ROCKS AND MINERALS
FOR THE COLLECTOR

Geological Survey of Canada
Popular Geoscience 97

Bay of Fundy, New Brunswick and Nova Scotia;
South Shore, Nova Scotia



Ann P. Sabina

2015

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Canada



Ann P. Sabina
1930-2015

Ann will be remembered for her dedication to mineralogy and gemmology. She started her career in mineralogy at the Geological Survey of Canada (GSC) in 1952, working in the new field of mineral identification based on X-ray diffraction. Ann was the author of the very popular GSC series "Rocks and Minerals for the Collector", which covers 14 regions of Canada, from Newfoundland and Labrador to the Yukon-Alaska border. She discovered the mineral weloganite ($Na_2Sr_3Zr(CO_3)_6 \cdot 3H_2O$) and was the first to collect the mineral sabinaite ($Na_4TiZr_2O_4(CO_3)_4$), which was named in her honour. She was also co-founder of the Canadian Gemmological Association, and a long-serving treasurer for the Mineralogical Association of Canada. After her retirement in the late 1990s, Ann continued to work daily up until shortly before her death.



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Cover illustration

Mosaics of Canadian gemstones set in silver. The gemstones were collected by the Geological Survey of Canada from localities in eastern Canada. The mosaics were produced in 1861 by Thomas C. Weston of the Geological Survey of Canada for the Survey's exhibits at the great international exhibitions held in the last half of the 19th century. The mosaics belong to the National Mineral Collection (NMC). Photographs are by Jeanne White, Geological Survey of Canada.

Butterfly: mosaic of agates (NMC 858). The mosaic measures 8.9 cm by 5.0 cm. (GSC 2006-084)

Circle: mosaic of jasper, agate, gneiss, epidote, and labradorite (NMC 859). The mosaic measures 3.8 cm across. (GSC 2006-083)

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Frontispiece. Fossil cliffs of Joggins, Nova Scotia, lunch time for delegates at the Twelfth International Geological Congress Field Excursion, 1913 (GSC 24287). The Joggins Fossil Cliffs was one of eight Natural Properties inscribed on UNESCO's World Heritage List on July 8, 2008.

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Abstract

Occurrences of minerals, rocks, and fossils are described for localities along Bay of Fundy, New Brunswick and Nova Scotia, and along South Shore, Nova Scotia. The collecting area features world-famous occurrences of the quartz-family minerals and zeolites along the Bay of Fundy shore. It also includes mines and occurrences of gypsum, barite, potash, halite, copper, antimony, tin, beryllium, manganese, iron, nickel, lead, gold, molybdenite, tungsten, and building stone.

Shoreline occurrences, inactive mines and quarries, and roadcuts provide most of the collecting localities. In general, operating mines are not open to collectors. Some old mines, no longer accessible, are included for historical interest.

Résumé

Ce guide décrit des venues de minéraux, de roches et de fossiles situées le long de la baie de Fundy (Nouveau-Brunswick et Nouvelle-Écosse) et de la côte sud de la Nouvelle-Écosse. La région recèle, autour de la baie de Fundy, des venues de zéolites et de minéraux de la famille du quartz qui sont connues dans le monde entier. Elle renferme aussi des mines et des venues de gypse, de barytine, de potasse, de halite, de cuivre, d'antimoine, d'étain, de béryllium, de manganèse, de fer, de nickel, de plomb, d'or, de molybdénite, de tungstène et de pierre de construction.

La plupart des sites de cueillette sont des venues côtières, des mines et des carrières désaffectées et des tranchées de route. Les mines en exploitation sont, en général, interdites aux collectionneurs. Certaines vieilles mines qui ne sont plus accessibles sont incluses dans ce document, en raison de leur intérêt historique.

ROCKS AND MINERALS FOR THE COLLECTOR: BAY OF FUNDY, NEW BRUNSWICK AND NOVA SCOTIA; SOUTH SHORE, NOVA SCOTIA

INTRODUCTION

This guidebook describes mineral, rock, and fossil occurrences along Bay of Fundy, New Brunswick and Nova Scotia, and along South Shore, Nova Scotia. It is a revision of Geological Survey of Canada Paper 64-10, published in 1964. Occurrences in adjacent parts of New Brunswick and Nova Scotia are described in Geological Survey of Canada guidebook series of Rocks and Minerals for the Collector covering the following areas: Estrie and Gaspésie, Québec, and parts of New Brunswick (GSC Miscellaneous Report 46), and northeastern Nova Scotia, Cape Breton Island, and Prince Edward Island (GSC Miscellaneous Report 51).

Most occurrences are accessible by automobile from the main highways and from secondary roads branching from them. A boat is required for some occurrences, and a hike is needed to reach some localities. Directions to each occurrence are designed for use with official provincial road maps. Latitude/longitude co-ordinates are given for each occurrence and may be used to locate the occurrence on the topographic map indicated for the occurrence (*see* Toporama — Topographic Maps on page 367). Mineral-occurrence maps show the locations of most of the occurrences described in the text. Additional details can be obtained from the appropriate topographic and geological maps indicated for each occurrence; these maps are available from the agencies listed on page 367.

Most inactive mines have not been operated for many years. Entering shafts, adits, and other workings is dangerous and should be avoided. Collecting in operating mines is at the discretion of the mine operator, and may not be permitted; these mines are included in this guidebook as points of interest to collectors. Many occurrences are on private property, or are held by claims. This guidebook does not authorize access or imply permission to visit these occurrences; permission must be obtained from the property owner. The rights of property owners must be respected at all times.

The collecting localities were investigated by the author with the assistance of Louise J. Woodley in 1963, and Valerie A. Williamson in 1976. The field investigation and the report were facilitated by information received from: Eldon E. George, Parrsboro; W.E. Hale, Department of Geology, University of New Brunswick; B. Jean Dougherty, Patricia A. Hunt, and D.G. Kelley, Geological Survey of Canada; Randy Miller, New Brunswick Museum; Ron Shaw, New Brunswick Department of Natural Resources and Energy; and Michel Picard, Canadian Museum of Nature. The laboratory identification of minerals by X-ray diffraction was done by John L. Jambor and Andrew C. Roberts, Geological Survey of Canada. This assistance is gratefully acknowledged.

COLLECTING ALONG THE ROUTE

The main collecting route is along the Bay of Fundy from St. Stephen, New Brunswick to Yarmouth, Nova Scotia, and along South Shore, Nova Scotia from Yarmouth to Halifax. The main route in New Brunswick follows Highway 1 (including parts of Fundy Coastal Drive) and Highway 2 (Trans-Canada Highway). The main route in Nova Scotia follows: highways 2, 236, 215, and 14 (Glooscap Trail); highways 1 and 1/101(Evangeline Trail); and, highways 3, 3/103, 309, 331, 332, 329, and 333 (Lighthouse Route). The distance in kilometres along the main routes is shown in bold print. The main collecting route and principal side trips are shown in Figure 1.

Information on each locality is listed systematically as follows: name of the mine, quarry, or occurrence; minerals and/or rocks found (shown in capital letters); mode of occurrence; brief description of the minerals or rocks, mining history, and special features of interest to collectors; location, latitude/longitude coordinates, and access including locality maps (for most localities) showing kilometre distances given in the text; publication references (indicated by a number listed in the 'References' section); references to maps of the National Topographic System (T), and to geological maps (G) of the Geological Survey of Canada (GSC), the New Brunswick Department of Natural Resources (NBDNR), the Nova Scotia Department of Natural Resources (NSDNR), and the Atlantic Geoscience Society.

UNITS OF MEASUREMENT

Units of measurement used in publications referred to in the text have been converted from the Imperial system to the International System (SI). The following conversions were used:

1 inch = 2.54 cm, 25.4 mm

1 foot = 0.305 m

1 mile = 1.609 km

1 acre = 0.40469 ha

1 ounce (Troy) = 31.103 g

1 pound = 0.453 kg

1 ton (short) = 0.907 t

1 ounce (Troy)/ton (short) = 34.285 g/t

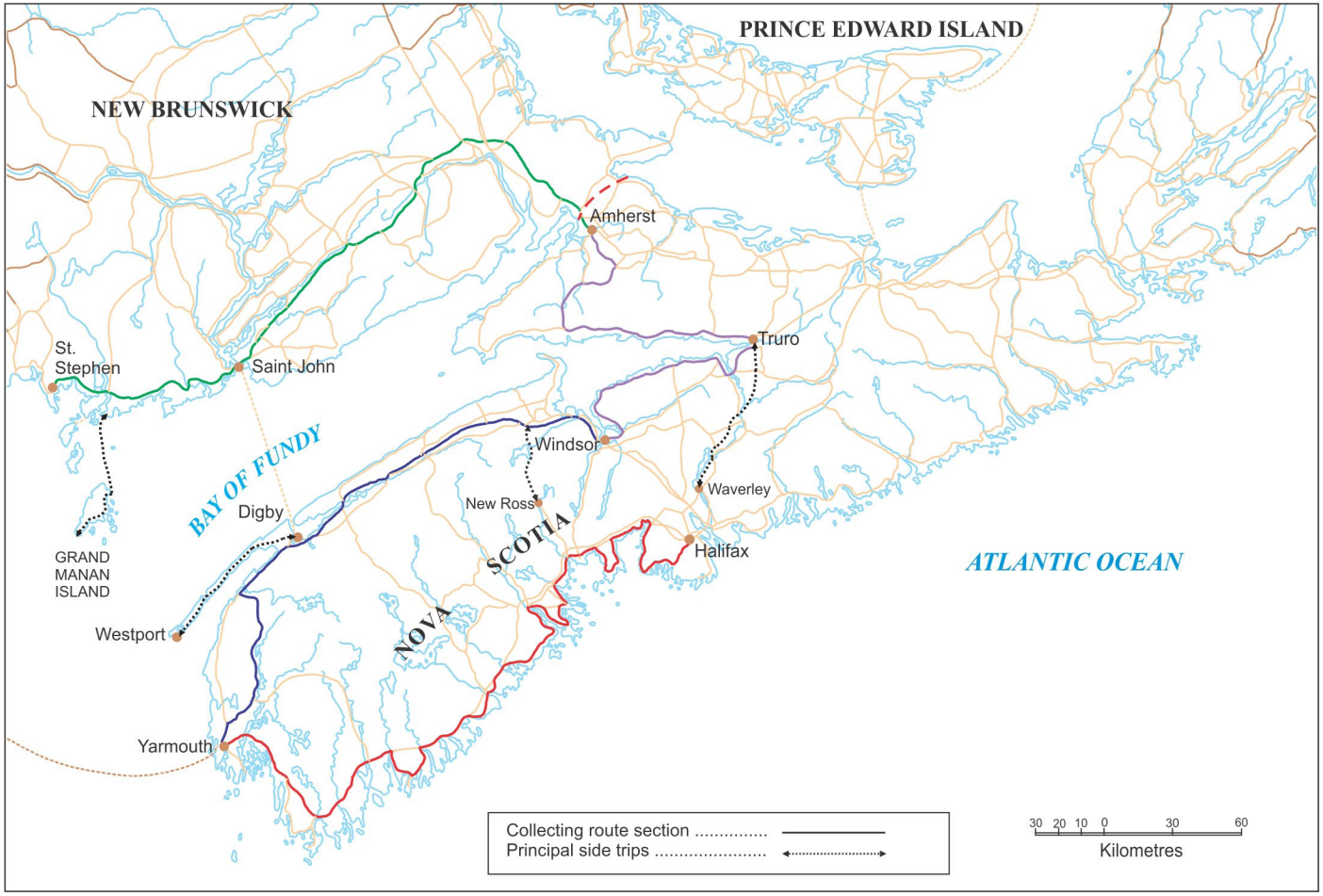


Figure 1. Map showing the collecting route.

