width, carrying silver-lead ore at surface, changing to argentiferous copper ore at depth, giving ore assaying up to 204 oz. silver per ton. A little ore was shipped, 1907–1908, returning about $10,000, but work has been confined mainly to development. There are necessary mine buildings. The company planned reorganization, 1910.

ZIMAPÁN MINING & SMELTING CO. MÉXICO.

Dead. Formerly at Zimapán, Hidalgo, Mex. Described Vol. VI.

ZOMEKI MINE. JAPAN.

Mine office: Ikuno-mura, Abu-gori, Nagato, Japan. Ores are slightly argentiferous chalcopyrite and bornite, associated with sphalerite, galena and pyrrhotite, occurring in lenses and fissure veins, near liparite dikes penetrating clay-slate, sandstone and limestone. Idle several years.

COMPAÑÍA MINERA DE ZOMELAHUACAN S. A. MÉXICO.

Mine office: Las Minas, Jalacingo, Vera Cruz, Mex. W. Vogel, manager at last accounts. Organized July 11, 1893, under laws of México, with indeterminate capital.

Lands include La Ascunción de Maria y Anexas, El Alto and Espíritu Santo y Anexas mines, lying in deep barrancas, near the village of Las Minas, circa 110 miles northwest of Vera Cruz. The mines have neither railway nor wagon-road, all supplies being packed in and ore packed out by burros, over mountain trails. The mines, of which El Alto is the principal, have been considerable producers in the past of auriferous and argentiferous copper and lead ores. One at depth is auriferous chalcopyrite, averaging 1.5 grams gold per metric ton to each unit of copper, and ore shipped, after selection, ranges 12 to 25% in copper tenor, nothing under 10% standing the heavy cost of shipment. The dumps show several thousand tons of low-grade material, averaging 3.5% copper and 2 to 6 grams gold per metric ton. Equipment includes water-power and a 10-stamp mill, and the mine employed circa 150 men, at last accounts.

ZONIA COPPER MINING CO. ARIZONA.

Dead. Office was 218 Tremont St., Boston, Mass. J. J. Hawkins was attorney. A little work was done on the property, which is near Placeritas, circa 1903, and a small and inadequate smelter was built, which apparently never was in blast. Formerly at Kirkland, Yavapai Co., Ariz.

ZUMA MINING & MILLING CO. UTAH.

Office and mine: Eureka, Juab Co., Utah. Michael L. Garity, president; Rasmus Nelson, vice-president; P. J. Fennell, secretary; J. E. Driscoll, treasurer; John Endlund, superintendent. Organized 1907, with capitalization $500,000, shares 50 cents par.

Lands, 6 claims, 4 patented, in the vicinity of the Crown Point and Iron King mines, developed by a 200′ shaft. Equipment includes steam and electric power, with an air-compressor. Was developing, with a small force, early 1911.

CHAPTER XXV.

GENERAL COPPER STATISTICS.

ıis, the final chapter of the work, devoted to the statistics of the copper ·y, contains a larger number of tables than in the earlier editions, and several times as much matter per page, it having been found possible to date two and even three of the tables of the earlier editions into a single It will be found, in many cases, that a single table gives figures covering dozen or more different but cognate points.

ıe exact order of precedence in which these tables are published is varied :, from year to year, as required by mechanical exigencies. The task of ıg-up" for the press upwards of forty different tables of statistics, each in hat different form from any other, and of greatly varying lengths, so as to in logical sequence, yet give full pages without awkward breaks or bad ;, is one that can be appreciated only by an experienced printer, and the l degree of success that has been secured in the typographical handling ı extremely awkward matter also is to be appreciated fully only by those ıve wrestled with similar problems. There is, however, a grouping of the cs contained in this chapter, under nine sub-heads, which are given, in dition, in the following invariable order, though there may be occasional ositions of individual tables contained in a subdivision:

ORLD'S PRODUCTION: Eight tables covering a variety of features.

IERICAN PRODUCTION: Two tables.

KE SUPERIOR PRODUCTION: Two tables.

IERICAN IMPORTS: One table.

IERICAN EXPORTS: Two tables.

ORLD'S COPPER TRADE: Eleven tables covering imports, exports, supplies ısumption, for the world and for all leading consuming countries.

ICES AND VALUES: Six tables

PPER SHARE FINANCES: Eight tables. devoted to dividends, assessments, zation and sales of shares of American copper mining companies.

ENTIETH CENTURY PRODUCTION: One table, giving comparative figures ıme[illegible] progression, based upon the figures of production and consump- [illegible]

[illegible] by titles and by numerous cross-references, [illegible]

WORLD'S COPPER PRODUCTION.

(*Long Tons.*)

Year.	United States.	Foreign.	Total.	Percentage of U. S. Production.
1880.....	27,000	126,959	153,959	17
1881.....	32,000	131,000	163,000	19
1882.....	40,467	141,155	181,622	22
1883.....	51,574	147,832	199,406	24
1884.....	64,708	155,141	220,249	29
1885.....	74,052	151,540	225,592	32
1886.....	70,430	146,656	217,086	32
1887.....	81,017	142,781	223,798	36
1888.....	101,054	156,972	258,026	39
1889.....	101,239	159,966	261,205	38
1890.....	115,966	153,489	269,455	43
1891.....	126,839	152,552	279,391	45
1892.....	154,018	156,454	310,472	49
1893.....	147,033	156,497	303,530	48
1894.....	158,120	166,385	324,505	49
1895.....	169,917	164,648	334,565	50
1896.....	205,384	167,979	373,363	54
1897.....	220,571	178,384	398,955	54
1898.....	235,050	194,106	429,156	54
1899.....	253,870	215,440	469,310	54
1900.....	269,111	216,743	485,854	57
1901.....	268,522	242,497	511,019	52
1902.....	294,297	247,870	542,167	54
1903.....	311,582	273,499	585,081	54
1904.....	362,739	278,955	641,694	56
1905.....	402,704	293,005	695,709	57
1906.....	409,414	303,200	712,614	57
1907.....	386,655	326,500	713,155	54
1908.....	420,953	328,300	749,253	56
1909.....	485,473	355,000	840,473	57

COPPER PRODUCTION BY CONTINENTS.

(*Long Tons.*)

Year.	North America.	Europe.	South America.	Asia.	Australasia	Africa.	Totals.
1896.....	222,524	88,948	26,340	21,000	11,272	7,450	377,534
1897.....	242,679	90,829	25,300	23,000	16,583	7,440	405,831
1898.....	261,625	89,461	30,065	25,175	15,943	7,110	429,379
1899.....	282,636	93,383	32,730	27,560	20,894	6,490	463,693
1900.....	303,784	91,009	36,095	28,121	21,270	6,720	486,999
1901.....	320,044	91,161	43,080	27,475	28,633	7,472	517,865
1902.....	355,280	91,552	40,266	29,775	27,281	4,450	548,604
1903.....	384,138	94,056	42,561	31,360	28,116	5,230	585,461
1904.....	445,557	90,820	41,265	34,850	26,657	7,775	645,924
1905.....	489,959	88,215	39,945	35,910	33,940	7,740	695,709
1906.....	497,794	91,995	36,855	42,740	36,250	6,980	712,614
1907.....	471,955	102,000	40,600	49,700	41,900	7,000	713,155
1908.....	489,653	112,100	56,800	43,700	40,100	6,900	749,253
1909.....	571,273	115,800	55,400	47,800	35,000	15,200	840,473

In 1909 North America produced nearly 68% of the entire copper output of the world. Europe of 13%; South America followed with upwards of 5%; Australasia followed with slightly less than 2%.

WORLD'S COPPER PRODUCTION BY COUNTRIES.

(Based on the figures of Henry R Merton & Co., Ltd.)

(*Long Tons.*)

ıntry.	1890	1895	1900	1905	1906	1907	1908	1909
ia.....	120	35	.....	415	440	100	.....	.....
ıtina.....	150	150	775	155	105	200	200	600
alasia.....	7,500	10,000	23,000	33,940	36,250	41,900	40,100	35,000
ia.....	1,210	1,110	865	1,175	1,225	900	1,600	1,700
ia.....	1,900	2,250	2,100	2,000	2,500	2,500	2,500	2,100
la.....	3,050	4,000	8,500	20,535	25,460	26,000	29,000	24,500
Colony.....	6,450	7,080	6,720	7,325	6,540	6,900	6,900	7,100
.....	26,120	22,075	25,700	29,165	25,745	27,100	38,900	36,400
.....	.....	.....	.....	.....	.....	.....	3,000	2,700
an S.W.Africa	.....	.....	.....	.....	.....	.....	.....	8,100
Britain.....	935	580	650	715	500	700	700	700
any.....	17,625	16,555	20,410	22,160	20,340	20,800	20,500	22,800
ary.....	300	200	490	150	210	100	100	4,600
.....	2,200	2,500	2,955	2,950	2,865	3,400	3,000	2,800
.....	15,000	18,430	27,840	35,910	42,740	49,700	43,700	47,800
o.....	4,325	11,620	22,050	64,440	60,625	57,500	38,200	57,200
undland.....	1,735	1,800	1,900	2,280	2,295	1,800	1,500	1,400
ay.....	1,390	2,685	3,935	6,305	6,120	7,100	9,300	9,400
.....	150	450	8,220	8,625	8,505	10,800	15,200	16,300
a.....	4,800	5,280	8,000	8,700	10,490	15,200	20,400	18,000
n.....	830	515	450	550	500	2,000	2,000	2,000
& Portugal...	51,700	54,950	52,872	44,810	49,320	50,500	53,400	53,000
d States.....	115,966	169,917	269,111	402,704	409,414	386,655	420,953	485,473
y.....	.....	.....	520	700	425	1,300	1,100	800
uela.....	5,640	.....	.....	.....	.....	.....	.....	.....
als.....	269,096	332,182	486,363	695,709	712,614	713,155	752,253	840,473

WORLD'S SMELTER PRODUCTION OF REFINED COPPER.

he following table, based upon figures of the Metallgesellschaft und Metal-
he Gesellschaft A.-G, gives estimated figures of production of raw copper
h country, whether from native or imported ores, matte or impure raw copper
ıt in for refining:

(*Metric Tons.*)

ntry.	1895	1900	1904	1905	1906	1907	1908	1909
l States.....	170,100	286,900	380,900	411,000	429,400	421,400	449,500	528,900
Britain.....	78,246	80,000	65,300	68,000	72,700	72,400	71,400	66,700
.....	7,000	10,000	48,500	53,300	51,000	52,000	40,000	50,000
.....	15,500	24,300	32,100	33,700	45,000	45,000	36,000	42,900
ny.....	25,777	30,900	30,300	31,700	32,300	31,900	30,000	31,100
lia.....	12,100	21,800	22,700	23,900	29,500	32,500	34,500	31,500
.....	19,600	20,000	22,000	21,000	20,000	20,000	20,000	22,000
.....	100	500	8,000	10,700	13,800	14,000	14,000	14,500
.....	5,854	8,100	10,900	8,900	10,600	15,000	16,800	18,500
, misc.....	1,500	2,600	11,500	11,000	12,000	7,500	11,400	12,700
.....	8,245	6,400	6,900	6,200	7,100	11,000	8,000	7,500
erica, misc..	3,800	4,000	4,000	4,000	4,000	5,500	2,000	13,000
.....	2,375	2,800	3,600	3,600	3,600	4,000	4,000	3,000
-Hungary..	1,276	1,200	1,500	1,400	1,500	1,100	1,300	1,800
als.....	351,473	499,500	[illegible]	[illegible]	732,500	733,300	738,900	844,100

PRODUCTION OF WORLD'S LARGEST MINES.

(*Pounds Avoirdupois.*)

Year.	Calumet & Hecla.	Anaconda.	Rio Tinto.	Boston & Montana.	Mansfeld.	Copper Queen.
1867.....	1,315,173	.....	1,937,843	.....	5,865,898	.....
1868.....	5,098,375	.....	2,475,765	.....	7,442,226	.....
1869.....	12,315,771	.....	2,147,280	.....	8,084,140	.....
1870.....	14,031,584	.....	2,231,055	.....	8,384,980	.....
1871.....	16,222,590	.....	1,895,956	.....	8,718,480	.....
1872.....	16,162,183	.....	1,772,498	.....	12,070,542	.....
1873.....	18,848,265	.....	.....	.....	12,281,487	.....
1874.....	20,125,225	.....	.....	.....	11,372,905	.....
1875.....	21,473,954	.....	.....	.....	13,312,499	.....
1876.....	21,690,732	.....	11,731,708	.....	13,852,024	.....
1877.....	23,568,468	.....	41,057,139	.....	15,230,287	.....
1878.....	25,253,128	.....	54,245,564	.....	17,645,115	.....
1879.....	26,270,943	.....	50,228,595	.....	18,882,434	.....
1880.....	31,675,239	.....	58,775,915	.....	21,734,902	1,379,940
1881.....	31,360,781	.....	61,171,913	.....	24,377,210	3,866,581
1882.....	32,053,528	.....	38,951,360	.....	25,795,840	7,744,276
1883.....	33,125,045	.....	45,857,280	.....	28,310,320	7,523,961
1884.....	40,473,585	.....	48,303,360	.....	28,183,680	7,668,617
1885.....	47,247,990	36,000,000	52,604,160	7,500,000	27,888,000	6,663,792
1886.....	50,518,220	33,267,864	55,328,000	2,000,000	28,212,800	3,797,256
1887.....	46,016,123	57,000,000	63,840,000	1,500,000	29,176,000	5,707,728
1888.....	50,295,721	63,245,473	63,840,000	18,278,667	29,970,200	12,031,[illegible]
1889.....	48,668,296	61,647,000	66,080,000	25,425,228	34,733,440	12,152,[illegible]
1890.....	59,868,106	64,046,812	67,200,000	25,942,298	35,392,000	13,120,[illegible]
1891.....	63,586,620	46,500,000	71,680,000	25,000,000	30,920,000	13,022,[illegible]
1892.....	56,495,211	75,000,000	70,560,000	30,386,595	34,406,400	12,916,[illegible]
1893.....	60,427,913	75,256,857	69,664,000	31,800,000	31,696,000	13,793,[illegible]
1894.....	61,324,626	95,57[illegible]000	73,920,000	50,000,000	33,677,600	12,968,[illegible]
1895.....	79,137,399	99,775,294	75,040,000	55,000,000	33,286,400	16,233,[illegible]
1896.....	89,280,621	125,350,693	73,920,000	60,250,000	40,913,600	22,966,[illegible]
1897.....	83,248,054	131,471,127	75,936,000	60,000,000	40,230,400	23,999,[illegible]
1898.....	86,426,320	107,214,059	75,499,200	62,000,000	40,420,800	33,747,[illegible]
1899.....	89,610,963	107,914,357	76,988,800	65,000,000	46,558,400	36,901,[illegible]
1900.....	77,761,382	110,000,000	80,039,680	66,200,000	41,193,600	34,382,[illegible]
1901.....	82,519,676	101,850,224	79,179,520	70,000,000	41,067,200	39,781,[illegible]
1902.....	81,248,739	100,000,000	77,235,200	75,000,000	41,000,000	35,831,[illegible]
1903.....	76,490,869	93,500,000	80,214,400	90,750,000	42,500,278	36,280,[illegible]
1904.....	80,341,019	90,000,000	80,214,400	94,000,000	41,629,349	58,602,[illegible]
1905.....	95,100,610	95,000,000	72,307,200	89,000,000	43,824,141	64,570,[illegible]
1906.....100,023,420		95,997,440	72,000,000	93,461,344	40,000,000	79,536,[illegible]
1907.....	83,863,116	63,055,661	72,390,080	Utah.	38,822,000	66,916,[illegible]
1908.....	81,660,723	64,869,176	77,952,000	43,689,875	39,686,800	82,553,[illegible]
1909.....	78,652,618	75,860,194	80,640,000	51,749,233	41,891,400	84,502,[illegible]
1910.....	72,672,469	223,808,546	74,867,320	85,644,511	40,000,000	71,928,[illegible]

PRODUCTION OF WORLD'S LEADING MINES.

n this table are given annual products, for latest years available, of all the important copper mines of the world, and also of a great majority of the r mines making as much as 100,000 lbs. avoirdupois of fine copper yearly. roducts in round numbers are estimates, based upon the best information ble, the other figures being exact returns.