A BRIEF GEOLOGICAL HISTORY

The Bay of Fundy area is part of the Appalachian Mountain structure system extending from the island of Newfoundland to the southeastern United States. The earliest geological event in the area was the accumulation of sedimentary and volcanic rocks of the Saint John region in Precambrian time. Granite pebbles in these rocks indicate that there was at least one period of granitic emplacement.

During the early part of the Paleozoic Era, sedimentary and volcanic material was deposited in a long narrow subsiding basin — the Appalachian geosyncline — of which the Bay of Fundy area is a part. During the Ordovician and Devonian periods, folding, faulting, metamorphism, and granitic emplacement occurred. As the era drew to a close, the processes of deposition and deformation were repeated, resulting in the formation of deposits of gypsum, anhydrite, halite, and coal.

During the early part of the Mesozoic Era — the Triassic and Jurassic Periods — the area was again the site of sedimentation and volcanism. The rifting of northern Pangea in Triassic time resulted in the formation of sedimentary basins including the Fundy Basin, now occupied by the Bay of Fundy. The sedimentary rocks exposed along parts of the Bay of Fundy and Minas Basin shorelines were formed at this time. Igneous activity in early Jurassic time produced the zeolite- and chalcedony-bearing basaltic lava forming Grand Manan Island, the Minas Basin shoreline, and North Mountain of Nova Scotia. During the Ice Age, glaciers swept southeastward altering the topography and leaving deposits of sand, gravel, and till.

The geological time chart with examples of the rocks formed is summarized in Table 1.

Maps (G): NR-1 Geological map of New Brunswick (NBDNR, 1:500 000)
Geological Highway Map of New Brunswick and Prince Edward Island (Atlantic Geoscience Society, Special Publication no. 2, 1:638 000)
Nova Scotia geology map (Atlantic Geoscience Society, 1:640 000).

BAY OF FUNDY, NEW BRUNSWICK

The Main Road Log — St. Stephen to the Nova Scotia border

The main road log proceeds along Highway 1 (including part of Fundy Coastal Drive) from St. Stephen to the junction of Highway 2 (Trans-Canada Highway) to the Nova Scotia border. The starting point is the junction of highways 1 and 3 at St. Stephen. Kilometre distances along these highways is shown in bold type. The collecting localities are described in the text following the road log. A page reference is indicated in parentheses following the name of each mine, occurrence, or quarry.

km	**0**	St. Stephen, junction of highways 1 and 3; the road log proceeds east along Highway 1 (Fundy Coastal Drive). Highway 3 provides access to the Todd (St. Stephen Nickel) mine (p. 10) and the Blakeney (Basswood Ridge) mine (p. 11).
km	**1.2**	Junction, Highway 750 to Moores Mills.
km	**6.6**	Junction, Oak Bay Road to The Ledge (Charlotte County Granite) quarry (p. 12).
km	**6.7**	Junction, road to the Oak Bay shore and access to the Spoon (Cookson) Island occurrences (p. 13).

Table 1. Geological time chart and rock types referred to in the text.

AGE (Millions of years)	EON	ERA	PERIOD	ROCKS FORMED	WHERE TO SEE THEM
	PHANEROZOIC	Cenozoic	Quaternary	Gravel, sand, alluvium	Streams, tidal flats, beaches
2.6			----------	----------	----------
			Tertiary	*Not represented in the collecting area*	
66.0			----------	----------	----------
		Mesozoic	Cretaceous	Clay	L.E. Shaw, Middle Musquodoboit pits; Paint Brook occurrence
				Silica sand	Brazil Lake quarry
145			----------	----------	----------
			Jurassic	Limestone, sandstone, basalt	Scots Bay, Grand Manan Island, North Mountain, Cape d'Or, Five Islands, Partridge Island
201			----------	----------	----------
			Triassic	Sandstone, conglomerate, shale	Maces Bay-Point Lepreau, Cobequid Bay, Cape Blomidon, Quaco Head
252			----------	----------	----------
		Paleozoic	Permian	*Not represented in the collecting area*	
299			----------	----------	----------
			Pennsylvanian	Sandstone, conglomerate, shale	Shepody Beach, Alma Beach, Joggins, Taylors Island, Duck Cove, Dorchester, New Horton copper mine
323			----------	----------	----------
				Conglomerate, limestone, gypsum, anhydrite	Hillsborough, Walton, Cheverie, Windsor, Sussex gypsum mine
			Mississippian	Bituminous shale	Hillsborough-Moncton area
				Shell limestone	Admiral Rock
				Limestone	East River Point quarries
359			----------	----------	----------
				Conglomerate, sandstone	St. Andrews, Blacks Harbour
				Shale	Beaver Harbour
				Gabbro	Digdeguash quarry; Todd (St. Stephen Nickel) mine, St. Alphonse quarry
				Granite	St. George, Nictaux, John Kline, Queen, The Ledge quarries; Peggys Cove
				Granite pegmatite	Sandy Bay, Port Mouton occurrences
			Devonian	Diorite	Bayside, Frog Lake, Birchtown quarries
				Slate, quartzite, iron formation	Torbrook area
				Peridotite	St. Stephen (Highway 3 roadcut)
				Rhyolite, basalt	Passamaquoddy Bay

Ref.: Gradstein, F.M, Ogg, J.G., Schmitz, M.D., and Ogg, G., 2012, The Geologic Time Scale 2012: Elsevier, Boston, 1176 p. (2 volumes)

Table 1. (Cont.)

AGE (Millions of years)	EON	ERA	PERIOD	ROCKS FORMED	WHERE TO SEE THEM
419	PHANEROZOIC	Paleozoic	----------	----------	----------
			Silurian	Volcanic tuffs, flows	Back Bay-Letete area; Letang Peninsula
				Limestone	Letang quarry
				Slate, sandstone	Waweig River, Simpson Corner
444			----------	----------	----------
				Quartzite	Chegoggin Point
				Mica schist	Moores Mills-Oak Bay area
			Ordovician	Shale	Spoon Island, Navy Island
				Staurolite-andalusite schist	Port La Tour, Shelburne, Jordan Falls areas
				Slate, schist	Nova Scotia gold mines
				Argillite, slate	Lunenburg Bay area
485			----------	----------	----------
			Cambrian	Mica schist	Baccaro, Blanche, Round Bay, Western Head
				Quartzite, slate	Nova Scotia gold mines
541			----------	----------	----------
	PROTEROZOIC	Precambrian		Marble	North River (of Five Islands) occurrences
				Quartzite	Folly Lake quarry
				Volcanic rocks	Dipper Harbour, Lorneville
				Chlorite schist, andesite	Martin Head to Point Wolfe
2500			----------	----------	----------
	ARCHEAN			Crystalline limestone	Marble Cove; Brookville, Indiantown quarries
				Quartzite, argillite, schist	Dipper Harbour; Grand Manan Island (east side, North Head to Red Head)
4000			----------	----------	----------

Ref.: Gradstein, F.M, Ogg, J.G., Schmitz, M.D., and Ogg, G., 2012, The Geologic Time Scale 2012: Elsevier, Boston, 1176 p. (2 volumes)