(*Pounds Avoirdupois.*)

Mine or Company.	Location.	Year.	Output.
Anaconda	Montana	1910	223,808,546
American S. S. Co.	U. S. A. & México.	1910	174,150,000
Phelps, Dodge & Co.	U. S. A. & México.	1910	116,888,070
Boston & Montana	Montana	1909	101,951,350
Utah Copper	Utah	1910	85,644,511
Rio Tinto	Spain	1910	74,867,320
Calumet & Hecla	Michigan	1910	72,672,469
Copper Queen	Arizona	1910	71,928,357
Nevada Cons.	Nevada	1910	62,772,342
Greene Cananea	México	1910	45,491,500
Mansfeld	Germany	1909	41,891,400
United Verde	Arizona	1910	36,663,880
Cerro de Pasco	Perú	1910	34,713,012
Butte Coalition	Montana	1909	34,654,971
Arizona	Arizona	1910	33,394,530
Copper Range	Michigan	1910	32,856,692
Boleo	México	1909	31,416,550
United States	Utah & Cal.	1910	28,430,425
Calumet & Arizona	Arizona	1910	28,029,806
Superior & Pittsburg	Arizona	1910	26,183,146
North Butte	Montana	1910	25,267,092
Granby	British Columbia	1910	22,754,899
Moctezuma	México	1910	22,681,472
Detroit	Arizona	1910	22,546,201
Quincy	Michigan	1910	22,517,014
Mammoth	California	1910	22,000,000
Butte & Boston	Montana	1910	20,9[illegible]
Osceola	Michigan	1910	19,3[illegible]
Champion	Michigan	1910	19,2[illegible]
Original	Montana	1909	
Furukawa	Japan	1909	
Mt. Lyell	Australia	191[illegible]	
Old Dominion	Arizona	19[illegible]	
Baltic	Michigan		
Chilena de Fundiciones	Chile		
Shannon	Arizona		
Mt. Morgan	Australia		
Canadian	Ontario		
Ashio	Japan		
Cape	CapeColony&Nfld.		
Sumitomo	Japan		
Shattuck-Arizona	Arizona		
Osshi	Japan		
Otavi	German S.W.Africa		
Great Cobar	Australia		
Osaka	Japan		
Hitsu-Bishi	Japan		
Boston Cons.	Utah		
Tennessee	Tennessee		
Ahmeek	Michigan		
Lota i Coronel	Chile		
Mohawk	Michigan		

PRODUCTION OF WORLD'S LEADING MINES. (Continued.)

(*Pounds Avoirdupois*)

No.	Mine or Company.	Location.	Year.	Output.
53	Tamarack	Michigan	1910	11,083,000
54	Poderosa	Chile	1910	10,902,000
55	Wallaroo & Moonta	Australia	1910	10,575,300
56	East Butte	Montana	1910	10,302,976
57	Tharsis	Spain	1909	9,750,000
58	Wolverine	Michigan	1910	9,665,534
59	Snowstorm	Idaho	1909	9,235,310
60	Sulitelma	Norway	1910	9,000,000
61	Braden	Chile	1910	9,000,000
62	St. Mary's	Michigan	1908	8,893,361
63	Bogoslovsk	Russia	1909	8,636,000
64	Chillagoe	Australia	1909	8,408,940
65	Balaklala	California	1910	8,451,653
66	Washoe	Montana	1909	8,227,179
67	Parrot	Montana	1909	7,921,930
68	Pittsburg & Montana	Montana	1909	7,789,520
69	Isle Royale	Michigan	1910	7,357,394
70	Texiutlán	México	1905	7,312,552
71	Utah Cons.	Utah	1910	7,459,471
72	Cananea Central	México	1909	7,440,494
73	South Utah	Utah	1908	7,244,179
74	Trenton	Montana	1909	7,168,318
75	British Columbia	British Columbia	1910	7,143,456
76	Dolores y Anexas	México	1910	7,000,000
77	Mason & Barry	Portugal	1910	6,619,200
78	Caucasus C. I. Co.	Russia	1909	6,608,426
79	Tintic	Utah	1910	6,172,265
80	O'okiep	Cape Colony	1905	6,117,440
81	Cuba	Cuba	1909	6,000,000
82	United Alkali	Spain	1910	6,000,000
83	Ohio	Utah	1910	6,000,000
84	Cons. M. & S. Co. of Canada.	British Columbia	1910	5,974,000
85	Namaqua	Cape Colony	1910	5,000,000
86	Trimountain	Michigan	1910	5,000,000
87	Imperial	Arizona	1910	5,000,000
88	Spassky	Siberia	1910	5,000,000
89	Warrior	Arizona	1910	5,000,000
90	Nababiep	Cape Colony	1905	5,000,000
91	Ducktown	Tennessee	1909	4,800,000
92	Pyrites de Huelva	Spain	1909	4,750,000
93	Central Chili	Chile	1910	4,700,000
94	Allouez	Michigan	1910	4,650,000
95	Centennial-Eureka	Utah	1910	4,500,000
96	Bor	Servia	1908	4,150,000
97	Cananea Dev. Co.	México	1909	4,100,000
98	Hidachi	Japan	1908	4,000,000
99	Catémou	Chile	1909	4,000,000
100	Snowshoe	British Columbia	1909	4,000,000
101	Montecatini Co.	Italy	1909	4,000,000
102	Mazapil	México	1909	4,000,000
103	Bully Hill	California	1910	4,000,000
104	Gatico	Chile	1910	4,000,000
105	Messina (Transvaal)	Transvaal	1910	3,984,000
106	Nijni-Tagilsk	Russia	1908	3,900,000
107	Carrizal	Chile	1909	3,894,000
108	Tuolumne	Montana	1910	3,750,000
109	United Globe	Arizona	1909	3,674,000
110	Seville	Spain	1910	3,500,000
111	Rammelsberg	Germany	1909	3,000,000

PRODUCTION OF WORLD'S LEADING MINES. (Continued.)

(*Pounds Avoirdupois.*)

Mine or Company.	Location.	Year.	Output.
ond	Ontario	1909	3,500,000
'ee	British Columbia	1910	3,392,901
añaral	Chile	1908	3,324,536
dabeg	Russia	1909	3,324,079
n Pedro	México	1909	3,271,641
perior	Michigan	1910	3,181,041
mocrata	México	1907	3,067,039
rocoro	Bolivia	1909	3,046,400
lama	Chile	1908	3,030,413
aruzawa	Japan	1908	3,023,863
tannia	British Columbia	1907	3,011,410
olovsky	Russia	1909	3,000,000
rdoba	Spain	1910	3,000,000
ghana Maaden	Turkey	1909	3,000,000
t Cove	Newfoundland	1910	3,000,000
untain	California	1910	2,987,815
ngana (Chillagoe)	Australia	1910	2,925,440
w Dominion	British Columbia	1907	2,910,695
	Japan	1908	2,849,687
at Fitzroy	Australia	1910	2,843,246
tillo de las Guardas	Spain	1910	2,750,000
a Montecatini	Italy	1905	2,638,906
no	Japan	1908	2,555,806
to y Santa Rosa	Spain	1909	2,500,000
ro Mountain	New Mexico	1910	2,500,000
te-Ballaklava	Montana	1910	2,428,346
n-Wyoming	Wyoming	1908	2,384,356
a	Spain	1909	2,358,720
v Queensland	Australia	1909	2,352,000
a Amarilla	Chile	1909	2,350,000
ional Metallurgical	México	1906	2,295,270
a Guallatiri	Bolivia	1903	2,282,032
ama	Chile	1909	2,272,465
st Western	Arizona	1910	2,250,000
htim	Russia	1909	2,248,549
Lake	Utah	1907	2,234,446
minsko-Kluchevski	Russia	1909	2,210,523
rance	Montana	1907	2,168,975
	Japan	1908	2,160,676
yd"	Australia	1908	2,150,400
Elliott	Australia	1909	2,145,920
General	México	1910	2,100,000
Boccheggiano	Italy	1905	2,100,000
matta	Australia	1905	2,069,760
Berthin	Bolivia	1903	2,028,232
Pinto	México	1910	2,000,000
	Norway	1910	2,000,000
ala	Russia	1903	2,000,000
us & Johnston	Perú	1908	2,000,000
	Spain	1909	2,000,000
quam	Brazil	1907	2,000,000
anza	Spain	1910	2,000,000
ski	Russia	1907	1,980,000
gan	Michigan	1909	1,979,305
	Japan	1908	1,930,734
	Siberia	1908	1,856,960
angen	Norway	1910	1,850,000
yell Blocks	Tasmania	1906	1,846,320
n	Australia	1910	1,836,800

PRODUCTION OF WORLD'S LEADING MINES. (Continued.)

(Pounds Avoirdupois.)

No.	Mine or Company.	Location.	Year.	Output.
289	Mina El Incienso	Chile	1908	675,000
290	Summit	Arizona	1909	667,465
291	Mina Viuda	Chile	1909	650,000
292	Los Anjeles	Chile	1904	650,000
293	Grafter	Yukon	1907	650,000
294	Yamagatatokito	Japan	1906	641,120
295	Altens	Norway	1907	625,000
296	Tokito	Japan	1908	619,000
297	Tsubaki	Japan	1908	607,740
298	Ray	Arizona	1909	605,108
299	Homanzan	Japan	1908	600,879
300	Mina Santa Rosa	Bolivia	1908	600,000
301	Mt. Andrew	Alaska	1910	600,000
302	Brixlegg	Austria	1909	600,000
303	Carreras Hnos	Bolivia	1906	600,000
304	Chagali-Héliar	Russia	1909	600,000
305	Copper King	California	1905	600,000
306	Frank Hough	Colorado	1910	600,000
307	Ikeda	British Columbia	1909	600,000
308	Keating	Montana	1909	600,000
309	Live Oak	Arizona	1907	588,247
310	Mt. Cannindah	Australia	1907	581,280
311	Salida	Colorado	1907	576,696
312	Nagamatsu	Japan	1908	575,636
313	Verchoturski	Russia	1908	575,000
314	Mizusawa	Japan	1908	567,114
315	Fernando	México	1903	554,000
316	Nevada-Douglas	Nevada	1907	553,548
317	Meraker	Norway	1909	550,000
318	Le Roi	British Columbia	1909	550,000
319	Atvidabergs	Sweden	1904	550,000
320	Galizurski	Russia	1908	528,944
321	Cordova	Arizona	1907	[illegible]
322	Kusakura	Japan	1908	[illegible]
323	Levant	England	1907	[illegible]
324	Daly West	Utah	1909	[illegible]
325	United Peak Downs	Australia	1907	[illegible]
326	Tzarevo-Alexandrovski	Siberia	1904	[illegible]
327	Polieff-Syssterski	Russia	1908	[illegible]
328	Mitchell	México	1907	[illegible]
329	Libiola	Italy	1909	[illegible]
330	Bogan River	Australia	1909	[illegible]
331	Ferrocobrizas	Spain	1908	[illegible]
332	Kupferplatte	Austria	1905	[illegible]
333	Takilma	Oregon	1907	[illegible]
334	Mt. Lyell Consols	Tasmania	1910	[illegible]
335	Mt. Hope	Australia	1908	[illegible]
336	Huillca	Perú	1907	[illegible]
337	Ugurchaiska	Russia	1909	[illegible]
338	Iron Silver	Colorado	1909	[illegible]
339	Hampden-Cloncurry	Australia	1901	[illegible]
340	Geisse Hnos	Chile	1909	[illegible]
341	Pike Hill	Vermont	1907	[illegible]
342	Carisa	Utah	1907	[illegible]
343	Duquesne	Arizona	1907	[illegible]
344	Omodani	Japan	1908	[illegible]
345	Kangiara	Australia	1909	[illegible]
346	Kamloops	British Columbia	1909	[illegible]
347	Higashiyama	Japan	1909	[illegible]

PRODUCTION OF WORLD'S LEADING MINES. (Continued.)

(*Pounds Avoirdupois.*)

Mine or Company.	Location.	Year.	Output.
Hidalgo	México	1909	400,000
G. Carvallo	Chile	1910	400,000
Capillitas	Argentina	1907	400,000
Los Bronces	Chile	1903	400,000
Bashmakovsky	Russia	1909	400,000
Ligure Ramifera	Italy	1909	400,000
Porsa	Norway	1902	396,828
San Gerardo	Perú	1908	396,828
Zelaya Hnos	Chile	1907	392,670
Utah & Eastern	Utah	1908	391,779
Ricardo Bentín	Perú	1908	391,140
Mt. Bulga	Australia	1907	375,000
Mina Astillas	Chile	1909	375,000
Mina Santa Fé	México	1903	370,483
Mina Gertrudis	Perú	1907	370,372
United	Washington	1908	360,000
Otori	Japan	1908	355,125
Tsuboi	Japan	1907	354,855
Albert	Quebec	1909	350,000
Mochikura	Japan	1908	350,000
Mochibe	Japan	1908	350,000
Atlas	Yukon	1910	350,000
Grand Gulch	Nevada	1910	350,000
Kjöli	Norway	1905	350,000
Carmen	Perú	1908	349,870
Kobyaku	Japan	1908	341,683
Innai	Japan	1908	338,830
Ruddygore	Australia	1907	337,276
Itsuki	Japan	1907	330,262
Naversberg Falun	Sweden	1905	325,000
Anglo-Chilena de Collahuasi	Chile	1908	325,000
Sasagatini	Japan	1908	320,110
Monitor	Montana	1906	320,000
Oxide	Arizona	1907	319,591
Hall	British Columbia	1904	318,124
Lake	Michigan	1910	318,050
Wolverine & Arizona	Arizona	1909	301,274
Rush & Brown	Alaska	1910	300,000
Richard III	British Columbia	1907	300,000
Quintera	México	1907	300,000
Osorio y Ca	Chile	1903	300,000
Las Vigas	México	1903	300,000
Etruscan	Italy	1905	300,000
Tip Top	Arizona	1906	298,890
Girilambone	Australia	1906	293,440
Leonard	Arizona	1909	283,597
Esperanza	México	1905	275,000
Juan de C. Ribillo	Chile	1903	275,000
Phœnix Cons	Michigan	1905	273,219
Standard	Arizona	1910	270,540
Carrizo	México	1909	262,000
Mt. Hector	Australia	1907	261,968
American-México	México	1904	261,531
Twin Buttes	Arizona	1910	258,672
Kokusei	Japan	1908	258,432
Yakuki	Japan	1908	251,738
Hanaoka	Japan	1908	250,000
Goodro	Alaska	1910	250,000
Flag	Australia	1910	250,000

PRODUCTION OF WORLD'S LEADING MINES. (Continued.)

(Pounds Avoirdupois.)

No.	Mine or Company.	Location.	Year.	Output.
407	Conrad Stannite	Australia	1907	250,000
408	Chewelah Copper King	Washington	1907	250,000
409	Burra Burra	Australia	1904	250,000
410	Bundarra	Australia	1907	250,000
411	Bossmo	Norway	1902	250,000
412	Lynda	Australia	1905	250,000
413	Normanby	Australia	1909	250,000
414	Queensland Expln.	Australia	1909	250,000
415	Rambler	Wyoming	1903	249,196
416	Huanillos	Chile	1903	245,065
417	Omaki	Japan	1902	245,000
418	Takara	Japan	1908	243,408
419	Arizona United	Arizona	1909	237,000
420	Burnie	Tasmania	1906	236,930
421	Vidal i Videla	Chile	1903	233,044
422	Takane	Japan	1907	231,528
423	Churruca	Perú	1903	228,483
424	Sawatari	Japan	1903	227,664
425	East Canada	Quebec	1910	225,000
426	Ain-Barbar	Algeria	1905	225,000
427	Marsellesa	Chile	1909	225,000
428	Wissener	Germany	1905	225,000
429	Glassford Creek	Australia	1907	223,200
430	Bonanza Belt	Arizona	1907	220,840
431	Widin	Bulgaria	1909	219,520
432	Mendoza y Ca.	México	1903	218,874
433	El Tiro	Arizona	1910	216,074
434	A. Vannoni	Perú	1907	216,050
435	Felix Vicuña	Chile	1908	215,936
436	New Keystone	Arizona	1907	208,891
437	Mt. Flora	Australia	1907	208,320
438	Anniversary	Australia	1907	208,320
439	Clifton	Arizona	1910	206,419
440	Natividad	Perú	1907	204,568
441	Cucharas	México	1903	200,815
442	Cieneguita	México	1908	200,000
443	Budgery	Australia	1907	200,000
444	Lobbs Hole	Australia	1910	200,000
445	Mt. Boppy	Australia	1909	200,000
446	Weimer	Idaho	1907	200,000
447	Hamley	Australia	1905	195,000
448	Lorenzo Mena	Chile	1910	194,707
449	Nishinokawa	Japan	1908	189,107
450	Ideal	Arizona	1909	184,291
451	Combarbalá	Chile	1907	178,865
452	Coahuila	México	1903	178,516
453	Ray Central	Arizona	1907	175,000
454	Kanayama	Japan	1908	175,000
455	Hiraiwa	Japan	1908	175,000
456	East Gwanda	Rhodesia	1909	175,000
457	Boberthaler	Germany	1909	175,000
458	Maximilian	Germany	1905	175,000
459	Milan	New Hampshire	1909	175,000
460	Utsonomiya	Japan	1908	174,438
461	Northwest S. & R. Co.	Oregon	1905	172,053
462	Cutter Cove	Chile	1907	169,558
463	Mineral Hill	Arizona	1907	167,853
464	Komaki	Japan	1903	167,548
465	Iimori	Japan	1908	

PRODUCTION OF WORLD'S LEADING MINES. (Continued.)

(*Pounds Avoirdupois.*)

Mine or Company.	Location.	Year.	Output.
J. R. Espinosa	Chile	1909	166,903
Daiji	Japan	1908	165,158
Castellanos y Ca.	Chile	1905	165,000
Unekura	Japan	1908	164,643
Oarasawa	Japan	1908	163,755
Oe	Japan	1903	160,696
Iwaya	Japan	1908	158,584
Blue Wing	North Carolina	1909	157,057
Boston & Corbin	Montana	1907	157,000
Kidogasawa	Japan	1908	154,256
Poropetsu	Japan	1908	153,232
Karatoya	Japan	1908	150,000
Shamblürgski	Russia	1905	150,000
Irvinebank	Australia	1906	150,000
Huanchaca de Bolivia	Bolivia	1909	150,000
London Metal Banking	Australia	1906	150,000
Ajax	Utah	1907	150,000
Lower Mammoth	Utah	1908	150,000
Mutooroo	Australia	1907	150,000
Omine	Japan	1908	150,000
Papovski	Siberia	1906	150,000
Prince Alfred	Australia	1905	150,000
Huachumachay	Perú	1906	149,030
Yaeger Cañon	Arizona	1907	145,849
La Serena	Chile	1908	145,000
Eclipse-Argo	Montana	1909	144,000
Kanasaka	Japan	1907	143,346
Ota	Japan	1908	142,271
Queenslander	Australia	1907	142,260
Vancouver	British Columbia	1907	140,000
Warter & Co.	Siberia	1909	139,287
Hirotani	Japan	1908	137,053
Ate	Japan	1908	134,087
Eureka Hill	Utah	1904	134,000
Okuzu	Japan	1907	132,412
Carlos Riesco	Chile	1908	132,320
Quellón o Valdivia	Chile	1909	125,836
Dogamaru	Japan	1908	125,695
Commercial	Arizona	1907	125,598
Wanibuchi	Japan	1907	125,000
Minas de Soto	Spain	1907	125,000
San Carlos	México	1903	125,000
Peñuelas	Spain	1907	125,000
North American	Missouri	1907	125,000
Aguirre Moncada	Chile	1907	125,000
Marinovitch y Linguardo	Perú	1909	125,000
Delmas Cons.	Utah	1908	125,000
José Larraguibel	Chile	1903	123,457
Keweenaw	Michigan	1908	122,474
Otto Harnecker	Chile	1909	122,223
Salt Lake-California	California	1908	120,000
Standard	Alaska	1907	120,000
Mitsui	Japan	1906	119,044
N. Azalia	Perú	1904	115,609
Osunatori	Japan	1907	114,411
Bulgoa	Australia	1906	114,388
True Blue	Australia	1906	112,000
Kitsunezuka	Japan	1907	111,129
Gila Valley	Arizona	1907	110,858

PRODUCTION OF WORLD'S LEADING MINES. (Continued.)

(*Pounds Avoirdupois.*)

No.	Mine or Company.	Location.	Year.	Output.
525	Inari	Japan	1908	109,246
526	Queen	Arizona	1907	108,027
527	Irigoyen Hnos	México	1902	107,894
528	Silver Spur	Australia	1910	107,520
529	I. Silva Ureta é Hijos	Chile	1909	106,923
530	Kamoishi	Japan	1908	105,280
531	Puquios	Chile	1907	104,000
532	Tomobuchi	Japan	1907	101,191
533	Kajitani	Japan	1908	100,000
534	Mina le Joya	Spain	1908	100,000
535	Hovin	Norway	1908	100,000
536	Golinsky	California	1908	100,000
537	Suc. F. Geisse	Chile	1903	100,000
538	Eureka	British Columbia	1907	100,000
539	Copper King	Yukon	1906	100,000
540	Copper Butte	Arizona	1907	100,000
541	Cootamundra	Australia	1907	100,000
542	Cons. White Bear	British Columbia	1907	100,000
543	Columbus Cons	Utah	1909	100,000
544	Cleopatra	Arizona	1910	100,000
545	Carrington	Australia	1910	100,000
546	Areachap	Cape Colony	1908	100,000
547	Amazon-Butte	Montana	1907	100,000
548	Akutosawa	Japan	1908	100,000
549	Marcionelli y Hanza	Perú	1905	100,000
550	Mona & Parys	Wales	1907	100,000
551	Mt. Fitton South	Australia	1908	100,000
552	Mt. Oxide	Australia	1910	100,000
553	Ono	Japan	1909	100,000
554	Person Cons	Virginia	1903	100,000
555	Stora Kopparberg	Sweden	1910	100,000
556	Subeni	Natal	1907	100,000
557	Tularosa	New Mexico	1910	100,000
558	Turgovski	Russia	1905	100,000
559	Yakuwoji	Japan	1907	100,000

WORLD'S COPPER PRODUCTION FOR NINETEENTH CENTURY.

(*Long Tons.*)

Decade.	Average Price of Rough Copper.	World's Production of Each Decade.	Increase of Production over Previous Decades.	Average Annual Production for Each Decade.	Increase of Average Annual Production.
1801 to 1810	£160	91,000	.....	9,100	.....
1811 to 1820	130	96,000	5,000	9,600	500
1821 to 1830	101	135,000	39,000	13,500	3,900
1831 to 1840	94	218,400	83,400	21,840	8,340
1841 to 1850	83	291,000	72,600	29,100	7,260
1851 to 1860	111	506,999	215,999	50,699	21,599
1861 to 1870	87	900,000	393,001	90,000	39,301
1871 to 1880	79	1,189,000	289,000	118,900	28,900
1881 to 1890	60	2,373,398	1,084,398	237,339	118,439
1891 to 1900	52	3,708,901	1,335,503	370,890	133,551
Totals and Averages	£96	9,507,299	.....	95,073	261,730

AMERICAN COPPER PRODUCTION.

(*Long Tons.*)

	United States Total Production	Michigan		Montana		Arizona	
		Production	Per cent of total	Production	Per cent of total	Production	Per cent of total
.....	650	572	88	.....	..	.....	..
.....	900	779	86	.....	..	.....	..
.....	1,100	792	72	.....	..	.....	..
.....	2,000	1,297	65	.....	..	.....	..
.....	2,250	1,819	81	.....	..	.....	..
.....	3,000	2,593	86	.....	..	.....	..
.....	4,000	3,666	91	.....	..	.....	..
.....	4,800	4,255	88	.....	..	.....	..
.....	5,500	4,088	74	.....	..	.....	..
.....	6,300	3,985	63	.....	..	.....	..
.....	7,200	5,388	74	.....	..	.....	..
.....	7,500	6,713	89	.....	..	.....	..
.....	9,000	6,065	67	.....	..	.....	..
.....	8,500	5,797	68	.....	..	.....	..
.....	8,000	5,576	69	.....	..	.....	..
.....	8,500	6,410	75	.....	..	.....	..
.....	8,900	6,138	69	.....	..	.....	..
.....	10,000	7,824	78	.....	..	.....	..
.....	11,600	9,346	80	.....	..	.....	..
.....	12,500	11,886	95	.....	..	.....	..
.....	12,600	10,992	87	.....	..	.....	..
.....	13,000	11,942	91	.....	..	.....	..
.....	12,500	10,961	87	.....	..	.....	..
.....	15,500	13,433	86	.....	..	.....	..
.....	17,500	15,327	87	.....	..	.....	..
.....	18,000	16,089	89	.....	..	.....	..
.....	19,000	17,085	89	.....	..	.....	..
.....	21,000	17,422	83	.....	..	.....	..
.....	21,500	17,719	82	.....	..	.....	..
.....	23,000	19,129	83	.....	..	.....	..
.....	27,000	22,204	82	.....	..	.....	..
.....	32,000	74,363	76	.....	..	.....	..
.....	40,467	25,439	62	.....	..	.....	..
.....	51,574	26,653	51	11,011	21	10,658	21
.....	64,708	30,961	47	19,256	30	11,935	18
.....	74,052	32,209	43	30,267	41	10,137	14
.....	70,430	36,124	51	25,362	36	6,990	10
.....	81,017	33,941	42	35,133	43	7,910	10
.....	101,054	38,604	38	43,704	43	14,195	14
.....	101,239	39,364	38	43,849	43	13,654	13
.....	115,966	45,273	39	50,437	43	15,534	13
.....	126,839	50,992	40	50,028	39	17,800	14
.....	154,018	54,999	36	72,860	47	17,160	11
.....	147,033	50,270	34	69,290	47	19,200	13
.....	158,120	51,031	32	81,729	52	19,873	13
.....	169,917	57,737	34	84,900	50	21,408	13
.....	205,384	63,418	31	99,071	48	32,560	16
.....	220,571	63,706	29	102,807	47	36,398	17
.....	235,050	66,056	28	92,041	39	49,624	21
.....	253,870	65,603	26	100,503	40	59,399	23
.....	269,111	63,461	24	120,865	45	52,820	20
.....	268,522	69,501	26	102,620	38	58,383	22
.....	294,297	76,050	26	128,975	44	53,546	18
.....	311,582	85,848	27	121,677	39	65,914	21
.....	362,739	93,001	26	133,176	38	85,179	23
.....	402,704	102,874	25	140,514	35	105,316	26
.....	409,414	102,514	25	131,563	32	117,216	29
.....	386,655	96,480	25	100,118	26	114,633	30
.....	[illegible]	99,408	23	112,724	27	129,251	30
.....	[illegible]	101,342	21	140,561	29	129,959	27

UNITED STATES COPPER PRODUCTION BY STATES.

(Based on figures of United States Geological Survey.)

(*Pounds Avoirdupois.*)

State.	1905.	1906.	1907.	1908.	1909.
Alaska	4,900,866	8,685,646	7,034,763	4,438,836	4,057,142
Arizona	235,908,150	262,566,103	256,778,437	289,523,267	291,119,236
California	16,697,489	28,153,202	33,696,602	39,643,835	53,800,705
Colorado	9,404,830	7,427,253	13,998,496	13,943,878	11,495,631
Idaho	7,321,585	8,578,046	9,216,299	7,256,086	7,090,122
Michigan	230,437,992	229,632,608	216,116,747	222,647,918	227,005,223
Montana	314,750,582	294,701,252	224,263,789	252,503,651	314,858,291
Nevada	413,292	1,090,635	1,998,789	12,241,372	53,840,231
New Mexico	5,334,192	7,099,842	10,140,140	4,991,351	5,681,126
North Carolina	.....	582,209	544,040	29,391	120,451
Oregon	.....	545,859	518,694	271,191	245,408
South Dakota	38	.....	.....	5,471	41,585
Tennessee	.....	17,809,442	19,745,119	19,710,108	19,207,707
Utah	58,153,393	50,329,119	66,418,370	71,370,370	101,241,114
Vermont	.....	240,315	696,102	.....	.....
Washington	223,328	290,823	122,263	162,201	120,511
Wyoming	2,530,531	106,177	3,026,004	2,416,197	433,672
East & South	15,134,960	149,102	147,663	173,490	1,318,490
Miscellaneous	846,615	647,583	1,356,051	1,580,831	2,159,536
Totals	902,057,843	918,635,216	865,818,368	942,936,449	1,087,453,996
From imported ores and mattes	50,105,300	191,370,022	163,519,756	218,705,487	325,456,533
Grand Totals	952,163,143	1,110,005,238	1,029,338,124	1,161,641,936	1,412,910,529

LAKE SUPERIOR COPPER PRODUCTION BY MINES.

(*Pounds Avoirdupois.*)

	1906.	1907.	1908.	1909.	1910.
Adventure	1,552,628	1,244,874	90,870	.....	.....
Ahmeek	3,077,507	5,510,985	6,280,241	9,198,110	11,844,954
Allouez	3,486,960	2,934,116	3,047,051	4,031,532	4,455,702
Atlantic	1,439,082	.....	.....	.....	.....
Baltic	14,397,557	16,709,868	17,724,854	17,817,836	17,549,782
Calumet & Hecla	100,023,420	83,863,116	81,660,723	78,652,618	72,672,469
Centennial	2,253,015	2,373,572	2,196,377	2,583,793	1,572,986
Champion	16,954,986	16,489,436	17,786,763	18,005,071	19,224,171
Franklin	4,571,570	4,401,248	3,703,421	1,615,556	966,353
Isle Royale	2,937,098	2,667,608	3,011,664	5,719,056	7,567,290
Keweenaw	.....	.....	122,474	57,091	.....
Lake	.....	.....	.....	.....	318,933
Mass	2,106,739	2,078,677	1,766,930	1,723,436	1,321,881
Michigan	2,875,341	2,665,404	3,000,206	1,979,305	35,022
Mohawk	9,352,252	10,107,266	10,295,881	11,248,474	11,412,066
Osceola	18,588,451	14,134,753	21,250,794	25,296,657	19,346,566
Quincy	16,194,838	19,796,058	20,600,361	22,511,984	22,517,011
Superior	.....	.....	.....	1,485,646	3,181,041
Tamarack	9,832,644	11,078,604	12,806,127	13,533,207	11,063,666
Tecumseh	58,008	* 60,000	.....	.....	.....
Trimountain	9,507,933	8,190,711	6,034,908	5,282,404	5,694,369
Victoria	546,334	1,207,237	1,290,040	1,062,218	1,164,564
Winona	278,182	1,285,863	.....	.....	.....
Wolverine	9,548,123	9,272,351	9,955,233	9,971,482	9,668,324
Miscellaneous	* 50,000	* 50,000	* 50,000	* 75,000	* 50,000
Totals	229,632,608	216,116,747	222,674,918	231,870,496	221,826,733

* Estimated.

PRODUCTION, VALUE AND DIVIDENDS OF LAKE COPPER.

	Gross product fine copper (Pounds).	Gross value of production (Dollars).	Total dividends paid (Dollars).	Percentage of dividends to gross value.	Dividends per pound of copper (Cents).
.....	24,880	5,000	.....	....	.....
.....	58,240	10,000	.....	....	.....
.....	297,120	55,000	.....	....	.....
.....	1,032,640	200,900	.....	....	.....
.....	1,505,280	336,000	60,000	17.0	3.98
.....	1,281,280	286,000	84,000	29.0	6.55
.....	1,744,960	289,500	60,000	12.0	3.43
.....	1,774,080	396,000	60,000	15.0	3.38
.....	2,905,280	648,500	90,000	14.0	3.09
.....	4,074,560	909,500	198,000	21.0	4.85
.....	5,809,334	1,586,160	168,000	10.0	2.89
.....	8,217,392	2,218,320	380,000	17.0	4.62
.....	9,530,830	2,382,500	480,000	20.0	5.03
.....	9,159,916	2,129,235	460,000	21.0	5.00
.....	8,937,995	1,950,355	360,000	18.0	4.02
.....	12,068,375	2,654,960	120,000	5.0	0.99
.....	15,182,837	3,487,995	260,000	7.0	1.70
.....	13,586,318	3,634,255	440,000	12.0	3.23
.....	12,985,444	4,415,600	720,000	16.0	5.54
.....	12,491,965	5,870,300	1,150,000	19.0	9.20
.....	14,358,592	5,635,515	510,000	9.0	3.55
.....	13,750,063	4,629,375	170,000	3.7	1.23
.....	17,515,607	4,442,841	110,000	2.4	0.63
.....	20,934,124	4,940,424	100,000	2.6	0.47
.....	26,625,301	6,230,016	210,000	3.4	0.78
.....	24,622,759	5,096,752	700,000	13.0	2.86
.....	25,746,448	5,728,485	1,640,000	29.0	6.34
.....	24,553,523	7,979,499	3,080,000	38.0	11.54
.....	30,291,505	8,726,100	2,330,000	27.0	7.69
.....	34,334,389	8,009,356	1,940,000	24.0	5.06
.....	36,039,497	8,180,625	1,920,000	23.0	5.32
.....	38,270,997	7,998,430	1,870,000	23.0	4.88
.....	39,026,671	7,327,880	1,840,000	25.0	4.71
.....	41,687,266	6,920,540	1,860,000	27.0	4.46
.....	42,671,529	7,327,350	1,818,620	25.0	4.26
.....	49,718,337	9,947,673	3,080,000	30.9	6.19
.....	54,548,909	9,971,702	2,665,000	26.7	4.88
.....	57,155,980	10,522,416	2,850,000	27.1	4.99
.....	59,702,404	9,457,853	2,670,000	28.1	4.47
.....	69,353,202	9,494,306	1,327,500	12.9	1.91
.....	72,147,889	7,942,597	1,970,000	24.8	2.73
.....	80,918,460	8,788,476	1,900,000	21.5	2.34
.....	76,028,697	8,530,342	1,370,000	16.1	1.80
.....	86,472,034	14,510,001	3,260,000	22.4	3.77
.....	88,175,675	11,894,942	2,670,000	22.4	3.03
.....	101,410,277	15,819,960	3,415,000	21.6	3.36
.....	114,222,709	14,574,727	3,540,000	24.3	3.10
.....	123,198,460	12,431,624	3,260,000	26.2	2.64
.....	112,605,078	12,105,145	3,520,000	29.1	3.12
.....	114,308,870	10,852,122	2,380,000	21.9	2.08
.....	129,330,749	13,877,109	3,280,000	23.6	2.54
.....	142,057,500	15,758,935	3,985,000	25.3	2.80
.....	142,702,586	16,530,843	5,431,000	32.8	3.80
.....	147,965,738	17,829,871	6,857,250	38.4	4.63
.....	146,950,338	26,098,382	12,318,450	47.2	8.39
.....	142,151,571	23,691,928	9,811,200	41.3	6.90
.....	155,716,848	26,038,857	7,496,900	28.8	4.81

PRODUCTION, VALUE AND DIVIDENDS OF LAKE COPPER. (Continued.)