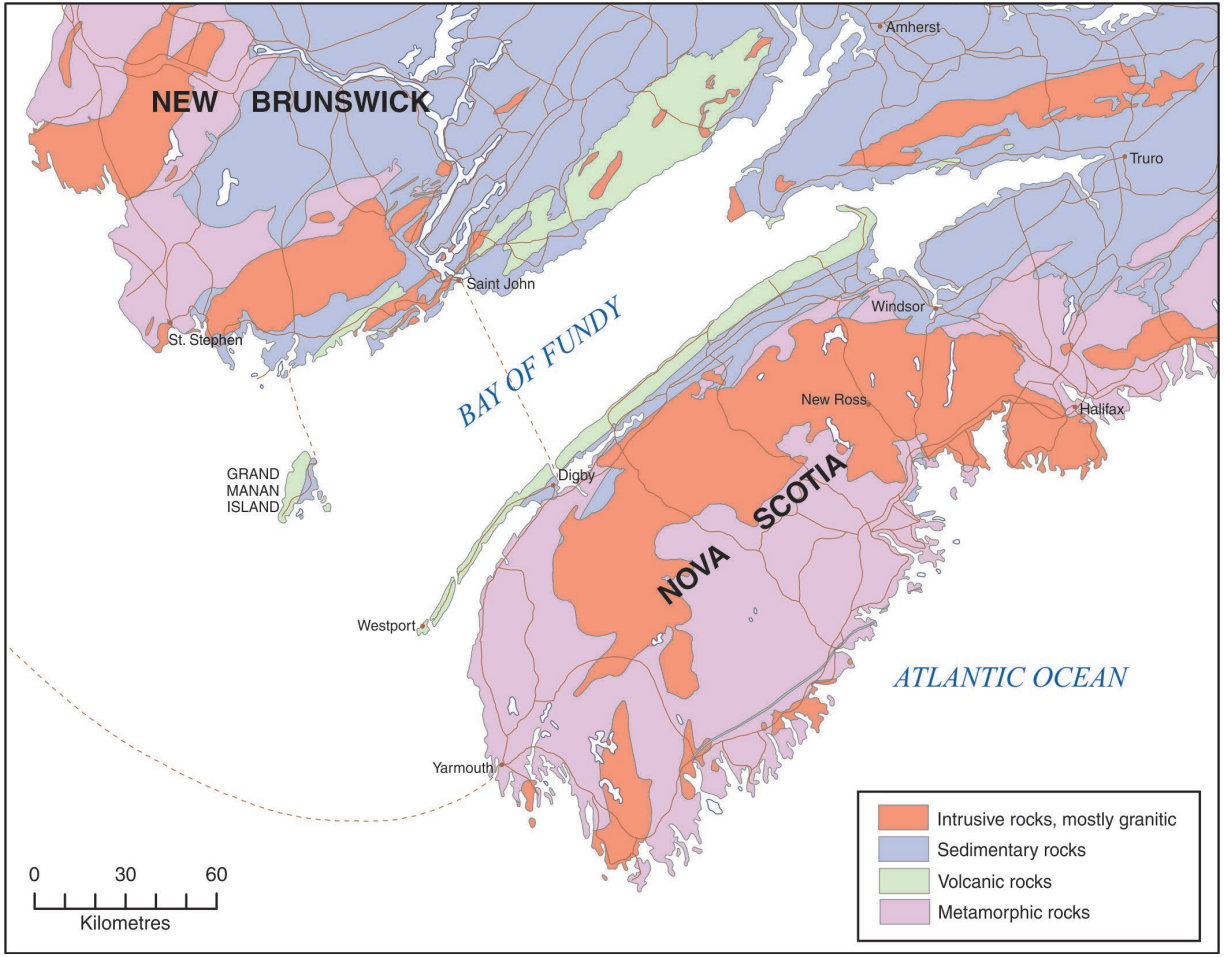


Figure 2. Geological map of the collecting area

km	**7.1**	Junction, Highway 755 to the Central Tower Hill occurrence (p. 14) and the Tower Hill Road occurrence (p. 14).
km	**9.5**	Simpson Corner occurrence (p. 15).
km	**12.5**	Junction, Highway 127 to the Waweig River occurrences (p. 15), to St. Andrews and the Bayside Black Granite quarry (p. 16) and the St. Andrews occurrence (p. 17).
km	**32.2**	Junction, Highway 760 to Elmsville and the Digdeguash Lake quarry (p. 17).
km	**40.4**	St. George Exit, and the junction of Highway 770 which provides access to the St. George granite quarries (p. 18), and the Kedron Stream occurrence (p. 28). The St. George Exit provides access to the Hatt Farm occurrence (p. 20), the Letang quarry (p. 21), the Oliver Cameron mine (p. 23), the Johnson (Wheal Louisiana) mine (p. 24), the Letete mine (p. 25), the Adam Island mine (p. 26), and the Simpsons Island mine (p. 27).
km	**42.1**	Junction, road to Lake Utopia and the Mount Pleasant mine (p. 29).
km	**46.0**	Roadcuts expose red granite containing epidote-chlorite zones and fractures filled with epidote. Lat. 45°07′14″N, Long. 66°45′23″W.
km	**47.5**	Junction, Highway 778 to the Beaver Harbour occurrences (p. 44) and the East Head occurrence (p. 44), and to Highway 176 leading to Blacks Harbour and the side trip to Grand Manan Island occurrences (p. 31). The ferry to Grand Manan Island leaves from Blacks Harbour, 10.3 km from this junction.
km	**57.4**	Junction, road to Crow Harbour and the Red Head Harbour mine (p. 46) and the Red Head occurrence (p. 47).
km	**64.7**	New River Beach, junction of the road to New River Beach Provincial Park.
km	**71.2**	Junction, Highway 780 to New River and the Lepreau mine (p. 47).
km	**71.9**	Lepreau, junction of the road to the Lepreau Falls occurrence (p. 49).
km	**72.6**	Junction, road to the Lepreau River occurrence (p. 49).
km	**73.5**	Junction, Highway 790 to the Ragged Point occurrence (p. 50), the Maces Bay occurrences (p. 51), and the Little Lepreau Basin occurrence (p. 52).
km	**81.9**	Scott Falls occurrence (p. 52).
km	**84.0**	Musquash, junction of the road to Dipper Harbour and to the Cranberry Head occurrence (p. 53) and the Gooseberry Cove occurrences (p. 55).
km	**93.1**	Ludgate Lake occurrence (p. 56).
km	**94.6**	Junction, road to Frenchmans Creek and the Frenchmans Creek occurrence (p. 56).
km	**98.4**	Junction, King William Road to the Lorneville occurrence (p. 57).
km	**101.0**	Junction, Highway 7 (Martinon By-Pass) to the Nerepis occurrences (p. 58), the Square Lake occurrences (p. 59), and the Shear mine (p. 61).

km	**105.5**	Saint John, Catherwood Street Exit to the Taylors Island, Saints Rest Beach, Sheldon Point occurrences (p. 62), the Calamites Ledges, Fern Ledges occurrences (p. 63), the Split Rock and Marble Cove mines (p. 65), and the Indiantown quarries (p.66).
km	**107.3**	Saint John, Market Place Exit to King Street and the Navy Island occurrence (p. 67).
km	**109.3**	Saint John, Main Street Exit to Union Street and the Cape Spencer mine (p. 67).
km	**115.7**	Rothesay Road (Highway 100) Exit to the Golden Grove occurrence (p. 68), the Brookville quarry (p. 69), and the Quispamsis occurrence (p. 71).
km	**123.4**	Rothesay, Highway 111 (Fundy Coastal Drive) Exit to West Quaco and the Quaco Head occurrence (p. 72).
km	**162.2**	Junction, road to Norton and the Dick (Annidale) mine (p. 75).
km	**179.4**	Sussex, junction of Highway 10 to the Marrtown mine (p. 76).
km	**182.2**	Sussex, junction of Smiths Creek Road (Highway 890) to the Jordan Mountain copper mine (p. 76) and the Jordan Mountain manganese mine (p. 78).
km	**186.7**	Sussex, junction of Highway 111 (Fundy Coastal Drive) to the Glebe mine (p. 81), the Markhamville mine (p. 83), and the Salt Springs (Clover Hill) mine (p. 84).
km	**189.7**	Sussex, junction of the road to the Penobsquis (Sussex) mine (p. 85).
km	**196.5**	Junction, Highway 114 (Fundy Coastal Drive) to Fundy National Park and to the Alma Beach and Cape Enrage occurrences (p. 86), the Point Wolfe mine (p. 88), and the Vernon (Goose Creek) mine (p. 88).
km	**218.4**	Petitcodiac, junction of Highway 905 to the Glenvale (Petitcodiac) mine (p. 90), the Gowland Mountain mine (p. 91), the Goshen mine (p. 92), the Elgin occurrence (p. 94), and the Teahan (Goodfellow) mine (p. 95).
km	**230.0**	Junction, Highway 2, the Trans Canada Highway. The main road log continues along Highway 2 to the Nova Scotia border.
km	**253.3**	Moncton, junction of Highway 126 leading to Highway 106 (Fundy Coastal Drive) and to the Turtle Creek (Berryton) mine (p. 96), the Hillsborough-Albert Mines mines (p. 97), the Albertite mines (p. 101), the Shepody Mountain (Hopewell) mine (p. 103), the Memel mine (p. 105), the Lumsden mine (p. 106), the New Horton mine (p. 107), the Midway (Copp) mine (p. 111), the Memramcook (Gouldville) mine (p. 108), the Dorchester mine (p. 107), the Cape Dorchester occurrence (p. 113), the Shepody Bay occurrence (p. 114), and the Pink Ledge (Pink Rocks) occurrence (p. 115).
km	**318.5**	Nova Scotia border, at the Missaguash River bridge.

This is the end of the road log from St. Stephen to the Nova Scotia border. The description of the occurrences follows.

Todd (St. Stephen Nickel) mine

PYRRHOTITE, CHALCOPYRITE, PENTLANDITE, SERPENTINE, CHLORITE, GOETHITE, CLINOAMPHIBOLE

In gabbro

Pyrrhotite, the principal ore mineral, occurs as small pockety masses and disseminations in the host rock. Chalcopyrite and minor pentlandite occur in massive pyrrhotite. Serpentine and bright green chlorite occur along shear zones. Rusty brown goethite forms coatings on ore specimens. Clinoamphibole occurs as small white fibrous aggregates on the host rock. Specimens of nickeliferous pyrrhotite were displayed in the Geological Survey of Canada economic minerals exhibit at the Paris International Exposition held in 1900.

Nickel mineralization in this area was known as early as about 1870. The mineralization showed up in several locations as masses of rusty brown gossan capping ore-bearing rock. Original exploration beginning in 1882 consisted of surface cuts and shallow shafts in the Todd deposit on the Rodgers farm. Assays indicated the ore to contain nickel, copper, and cobalt. In 1929, Anaconda Copper Mining Company Limited did some trenching, and various other companies carried out drilling and surface work during the next 30 years. In 1959 and 1960, St. Stephen Nickel Mines Limited conducted underground exploration from an 88 m shaft in the main zone of the Todd mine. The deposit carries values in platinum and palladium.

The mine is about 3 km north of St. Stephen. Lat. 45°13′18″N, Long. 67°18′15″W. *See* Map 1.

Road log from Highway 1 (Fundy Coastal Drive) at **km 0** (*see* the Main Road Log on page 4):

km		
	0	Junction, highways 1 and 3; proceed north along Highway 3.
	1.3	Junction; turn left (west).
	3.0	Junction; turn right (north) onto Highway 740.
	3.5	Junction; turn left (northwest) onto a single-lane road.
	4.1	Todd (St. Stephen Nickel) mine.

Refs.: 13 p. 155A; 47 p. 21-G/3W-6; 105 p. 156AA-159AA; 136; 211 p. 4-20; 225 p. 25-28; 280 p. 544-549; 306 p. 117; 397 p. 113.

Maps (T): 21 G/3 St. Stephen
(G): 72-13 Geology of St. Stephen area (NBDNR, 1:15 840)
98-24 Bedrock geological compilation of the St. Stephen area (NTS 21 G/03), Charlotte County, New Brunswick (NBDNR, 1:50 000)
143 St. Stephen, New Brunswick, Map Sheet 1 S.W. (GSC, 1:253 440)
1096A St. Stephen, Charlotte County, New Brunswick (GSC, 1:63 360)
NR-2 Mineral occurrence map of New Brunswick (NBDNR, 1:500 000)
NR-5 Geological map of southwestern New Brunswick (NBDNR, 1:250 000)
Geological highway map of New Brunswick and Prince Edward Island, Special Publication No. 2 (Atlantic Geoscience Society, 1:638 000).

Blakeney (Basswood Ridge) mine

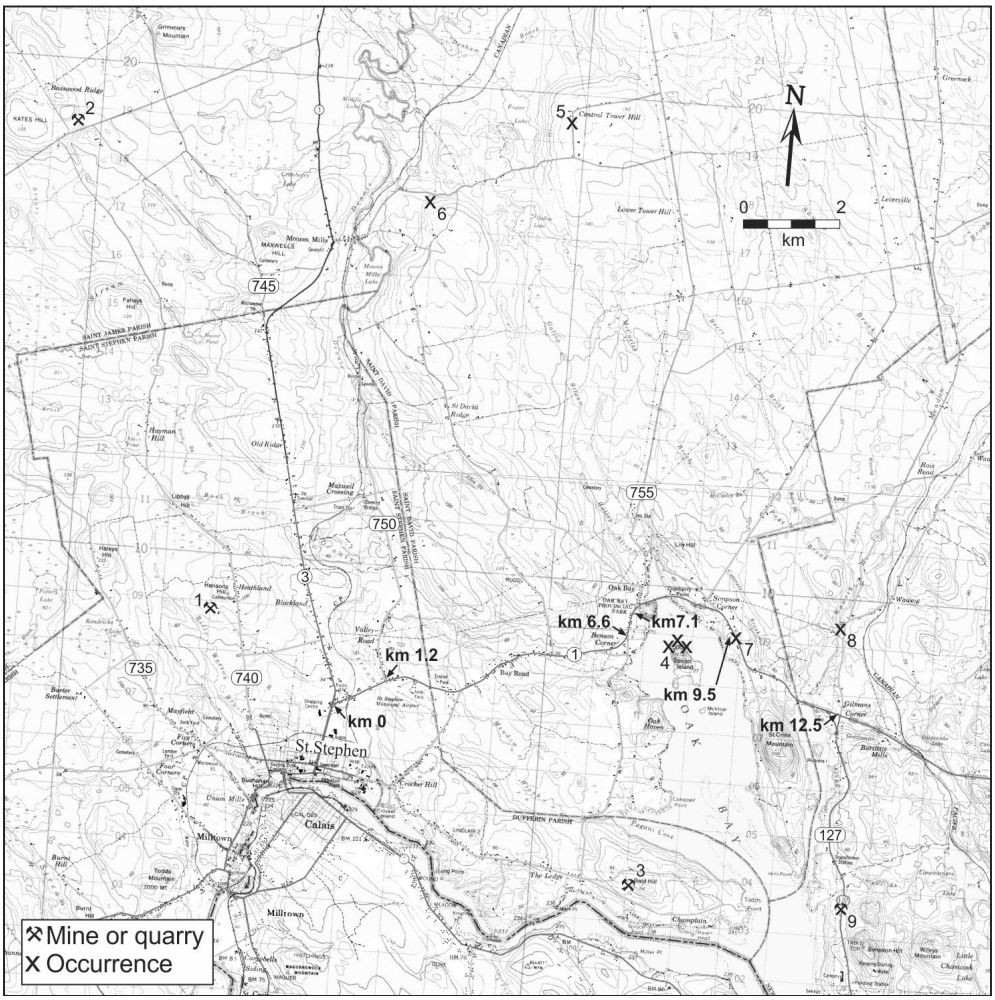
PYRITE, QUARTZ CRYSTALS

In graphitic schist and arkose

Pyrite occurs as small grains in a white quartz vein measuring 3 to 4 m wide and 120 m long. Quartz crystals averaging 2 cm long and 1 cm wide occur in the vein.