Year.	Gross product fine copper (Pounds).	Gross value of production (Dollars).	Total dividends paid (Dollars).	Percentage of dividends to gross values.	Dividends per pound of copper (Cents).
1902.....	170,325,598	20,711,592	3,440,000	16.6	2.02
1903.....	192,299,191	26,383,449	4,980,000	18.8	2.59
1904.....	208,355,935	27,107,107	5,432,300	20.0	2.64
1905.....	230,437,992	36,616,586	9,224,600	25.2	4.02
1906.....	229,632,608	43,044,732	13,911,500	30.9	6.07
1907.....	216,116,747	43,319,940	13,469,950	31.1	6.23
1908.....	222,674,918	30,239,253	4,837,300	16.0	2.17
1909.....	231,870,496	31,256,141	6,309,200	20.2	2.72
1910.....	221,508,205	29,072,951	6,974,000	23.9	3.14
Totals..	5,122,478,402	$726,849,840	$182,824,770	25.1	3.56

The average price received for all Lake Superior copper, from 1845 to 1910, inclusive, was 14.19 cents per pound, with average dividends of 3.56 cents per pound, leaving an estimated cost of 10.63 cents for all years. While this may be accepted as an arbitrary figure, the cost might be figured much higher, or materially higher. By adding $60,000,000 to the cost of production, for money lost in unproductive ventures, the cost of copper produced would be made almost 11.5 cents per pound. By adding another $15,000,000 for assessments on mines that have since repaid in dividends the original assessments, cost of copper would be increased to about 11.85 cents per pound, leaving a net margin of profit, for the entire production, of almost exactly 2 cents per pound, plus the present aggregate values of the mines, which would be about equal to total dividend disbursements to date, or about 3.5 cents per pound.

Omitting the production of mines that have not proven profitable, the average cost of copper produced by dividend-paying Lake Superior mines probably has been about 9.5 cents per pound, for all years.

AMERICAN COPPER IMPORTS.

The following table, showing imports of copper, in various forms, into the United States, is summarized from the official figures of the United States government. The government statisticians have seen fit to vary the methods employed in presenting these figures, from time to time, but the present plan of giving contents in fine copper of imported ore and matte is preferable to the old plan of giving actual weight of imported ore and matte:

(*Pounds Avoirdupois.*)

Year.	Copper Contents. Ore & Matte.	Raw Copper.	Old Copper.	Total Fine Copper.
1890.....	3,448,237	5,189	284,789	3,960,053
1891.....	8,931,554	2,556	134,407	11,472,436
1892.....	7,669,978	22,097	71,485	8,066,647
1893.....	7,256,015	554,348	59,375	11,045,297
1894.....	4,804,614	606,415	160,592	11,445,441
1895.....	5,300,000	7,979,322	1,336,901	14,616,223
1896.....	5,900,000	9,074,379	2,422,554	17,396,933
1897.....	12,000,000	12,646,552	1,780,390	28,923,098
1898.....	19,750,000	5,892,944	1,986,133	73,916,467
1899.....	23,800,000	64,282,583	6,678,145	95,722,340
1900.....	36,380,000	62,404,489	3,354,756	105,176,808
1901.....	64,000,000	71,001,713	2,818,757	137,826,496
1902.....	40,000,000	112,420,253	2,119,031	194,501,757
1903.....	32,000,000	133,472,398	3,235,597	168,707,995
1904.....	38,947,772	142,344,433	4,000,000	181,292,206
1905.....	50,105,300	156,358,243	4,561,142	210,724,685
1906.....	49,034,891	176,558,390	6,487,226	225,843,281
1907.....	59,718,787	192,901,267	.....	252,620,054
1908.....	56,481,343	162,224,144	.....	218,705,487
1909.....	81,087,393	240,713,722	.....	321,801,115

AMERICAN COPPER EXPORTS.

1864–1909.

The United States government estimates of exports of copper, including in- nd various forms of refined copper, matte, blister copper and ores, and factured products, are as follows:

(*Pounds Avoirdupois.*)

Ending—	Ore and Matte.	Refined.	Value.
30, 1864	10,958,100	102,831	$ 432,570
1865	22,519,700	1,572,382	1,544,870
1866	21,508,000	123,444	936,211
1867	8,773,100	4,637,867	791,901
1868	9,261,200	1,350,896	922,409
1869	12,141,800	1,134,360	592,698
1870	1,919,800	2,214,658	1,042,246
1871	5,444,500	581,650	915,431
1872	3,556,400	267,868	287,735
1873	4,525,200	38,958	259,076
1874	1,332,600	503,160	467,208
1875	5,130,500	5,123,470	1,815,266
1876	1,530,400	14,304,160	3,526,410
1877	2,143,200	13,461,553	3,023,394
1878	3,294,700	11,297,876	2,488,921
1879	2,307,000	17,207,739	2,933,205
1880	2,162,300	4,206,258	849,218
1881	995,800	4,865,407	876,395
1882	2,593,600	3,340,531	748,456
1883	11,292,300	8,221,363	2,348,004
1884	38,614,000	17,044,760	5,595,859
1885	43,230,000	44,731,858	10,187,024
31,1886	41,752,000	19,553,421	4,380,322
1887	50,128,000	12,471,393	4,114,456
1888	79,496,000	31,706,527	11,897,240
1889	81,850,000	16,813,410	10,209,722
1890	43,141,100	10,971,899	5,918,395
1891	67,212,000	69,279,024	15,703,543
1892	94,304,000	30,515,736	10,162,870
1893	83,504,000	138,984,128	18,935,497
1894	8,704,000	162,393,000	16,143,094
1895	27,648,000	121,328,390	14,938,309
1896	41,426,500	259,223,924	31,035,211
1897	18,128,000	277,255,742	32,755,053
1898	18,686,000	291,955,905	35,545,251
1899	7,454,000	246,826,331	43,485,654
1900	20,014,000	337,973,751	58,875,439
1901	24,602,592	194,249,828	36,071,448
1902	40,398,400	354,668,849	46,811,729
1903	27,531,840	310,729,524	44,365,155
1904	42,396,480	554,550,030	74,816,934
1905	84,421,320	534,907,619	86,408,731
1906	106,666,560	454,752,018	
1907	222,075,840	508,929,401	
1908	141,453,760	661,876,127	
1909	134,131,200	682,846,726	

AMERICAN COPPER EXPORTS BY DESTINATIONS.

(*Pounds Avoirdupois.*)

Destination.	1900.	1905.	1908.	1909.
Holland	101,398,294	189,675,886	195,562,619	204,276,211
Germany	67,348,848	104,575,884	137,453,292	138,213,290
France	67,725,989	74,604,044	115,690,381	99,003,962
Great Britain	63,522 445	60,945,794	117,810,314	156,511,113
Italy	5,550,285	15,800,967	25,512,267	26,336,099
Russia	5,650,423	18,418,962	4,657,077	3,519,216
Belgium	12,554,191	4,997,206	5,560,366	6,016,861
China	.....	79,940,250	13,735,899	.....
British North America	1,616,778	3,019,450	3,977,142	6,790,410
México	296,684	290,763	35,895	46,287
Miscellaneous Europe	11,258,115	25,279,162	39,433,674	41,661,979
Miscellaneous	1,051,599	16,359,751	2,447,101	319,329
Totals	337,973,751	534,907,619	661,876,127	682,846,726

AMERICAN COPPER TRADE.

1897-1909.

This table, compiled from the figures of the Metallgesellschaft und Metallurgische Gesellschaft A.-G., of Frankfort-on-Main, gives all figures in round hundreds of tons:

(*Metric Tons.*)

Year.	Production.	Imports.	Total Supply.	Gross Exports.	Net Supply.	Consumption
1897	224,100	12,200	236,300	130,900	105,400	117,400
1898	238,900	34,700	273,600	145,600	128,000	120,500
1899	258,000	46,500	304,500	114,600	189,900	169,000
1900	275,000	47,300	322,300	157,900	164,400	168,400
1901	273,000	80,100	353,100	100,800	252,300	189,800
1902	299,200	73,400	372,600	171,200	201,400	213,400
1903	316,600	75,900	392,500	145,400	247,100	236,100
1904	368,600	82,200	450,800	257,400	193,400	211,400
1905	395,300	95,700	491,000	250,300	240,700	276,300
1906	415,000	102,500	517,500	215,000	302,500	360,000
1907	405,900	115,000	520,000	243,300	276,700	232,600
1908	431,900	99,200	531,100	308,500	222,600	210,600
1909	498,100	146,000	644,100	316,200	327,900	318,900

AMERICAN COPPER SUPPLY.

(*Pounds Avoirdupois.*)

Year.	Domestic Production.	Imports.	Total Supply.	Exports.	Net Supply.
1892	344,998,679	8,066,647	353,065,326	96,515,736	256,549,590
1893	329,354,398	11,045,297	340,399,695	188,984,128	151,415,567
1894	354,188,374	11,445,441	365,633,815	168,143,000	197,490,815
1895	380,613,404	14,616,223	395,229,627	136,528,390	258,701,237
1896	460,061,430	17,297,272	477,358,702	282,105,860	195,252,842
1897	494,078,274	28,578,420	522,656,694	288,662,340	233,994,354
1898	526,512,987	73,916,467	600,429,454	321,023,873	279,405,581
1899	568,666,921	95,722,340	664,389,261	252,876,480	411,512,781
1900	606,117,166	105,176,808	711,293,974	348,402,853	362,891,121
1901	602,072,519	137,826,406	739,898,925	222,137,911	517,761,014
1902	659,225,014	194,501,757	853,726,771	354,668,849	499,057,923
1903	729,943,131	168,707,995	898,651,126	310,729,524	587,921,602
1904	812,537,267	181,292,205	993,829,472	554,550,030	439,279,442
1905	902,057,843	210,724,685	1,112,782,528	534,907,619	577,874,909
1906	917,086,889	225,843,281	1,142,930,170	454,752,018	688,178,152
1907	865,818,368	238,031,320	1,103,849,688	508,924,401	594,925,287
1908	942,936,449	218,705,487	1,161,641,936	661,876,127	499,765,809
1909	1,087,453,906	325,456,533	1,412,910,437	682,846,726	730,063,711

AMERICAN COPPER SUPPLY.

e following table gives the figures of American copper supply, deliveries and , according to the statistics gathered by the American Copper Producers' ation:

(*Pounds Avoirdupois.*)

	Stocks.	Production.	Deliveries.	Changes.
ıary	122,357,266	112,135,200	90,362,421	+21,772,779
ruary	144,130,045	103,700,817	74,546,614	+29,154,203
ch	173,284,248	117,058,661	108,063,007	+ 8,995,654
il	182,279,902	113,574,292	112,656,121	+ 918,171
	183,198,073	118,356,146	131,706,078	—13,349,932
	169,848,141	116,567,493	131,557,573	—14,990,080
	154,858,061	118,277,603	150,539,057	—32,261,454
ust	122,596,607	120,597,234	107,996,911	+12,600,323
ember	135,196,930	118,023,139	102,182,932	+15,840,207
ıstment	.....	3,007,738	2,572,103	+ 435,635
ober	151,472,772	124,657,709	122,620,855	+ 2,036,854
ember	153,509,626	121,618,369	122,124,468	+ 2,036,854
ember	153,003,527	117,828,655	129,066,071	— 506,099
ıary	141,766,111	116,547,287	159,850,059	—43,302,772
ruary	98,463,339	112,712,493	103,987,840	+ 8,724,653
ch	107,187,992	120,067,467	103,430,585	+16,636,882
il	123,824,874	117,477,639	99,318,354	+18,159,285
	141,984,159	123,242,476	104,800,662	+18,441,814
	160,425,973	127,219,188	119,259,144	+ 7,960,044
	168,386,017	118,370,003	116,115,342	+ 2,254,661
ust	170,640,678	127,803,618	129,563,051	— 1,759,433
ember	168,881,245	119,519,983	139,607,514	—20,087,531
ober	148,793,714	126,469,284	136,001,084	— 9,531,800
ember	139,261,914	119,353,463	128,226,308	— 8,872,845
ember	130,389,069	123,339,219	131,698,093	— 1,309,024
ary	129,080,045	115,696,591	95,287,293	+20,409,295
uary	149,489,340	109,828,297	95,630,017	+14,198,280
ch	163,688,620	130,532,080	125,161,916	+ 5,370,164

FRENCH COPPER TRADE.

he following table is based upon the compilations of the Metallgesellschaft etallurgische Gesellschaft A.-G.:

(*Metric Tons.*)

	Pro-duction.	Imports.	Gross Supply.	Exports.	Net Supply.	Con-sumption
	6,400	24,154	30,554	2,116	28,438	25,580
	6,600	26,060	32,660	2,204	30,456	28,596
	6,400	26,756	33,156	2,467	30,689	28,854
	8,245	32,656	40,901	3,163	37,738	32,388
	6,544	40,136	46,680	3,456	43,224	35,099
	7,400	48,028	55,428	3,559	51,868	43,100
	7,800	45,575	53,375	4,044	49,331	39,700
	6,600	49,515	56,115	6,882	49,233	42,600
	6,400	51,962	58,362	5,736	52,626	46,500
	7,000	41,196	48,196	5,122	43,074	34,300
	7,300	49,094	56,394	3,485	52,909	43,900
	6,900	46,834	53,734	4,658	49,076	42,700
	6,900	56,526	63,426	5,369	58,057	45,300
	6,200	56,500	62,700	6,600	56,100	50,200
	7,100	64,700	71,800	6,100	65,700	58,100
	7,500	62,800	70,300	4,900	65,400	65,000
	8,000	74,400	82,400	5,200	77,200	73,900
	7,500	71,300	78,800	4,600	74,200	73,100

ENGLISH COPPER TRADE.

(*Long Tons.*)

Year.	Production.	Imports.	Gross Supply.	Exports.	Net Supply.	Consumption
1880	3,662	92,734	96,396	59,482	36,914	.....
1881	3,875	86,227	90,102	61,689	28,413	.....
1882	3,464	93,875	97,339	55,683	41,656	.....
1883	2,620	99,146	101,766	59,350	42,416	.....
1884	3.350	109,390	112,740	64,691	48,049	.....
1885	2,733	123,549	126,282	62,080	64,202	.....
1886	1,471	108,015	109,486	60,511	48,975	.....
1887	389	103,089	103,478	69,453	34,025	.....
1888	1,456	135,470	136,926	72,066	64,860	3,867
1889	905	139,983	140,888	75,627	65,261	66,513
1890	935	141,249	142,184	89,747	52,437	84,930
1891	900	138,616	139,515	76,056	63,459	72,622
1892	495	134,371	134,866	82,542	52,324	54,254
1893	425	129,832	130,257	70,986	59,271	67,390
1894	445	125,008	125,453	54,689	70,764	62,617
1895	580	119,941	120,521	65,990	54,531	62,502
1896	580	135,856	136,436	59,334	57,102	61,470
1897	518	136,555	137,073	56,542	80,531	86,245
1898	640	139,704	140,344	63,256	77,088	81,312
1899	637	141,610	142,247	75,271	66,976	61,942
1900	765	154,941	155,706	56,997	98,709	105,586
1901	532	149,578	150,110	70,396	79,714	83,935
1902	482	160,201	160,683	69,156	91,527	97,639
1903	536	132,926	133,462	76,305	57,157	54,050
1904	493	157,897	158,390	73,447	84,943	88,080
1905	700	155,200	155,900	77,800	78,100	74,578
1906	700	145,400	146,100	66,300	79,800	76,159
1907	700	153,100	153,800	42,800	111,000	88,300
1908	700	193,000	193,700	34,400	159,300	128,900
1909	650	200,600	201,250	36,600	164,650	109,100

RUSSIAN COPPER TRADE.

This table is based upon the compilations of the Metallgesellschaft und Metallurgische Gesellschaft A.-G.:

(*Metric Tons.*)

Year.	Production.	Imports.	Gross Supply.	Exports.	Net Supply.	Consumption
1892	4,978	6,568	11,546	.....	11,546	11,500
1893	5,100	8,756	13,856	.....	13,856	13,750
1894	5,409	6,666	12,075	.....	12,075	12,250
1895	5,854	8,100	13,954	.....	13,954	14,000
1896	5,832	12,433	18,265	.....	18,265	18,000
1897	6,941	12,507	19,448	.....	19,448	19,500
1898	7,291	14,450	21,741	.....	21,741	22,000
1899	7,533	11,100	18,633	.....	18,633	18,850
1900	8,100	12,300	20,400	.....	20,400	20,500
1901	8,100	10,900	19,000	.....	19,000	19,000
1902	8,800	17,500	26,300	.....	26,300	26,250
1903	10,500	14,450	24,950	.....	24,950	25,000
1904	10,900	20,300	31,200	.....	31,200	31,250
1905	8,900	18,700	27,600	.....	27,600	27,500
1906	10,600	16,000	26,600	400	26,200	26,000
1907	15,000	4,500	19,500	1,500	18,000	18,000
1908	16,800	4,800	21,600	20	21,580	21,000
1909	18,500	3,500	22,000	400	21,600	22,000

GERMAN COPPER TRADE.

he following table is based upon the compilations of the Metallgesellschaft letallurgische Gesellschaft A.-G.:

(*Metric Tons.*)

	Production.	Imports.	Gross Supply.	Exports.	Net Supply.	Consumption
.....	18,113	13,819	31,932	6,906	25,026	25,000
.....	19,928	13,168	33,096	5,706	27,390	27,250
.....	19,314	11,913	31,227	6,510	24,717	25,000
.....	20,192	12,427	32,619	5,154	27,465	27,250
.....	21,017	8,082	29,099	4,530	24,569	24,500
.....	24,160	29,643	53,803	7,135	46,668	46,500
.....	24,427	31,408	55,835	8,428	47,407	47,000
.....	24,092	34,182	58,274	6,247	52,027	52,000
.....	24,781	32,498	57,279	6,598	50,681	50,000
.....	24,011	38,455	62,466	7,517	54,949	55,000
.....	25,722	37,032	62,754	6,609	56,145	56,000
.....	25,777	44,365	70,142	6,329	63,813	64,000
.....	29,319	56,814	86,133	5,996	80,137	80,000
.....	29,408	67,573	96,981	7,183	89,798	90,000
.....	30,695	73,291	103,986	6,972	97,014	97,000
.....	34,634	70,091	104,725	7,061	97,664	98,000
.....	30,929	83,503	114,432	5,505	108,927	107,000
.....	31,317	58,620	89,937	5,097	84,840	85,000
.....	30,578	76,050	106,628	4,678	101,950	100,000
.....	31,214	83,261	114,475	4,333	110,142	110,000
.....	30,264	110,231	140,495	4,223	136,272	135,000
.....	31,717	102,218	133,935	5,958	127,977	130,000
.....	32,275	126,066	158,341	7,243	151,098	150,000
.....	31,854	124,072	155,926	6,112	149,814	150,000
.....	30,001	157,434	187,435	6,778	180,657	175,000
.....	31,126	154,673	185,799	6,745	179,054	180,000

AUSTRO-HUNGARIAN COPPER TRADE.

he following table is based on the figures of the Metallgesellschaft und Metalhe Gesellschaft A.-G.:

(*Metric Tons.*)

	Production.	Imports.	Gross Supply.	Exports.	Net Supply.	Consumption.
.....	1,295	8,644	9,939	342	9,597	.....
.....	1,396	11,822	13,218	434	12,784	.....
.....	1,726	13,383	15,109	255	14,854	.....
.....	1,276	11,747	13,023	151	12,872	.....
.....	1,366	13,666	15,032	228	14,804	.....
.....	1,426	15,926	17,352	159	17,193	17,000
.....	1,343	17,442	18,785	173	18,612	18,300
.....	1,479	16,185	17,664	534	17,130	16,500
.....	1,200	18,970	20,170	471	19,699	18,700
.....	1,150	17,504	18,654	435	18,219	18,200
.....	1,350	18,256	19,606	436	19,170	19,200
.....	1,400	18,704	20,104	1,226	18,878	18,700
.....	1,463	22,532	23,995	747	23,248	23,100
.....	1,439	22,535	23,974	1,253	22,721	21,900
.....	1,457	24,488	25,945	1,271	24,674	24,200
.....	1,066	26,181	27,247	619	26,628	26,500
.....	1,338	33,259	34,597	1,125	33,472	33,000
.....	1,765	30,606	32,371	1,250	31,121	31,000

WORLD'S COPPER SUPPLY.