The occurrence is a former gold prospect. Several pits expose the quartz vein.

The mine is about 14 km northwest of St. Stephen. Lat. 45°18′40″N, Long. 67°20′54″W. *See* Map 1.



1. Todd (St. Stephen Nickel) mine 2. Blakeney (Basswood Ridge) mine 3. The Ledge (Charlotte County Granite) quarry 4. Spoon (Cookson) Island occurrences 5. Central Tower Hill occurrence 6. Tower Hill Road occurrence 7. Simpson Corner occurrence 8. Waweig River occurrences 9. Bayside Black Granite quarry

Map 1. St. Stephen

Road log from Highway 1 (Fundy Coastal Drive) at **km 0** (*see* the Main Road Log on page 4):

km		
	0	Junction, highways 1 and 3; proceed north along Highway 3.
	2.6	Roadcuts expose peridotite containing serpentine and magnetite. Lat. 45°13′34″N, Long. 67°16′49″W.
	8.0	Junction; proceed north along Highway 745.
	13.3	Junction; turn left (southwest) onto Highway 730.
	15.45	Junction; turn right (northwest).
	15.6	Junction, trail on right; proceed along this trail leading northeast along the side of a ridge.
	16.2	Blakeney (Basswood Ridge) mine, on the southeast side of the ridge.

Ref.: 225 p. 34.

Maps (T): 21 G/6 & 21 G/5 Rollingdam
(G): 97-31 Geology of the Rollingdam area (NTS 21 G/06), Charlotte County, New Brunswick (NBDNR, 1:50 000)
143 St. Stephen, New Brunswick, Map Sheet 1 S.W. (GSC, 1:253 440)
097A Rolling Dam, Charlotte County, New Brunswick (GSC, 1:63 360)
NR-2 Mineral occurrence map of New Brunswick (NBDNR, 1:500 000)
NR-5 Geological map of southwestern New Brunswick (NBDNR, 1:250 000)
Geological highway map of New Brunswick and Prince Edward Island, Special Publication No. 2 (Atlantic Geoscience Society, 1:638 000)

The Ledge (Charlotte County Granite) quarry

GRANITE

The granite is grey with a medium- to coarse-grained texture. It is composed of white feldspar, quartz, and biotite. It is of Devonian age.

In about 1910, Alfred Price and Levi McPherson began quarrying operations on Browns Mountain, now known as Bald Hill. A total of about six openings were made. One of the old quarries was reopened and operated by Charlotte County Granite Company in the 1960s. Granite from these quarries was used for monument bases, curb stones, and building blocks. An example of its use is seen in the base of the exterior of the Beaverbrook Art Gallery in Fredericton.

The quarry is about 7 km southeast of St. Stephen. Lat. 45°10′29″N, Long. 67°11′30″W. *See* Map 1.

Road log from Highway 1 (Fundy Coastal Drive) at **km 6.6** (*see* the Main Road Log on page 4):

km		
	0	Junction, Highway 1 and Oak Bay Road; turn right (south) onto Oak Bay Road.
	5.6	The Ledge, junction; turn left (east).
	5.7	Junction; follow the road on right leading southeast.

6.6 Junction; turn left (north) onto the quarry road.

6.9 The Ledge (Charlotte County Granite) quarry.

Refs.: 47 p. 21-G/3E-10; 285 p. 127-129.

Maps (T): 21 G/3 St. Stephen
(G): 97-32 Geology of the Oak Bay area (NTS 21 G/03), Charlotte County, New Brunswick (NBDNR, 1:20 000)
98-24 Bedrock geological compilation of the St. Stephen area (NTS 21 G/03), Charlotte County, New Brunswick (NBDNR, 1:50 000)
143 St. Stephen, New Brunswick, Map Sheet 1 S.W. (GSC, 1:253 440)
1096A St. Stephen, Charlotte County, New Brunswick (GSC, 1:63 360)
NR-2 Mineral occurrence map of New Brunswick (NBDNR, 1:500 000)
NR-5 Geological map of southwestern New Brunswick (NBDNR, 1:250 000)
Geological highway map of New Brunswick and Prince Edward Island, Special Publication No. 2 (Atlantic Geoscience Society, 1:638 000)

Spoon (Cookson) Island occurrences

FOSSILS

In shale

Graptolite fossils (*Colonograptus herrmanni*) of Ordovician age occur at this locality.

The occurrences are exposed along the northwestern and northeastern shore of Spoon (Cookson) Island, located in the north end of Oak Bay, about 7 km east of St. Stephen. Lat. 45°13′10″N, Long. 67°11′03″W to Lat. 45°13′13″N, Long. 67°10′55″W to Lat. 45°13′07″N, Long. 67°10′46″W. *See* Map 1.

Access to the Spoon (Cookson) Island occurrences is by a 0.6 km road leading east from Highway 1 (Fundy Coastal Drive) at **km 6.7** (*see* the Main Road Log on page 4) to the shore of Oak Bay; from this point, proceed east 400 m by boat to the fossil occurrence on the northwestern shore of Spoon (Cookson) Island, continuing to the northern and northeastern shore of the island.

Refs.: 82 p. 4-6, 16; 293 p. 31-32.

Maps (T): 21 G/3 St. Stephen
(G): 97-32 Geology of the Oak Bay area (NTS 21 G/03g), Charlotte County, New Brunswick (NBDNR, 1:20 000)
98-24 Bedrock geological compilation of the St. Stephen area (NTS 21 G/03), Charlotte County, New Brunswick (NBDNR, 1:50 000)
143 St. Stephen, New Brunswick, Map Sheet 1 S.W. (GSC, 1:253 440)
1096A St. Stephen, Charlotte County, New Brunswick (GSC, 1:63 360)
NR-5 Geological map of southwestern New Brunswick (NBDNR, 1:250 000)
Geological highway map of New Brunswick and Prince Edward Island, Special Publication No. 2 (Atlantic Geoscience Society, 1:638 000)

Central Tower Hill occurrence

STAUROLITE, GARNET, ANDALUSITE

In mica schist

Staurolite occurs as dark brown prismatic crystals averaging 15 mm long. Small pink garnet crystals, about 3 mm across, are associated with staurolite. Pink andalusite crystals (up to 10 cm long) commonly coated with mica have been found in the area.

The occurrence is exposed in roadcuts along Central Tower Hill Road, about 15 km northeast of St. Stephen. Lat. 45°18′57″N, Long. 67°13′02″W. *See* Map 1.

Road log from Highway 1 (Fundy Coastal Drive) at **km 7.1** (*see* the Main Road Log on page 4):

km		
	0	Junction, highways 1 and 755; proceed north along Highway 755.
	9.9	Junction; turn left (west) onto Tower Hill Road.
	12.0	Junction; turn right (north) onto Central Tower Hill Road.
	12.8	Central Tower Hill occurrence.

Refs.: 16 p. 56, 239, 240; 148 p. 36; 233 p. 328-329; 306 p. 117.

Maps (T): 21 G/6 and 21 G/5 Rollingdam

(G): 20-1966 St. Stephen-Pleasant Mountain area, New Brunswick (GSC,1:63 360)
91-35 Geology of the Tower Hill area (NTS 21 G/06b), Charlotte County, New Brunswick (NBDNR, 1:20 000)
97-31 Geology of the Rollingdam area (NTS 21 G/06), Charlotte County,New Brunswick (NBDNR, 1:50 000)
143 St. Stephen, New Brunswick, Map Sheet 1 S.W. (GSC, 1:253 440)
1097A Rolling Dam, Charlotte County, New Brunswick (GSC, 1:63 360)
NR-2 Mineral occurrence map of New Brunswick (NBDNR, 1:500 000)
NR-5 Geological map of southwestern New Brunswick (NBDNR, 1:250 000)
Geological highway map of New Brunswick and Prince Edward Island, Special Publication No. 2 (Atlantic Geoscience Society, 1:638 000)

Tower Hill Road occurrence

FOSSILS

In slate

Graptolite fossils of Ordovician age occur in black slate associated with quartzite.

The occurrence is exposed in a quarry on the Tower Hill Road, about 12 km north of St. Stephen. Lat. 45°18′00″N, Long. 67°15′15″W. *See* Map 1.

Road log from Highway 1 (Fundy Coastal Drive) at **km 7.1** (*see* the Main Road Log on page 4):

km		
	0	Junction, highways 1 and 755; proceed north along Highway 755.
	9.9	Junction; turn left (west) onto Tower Hill Road.
	15.2	Tower Hill Road occurrence, on the south side of the road.

Ref.: 148 p. 36-37.

Maps (T): 21 G/6 and 21 G/5 Rollingdam
(G): 20-1966 St. Stephen-Pleasant Mountain area, New Brunswick (GSC,1:63 360)
90-146 Geology of the Moores Mills area (NTS 21 G/06c), Charlotte County, New Brunswick (NBDNR, 1:20 000)
97-31 Geology of the Rollingdam area (NTS 21 G/06), Charlotte County, New Brunswick (NBDNR, 1:50 000)
143 St. Stephen, New Brunswick, Map Sheet 1 S.W. (GSC, 1:253 440)
1097A Rolling Dam, Charlotte County, New Brunswick (GSC, 1:63 360)
NR-5 Geological map of southwestern New Brunswick (NBDNR, 1:250 000)
Geological highway map of New Brunswick and Prince Edward Island, Special Publication No. 2 (Atlantic Geoscience Society, 1:638 000)

Simpson Corner occurrence

FOSSILS

In greywacke sandstone and slate

Silurian fossils occur in the interbedded greywacke sandstone and slate of the Waweig Formation. Brachiopods are the most common species. Other species include gastropods, bryozoans, crinoids, trilobites, and plants.

The occurrence outcrops along Highway 1 (Fundy Coastal Drive) at **km 9.5** (*see* the Main Road Log on page 4), south of Simpson Corner and immediately north of an abandoned schoolhouse on the western side of the highway, about 9 km east of St. Stephen. Lat. 45°13′20″N, Long. 67°10′04″W. *See* Map 1.

Ref.: 290 p. 1328-1331.