The following table combines the statistics of the American Copper Producers' Association and the British visible supply. These figures cover commercial copper ready for consumption, but necessarily do not include the stocks in the hands of consumers, neither do they include sundry stocks in Holland and Germany, which probably fluctuate between a minimum of about 25,000,000 lbs., and a maximum of about 75,000,000 lbs., with a mean that probably approximated 50,000,000 lbs. during 1909–1910:

(*Pounds Avoirdupois.*)

1909.	American Stocks	European Visible Supply	Total Stocks	Change
January	122,357,266	118,574,400	240,931,666	.....
February	144,130,045	117,140,800	261,270,845	+20,339,179
March	173,284,248	115,436,160	288,720,408	+27,349,563
April	182,279,902	114,056,320	296,336,222	+ 7,615,814
May	183,198,073	127,352,960	310,551,033	+14,214,811
June	169,848,141	150,928,960	320,777,101	+10,226,068
July	154,858,061	171,492,160	326,350,221	+ 5,573,120
August	122,596,607	197,608,320	320,204,927	— 6,145,294
September	135,196,930	210,226,240	345,423,170	+25,218,243
October	151,472,772	222,559,680	374,032,452	+28,609,282
November	153,509,626	236,864,320	390,373,946	+16,341,494
December	153,003,527	244,209,280	397,212,807	+ 6,838,861
1910.				
January	141,766,111	248,209,920	389,976,031	— 7,236,776
February	98,463,339	254,139,200	352,602,539	—37,373,492
March	107,187,992	249,607,680	356,795,672	+ 4,193,133
April	123,824,874	246,863,680	370,688,554	+13,892,882
May	141,984,159	239,265,600	381,249,759	+10,561,205
June	160,425,973	232,853,680	393,279,653	+12,029,894
July	168,386,017	222,295,260	390,681,277	— 2,598,376
August	170,640,678	218,413,440	389,054,118	— 1,627,159
September	168,881,245	210,472,640	379,353,885	— 9,700,233
October	148,793,714	198,065,280	346,858,994	—32,493,891
November	139,261,914	193,200,000	332,461,914	—14,397,080
December	130,389,069	187,705,280	318,094,349	— 4,367,565

AVERAGE AMERICAN AND ENGLISH PRICES.

The following table of average annual prices of copper in England and the ed States is based upon the New York price for Lake copper and the London for Standard copper. The two last columns give the American prices in cents fractions and the English equivalent in sterling. English prices are for long of 2,240 pounds, and American prices for pounds avoirdupois, the last column, g English equivalent of the American prices, being figured in long tons.

	English Prices.												American Prices.			
	Lowest.			Highest.			Fluctuation			Average.			Average	Average.		
	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	Cents.	£	s.	d.
.....	54	10	0	74	0	0	10	10	0	62	14	7	21.438	99	0	8
.....	57	0	0	72	10	0	15	10	0	61	16	9	18.188	84	0	8
.....	63	0	0	71	10	0	8	10	0	66	10	5	19.125	88	6	11
.....	57	0	0	67	10	0	9	10	0	62	17	11	16.500	76	3	7
.....	47	5	0	58	0	0	10	15	0	53	17	6	13.000	59	19	0
.....	38	10	0	61	12	6	23	2	6	43	11	0	10.838	49	6	5
.....	38	10	0	43	15	0	5	5	0	40	1	8	11.063	51	1	10
.....	38	7	6	85	5	0	46	17	6	46	0	6	13.850	64	0	0
.....	73	0	0	105	0	0	32	0	0	81	11	3	16.775	77	10	1
.....	35	0	0	80	0	0	45	0	0	49	14	8	13.490	62	6	5
.....	46	10	0	61	12	6	15	2	6	54	5	3	15.600	72	1	10
.....	44	1	3	56	10	0	12	8	9	51	9	4	12.760	58	19	1
.....	43	10	0	47	18	9	4	8	9	45	13	2	11.560	53	8	4
.....	40	12	6	46	16	3	6	3	9	43	15	6	10.750	49	13	10
.....	37	17	6	43	0	0	5	2	6	40	7	4	9.520	44	0	0
.....	38	13	9	47	8	9	8	15	0	42	19	7	10.730	49	12	0
.....	40	10	0	50	8	9	9	18	9	46	18	1	10.790	50	14	9
.....	47	0	0	51	15	0	4	15	0	49	2	6	11.980	52	10	2
.....	49	5	0	57	8	9	8	3	9	51	16	7	12.360	55	13	10
.....	58	1	3	79	2	6	21	1	3	73	13	9	17.050	82	0	11
.....	70	14	2	78	7	1	7	12	11	73	12	6	16.650	76	18	2
.....	47	0	0	72	17	6	25	17	6	66	19	8	16.720	77	4	7
.....	47	10	0	56	15	0	9	5	0	52	11	5	12.160	56	3	8
.....	53	13	7	64	0	7	10	7	0	58	3	2	13.720	63	4	8
.....	55	5	0	68	7	6	13	2	6	62	12	2	13.010	60	2	6
.....	64	2	6	80	12	6	16	10	0	69	9	2	15.890	73	7	9
.....	78	5	1	105	4	3	26	19	2	87	8	6	19.610	90	4	10
.....	55	0	0	113	0	0	58	0	0	84	0	0	20.004	91	19	10
.....	57	7	8	63	8	10	6	1	2	59	18	3	13.500	62	7	0
.....	54	15	0	63	17	6	9	1	6	58	15	3	13.480	62	5	10
.....	52	15	0	62	0	0	9	5	0	57	7	6	13.125	60	12	6

PRICES OF ELECTROLYTIC COPPER.

The following table gives the average monthly prices of electrolytic wire-bars, e New York Metal Exchange, for the years named:

nth.	1900.	1905.	1906.	1907.	1908.	1909.	1910.
	(*Cents.*)						
ıry.....	16.250	15.150	18.310	24.404	13.955	14.085	13.680
ıary.....	16.250	15.200	17.869	24.869	13.230	13.215	13.510
h.....	16.250	15.200	18.361	25.065	12.910	12.585	13.425
.....	16.875	15.180	18.375	24.224	12.890	12.670	12.930
.....	16.750	15.000	18.475	24.048	12.820	13.025	12.670
.....	16.250	15.000	18.442	22.665	12.850	13.260	12.590
.....	16.250	15.110	18.190	21.130	12.880	12.970	12.365
st.....	16.375	15.875	18.380	18.356	13.610	13.060	12.560
mber.....	16.500	16.225	19.033	15.565	13.585	12.930	12.490
ber.....	16.625	16.500	21.203	13.169	13.525	12.810	12.775
mber.....	16.625	16.845	21.833	13.391	14.210	13.240	12.875
mber.....	16.625	18.590	22.885	13.163	14.210	13.480	12.725
arly Average..	16.545	15.980	19.775	20.860	13.390	13.110	12.880

MONTHLY PRICES OF LAKE SUPERIOR INGOT COPPER.

(*January-June.*)

Year.	January.		February.		March.		April.		May.		June.	
	Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.
1860	24	23½	24	23¾	23¾	23	23½	23	23½	22¾	22¼	21¼
1861	20	19	19½	19	19½	19¼	19¾	19	19½	19¼	19	18
1862	28	27	28	25	25	23	23	21½	21¼	20¾	23	20¾
1863	35	31	37	35	37	31	31	30	30½	30	30¼	30
1864	41¼	39	42	41¼	42½	41½	44	42½	44	43	49	44
1865	50½	46	46	44	44½	34	35	34	34	30	30½	28¾
1866	42	38	38	35½	35½	29½	30	28½	31	29	33	31
1867	29¼	27	27¾	27½	27½	24	24½	23½	24¼	24	24½	24
1868	23½	21½	24	22½	24	23¼	24¼	23¼	24¼	24	24	23½
1869	26¼	23¾	27	26	26¾	24	24	23¼	24¼	23¾	23¾	22
1870	22	21⅛	21¼	20⅞	20¾	19	19¼	19¼	19½	19	20⅛	19
1871	22⅞	22	22⅜	21⅛	22	21½	21⅜	21¼	21¾	21⅜	21¼	21¼
1872	28½	27⅛	28⅜	28¼	30½	28⅜	44	30½	42	36	34¼	33
1873	35	32¼	35	34	35	34½	34¼	30¼	33½	32	31¼	29¼
1874	25	24½	25	24⅜	24¾	24	25	24¾	25	24⅞	24¼	24¼
1875	23½	21⅞	22⅜	21¾	21¾	21½	21⅜	21½	23¼	22⅜	23	23
1876	23¼	23	22⅞	22⅜	22¼	22	22⅜	22	22⅜	21	21	19¼
1877	19½	19	20¼	19¼	19¼	19	19½	19¼	19¼	19	19⅜	19
1878	17⅜	17¼	17½	17⅛	17⅛	16⅞	17	16⅞	16⅜	16¼	16⅛	16⅛
1879	16	15½	15½	15½	15¾	15¼	16	15¼	16¼	16	16½	16⅛
1880	25	21⅜	24½	24	24	22¾	22½	21	21	18	18⅛	17⅜
1881	19⅜	19⅜	19⅜	19⅛	19⅜	19	19	18¾	18⅞	18¼	18⅛	16⅛
1882	20⅜	20¼	20	19	19¼	18⅞	18⅞	17⅛	18¼	18	18¼	18
1883	18⅛	18	17⅞	17¾	17⅝	17½	16	15⅜	16	15⅞	15⅞	15
1884	15	14⅞	15	14⅜	15	14⅜	15	14½	14¼	14⅛	14¼	14
1885	11½	10⅜	11⅞	10⅜	11⅛	10⅜	11¼	10 1/16	11⅛	10⅛	11⅛	11
1886	11⅜	11⅜	11⅜	11⅜	11⅛	11⅜	11⅛	11⅜	11⅛	10	10⅛	10
1887	12	11⅛	11⅛	10⅜	10⅞	10⅜	10⅜	10	10	9 13/16	10⅛	10
1888	17⅜	15 7/16	16 1/16	16	16 3/16	15 1/16	16 3/16	16	16⅜	16 5/16	16⅛	16⅛
1889	17⅞	16½	16⅛	16⅛	15⅜	15	16	15½	12⅛	12	12 1/16	12
1890	14½	14¼	14¼	14¼	14¼	14	14¼	14¼	15¼	14⅛	16¼	15⅛
1891	15	14⅝	14⅝	14½	14¼	13⅝	13¾	13⅜	13⅛	12¼	13	12⅛
1892	11	10⅜	10⅜	10½	12	10¼	12	11⅛	12¼	12	11⅛	11¼
1893	12½	12¼	12¼	12	12	11⅜	11⅜	11¼	11⅛	11	11	10⅝
1894	10¼	10	10	9⅜	9⅜	9⅜	9¼	9⅜	9⅜	9¼	9¼	9
1895	10	9⅞	9⅞	9½	9½	9¼	9¼	9⅜	10⅜	9⅜	10⅛	10⅛
1896	10⅛	9⅜	11¼	10	11¼	10⅛	11	10⅛	11⅛	10⅛	11⅛	11⅛
1897	12	11½	12	11	11⅜	11⅛	11⅛	11	11⅛	10⅛	11⅛	10⅞
1898	11	10 9/16	11⅜	11⅛	12	11⅛	12⅛	11⅜	12⅛	12	11⅛	11⅛
1899	17	13¼	18⅛	17	18	17¼	19⅜	18	19¼	18⅛	18⅛	17⅜
1900	16½	16¼	16½	16	17	16¼	17¼	17	17⅛	16½	16⅛	16⅛
1901	17	17	17	17	17	17	17	17	17	17	17	17
1902	11	13	12⅛	13½	12½	12½	12	12½	12	12½	12¼	12⅛
1903	12⅜	12¼	13⅛	12⅜	15⅜	13¾	15⅛	14¾	15¼	14¼	15⅛	14
1904	13	12½	12⅜	12¼	13	12¼	13⅜	13	13⅜	13	13¼	13⅛
1905	15⅜	15⅛	15⅜	15⅜	15⅜	15⅜	15⅜	15⅛	15	15	15	15
1906	19	18⅛	18⅜	17⅜	18¼	18¼	18⅜	18¼	18⅜	18¼	18⅛	18
1907	25⅞	25	25¼	25⅜	26¼	25¼	25⅜	25¼	25¼	25¼	24⅜	24
1908	14½	13¾	14½	12½	13½	12½	13½	13	13¼	12¾	13¼	12¾
1909	14¾	14	14½	12¾	13¼	12½	13¼	13	13¼	13	13¼	13¼
1910	14⅛	13⅞	14	13⅜	14	13⅜	13¾	13	13⅛	12⅛	13⅛	12⅛

ONTHLY PRICES OF LAKE SUPERIOR INGOT COPPER. (Continued.)