Maps (T): 21 G/3 St. Stephen
(G): 20-1966 St. Stephen-Pleasant Mountain area, New Brunswick (GSC,1:63 360)
97-32 Geology of the Oak Bay area (NTS 21 G/03g), Charlotte County, New Brunswick (NBDNR, 1:20 000)
98-24 Bedrock geological compilation of the St. Stephen area (NTS 21 G/03), Charlotte County, New Brunswick (NBDNR, 1:50 000)
143 St. Stephen, New Brunswick, Map Sheet 1 S.W. (GSC, 1:253 440)
1096A St. Stephen, Charlotte County, New Brunswick (GSC, 1:63 360)
NR-5 Geological map of southwestern New Brunswick (NBDNR, 1:250 000)

Waweig River occurrences

PYRITE, FOSSILS

In greywacke slate

Pyrite and brachiopod fossils occur in weathered greywacke slate. The brachiopods are of Silurian age.

The pyrite-bearing rock and the fossil-bearing rock are exposed on opposite sides of the Waweig River, about 11 km east of St. Stephen. Lat. 45°13′32″N, Long. 67°08′21″W (at bridge). *See* Map 1.

Road log from Highway 1 (Fundy Coastal Drive) at **km 12.5** (*see* the Main Road Log on page 4):

km		
	0	Junction, highways 1 and 127; proceed north along Highway 127.
	1.9	Junction: turn left (west).
	2.0	Bridge over the Waweig River. The pyrite-bearing rock is exposed on the east side of the river, about 60 m south of the bridge. To reach the fossil-bearing rock, proceed along the bridge to the west side of the river; the occurrence is just south of the bridge.

Refs.: 16 p. 163-164; 47 p. 21-G/3E-5; 152 p. 23; 233 p. 324; 306 p. 87-89.

Maps (T): 21 G/3 St. Stephen
(G): 20-1966 St. Stephen-Pleasant Mountain area, New Brunswick (GSC,1:63 360)
97-32 Geology of the Oak Bay area (NTS 21 G/03g), Charlotte County, New Brunswick (NBDNR, 1:20 000)
98-24 Bedrock geological compilation of the St. Stephen area (NTS 21 G/03), Charlotte County, New Brunswick (NBDNR, 1:50 000)
143 St. Stephen, New Brunswick, Map Sheet 1 S.W. (GSC, 1:253 440)
1096A St. Stephen, Charlotte County, New Brunswick (GSC, 1:63 360)
NR-2 Mineral occurrence map of New Brunswick (NBDNR, 1:500 000)
NR-5 Geological map of southwestern New Brunswick (NBDNR, 1:250 000)
Geological highway map of New Brunswick and Prince Edward Island, Special Publication No. 2 (Atlantic Geoscience Society, 1:638 000)

Bayside Black Granite quarry

DIORITE

The diorite is black, and medium to coarse grained. It is composed of hornblende, augite, and plagioclase, with minor biotite and magnetite. The rock is of Devonian age.

Several small quarrying operations were carried out by various operators on both sides of Highway 127 in the Bayside area for about 30 years beginning in about 1911. The rock was used as a building and monument stone. It was known commercially as Irish Black Granite and as Black Granite. A specimen was displayed in the Geological Survey of Canada economic minerals exhibit at the Paris International Exposition held in 1900.

The Bayside Black Granite quarry is about 12 km southeast of St. Stephen. Lat. 45°10′20″N, Long. 67°08′09″W. *See* Map 1.

Road log from Highway 1 (Fundy Coastal Drive) at **km 12.5** (*see* the Main Road Log on page 4):

km		
	0	Junction, highways 1 and 127; proceed south along Highway 127.
	4.3	Bayside Black Granite quarry on the H. Murray property on the west side of the highway.

Refs.: 45 p. 50, 56-57; 47 p. 21-G/3E-9; 82 p. 18; 285 p. 145-150; 397 p. 189.

Maps (T): 21 G/3 St. Stephen
(G): 20-1966 St. Stephen-Pleasant Mountain area, New Brunswick (GSC,1:63 360)

97-32 Geology of the Oak Bay area (NTS 21 G/03g), Charlotte County, New Brunswick (NBDNR, 1:20 000)
98-24 Bedrock geological compilation of the St. Stephen area (NTS 21 G/03), Charlotte County, New Brunswick (NBDNR, 1:50 000)
143 St. Stephen, New Brunswick, Map Sheet 1 S.W. (GSC, 1:253 440)
1096A St. Stephen, Charlotte County, New Brunswick (GSC, 1:63 360)
NR-2 Mineral occurrence map of New Brunswick (NBDNR, 1:500 000)
NR-5 Geological map of southwestern New Brunswick (NBDNR, 1:250 000)
Geological highway map of New Brunswick and Prince Edward Island, Special Publication No. 2 (Atlantic Geoscience Society, 1:638 000)

St. Andrews occurrence

CHALCEDONY (AGATE), JASPER; FOSSILS

In beach gravel; in sandstone

Reddish chalcedony (agate) and red jasper occur as pebbles along the beach. The pebbles are derived from seacliffs exposing two amygdaloidal basalt dykes, each about 45 m wide, cutting red sandstone. Plant fossils, of Devonian age, occur in sandstone.

The occurrence is about 20 km southeast of St. Stephen. Lat. 45°04′53″N, Long. 67°05′03″W to Lat. 45°04′33″N, Long. 67°04′56″W.

Road log from Highway 1 (Fundy Coastal Drive) at **km 12.5** (*see* the Main Road Log on page 4):

km		
	0	Junction, highways 1 and 127; proceed south along Highway 127.
	15.4	St. Andrews, junction; turn right (west).
	16.0	Junction; turn right (north).
	17.2	Marine aquarium. Walk to the wharf. The St. Andrews occurrence extends south along the shore from the wharf to Joes Point, about 700 m.

Refs.: 136; 152 p.16–17.

Maps (T): 21 G/3 St. Stephen
(G): 98-24 Bedrock geological compilation of the St. Stephen area (NTS 21 G/03), Charlotte County, New Brunswick (NBDNR, 1:50 000)
143 St. Stephen, New Brunswick, Map Sheet 1 S.W. (GSC, 1:253 440)
1096A St. Stephen, Charlotte County, New Brunswick (GSC, 1:63 360)
NR-2 Mineral occurrence map of New Brunswick (NBDNR, 1:500 000)
NR-5 Geological map of southwestern New Brunswick (NBDNR, 1:250 000)
Geological highway map of New Brunswick and Prince Edward Island, Special Publication No. 2 (Atlantic Geoscience Society, 1:638 000)

Digdeguash Lake quarry

GABBRO

The gabbro is black, medium grained with a uniform texture. It is composed of olivine, augite, plagioclase, and biotite.

Stephen Spinney began quarrying operations on the west side of Digdeguash Lake in 1932. Other operators were involved in intermittent operations since that time. In the 1960s, Atlantic Black Granite Company produced monument stone and building stone. The rock was known commercially as Black Granite. An example of its use is the exterior facing of the front entrance to the Centennial Building in Fredericton.

The quarry is just west of Digdeguash Lake, about 12 km northwest of St. George. Lat. 45°13′19″N, Long. 66°55′25″W. *See* Map 2.

Road log from Highway 1 (Fundy Coastal Drive) at **km 32.2** (*see* the Main Road Log on page 4):

km		
	0	Junction, highways 1 and 760; proceed north along Highway 760.
	7.3	Junction; turn right (east).
	8.9	Digdeguash Lake quarry.

Refs.: 45 p. 57; 47 p. 21-G/2W-34; 307 p. 37-39.

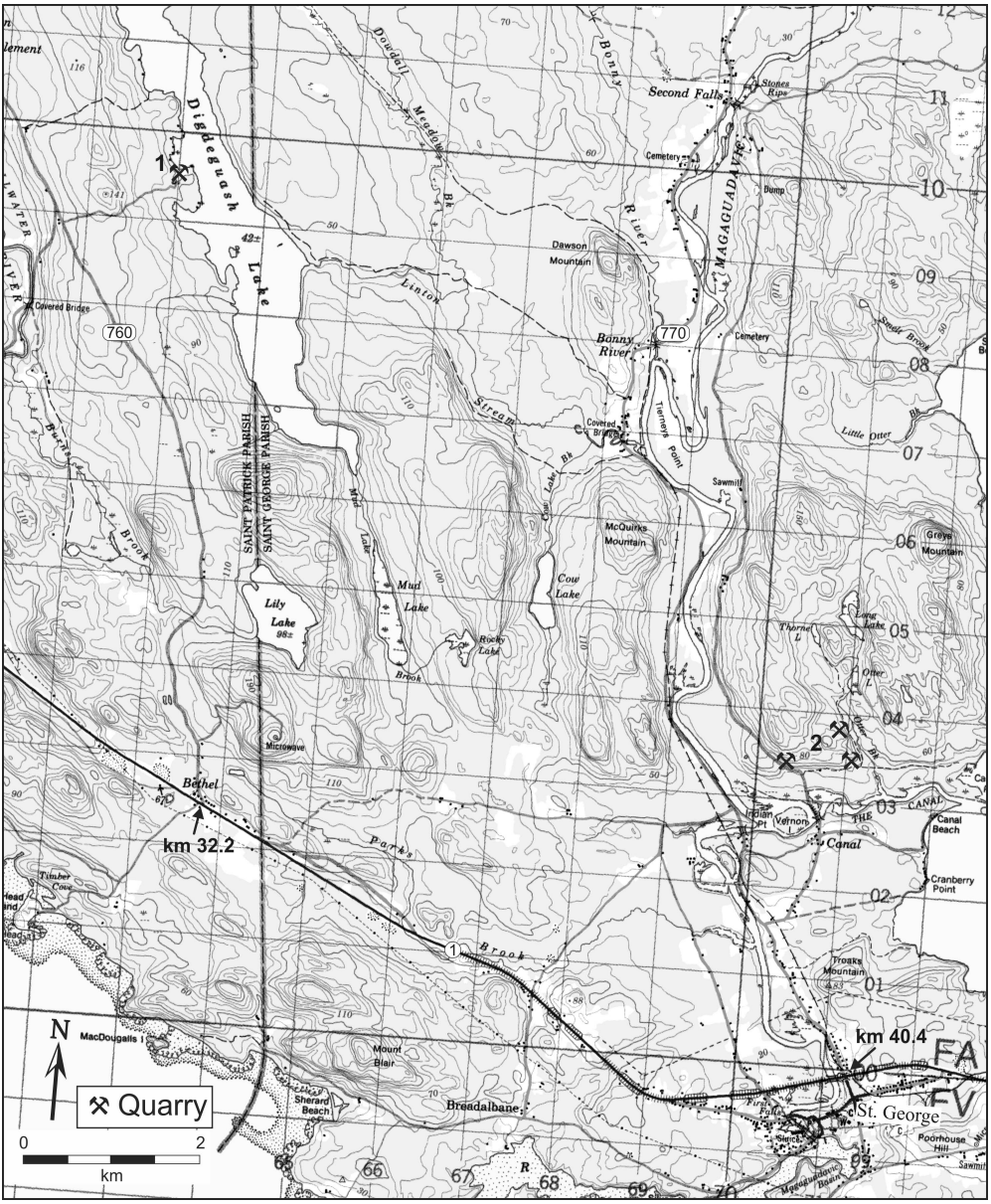
Maps (T): 21 G/2 St. George
(G): 20-1966 St. Stephen-Pleasant Mountain area, New Brunswick (GSC,1:63 360)
98-23 Bedrock geological compilation of the St. George area (NTS 21 G/02), Charlotte County, New Brunswick (NBDNR, 1:50 000)
143 St. Stephen, New Brunswick, Map Sheet 1 S.W. (GSC, 1:253 440)
1094A St. George, Charlotte County, New Brunswick (GSC, 1:63 360)
NR-2 Mineral occurrence map of New Brunswick (NBDNR, 1:500 000)
NR-5 Geological map of southwestern New Brunswick (NBDNR, 1:250 000)
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St. George granite quarries

GRANITE

The granite is medium to coarse grained, orange to orange-red, and pinkish grey. It is composed of orthoclase, plagioclase, quartz, hornblende, and biotite. The stone is regarded as the most striking and attractive granite ever produced in Canada. Due to its fire-red colour, durability, and fine polishing quality, it was sought for use as a monument stone and as an ornamental building stone. A vase and small column of the polished red granite were presented to the Geological Survey of Canada in 1875 by the original operator, Bay of Fundy Red Granite Company. Polished monuments, headstones, column bases, and urns were displayed in the Geological Survey of Canada economic minerals exhibit at the Philadelphia International Exhibition held in 1876 and at the Colonial and Indian Exhibition held in London in 1886; polished 15 cm cubes of red granite and polished specimens of grey and black granite were displayed at the Paris International Exposition held in 1900. These items are kept in the National Mineral Collection, Geological Survey of Canada.

Quarrying operations were carried out by various companies for about 75 years beginning in 1872. Some 39 openings were made into the red granite hills between Lake Utopia and the Magaguadavic River, north of St. George. In 1872, Bay of Fundy Red Granite Company began the quarrying and finishing of the granite from the original quarry on the shore of Lake Utopia. The first use of the rock was as monument stone for a large cross now marking the burial site of Rev. Samuel Thompson in St. Marks Cemetery, St. George; it was produced by the Bay of Fundy Red Granite Company in 1872. This company also produced columns for the Roman



1. Digdeguash Lake quarry 2. St. George granite quarries

Map 2. St. George north

Catholic Cathedral in Boston, the Parliament Buildings in Ottawa, and the post office in Saint John. Stone produced in subsequent operations was used for the New York Public Library, and Museum of Natural History, New York City; J. Pierpont Morgan Memorial, Hartford, Connecticut; Banque des Peuples, John A. MacDonald Memorial, and Infant Jesus Church, Montreal; Roosevelt Cairn, Campobello Island; Saint John Dry Docks and Railroad bridge; Montcalm Monument, Quebec City; and post offices in St. Stephen and in Owen Sound (Ontario). The cutting, grinding, and polishing of the granite was done in St. George.

There are several inactive quarries, about 4 km north of St. George. Lat. 45°09′55″N, Long. 66°49′58″W; Lat. 45°09′56″N, Long. 66°49′21″W; Lat. 45°10′06″N, Long. 66°49′27″W. *See* Map 2.

Road log from Highway 1 (Fundy Coastal Drive) at **km 40.4** (*see* the Main Road Log on page 4):

km		
	0	St. George, junction of highways 1 and 770; proceed north along Highway 770.
	2.0	Junction; turn right (east).
	2.2	Junction; follow the road on left leading northeast.
	4.0	Junction, road on right leading east. Follow this road 600 m to an inactive quarry on the north side of the road; continue along this road another 100 m to a junction; turn left (north) and proceed 300 m to another inactive quarry. The road log continues along the main road.
	4.3	Inactive granite quarry, on the east side of the road.

Refs.: 13 p. 155A, 158A; 16 p. 233-234, 235-236; 45 p. 51-56; 47 p. 21-G/2W-30; 183 p. 11, 17; 189 p. 147, 163; 233 p. 345-348; 285 p. 110-122; 306 p. 91; 307 p. 37-39; 393 p. 97; 395 p. 125-126; 397 p. 189.

Maps (T): 21 G/2 St. George
(G): 67-1 St. Andrews-St. George area, New Brunswick (NBDNR, 1:31 680)
98-23 Bedrock geological compilation of the St. George area (NTS 21 G/02), Charlotte County, New Brunswick (NBDNR, 1:50 000)
143 St. Stephen, New Brunswick, Map Sheet 1 S.W. (GSC, 1:253 440)
1094A St. George, Charlotte County, New Brunswick (GSC, 1:63 360)
NR-2 Mineral occurrence map of New Brunswick (NBDNR, 1:500 000) NR-5 Geological map of southwestern New Brunswick (NBDNR, 1:250 000)
Geological highway map of New Brunswick and Prince Edward Island, Special Publication No. 2 (Atlantic Geoscience Society, 1:638 000)

Hatt Farm occurrence

PYRITE, CHALCOPYRITE, GALENA

In rhyolite

Pyrite, chalcopyrite, and galena occur in quartz veins.

The occurrence was explored for copper from a shallow shaft in the 1860s.

The occurrence is about 6 km south of St. George. Lat. 45°04′30″N, Long. 66°49′13″W. *See* Map 3.

Road log from Highway 1 (Fundy Coastal Drive) at **km 40.4** (*see* the Main Road Log on page 4):

km		
	0	Highway 1 at the St. George Exit; proceed south to St. George.
	0.3	St. George, intersection; continue straight ahead (south).
	1.1	Junction; turn right (west) onto Highway 172.
	2.95	Roadcut exposes black slate containing Silurian brachiopod fossils. Lat. 45°06′37″N, Long. 66°49′32″W.
	6.5	Junction; proceed straight ahead (south) to the Letang Peninsula.
	7.35	Hatt Farm occurrence, on the east side of road.

Refs.: 47 p. 21-G/2W-10; 82 p. 18; 307 p. 13.

Maps (T): 21 G/2 St. George
(G): 95-7A Geology of the Letang area (part of NTS 21 G/02c), Charlotte County, New Brunswick (NBDNR, 1:20 000)
143 St. Stephen, New Brunswick, Map Sheet 1 S.W. (GSC, 1:253 440)
1094A St. George, Charlotte County, New Brunswick (GSC, 1:63 360)
NR-2 Mineral occurrence map of New Brunswick (NBDNR, 1:500 000)
NR-5 Geological map of southwestern New Brunswick (NBDNR, 1:250 000)
Geological highway map of New Brunswick and Prince Edward Island, Special Publication No. 2 (Atlantic Geoscience Society, 1:638 000)

Letang quarry

MARBLE

In limestone and siliceous dolomite

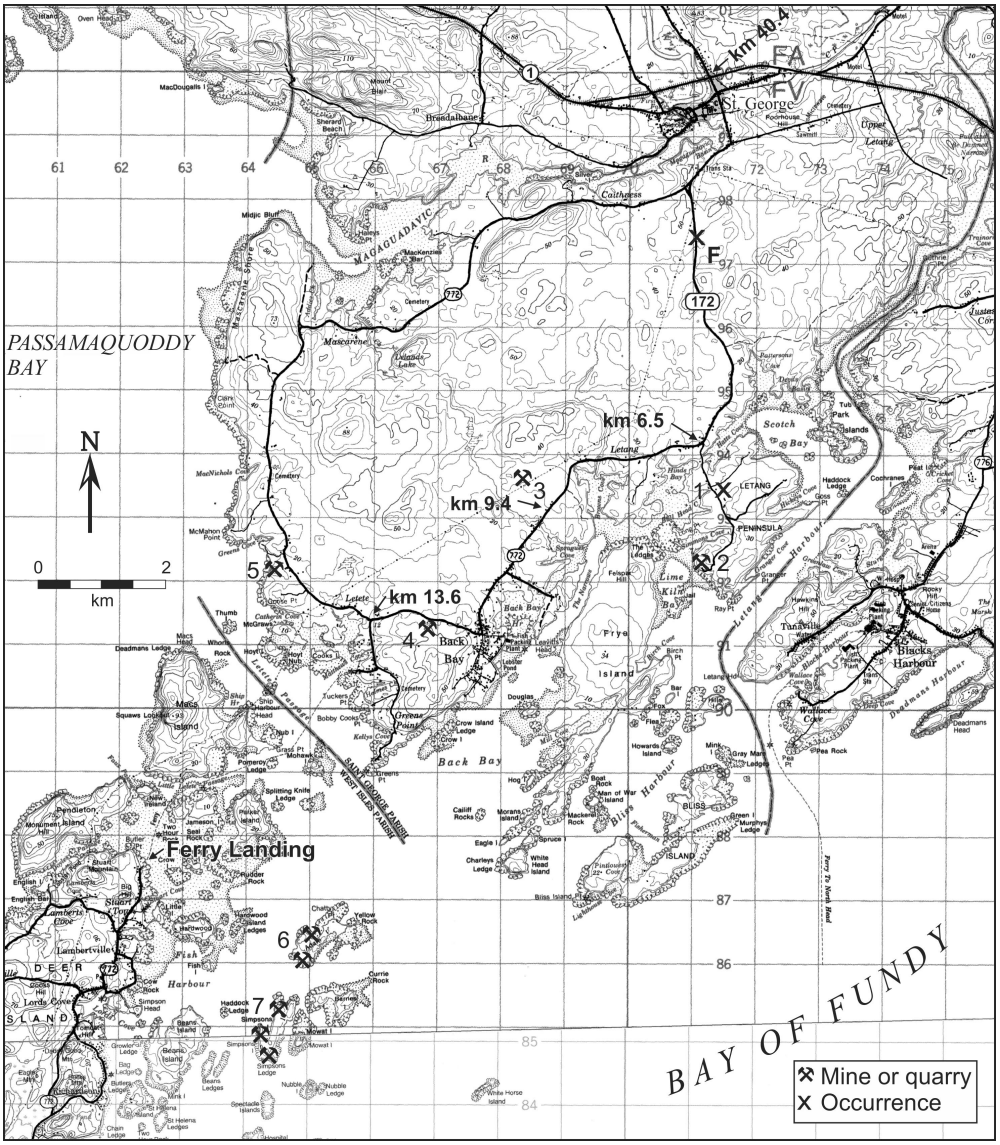
The marble is pink, light green, grey, buff, and cream-white, commonly mottled and banded in these colours. The marble occurs in a zone between grey limestone and siliceous dolomite. It is suitable for lapidary purposes.

St. George Lime Company began quarrying the limestone in the 1820s. The quarry produced lime for many years and most of the output was shipped to the United States. In 1927, Mr. Sutton Clark of St. George quarried a small amount of limestone and shipped it to the Nashwaak Pulp and Paper Company in Saint John for use in the pulp mill.

The quarry is on the shore of Lime Kiln Bay, Letang Harbour, about 7 km south of St. George. Lat. 45°03′50″N, Long. 66°49′30″W. *See* Map 3.

Road log from Highway 1 (Fundy Coastal Drive) at **km 40.4** (*see* the Main Road Log on page 4):

km		
	0	Highway 1 at the St. George Exit; proceed south to St. George.
	0.3	St. George, intersection; continue straight ahead (south).
	1.1	Junction; turn right (west) onto Highway 172.
	6.5	Junction; proceed straight ahead (south) to the Letang Peninsula.
	7.35	Hatt Farm occurrence; continue straight ahead.



1. Hatt Farm occurrence 2. Letang quarry 3. Oliver Cameron mine 4. Johnson (Wheal Louisiana) mine 5. Letete mine 6. Adam Island mine 7. Simpsons Island mine

Map 3. St. George south

	7.8	Junction; proceed straight ahead along the road leading south.
	9.0	Wharf at the junction of the quarry road; walk northwest along the quarry road for about 70 m to the Letang quarry. The limestone is also exposed along the shore, about 150 m north of the wharf.