(*July-December.*)

Year.	July.		August.		September.		October.		November.		December.	
	Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.
.....	21¾	21½	21½	21½	22	21¼	22	21½	21½	20½	20¼	19¾
.....	18	17½	19	17¾	20¼	19	20¼	20	22½	20¼	27	22½
.....	24½	22½	24½	24	27	24¼	32⅞	27	32⅞	30½	32	31½
.....	32	29	31	29	32¼	31	34¼	32¼	38½	34½	38¾	38½
.....	55	49	52½	50	52½	47½	48	47	49	47	50	48½
.....	30½	28	32	30½	32¾	31½	33	32¼	45½	33	45½	39½
.....	33½	31	31	30	31½	30¾	31	30¾	30¾	26½	29	26½
.....	26	24	26½	25¾	27¼	26½	26¾	22¾	23	22¾	23	21½
.....	24½	23⅛	24¼	24	24	23¾	24	23	24	22½	24½	23¾
.....	22¼	21⅞	23½	21⅞	23	22	22¾	22	22½	22	22	21½
.....	20½	20⅝	21⅜	20⅛	21½	20⅜	21½	21½	23⅝	21⅜	22⅝	22¼
.....	22¼	21⅝	23	22⅜	22⅞	22⅞	23⅞	23¼	24¼	23¼	27	24½
.....	34	33	35	32½	35¼	33	34⅜	31½	32¼	30½	32½	30½
.....	29	26⅝	27½	27	27	25½	25½	24	24	21	25	23
.....	24¼	20	21	19	21¼	21	22¼	21¼	23¾	22¼	23¼	23¼
.....	23	22⅝	23⅜	23	23⅞	23⅛	23¼	23	23¼	23	23⅜	23⅜
.....	20	19½	19½	18¾	21	18¾	21¼	20½	20½	20	20	19⅜
.....	19¼	19	19	17⅝	18½	17⅞	18	17¾	17¾	17⅝	17¾	17½
.....	16¼	16	16	16	16¼	16	16	15½	15⅝	15½	16	15⅜
.....	16¼	16	16⅜	16	17	16¼	21½	18	21¾	21	21½	21
.....	18⅝	18½	19½	19	18⅞	18¾	18⅝	18¾	18⅝	18¾	19½	18⅞
.....	16½	16	16⅜	16⅜	18⅛	16¾	18⅜	18	19	18⅛	20⅜	19½
.....	18¼	18½	18¼	18⅛	18¼	18	18¼	18	18⅛	18	18	17⅜
.....	15⅛	15	15	15	15¼	15⅛	15¼	15⅛	15	14⅞	15	14⅞
.....	14½	13⅞	14	13⅞	13½	13	13⅝	12⅞	13	12½	12½	11
.....	11¾	10⅞	11½	11	11½	10 19/20	11⅛	10⅜	11⅛	10⅜	11½	11 1/10
.....	10⅜	10	10½	10	11⅛	10¼	11¾	11⅛	12	11¾	12½	11⅛
.....	10⅜	10⅛	10¾	10⅜	11	10⅝	12 3/20	10 3/10	14 19/20	11 1/10	17¾	14 19/20
.....	16 9/10	16 13/20	17	16⅝	17 7/10	16 9/10	17⅝	17 7/10	17⅜	17½	17 3/10	17 1/10
.....	12	12	12	12	12	11	11	11	13¼	11¼	14½	14
.....	17¼	16½	17¼	17	17	17	16⅞	16¾	16¾	16¾	16	15
.....	12⅞	12½	12⅜	12	12½	12⅛	12⅝	11⅜	11½	11	11⅛	10¼
.....	11¾	11¼	11¼	11⅜	11⅜	11 1/10	11¼	11 1/10	12	11⅜	12⅜	12¼
.....	10½	10¼	10⅛	9⅜	9⅞	9⅜	9¾	9¼	10¼	9¼	10½	10⅜
.....	9⅝	9	9½	9	9½	9⅛	9¾	9½	9½	9⅜	10	9½
.....	11⅜	10½	12¼	11¾	12¼	12	12	11¾	11⅝	11	11	10
.....	11¾	11	11⅛	10⅞	10⅞	10⅜	10⅞	10½	11½	10⅞	11½	11¼
.....	11⅛	11	11¼	11	11⅜	11¼	11¼	11	11	10⅜	11	10⅝
.....	11¾	11½	12⅛	11⅜	12½	12⅛	11½	12¼	11¾	12½	12⅞	12⅝
.....	18½	18¼	18¼	18¼	18½	18⅜	18⅞	17	17¼	17	17	16¼
.....	16½	16⅛	16⅜	16¼	16⅞	16¾	16⅞	16¾	17	16⅜	17	16¾
.....	17	16½	16¾	16⅜	16½	16⅜	16 15/16	16¾	16 15/16	16 15/16	17	13
.....	12	12½	11⅝	12⅛	11⅜	12¼	11¾	12¼	11½	12	11⅝	12
.....	14½	13	13¼	13	13¼	13¼	14	13	13⅜	12¼	12⅜	12
.....	12⅞	12⅝	12⅞	12⅝	13	12¾	14	12⅞	15⅜	13⅞	15½	14⅞
.....	15⅜	15	16⅜	15½	16½	16⅛	16½	16½	17⅜	16½	18⅞	17⅝
.....	18⅝	18½	18⅞	18¾	20⅛	18⅞	22½	20¼	22⅜	22½	24	22¾
.....	24⅞	22¼	22¼	20	19½	15¼	15¼	12½	14⅞	13½	14	13¼
.....	13½	12¾	14	13½	14	13½	14	13¼	14¾	14	14¾	14½
.....	13¼	13¼	13¾	13¼	13⅜	13	13½	12⅞	14	13½	14½	13½
.....	12¾	12½	13	12¾	13	12¾	13¼	12¾	13¼	13	13	12¾

HIGH, LOW AND AVERAGE PRICES OF LAKE COPPER.

1860–1910.

(*Cents.*)

Year.	Highest. Price.	Highest. Month.	Lowest. Price.	Lowest. Month.	Average.
1860	24.000	January	19.750	December	22.875
1861	27.000	December	17.500	July	22.250
1862	32.875	November	20.750	May	21.875
1863	38.750	December	29.000	July	33.875
1864	55.000	July	39.000	January	47.000
1865	50.500	January	28.000	July	39.250
1866	42.000	January	26.500	November	34.250
1867	29.250	January	21.500	December	25.375
1868	24.500	December	21.500	January	23.000
1869	27.000	February	21.500	December	24.250
1870	23.375	November	19.000	March	21.188
1871	27.000	December	21.250	April	24.125
1872	44.000	April	27.125	January	35.563
1873	35.000	January	21.000	November	28.000
1874	25.000	January	19.000	August	22.000
1875	23.875	September	21.500	January	22.688
1876	23.250	January	18.750	August	21.000
1877	20.500	February	17.500	December	19.000
1878	17.625	January	15.500	October	16.563
1879	21.750	November	15.500	January	18.625
1880	25.000	January	17.875	June	21.438
1881	20.375	December	16.000	July	18.188
1882	20.375	January	17.875	April	19.125
1883	18.125	January	14.875	November	16.500
1884	15.000	December	11.000	December	13.000
1885	11.875	February	9.800	May	10.838
1886	12.125	December	10.000	May	11.063
1887	17.750	December	9.950	May	13.850
1888	17.600	November	15.850	January	16.775
1889	17.500	January	11.000	September	13.490
1890	17.250	July	14.000	March	15.600
1891	15.000	January	10.250	December	12.760
1892	12.375	December	10.500	February	11.560
1893	12.500	January	9.600	August	10.750
1894	10.250	January	9.000	June	9.529
1895	12.250	August	9.375	April	10.750
1896	12.000	June	9.750	January	10.980
1897	12.000	January	10.750	November	11.360
1898	13.250	December	11.000	January	12.050
1899	19.375	April	13.250	January	17.760
1900	17.250	April	16.000	February	16.650
1901	17.000	January	13.000	December	16.750
1902	13.500	February	11.000	January	12.150
1903	15.375	March	12.000	December	13.720
1904	15.375	November	12.250	February	13.010
1905	18.875	December	15.000	May	15.990
1906	24.000	December	17.875	February	19.610
1907	26.250	March	12.500	October	20.040
1908	14.750	December	12.500	February	13.500
1909	14.750	January	12.500	March	13.490
1910	14.125	January	12.500	July	13.120

CONVERSION TABLE FOR AMERICAN AND ENGLISH PRICES.

his table gives the equivalents, in American and English currency, for the of copper, from £35 to £150 per ton. The American basis of weight is the upois pound; the English basis is the long ton of 2,240 pounds avoirdupois. ıte of exchange is figured at £1=$4.85:

(Pounds Sterling and Cents.)

.. 7.58c.	£64....13.86c	£ 93....20.14c.	£122....26.41c.
.. 7.80c.	£65....14.07c.	£ 94....20.35c.	£123....27.63c.
.. 8.01c.	£66....14.29c.	£ 95....20.57c.	£124....27.85c.
.. 8.23c.	£67....14.51c	£ 96....20.79c.	£125....27.06c.
.. 8.45c.	£68....14.72c	£ 97....21.00c.	£126....27.28c.
.. 8.66c.	£69....14.94c	£ 98....21.22c.	£127....27.50c.
.. 8.88c.	£70....15.16c.	£ 99....21.43c	£128....27.71c.
.. 9.10c.	£71....15.37c.	£100....21.65c.	£129....27.93c.
.. 9.31c	£72....15.59c.	£101....21.87c.	£130....28.14c.
.. 9.53c.	£73....15.81c.	£102....22.08c.	£131....28.36c.
.. 9.75c.	£74....16.02c.	£103....22.30c.	£132....28.58c.
.. 9.96c	£75....16.24c.	£104....22.52c.	£133....28.80c.
..10.18c.	£76....16.46c.	£105....22.73d.	£134....29.01c.
..10.39c.	£77....16.67c.	£106....22.95c.	£135....29.23c.
..10.61c.	£78....16.89c.	£107....23.16c.	£136....29.45c.
..10.83c.	£79....17.10c.	£108....23.38c.	£137....29.66c.
..11.04c.	£80....17.32c.	£109....23.60c.	£138....29.88c.
..11.26c	£81....17.54c.	£110....23.82c.	£139....30.10c.
..11.48c.	£82....17.75c.	£111....24.03c.	£140....30.31c.
..11.69c.	£83....17.97c.	£112....24.25c.	£141....30.53c.
..11.91c.	£84....18.19c.	£113....24.47c.	£142....30.75c.
..12.12c	£85....18.40c.	£114....24.68c.	£143....30.96c.
..12.34c.	£86....18.62c.	£115....24.90c.	£144....31.18c.
..12.56c.	£87....18.84c.	£116....25.12c.	£145....31.39c.
..12.77c.	£88....19.05c.	£117....25.33c.	£146....31.61c.
..12.99c.	£89....19.27c.	£118....25.55c.	£147....33.83c.
..13.21c.	£90....19.49c.	£119....25.77c.	£148....34.04c.
..13.42c.	£91....19.70c.	£120....25.98c.	£149....34.26c.
..13.64c.	£92....19.92c.	£121....26.20c.	£150....32.48c.

PROPORTION OF COPPER TO AMERICAN METAL PRODUCTION.

	Total Value of Metallic Products.	Total Value of Copper Production.	Production of Copper in Pounds.	Percentage of Copper Values
.....	$253,731,822	$ 33,833,954	231,270,622	13.3
.....	267,247,033	26,907,809	231,246,214	10.0
.....	305,735,670	30,848,797	265,115,133	10.1
.....	300,232,798	38,455,300	295,812,076	12.1
.....	307,936,189	37,977,142	352,971,744	12.3
.....	250,207,406	32,054,601	339,785,972	12.8
.....	218,382,494	33,141,142	364,866,808	15.2
.....	282,149,808	38,682,347	392,639,964	13.8
.....	287,860,155	49,456,603	460,061,430	17.2
.....	302,531,147	54,080,180	494,078,274	17.9
.....	343,748,268	61,865,276	526,375,591	18.0
.....	525,797,557	101,222,712	581,319,091	19.0
.....	550,425,286	98,494,039	602,808,839	17.9
.....	524,873,284	86,629,266	601,499,886	16.5
.....	642,258,584	76,568,954	659,508,644	11.9
.....	624,318,008	91,506,006	698,044,517	15.3
.....	542,081,983	105,629,845	812,537,267	19.5
.....	702,453,101	139,795,716	902,057,843	19.9
.....	886,110,856	177,595,888	918,635,216	20.0
.....	903,802,244	173,799,300	866,308,743	19.2
.....	549,923,116	124,419,335	942,936,449	22.6
.....	753,427,290	142,083,711	1,087,453,906	18.8

SHARE PRICES OF AMERICAN COPPER COMPANIES

1907-1910

Company.	1907. High	1907. Low	1908. High	1908. Low	1909. High	1909. Low	1910. High	1910. Low
Adventure	$ 6.50	$ .63	$ 12.25	$ 1.50	$ 10.50	$ 4.88	$ 10.00	$ 4.00
Ahmeek	110.00	75.00	135.00	50.00	245.00	135.00	225.00	140.00
Alloues	74.25	20.00	41.50	24.00	62.00	33.25	58.25	31.00
Amalgamated	121.88	41.75	88.38	45.13	96.50	65.00	90.75	55.13
Anaconda	75.50	25.13	53.50	27.50	54.38	37.75	54.00	33.50
Atlantic	22.00	6.50	19.63	8.00	18.00	8.00	11.50	5.00
Butte Coalition	39.13	10.00	29.25	15.25	33.63	21.38	26.50	15.63
Calumet & Arizona	198.00	89.00	130.00	93.00	119.00	96.25	108.00	44.75
Calumet & Hecla	1,000.00	535.00	700.00	565.00	695.00	585.00	685.00	560.00
Centennial	47.00	15.00	37.00	21.00	44.50	29.00	38.00	13.50
Chino	.....	.....	.....	.....	13.13	6.50	24.00	9.50
Copper Range	105.00	44.25	83.88	55.13	86.75	68.50	85.00	57.50
East Butte	.....	.....	15.88	7.50	16.63	7.50	14.00	6.25
First National	.....	.....	9.75	2.00	9.75	4.75	6.63	1.38
Franklin	29.25	6.00	19.50	6.50	19.00	13.00	22.50	9.00
Giroux	10.38	2.38	7.00	2.75	12.25	6.13	12.38	6.00
Granby	152.00	60.00	109.00	78.75	110.50	90.00	111.25	20.00
Greene Cananea	25.00	5.25	13.13	6.88	14.63	9.00	11.88	6.38
Hancock	20.50	4.75	15.25	3.25	38.00	8.25	36.00	14.75
Inspiration	.....	.....	.....	.....	9.63	5.00	10.50	6.75
Isle Royale	36.50	11.50	26.25	17.75	33.25	22.50	28.25	13.50
Keweenaw	16.00	4.25	9.75	3.00	7.88	2.50	6.75	3.00
Lake	10.00	4.00	24.25	6.00	74.13	16.00	94.50	28.00
La Salle	35.00	8.00	17.25	12.25	19.13	10.75	19.00	6.00
Mass	9.25	2.50	8.38	2.25	18.25	4.25	10.63	4.50
Miami	.....	.....	15.50	4.63	28.13	12.75	28.88	17.00
Mohawk	96.50	37.00	73.00	45.00	70.50	57.50	75.25	43.00
Nevada Cons	20.50	6.25	20.75	8.38	30.00	16.50	27.25	17.63
North Butte	120.00	30.00	89.75	40.13	85.25	47.00	50.00	18.50
Ojibway	15.00	10.00	16.25	6.25	14.88	5.75	12.75	5.00
Old Dominion	63.00	18.00	60.50	28.00	59.00	47.25	55.00	29.50
Osceola	181.00	71.00	135.50	77.00	170.00	122.00	166.00	114.00
Quincy	148.00	70.00	100.00	77.00	96.00	84.00	92.00	68.00
Ray Cons	.....	.....	.....	.....	27.50	7.50	27.25	15.25
Shannon	24.38	7.13	19.50	9.75	17.88	13.50	18.00	8.75
South Lake	.....	.....	.....	.....	.....	.....	15.25	4.13
Superior	22.50	7.00	36.50	15.00	67.00	33.88	68.25	35.00
Superior & Boston	.....	.....	18.75	1.63	18.50	12.00	18.00	4.63
Superior & Pittsburg	28.75	7.50	20.13	10.13	18.50	12.88	16.75	9.00
Tamarack	170.00	51.00	88.00	56.00	90.00	62.00	78.00	45.00
Tennessee	53.50	17.00	52.25	25.50	49.00	33.50	40.63	19.75
U. S. Smelting, pfd	49.00	27.75	47.00	37.00	54.00	44.00	53.13	45.75
U. S. Smelting, com	70.00	24.75	46.88	28.50	59.00	39.00	55.00	30.00
Utah Cons	79.00	25.50	49.50	29.50	49.75	37.25	46.00	12.50
Utah Copper	39.50	13.00	52.75	20.00	67.25	39.75	60.50	39.38
Victoria	11.63	3.56	6.75	2.50	6.00	3.00	5.75	2.00
Winona	14.00	2.50	7.75	4.50	13.25	4.75	15.00	5.00
Wolverine	200.00	92.50	155.00	115.50	158.00	139.00	150.00	102.00

DIVIDENDS OF AMERICAN COPPER MINES.

Company.	1908.	1909.	1910.	Total.
onda	$ 2,400,000	$ 1,200,000	$ 9,600,000	$53,400,000
na	1,167,584	573,860	1,042,591	14,441,875
tic	.....	.....	.....	990,000
	900,000	1,900,000	1,000,000	6,550,000
iam-New Haven	.....	.....	.....	68,669
n & Montana	1,800,000	1,800,000	2,100,000	61,675,000
hacker	.....	.....	.....	20,000
-Ballaklava	.....	.....	125,000	125,000
& Boston	.....	.....	.....	1,800,000
Coalition	.....	250,000	1,000,000	3,700,000
net & Arizona	800,000	800,000	600,000	11,500,000
net & Hecla	2,000,000	2,700,000	2,900,000	112,500,000
a	.....	.....	.....	55,000
nnial-Eureka	.....	.....	600,000	3,367,700
al	.....	.....	.....	2,130,000
pion	500,000	500,000	900,000	5,600,000
	.....	.....	.....	2,518,620
nbus Cons	.....	.....	.....	226,832
a-Parrot	.....	.....	.....	1,760,000
er Falls	.....	.....	.....	100,000
erland-Ely	.....	.....	390,000	390,000
n & Lark	.....	.....	.....	350,000
West	.....	162,000	162,000	6,281,000
lin	.....	.....	.....	1,240,000
y	540,000	270,000	270,000	4,451,051
e Cons	.....	.....	.....	7,450,580
Silver	.....	.....	.....	5,642,000
ial	.....	.....	.....	300,000
Silver	.....	50,000	200,000	4,350,000
co	.....	.....	50,000	955,000
arge	.....	.....	.....	160,000
i No. 2	180,000	115,200	180,000	1,375,200
moth	40,000	.....	.....	2,220,000
ota	.....	.....	.....	1,820,000
wk	250,000	300,000	200,000	2,150,000
ana O. P. Co	.....	.....	.....	9,437,274
tain	.....	.....	.....	4,216,250
nal	.....	.....	.....	320,000
da Cons	.....	431,700	1,726,800	2,158,500
ouse	.....	.....	.....	600,000
Butte	1,200,000	1,200,000	328,000	8,528,000
Dominion	146,623	586,488	324,000	1,619,543
la	192,300	769,200	961,500	9,343,250
t	.....	.....	68,954	6,876,603
bic	.....	.....	.....	1,000,000
ix	.....	.....	.....	20,000
y	495,000	440,000	412,500	19,302,500
y (Utah)	.....	.....	.....	959,370
Bird	.....	.....	.....	72,000
	.....	.....	.....	100,000
Rita	.....	.....	.....	100,000
ion	.....	.....	.....	450,000
uck-Arizona	.....	.....	700,000	700,000
storm	150,000	225,000	180,000	1,005,000
ard	.....	.....	.....	40,000
rack	.....	.....	.....	9,420,000
nece	500,000	250,000	.....	2,306,250
ountain	500,000	.....	.....	800,000

DIVIDENDS OF AMERICAN COPPER MINES. (Continued.)