Refs.: 16 p. 232; 47 p. 21-G/2W-26; 82 p. 19; 161 p. 129-132; 177 p. 75-83; 307 p. 37; 363 p. 55-59.

Maps (T): 21 G/2 St. George
(G): 95-7A Geology of the Letang area (part of NTS 21 G/02c), Charlotte County, New Brunswick (NBDNR, 1:20 000)
143 St. Stephen, New Brunswick, Map Sheet 1 S.W. (GSC, 1:253 440)
1094A St. George, Charlotte County, New Brunswick (GSC, 1:63 360)
NR-2 Mineral occurrence map of New Brunswick (NBDNR, 1:500 000)
NR-5 Geological map of southwestern New Brunswick (NBDNR, 1:250 000)
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Oliver Cameron mine

CHALCOPYRITE, PYRRHOTITE, SPHALERITE, GALENA, PYRITE, NATIVE COPPER, NATIVE BISMUTH, LANGITE, SPANGOLITE, YARROWITE, SULPHUR, GYPSUM, ROZENITE, QUARTZ CRYSTALS, BARITE, EPIDOTE

In chlorite schist

Chalcopyrite, the copper ore mineral, occurs with pyrrhotite, and minor sphalerite, galena, and pyrite in quartz-calcite veins. Native copper and native bismuth occur in chlorite. Secondary minerals occurring as crusts or coatings on the sulphides and on quartz are langite, as blue granular encrustations; spangolite, as bluish-green coatings and encrustations; yarrowite, as black velvety and iridescent microscopic rounded aggregates; sulphur, as white powdery coatings on pyrite; gypsum, as colourless to white fine crystal aggregates; and rozenite, as dull white powdery to loose granular crusts. Quartz crystals up to 5 mm across occur in barite-lined cavities in massive quartz. Small crystals of epidote occur in chlorite and in quartz.

The mine consists of the Oliver and the Cameron lodes. The mineralization was discovered in the early 1860s and explored by several pits and shallow shafts. Further investigation of the deposit was done by N.A. Timmins Limited (1930), Eastern Mining and Smelting Company of Saint John (1933), Anthonian Mining Corporation (1950s), and Highbourne Explorations Limited (1983–1984).

The mine is about 6 km south-southwest of St. George. Lat. 45°04′38″N, Long. 66°51′39″W. *See* Map 3.

Road log from Highway 1 (Fundy Coastal Drive) at **km 40.4** (*see* the Main Road Log on page 4):

km		
	0	Highway 1 at the St. George Exit; proceed south to St. George.
	0.3	St. George, intersection; continue straight ahead (south).
	1.1	Junction; turn right (west) onto Highway 172.
	6.5	Junction; turn right (west) onto the road to Letang.

	9.4	Trail on right leads northwest 650 m to the Oliver shaft. Continue northeast 140 m to the Cameron shaft.

Refs.: 47 p. 21-G/2W-12; 50 p. 81-82; 233 p. 343-344; 307 p. 31.

Maps (T): 21 G/2 St. George
(G): 98-23 Bedrock geological compilation of the St. George area (NTS 21 G/02), Charlotte County, New Brunswick (NBDNR, 1:50 000)
143 St. Stephen, New Brunswick, Map Sheet 1 S.W. (GSC, 1:253 440)
1094A St. George, Charlotte County, New Brunswick (GSC, 1:63 360)
NR-2 Mineral occurrence map of New Brunswick (NBDNR, 1:500 000)
NR-5 Geological map of southwestern New Brunswick (NBDNR, 1:250 000)
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Johnson (Wheal Louisiana) mine

CHALCOPYRITE, BORNITE, PYRITE, PYRRHOTITE, NATIVE COPPER, GOETHITE, ROZENITE, YARROWITE, MALACHITE, EPIDOTE, PREHNITE, CLINOAMPHIBOLE, TOURMALINE

In chlorite schist and diabase

The copper ore consists of chalcopyrite, bornite, pyrite, pyrrhotite, and native copper (rare) in quartz-calcite gangue and in the host chlorite schist. Goethite and white rozenite occur as powdery coatings on pyrrhotite and pyrite. Yarrowite occurs as iridescent and velvety black microscopic rounded aggregates on sulphides and on quartz. Malachite occurs as green crusts on the ore minerals. Epidote occurs as small crystals in quartz-feldspar-chlorite rock associated with diabase; white to bluish-grey prehnite prisms and colourless to white acicular to hair-like clinoamphibole crystals are associated with epidote. Tourmaline (schorl) has been reported from the deposit.

The mine was opened by Messrs. Johnson of Liverpool in about 1853. Two shafts were sunk, the main one to 30 m. Operations were short lived due to poor returns. In about 1902, the main shaft was deepened to 90 m, and a small amount of copper was produced. Recent investigations were done by Michael Smith of Bathurst (1982–1983), and Highbourne Explorations Limited (1983–1984).

The mine is about 9 km south-southwest of St. George. Lat. 45°03′28″N, Long. 66°52′51″W. *See* Map 3.

Road log from Highway 1 (Fundy Coastal Drive) at **km 40.4** (*see* the Main Road Log on page 4):

km		
	0	Highway 1 at the St. George Exit; proceed south to St. George.
	0.3	St. George, intersection; continue straight ahead (south).
	1.1	Junction; turn right (west) onto Highway 172.
	6.5	Junction; turn right (west) onto the road to Letang.
	11.7	Back Bay; the road makes a sharp right turn (west). Proceed west along this road.

	12.6	Johnson (Wheal Louisiana) mine, on the south side of the road. One shaft is about 100 m south of this point; another is about 300 m to the southwest. A quarry in the side of a hill opposite the mine exposes similar mineralization.

Refs.: 12 p. 22M; 16 p. 226; 47 p. 21-G/2W-16; 50 p. 81; 109 p. 88-89; 233 p. 343; 307 p. 31.

Maps (T): 21 G/2 St. George
(G): 98-23 Bedrock geological compilation of the St. George area (NTS 21 G/02), Charlotte County, New Brunswick (NBDNR, 1:50 000)
143 St. Stephen, New Brunswick, Map Sheet 1 S.W. (GSC, 1:253 440)
1094A St. George, Charlotte County, New Brunswick (GSC, 1:63 360)
NR-2 Mineral occurrence map of New Brunswick (NBDNR, 1:500 000)
NR-5 Geological map of southwestern New Brunswick (NBDNR, 1:250 000)
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Letete mine

CHALCOPYRITE, CHALCOCITE, PYRITE, PYRRHOTITE

In gabbro and diabase

Chalcopyrite and chalcocite, the copper ore minerals, occur with minor pyrite and pyrrhotite in quartz-calcite veins. Some fine specimens of chalcopyrite were removed during mining operations.

The mine was explored by several shallow shafts on the property of Messrs. Steadman and Woodward in the 1860s. About 40 years later, a 43 m shaft was sunk.

The mine is about 10 km southwest of St. George. Lat. 45°03′56″N, Long. 66°54′43″W. *See* Map 3.

Road log from Highway 1 (Fundy Coastal Drive) at **km 40.4** (*see* the Main Road Log on page 4):

km		
	0	Highway 1 at the St. George Exit; proceed south to St. George.
	0.3	St. George, intersection; continue straight ahead (south).
	1.1	Junction; turn right (west) onto Highway 172.
	6.5	Junction; turn right (west) onto the road to Letang.
	11.7	Back Bay; the road makes a sharp right turn (west). Proceed west along this road.
	12.6	Johnson (Wheal Louisiana) mine, on the south side of the road; continue straight ahead.
	13.6	Junction; continue straight ahead (northwest) toward Letete.
	15.1	Junction; turn left (west).
	15.5	Letete mine, on the north side of the road.

Refs.: 12 p. 22M; 16 p. 226; 47 p. 21-G/2W-15; 105 p. 156AA; 109 p. 88-89; 307 p. 33; 308 p. 8.

Maps (T): 21 G/2 St. George
(G): 98-23 Bedrock geological compilation of the St. George area (NTS 21 G/02), Charlotte County, New Brunswick (NBDNR, 1:50 000)
143 St. Stephen, New Brunswick, Map Sheet 1 S.W. (GSC, 1:253 440)
1094A St. George, Charlotte County, New Brunswick (GSC, 1:63 360)
NR-2 Mineral occurrence map of New Brunswick (NBDNR, 1:500 000)
NR-5 Geological map of southwestern New Brunswick (NBDNR, 1:250 000)
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Adam Island mine

BORNITE, CHALCOPYRITE, CHALCOCITE, MALACHITE, PYRITE

In basalt

The copper mineralization consists of bornite, chalcopyrite, and minor chalcocite, malachite, and pyrite in quartz-calcite veins. Splendid specimens of bornite were found during early mining operations.

Small quantities of rich ore were found during original exploration of the copper-bearing veins in 1869 and 1870. Several shafts were sunk at that time. Most of the exploration was done from a 24 m shaft but results proved to be unsatisfactory. Eastern Mining and Smelting Company Limited did some exploration work between 1929 and 1933. At that time, the workings consisted of several trenches, and two shafts to 29 m and 21 m, respectively. The deposit proved to be uneconomic. More recent examination of the deposit was done by Anacon Extension Limited (1952), Newcastle Mining Company Limited (1964), and Woodville Mines Limited (1975–1976).

The mine is on Adam Island in the Bay of Fundy, about 15 km southwest of St. George and 3 km east of Deer Island. Lat. 45°00′48″N, Long. 66°54′20″W (north shaft); Lat. 45°00′41″N, Long. 66°54′26″W (south shaft). A ferry connects Deer Island to the mainland, a distance of 5 km. *See* Map 3.

Road log from Highway 1 (Fundy Coastal Drive) at **km 40.4** (*see* the Main Road Log on page 4):

km		
	0	Highway 1 at the St. George Exit; proceed south to St. George.
	0.3	St. George, intersection; continue straight ahead (south).
	1.1	Junction; turn right (west) onto Highway 172.
	6.5	Junction; turn right (west) onto the road to Letang.
	11.7	Back Bay; the road makes a sharp right turn (west). Proceed west along this road.
	13.6	Junction; turn left (south).
	14.4	Junction; turn right (west).

14.7 End of the road. The ferry to Deer Island leaves from this point. Access to the Adam Island mine is by boat from the ferry terminal in Deer Island, a distance of about 3 km. One of the mine shafts (north shaft) is on the western shore of a bay in the middle of the island; the other (south shaft) is about 300 m to the southwest.

Refs.: 12 p. 20M-21M; 16 p. 89, 225, 226; 47 p. 21-G/2W-18; 105 p. 156AA; 109 p. 88; 241 p. 58.

Maps (T): 21 G/2 St. George
(G): 95-7B Geology of the Head Harbour Passage area (parts of NTS 21 B/15e and 21 G/02d), Charlotte County, New Brunswick (NBDNR, 1:20 000)
143 St. Stephen, New Brunswick, Map Sheet 1 S.W. (GSC, 1:253 440)
1094A St. George, Charlotte County, New Brunswick (GSC, 1:63 360)
NR-2 Mineral occurrence map of New Brunswick (NBDNR, 1:500 000)
NR-5 Geological map of southwestern New Brunswick (NBDNR, 1:250 000)
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Simpsons Island mine

CHALCOCITE, MALACHITE, CHALCOPYRITE, BORNITE, PYRITE

In volcanic tuffs and sedimentary rocks

The copper mineralization consists of chalcocite, chalcopyrite, bornite, and pyrite. Splendid specimens of bornite were found during early mining operations.