Company.	1908.	1909.	1910.	Total.
United Globe	.....	.....	.....	$ 379,500
United States	$ 2,402,324	$ 2,402,476	$ 2,403,751	12,050,980
United Verde	2,700,000	449,890	2,700,000	30,255,570
Utah Cons	600,000	600,000	150,000	7,950,000
Utah Copper	735,000	1,464,036	3,431,345	5,630,381
Wolverine	600,000	600,000	600,000	6,300,000
Totals	$ 20,718,831	$ 19,139,850	$ 35,206,441	$463,444,507
Amalgamated	$ 3,077,580	$ 3,077,756	$ 3,077,758	$63,410,327
Copper Range Cons.	1,536,740	1,536,740	1,536,930	10,756,526
General Development Co	.....	.....	390,000	2,760,000
Old Dominion Co.	.....	.....	439,867	1,600,445
Phelps, Dodge & Co.	.....	5,396,652	5,399,875	10,796,527
St. Mary's M. L. Co.	.....	160,000	160,000	3,800,000
United Copper	.....	.....	.....	6,412,500
Grand Totals	$ 25,333,151	$ 29,310,998	$ 46,210,871	$562,989,832

TOTAL LAKE SUPERIOR DIVIDENDS.

1849—1910

Name of Company.	Present Status.	Dates Paid. First.	Dates Paid. Last.	Number of Dividends.	Total Amount.
Atlantic	*a*	1878	1905	19	$ 990,000
Baltic	*b*	1905	1910	12	6,550,000
Calumet	*c*	1870	1871	3	300,000
Calumet & Hecla	*b*	1871	1910	152	112,500,000
Central	*c*	1864	1905	31	2,130,000
Champion	*b*	1903	1910	52	6,600,000
Cliff	*d*	1849	1867	37	2,518,630
Copper Falls	*a*	1864	1871	3	100,000
Franklin	*b*	1863	1894	21	1,240,000
Hecla	*c*	1869	1871	7	650,000
Kearsarge	*e*	1890	1897	3	160,000
Minesota	*f*	1854	1876	19	1,820,000
Mohawk	*b*	1906	1910	9	2,150,000
National	*a*	1861	1872	9	320,000
Osceola	*b*	1878	1910	66	9,343,250
Pewabic	*g*	1862	1873	11	1,000,000
Phœnix	*a*	1877	1877	1	20,000
Quincy	*b*	1862	1910	93	19,302,500
Ridge	*h*	1873	1880	4	100,000
Tamarack	*b*	1888	1907	43	9,420,000
Trimountain	*b*	1903	1908	3	800,000
Wolverine	*b*	1898	1910	25	6,300,000
Totals				623	$184,314,370
Copper Range Cons.	*i*	1905	1910	28	10,756,526
Copper Range Co.	*i*	1905	1910	14	2,500,000
St. Mary's M. L. Co.	*i*	1886	1910	30	3,800,000
Grand Totals				695	$201,370,896

a. *Idle.*
b. *Active.*
c. *Absorbed by Calumet & Hecla.*
d. *Absorbed by Tamarack.*
e. *Absorbed by Osceola.*
f. *Absorbed by Michigan.*
g. *Absorbed by Quincy.*
h. *Absorbed by Mass.*
i. *Not a direct copper producer.*

DIVIDENDS OF LAKE SUPERIOR MINES.

1849–1872.

	1849.	1850.	1851.	1852.
.....$	60,000	$ 84,000	$ 60,000	$ 60,000
Totals.....$	60,000	$ 84,000	$ 60,000	$ 60,000

	1853.	1854.	1855.	1856.
.....$	90,000	$ 108,000	$ 78,000	$ 180,000
sota.....	.....	90,000	90,000	200,000
Totals.....$	90,000	$ 198,000	$ 168,000	$ 380,000

	1857.	1858.	1859.	1860.
.....$	180,000	$ 160,000	$ 180,000	$ .....
sota.....	300,000	300,000	180,000	120,000
Totals.....$	480,000	$ 460,000	$ 360,000	$ 120,000

	1861.	1862.	1863.	1864.
.....$	80,000	$ 80,000	$ 180,000	$ 320,000
sota.....	100,000	160,000	160,000	60,000
nal.....	80,000	80,000	.....	80,000
bic.....	.....	60,000	120,000	200,000
cy.....	.....	60,000	200,000	280,000
klin.....	.....	.....	60,000	100,000
al.....	.....	.....	.....	50,000
er Falls.....	.....	.....	.....	60,000
Totals.....$	260,000	$ 440,000	$ 720,000	$1,150,000

	1865.	1866.	1867.	1868.
.....$	200,000	$ 120,000	$ 60,000	$ .....
nal.....	40,000	.....	.....	.....
cy.....	160,000	.....	.....	60,000
klin.....	60,000	.....	.....	.....
al.....	50,000	50,000	50,000	40,000
Totals.....$	510,000	$ 170,000	$ 110,000	$ 100,000

	1869.	1870.	1871.	1872.
.....$	.....	$	$ 100,000	$ 100,000
sota.....	.....	.....	.....	50,000
nal.....	.....	.....	20,000	20,000
bic.....	.....	.....	20,000	40,000
cy.....	40,000	120,000	140,000	350,000
klin.....	.....	.....	20,000	40,000
al.....	70,000	80,000	50,000	80,000
er Falls.....	.....	.....	40,000	.....
a.....	100,000	300,000	250,000	.....
net.....	.....	200,000	100,000	.....
net & Hecla	.....	.....	900,000	2,400,000
Totals.....$	210,000	$ 700,000	$1,640,000	$3,080,000

DIVIDENDS OF LAKE SUPERIOR MINES. (Continued.)

1873–1888.

	1873.	1874.	1875.	1876.
Minesota	$.....	$.....	$.....	$ 10,000
Pewabic	20,000	.....	.....	.....
Quincy	100,000	160,000	220,000	160,000
Central	160,000	160,000	80,000	100,000
Calumet & Hecla	2,000,000	1,600,000	1,600,000	1,600,000
Ridge	50,000	20,000	20,000	.....
Totals	$ 2,330,000	$1,940,000	$1,920,000	$1,870,000

	1877.	1878.	1879.	1880.
Cliff	$.....	$.....	$ 38,620	$ .....
Quincy	80,000	100,000	40,000	220,000
Central	140,000	100,000	80,000	100,000
Calumet & Hecla	1,600,000	1,600,000	1,600,000	2,500,000
Ridge	.....	.....	.....	10,000
Phœnix	20,000	.....	.....	.....
Atlantic	.....	20,000	.....	40,000
Osceola	.....	40,000	60,000	210,000
Totals	$ 1,840,000	$1,860,000	$1,818,620	$3,080,000

	1881.	1882.	1883.	1884.
Quincy	$ 320,000	$ 520,000	$ 380,000	$ 280,000
Franklin	.....	.....	.....	80,000
Central	120,000	50,000	60,000	40,000
Calumet & Hecla	2,000,000	2,000,000	2,000,000	800,000
Atlantic	.....	80,000	80,000	40,000
Osceola	225,000	200,000	150,000	87,500
Totals	$ 2,665,000	$2,850,000	$2,670,000	$1,327,500

	1885.	1886.	1887.	1888.
Quincy	$ 180,000	$ 240,000	$ 200,000	$ 280,000
Franklin	40,000	80,000	40,000	120,000
Central	30,000	40,000	40,000	70,000
Calumet & Hecla	1,700,000	1,500,000	1,000,000	2,000,000
Atlantic	20,000	40,000	40,000	120,000
Osceola	.....	.....	50,000	150,000
Tamarack	.....	.....	.....	140,000
Totals	$ 1,970,000	$1,900,000	$1,370,000	$2,920,000

DIVIDENDS OF LAKE SUPERIOR MINES. (Continued.)

1889–1904.

	1889.	1890.	1891.	1892.
y	$ 280,000	$ 320,000	$ 450,000	$ 350,000
tlin	80,000	80,000	80,000	160,000
al	40,000	20,000	20,000	.....
net & Hecla	1,500,000	2,000,000	2,000,000	2,000,000
tic	80,000	100,000	40,000	.....
la	50,000	225,000	150,000	150,000
rack	640,000	590,000	800,000	600,000
arge	.....	80,000	.....	.....
Totals	$2,670,000	$3,415,000	$3,540,000	$3,260,000

	1893.	1894.	1895.	1896.
bic	$ 400,000	$.....	$ 140,000	$.....
y	300,000	400,000	600,000	1,000,000
tlin	120,000	80,000	.....	.....
net & Hecla	2,000,000	1,500,000	2,000,000	2,500,000
la	100,000	.....	100,000	125,000
rack	600,000	400,000	400,000	360,000
arge	.....	.....	40,000	.....
Totals	$3,520,000	$2,380,000	$3,280,000	$3,985,000

	1897.	1898.	1899.	1900.
y	$ 800,000	$1,000,000	$ 950,000	$ 900,000
net & Hecla	4,000,000	5,000,000	10,000,000	7,000,000
tic	40,000	40,000	.....	80,000
la	191,000	277,250	558,450	571,200
rack	360,000	480,000	600,000	1,020,000
arge	40,000	.....	.....	.....
erine	.....	60,000	210,000	240,000
Totals	$5,431,000	$6,857,250	$12,318,450	$9,811,200

	1901.	1902.	1903.	1904.
y	$ 900,000	$ 700,000	$ 550,000	$ 500,000
net & Hecla	4,500,000	2,500,000	3,500,000	4,000,000
tic	80,000	.....	.....	.....
la	576,900	.....	.....	192,300
rack	1,200,000	.....	.....	90,000
rine	240,000	240,000	330,000	450,000
pion	.....	.....	300,000	200,000
untain	.....	.....	300,000	.....
Totals	$7,496,900	[illegible]	[illegible]	$5,432,300

DIVIDENDS OF LAKE SUPERIOR MINES. (Continued.)

1905–1910.

	1905.	1906.	1907.	1908.
Quincy	$ 600,000	$ 1,250,000	$ 1,350,000	$ 495,000
Central	160,000	.....	.....	.....
Calumet & Hecla	5,000,000	7,000,000	6,500,000	2,000,000
Atlantic	50,000	.....	.....	.....
Osceola	384,600	961,500	1,249,950	192,300
Tamarack	120,000	480,000	420,000	.....
Wolverine	660,000	1,020,000	1,050,000	600,000
Champion	1,000,000	1,200,000	1,000,000	500,000
Baltic	1,250,000	1,400,000	1,000,000	900,000
Mohawk	.....	500,000	900,000	250,000
Trimountain	.....	.....	.....	500,000
Totals	$ 9,224,600	$13,811,500	$13,469,950	$ 4,837,300
Copper Range Cons	1,536,086	2,304,810	2,304,810	1,536,740
Copper Range Co.	300,000	600,000	450,000	300,000
St. Mary's M. L. Co.	300,000	600,000	750,000	.....
Grand Totals	$11,360,686	$17,316,310	$16,974,760	$ 6,674,040

	1909.	1910.
Quincy	$ 440,000	$ 412,500
Calumet & Hecla	2,700,000	2,900,000
Osceola	769,200	961,500
Wolverine	600,000	600,000
Champion	500,000	900,000
Baltic	1,000,000	1,000,000
Mohawk	300,000	200,000
Totals	$ 6,309,200	$ 6,974,000
Copper Range Cons	1,536,930	1,537,340
Copper Range Co	400,000	450,000
St. Mary's Mineral Land Co	160,000	160,000
Grand Totals	$ 8,406,130	$ 9,121,340

DIVIDENDS AND ASSESSMENTS OF LAKE SUPERIOR MINES.

1849–1910

Company.	Assessments.	Dividends.	Dr. Balance.	Cr. Balance.
Adventure Cons.	$ 2,450,000	$.....	$ 2,450,000	$.....
Ahmeek	850,000	.....	850,000	.....
Albany & Boston	840,000	.....	840,000	.....
Allouez	2,225,000	.....	2,225,000	.....
Atlantic	1,180,000	990,000	190,000	.....
Arcadian	1,800,000	.....	1,800,000	.....
Arnold	810,000	.....	810,000	.....
Ashbed	40,000	.....	40,000	.....
Aztec	150,000	.....	150,000	.....
Baltic	1,800,000	6,550,000	.....	4,750,000
Belt	1,300,000	.....	1,300,000	.....
Bohemian	180,000	.....	180,000	.....
Caledonia	140,000	.....	140,000	.....
Calumet & Hecla	1,200,000	112,500,000	.....	111,300,000
Centennial (Old)	1,135,000	.....	1,135,000	.....
Centennial (New)	1,755,000	.....	1,755,000	.....

IDENDS AND ASSESSMENTS OF LAKE SUPERIOR MINES. (Continued.)
1849–1910.

Company.	Assessments.	Dividends.	Dr. Balance.	Cr. Balance.
ral	100,000	2,130,000	.....	2,030,000
apion	2,500,000	6,600,000	.....	4,100,000
(Old)	111,000	2,518,620	.....	2,407,620
lomerate	1,300,000	.....	1,300,000	.....
er Falls	1,000,000	100,000	900,000	.....
er Range Cons	2,300,000	10,756,526	.....	8,456,526
ware	2,000,000	.....	2,000,000	.....
River	1,200,000	.....	1,200,000	.....
green Bluff	225,000	.....	225,000	.....
Steel	264,000	.....	264,000	.....
est	180,000	.....	180,000	.....
klin	1,020,000	1,240,000	.....	220,000
ock	1,800,000	.....	1,800,000	.....
boldt	120,000	.....	120,000	.....
n	240,000	.....	240,000	.....
na (Old)	200,000	.....	200,000	.....
Royale	2,750,000	.....	2,750,000	.....
sarge	180,000	160,000	20,000	.....
eenaw	2,800,000	.....	2,800,000	.....
Philip	800,000	.....	800,000	.....
	300,000	.....	300,000	.....
alle	1,000,000	.....	1,000,000	.....
Cons	2,100,000	.....	2,100,000	.....
lower	800,000	.....	800,000	.....
igan	2,000,000	.....	2,000,000	.....
rs	2,000,000	.....	2,000,000	.....
sota	456,000	1,820,000	.....	1,364,000
wk	1,800,000	2,150,000	.....	350,000
nal	350,000	320,000	30,000	.....
Arcadian	75,000	.....	75,000	.....
such	400,000	.....	400,000	.....
hwest	283,000	.....	283,000	.....
rich	230,000	.....	230,000	.....
Trap Rock	150,000	.....	150,000	.....
way	1,008,000	.....	1,008,000	.....
Colony	1,100,000	.....	1,100,000	.....
ola	1,700,000	9,343,250	.....	7,643,250
sylvania	126,000	.....	126,000	.....
nsula	400,000	.....	400,000	.....
abic	585,200	1,000,000	.....	414,800
nix (Old)	1,037,500	20,000	1,017,500	.....
nix Cons	1,350,000	.....	1,350,000	.....
cy	200,000	19,302,500	.....	19,102,500
e	470,000	100,000	370,000	.....
le Island	1,000,000	.....	1,000,000	.....
rior	100,000	.....	100,000	.....
arack	780,000	9,420,000	.....	8,640,000
arack Junior	640,000	.....	640,000	.....
mseh	500,000	.....	500,000	.....
ountain	2,000,000	800,000	1,200,000	.....
e	500,000	.....	500,000	.....
oria	1,200,000	.....	1,200,000	.....
na	2,200,000	.....	2,200,000	.....
verine	780,000	6,300,000	.....	5,520,000
ndot	1,000,000	.....	1,000,000	.....
ellaneous	10,000,000	.....	10,000,000	.....
Totals	$ 79,565,700	$194,120,896	$61,843,500	$176,298,696
Credit Balance	.....	.....	.....	.....

ASSESSMENTS OF LAKE SUPERIOR MINES.

Company.	1897.	1898.	1899.	1900.
Adventure	$	$	$	$ 200,000
Alloues	.....	80,000	.....	.....
Arnold	.....	180,000	180,000	.....
Baltic	100,000	100,000	300,000	.....
Centennial	120,000	270,000	.....	270,000
Copper Range	.....	.....	.....	300,000
Humboldt	20,000	.....	.....	.....
Mass	.....	.....	.....	200,000
Mohawk	.....	.....	.....	250,000
National	.....	200,000	.....	.....
Tecumseh	40,000	.....	.....	.....
Trimountain	.....	.....	.....	300,000
Union	50,000	.....	.....	.....
Washington	.....	8,000	.....	.....
Totals	$ 330,000	$ 838,000	$ 480,000	$ 1,520,000

Company.	1901.	1902.	1903.	1904.
Adventure	$ 700,000	$ 200,000	$ 200,000	$ 50,000
Alloues	300,000	.....	.....	300,000
Baltic	300,000	.....	.....	.....
Centennial	180,000	.....	.....	360,000
Mass	500,000	100,000	100,000	100,000
Michigan	100,000	200,000	300,000	.....
Mohawk	300,000	300,000	200,000	.....
Old Colony	.....	.....	100,000	.....
Phœnix	.....	100,000	100,000	100,000
Rhode Island	.....	100,000	.....	.....
Tecumseh	55,000	.....	.....	.....
Trimountain	200,000	300,000	.....	.....
Victoria	.....	200,000	100,000	.....
Winona	.....	100,000	100,000	.....
Wyandot	.....	.....	.....	100,000
Totals	$ 2,635,000	$ 1,600,000	$ 1,200,000	$ 1,010,000

Company.	1905.	1906.	1907.	1908.
Adventure	$	$ 50,000	$ 150,000	$ .....
Ashbed	40,000	.....	.....	.....
Centennial	360,000	.....	.....	.....
Mass	100,000	.....	.....	.....
Michigan	.....	.....	.....	200,000
Phœnix	.....	.....	150,000	.....
Rhode Island	.....	.....	100,000	.....
Victoria	100 000	.....	.....	.....
Winona	100,000	300,000	200,000	100,000
Wyandot	.....	.....	50,000	50,000
Totals	$ 700,000	$ 350,000	$ 650,000	$ 350,000

Company.	1909.	1910.
Adventure	$	$ 100,000
Atlantic	200,000	.....
Hancock	200,000	400,000
Keweenaw	200,000	.....
Mass	.....	200,000
Michigan	200,000	.....
National	30,000	.....
New Arcadian	75,000	75,000
Ojibway	.....	168,000
Victoria	100,000	.....
Winona	300,000	200,000
Total	$ 1,305,000	$ 1,143,000

CAPITALIZATION OF LAKE SUPERIOR COPPER COMPANIES.

Name of Company	Organized under laws	Authorised Capitalisation	No. Shares Authorized	No. Shares Issued	No. Shares Unissued
nture	Michigan	$2,500,000	100,000	100,000	.....
eek	Michigan	1,250,000	50,000	50,000	.....
tes	Michigan	2,500,000	100,000	100,000	.....
dian	New Jersey	3,750,000	150,000	150,000	.....
ld.	Michigan	2,500,000	100,000	62,000	38,000
ed	Michigan	1,000,000	40,000	40,000	.....
ntic	Michigan	2,500,000	100,000	100,000	.....
c	Michigan	2,500,000	100,000	100,000	.....
net & Hecla	Michigan	2,500,000	100,000	100,000	.....
ennial	Michigan	2,500,000	100,000	90,000	10,000
pion	Michigan	2,500,000	100,000	100,000	.....
(New)	Michigan	2,500,000	100,000	60,000	40,000
er Range Co	Michigan	2,500,000	100,000	100,000	.....
er Range Cons.	New Jersey	38,500,000	385,000	384,185	815
River	New Jersey	1,200,000	100,000	100,000	.....
klin	Michigan	5,000,000	200,000	100,000	100,000
ock	Michigan	5,000,000	200,000	100,000	100,000
hton	Michigan	2,500,000	100,000	67,000	33,000
boldt	Michigan	1,000,000	40,000	40,000	.....
na	Michigan	2,500,000	100,000	80,000	20,000
Royale	New Jersey	3,750,000	150,000	150,000	.....
enaw	Michigan	10,000,000	400,000	200,000	200,000
Philip	Michigan	2,500,000	100,000	100,000	.....
.....	Michigan	2,500,000	100,000	86,500	13,500
lle	Michigan	10,000,000	400,000	302,977	97,023
.....	Michigan	2,500,000	100,000	100,000	.....
lower	Michigan	2,500,000	100,000	100,000	.....
gan	Michigan	2,500,000	100,000	100,000	.....
wk	Michigan	2,500,000	100,000	100,000	.....
nal	Michigan	2,500,000	100,000	75,000	25,000
Arcadian	Michigan	3,750,000	150,000	150,000	.....
Baltic	Michigan	2,500,000	100,000	70,000	30,000
Lake	Michigan	2,500,000	100,000	100,000	.....
ray	Michigan	2,500,000	100,000	84,000	16,000
olony	Michigan	2,500,000	100,000	100,000	.....
	Michigan	2,500,000	100,000	70,000	30,000
la	Michigan	2,500,000	100,000	96,150	3,850
ix	Michigan	2,500,000	100,000	100,000	.....
y	Michigan	3,750,000	150,000	110,000	40,000
e Island	Michigan	2,500,000	100,000	100,000	.....
ary's M. L. Co.	New Jersey	5,000,000	200,000	160,000	40,000
a	Michigan	1,000,000	40,000	40,000	.....
Lake	Michigan	2,500,000	100,000	60,000	40,000
ior	Michigan	2,500,000	100,000	100,000	.....
rack	Michigan	1,500,000	60,000	60,000	.....
untain	Michigan	2,500,000	100,000	100,000	.....
C. L. & M. Co.	Michigan	2,500,000	100,000	80,000	20,000
ria	Michigan	2,500,000	100,000	100,000	.....
na	Michigan	2,500,000	100,000	100,000	.....
erine	Michigan	1,500,000	60,000	60,000	.....
dot	Michigan	2,500,000	100,000	100,000	.....

NUMBER OF SHAREHOLDERS IN LAKE COPPER COMPANIES.

(By Years)

Company	1896	1898	1900	1902	1904	1906	1908	1909
Adventure	.....	....	1,046	1,050	1,283	1,093	1,185	589
Ahmeek	.....	....	....	....	114	195	238	236
Allouez	.....	....	465	554	726	537	549	466
Atlantic	364	401	374	417	633	488	517	621
Baltic	.....	....	513	177	10	12	16	16
Calumet & Hecla	2,464	2,716	3,080	3,425	3,258	3,651	3,903	4,024
Centennial	.....	438	439	597	636	516	536	485
Central	.....	....	203	189	224	....	....	....
Champion	.....	....	....	8	8	8	8	8
Copper Crown	.....	....	....	....	....	621	....	....
Elm River	.....	....	....	....	562	163	631	642
Evergreen Bluff	.....	....	....	....	....	....	....	46
Franklin	458	442	945	1,311	1,429	880	936	1,329
Frontenac	.....	....	....	....	....	6	6	6
Gratiot	.....	....	....	....	....	....	14	13
Hancock	.....	....	....	....	....	570	840	547
Hulbert	.....	....	....	....	....	19	....	19
Indiana	.....	....	....	....	....	....	....	204
Isle Royale	.....	....	....	....	....	....	943	785
Keweenaw	.....	....	....	....	....	1,239	2,226	2,088
King Philip	.....	....	....	....	....	11	17	23
Lake	.....	....	....	....	....	173	371	308
La Salle	.....	....	....	....	....	....	1,440	1,484
Laurium	.....	....	....	....	....	40	40	23
Manitou	.....	....	....	....	....	7	7	7
Mass	.....	....	477	....	....	1,005	1,033	....
Mayflower	.....	....	399	587	594	638	679	765
Michigan	.....	....	592	933	937	872	1,161	1,134
Middle Range	.....	....	....	....	....	4	4	4
Mohawk	.....	....	594	951	1,076	1,434	1,998	2,016
New Arcadian	.....	....	....	....	1,047	....	....	1,144
New Baltic	.....	....	....	....	....	....	....	12
North Lake	.....	....	....	....	....	....	146	490
Ojibway	.....	....	....	....	....	....	441	607
Old Colony	.....	....	598	721	747	770	733	667
Oneco	.....	....	....	....	....	192	219	275
Osceola	823	1,477	1,512	1,985	2,089	1,544	1,538	1,373
Pacific	.....	....	....	....	....	122	126	126
Phœnix	.....	....	352	582	642	....	....	....
Quincy	978	1,445	1,540	1,557	1,657	1,561	2,155	2,088
Rhode Island	.....	....	1,100	1,216	1,339	980	1,072	232
St. Louis	.....	....	....	....	....	8	8	8
Seneca	.....	....	....	....	69	....	....	103
South Lake	.....	....	....	....	....	....	....	202
South Range	.....	....	....	....	....	30	38	38
South Side	.....	....	....	....	....	....	....	44
Superior	.....	....	....	....	....	216	419	374
Tamarack	1,178	1,353	1,169	1,286	1,136	909	978	894
Tecumseh	.....	....	....	....	....	379	12	....
Torch Lake	.....	....	....	....	....	23	22	22
Trimountain	.....	....	780	730	41	23	18	17
Union	.....	....	....	....	....	327	343	338
Victoria	.....	....	796	1,206	1,324	1,245	1,341	1,261
West Minesota	.....	....	....	....	....	....	....	33
Whealkate	.....	....	....	....	....	5	8	9
Winona	.....	....	637	909	878	801	985	875
Wolverine	333	625	892	1,223	1,292	1,342	1,622	1,604
Wyandot	.....	....	....	....	....	657	786	731
Totals	6,598	8,897	18,503	21,735	22,714	25,203	32,308	32,439

TWENTIETH CENTURY COPPER PRODUCTION. (Continued.)

1901-2000

(*Long Tons*)

Years.	Yearly Averages Theoretical	Actual	Actual Production. Gain	Loss	Percentage Theoretical Production
1801-1810	9,000	9,100	100	.....	101.11
1811-1820	13,500	9,600	.....	3,900	71.11
1821-1830	19,750	13,500	.....	6,250	68.35
1831-1840	29,625	21,840	.....	7,785	73.72
1841-1850	44,437	29,100	.....	15,337	65.48
1851-1860	66,656	50,699	.....	15,957	76.05
1861-1870	99,984	90,000	.....	9,984	90.00
1871-1880	149,992	118,900	.....	31,092	78.66
1881-1890	224,964	237,339	12,375	.....	105.99
1891-1900	337,447	370,890	33,443	.....	109.99

The foregoing table shows very plainly the effect of electrical demand for the metal, which first became a factor of importance in the ninth decade, shortly after 1880. Previous to that decade the theoretical increase of 4% annually, compounded, exceeds the actual increase in every decade, but after 1880 the actual increase exceeds the theoretical ratio. The actual copper output of 1900 was 486,732 tons, and the theoretical output for that year, based on the average of the decade 1890-1900, with 21⅞% increase for 5 years from the mean of 1895, would have been 410,560 tons. It is evident that the average ratio of increase of slightly more than 4% yearly, which ruled during the Nineteenth Century, is not the factor of the present electrical age. What that factor may be is uncertain. The electrification of the globe, while wonderful progress has been made, is not yet a sufficiently established fact to give accurate data for an average ratio of increase in consumption. The theoretical increase of 8% yearly, compounded, based upon the actual output of 486,732 long tons in 1900, would give a theoretical production of 811,404 long tons in 1907, whereas the output actually was only 713,155 long tons—or very materially less than the theoretical production on the basis of 8% compounded yearly, though the 8% increase was very fairly maintained during the first lustrum of the Twentieth Century.

In this connection it may be remarked that the highly valuable statistical compilations of the late M. Georges de la Bouglise, never published, but which M. de la Bouglise gave the author of this work the opportunity of inspecting, show, from 1840 to 1900, inclusive, an average annual increase, compounded yearly, of about 6.5% for all the leading commercial metals, including iron, copper, lead, tin and zinc, with a nearly similar percentage of increase in the output of coal, so necessary a concomitant of the metals. Following 1880, owing to the electrical demand, now consuming nearly one-half the world's production, copper made rapid gains over all the other commercial metals, except nickel and aluminum, metals so comparatively new in extensive commercial use that the percentages of gain are too abnormal to be used as a basis for forecasting future consumption.

The ratio of increase in copper production of the world has been 6 to 8% for several years past. It has grown to be considered an axiom in the copper trade that the normal increase is 8% yearly, but this ratio, while it may be considered the present factor, has not been established for a sufficiently long time to be assured for an

TWENTIETH CENTURY COPPER PRODUCTION. (Continued.)

1901–2000

efinite period in the future. The following table gives hypothetical outputs for ry tenth year during the Twentieth Century, based upon various percentages of ease, all figured from the actual production of the closing year of the Nineteenth tury. The compound increases, for facility in computation, are taken at slight nges from their actual value, as, for instance, 4% compounded for ten years is red as 50% increase, instead of 48.02%, the actual figure; 5% is figured at 60%, ead of 62.89%; 7% compounded is figured as 80% in ten years, instead of 02%; 8% is figured as only 110% instead of 115.89%.

(*Long Tons*)

r.	At 4%.	At 5%.	At 7%.	At 8%.
0	486,732	486,732	486,732	486,732
0	730,098	778,771	876,117	1,022,137
0	1,095,147	1,246,033	1,577,011	2,146,488
0	1,642,720	1,993,654	2,838,621	4,507,625
0	2,464,080	3,189,846	5,126,317	9,466,012
0	3,696,121	5,103,754	9,227,372	19,878,626
0	5,544,181	8,166,007	16,609,269	41,745,115
0	8,316,272	13,065,612	29,896,685	87,664,741
0	12,474,408	20,904,980	53,914,033	184,095,956
0	18,711,613	33,447,968	97,045,260	386,601,507
0	28,067,419	52,516,748	174,681,468	811,863,165

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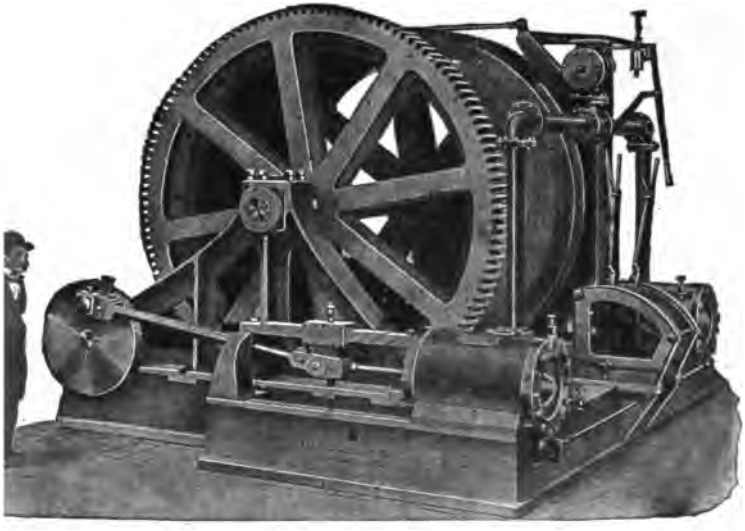

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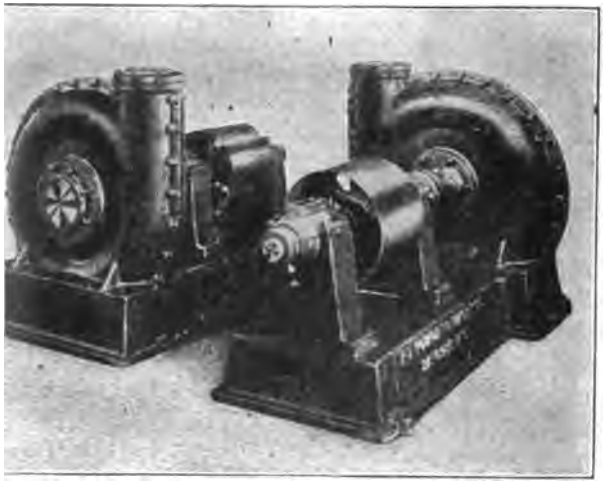

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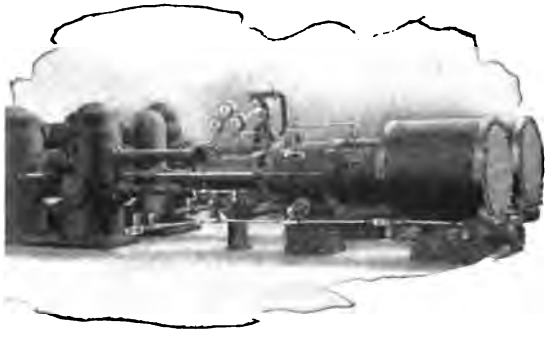

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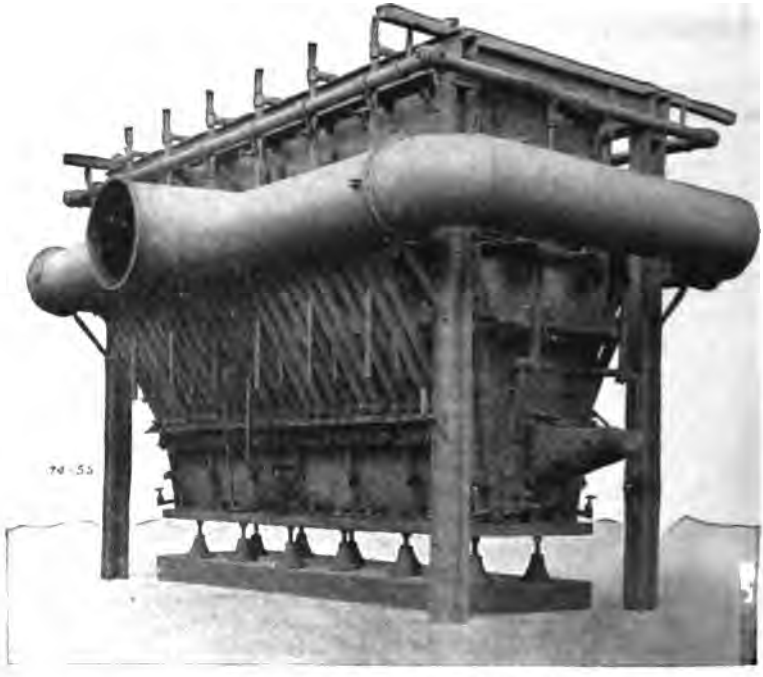

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