The copper-bearing discovery vein was found in a rock exposure along the shore of Simpsons Island below the highwater mark; the vein, 120 cm wide, consisted of massive malachite over a 20 cm core of chalcocite. In about 1863, a local company owned by Messrs. Lord and Dakin removed 60 to 70 barrels of copper ore from the shoreline occurrence. Additional work was attempted on a vein below the shoreline occurrence, but was discontinued due to flooding. Subsequently, several small veins were discovered further inland and some prospecting was done on them. In about 1890, Messrs. Crow and Welter, associated with James Lord of Lord's Cove, Deer Island, sank shafts to 16 m and 41 m on these veins. More recent examination of the property was done by Eastern Mining and Smelting Company Limited (1929), and Woodville Mines Limited (1975–1976).

The mine is on Simpsons Island in the Bay of Fundy, about 16 km southwest of St. George and 3 km east of Deer Island. Lat. 45°00′14″N, Long. 66°54′44″W (northwestern shaft); Lat. 45°00′01″N, Long. 66°54′51″W (midpoint shaft); Lat. 45°59′52″N, Long. 66°54′57″W (south shaft). A ferry connects Deer Island to the mainland, a distance of 5 km. *See* Map 3.

Road log from Highway 1 (Fundy Coastal Drive) at **km 40.4** (*see* the Main Road Log on page 4):

km		
	0	Highway 1 at the St. George Exit; proceed south to St. George.
	0.3	St. George, intersection; continue straight ahead (south).
	1.1	Junction; turn right (west) onto Highway 172.
	6.5	Junction; turn right (west) onto the road to Letang.

	11.7	Back Bay; the road makes a sharp right turn (west). Proceed west along this road.
	13.6	Junction; turn left (south).
	14.4	Junction; turn right (west).
	14.7	End of the road. The ferry to Deer Island leaves from this point. Access to the Simpsons Island mine is by boat from the Deer Island ferry terminal, a distance of about 3.5 km. The Simpsons Island mine shafts are located as follows: at the northwestern end of the island, on the shore of a bay on the western shore at the midpoint, and at the south end.

Refs.: 12 p. 20M-21M; 16 p. 226; 47 p. 21-G/2W-13; 105 p. 156AA; 109 p. 88.

Maps (T): 21 B/15 and 21 B/14 Campobello Island
21 G/2 St. George

(G): 95-7B Geology of the Head Harbour Passage area (parts of NTS 21 B/15e and 21 G/02d), Charlotte County, New Brunswick (NBDNR, 1:20 000)
143 St. Stephen, New Brunswick, Map Sheet 1 S.W. (GSC, 1:253 440)
1094A St. George, Charlotte County, New Brunswick (GSC, 1:63 360)
NR-2 Mineral occurrence map of New Brunswick (NBDNR, 1:500 000)
NR-5 Geological map of southwestern New Brunswick (NBDNR, 1:250 000)
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Kedron Stream occurrence

SPHALERITE, PYRITE, GALENA, PYRRHOTITE, CHALCOPYRITE, STANNITE

In metamorphosed siltstone

Dark brown sphalerite occurs with pyrite, chalcopyrite, pyrrhotite, and galena in quartz veins. Stannite occurs as inclusions in sphalerite.

The occurrence is exposed at the water level along Kedron Stream, about 32 km northwest of St. George. Lat. 45°24′29″N, Long. 66°55′48″W. *See* Map 4.

Road log from Highway 1 (Fundy Coastal Drive) at **km 40.4** (*see* the Main Road Log on page 4):

km		
	0	St. George, junction of highways 1 and 770; proceed north along Highway 770 to Pomeroy.
	35.0	Pomeroy, junction; turn right (east).
	35.8	Junction; turn left (northwest).
	36.5	Junction; follow the road on left continuing northwest.
	37.1	Bridge over Kedron Stream. Proceed about 250 m upstream (north) to the Kedron Stream occurrence.

Refs.: 48 p. 21-G/7W-2; 383 p. 8-10.

Maps (T): 21 G/7 McDougall Lake

(G): 20-1966 St. Stephen-Pleasant Mountain area, New Brunswick (GSC,1:63 360)
143 St. Stephen, New Brunswick, Map Sheet 1 S.W. (GSC, 1:253 440)

NR-2 Mineral occurrence map of New Brunswick (NBDNR, 1:500 000)
NR-5 Geological map of southwestern New Brunswick (NBDNR, 1:250 000)
Geological highway map of New Brunswick and Prince Edward Island, Special Publication No. 2 (Atlantic Geoscience Society, 1:638 000)

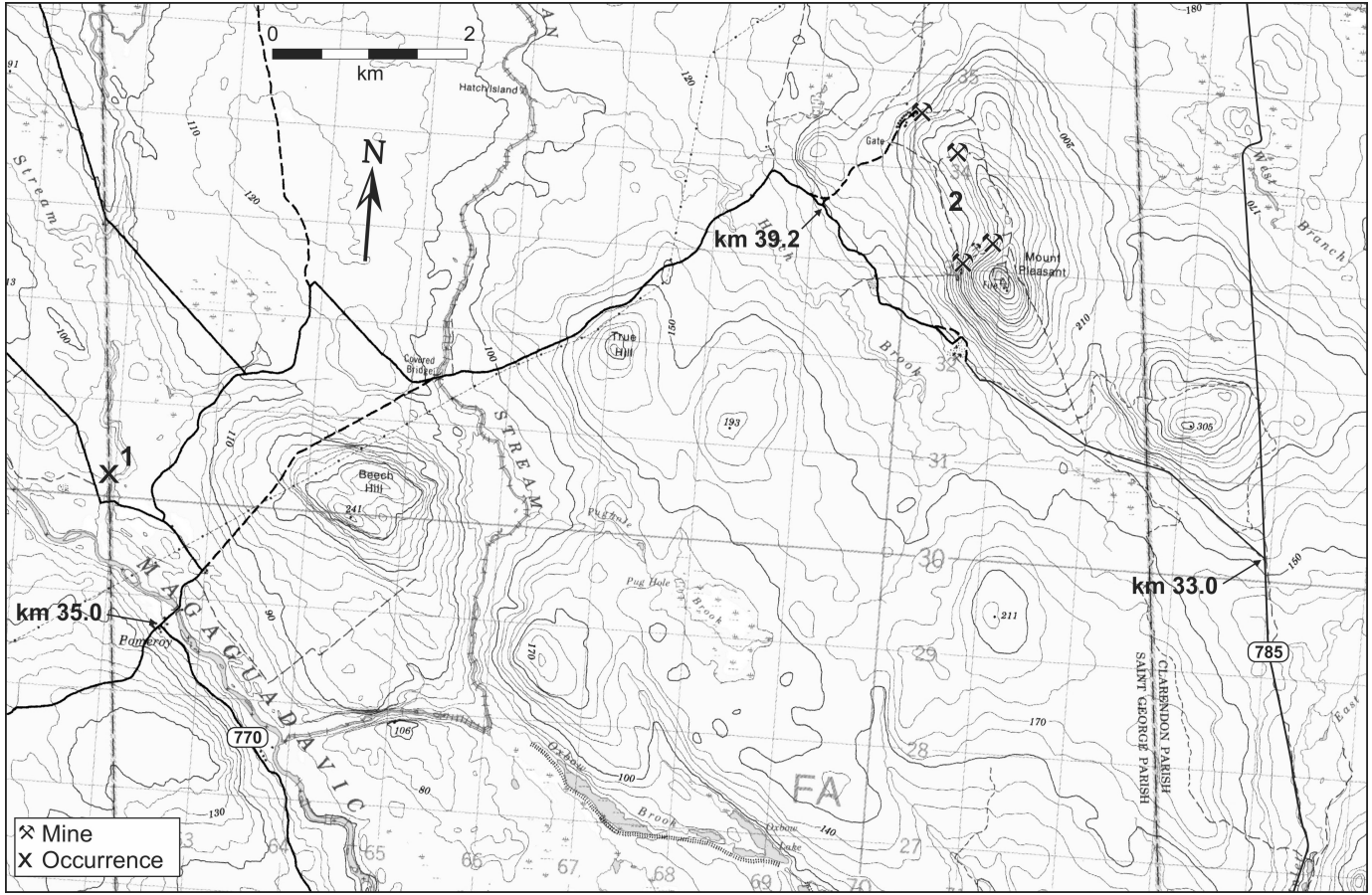
Mount Pleasant mine

WOLFRAMITE, MOLYBDENITE, CASSITERITE, STANNITE, NATIVE BISMUTH, BISMUTHINITE, ARSENOPYRITE, LOELLINGITE, KESTERITE, STANNOIDITE, SPHALERITE, GALENOBISMUTITE, AIKINITE, KRUPKAITE, COSALITE, GALENA, MAWSONITE, TENNANTITE, FREIBERGITE, PYRARGYRITE, NATIVE SILVER, CHALCOPYRITE, PYRITE, MARCASITE, PYRRHOTITE, GLAUCODOT, BORNITE, CHALCOCITE, WITTICHENITE, ROQUESITE, PETRUKITE, DZALINDITE, SIDERITE, TOPAZ, FLUORITE, KAOLINITE, CHLORITE, TOURMALINE, SERICITE

In feldspar porphyry, breccia, and granite

The minerals occur as disseminated grains and as intimate mixtures, the individual minerals generally distinguishable only by microscopic observation. The deposit consists of two types of mineralization: the tungsten-molybdenum-bismuth type, and the tin-copper-zinc type. The tungsten-molybdenum-bismuth mineralization consists of wolframite (ferberite) and molybdenite with minor amounts of native bismuth and bismuthinite; gangue minerals are quartz, topaz, fluorite, arsenopyrite, and loellingite. Wolframite occurs as crystals and crystal aggregates several centimetres across. Fluorite occurs as colourless, green, violet, brown, and black grains in the ore and as large light blue crystals in kaolinite. Topaz occurs as microscopic crystals and as dense aggregates of small crystals. Stannite, kesterite, and stannoidite occur as grains in sphalerite. Galenobismutite, aikinite, krupkaite, and cosalite occur as tiny inclusions in galena. Mawsonite is intergrown with tennantite and cassiterite. Freibergite, pyrargyrite, and native silver are also present. The tin-copper-zinc mineralization consists of cassiterite and stannite associated with arsenopyrite, loellingite, sphalerite, chalcopyrite, galena, pyrite, marcasite, molybdenite, tennantite, glaucodot, bornite, chalcocite, bismuthinite, wittichenite, roquesite, petrukite, and dzhalindite; gangue minerals are kaolinite, chlorite, black tourmaline, sericite, and quartz. The ore minerals occur in fractures in quartz veinlets, and as disseminated grains. Some minerals including arsenopyrite, sphalerite, galena, and chalcopyrite occur as masses several centimetres across. The deposit yielded museum-type specimens of blue transparent fluorite crystals up to 8 cm across.

The deposit contains concentrations of tungsten, tin, molybdenum, indium, bismuth, zinc, copper, and fluorite. Two zones, 1200 m apart, have been extensively explored. The North zone contains cassiterite and indium mineralization. The Fire Tower zone consists mainly of wolframite and molybdenite. J.E. Riddell and H.E. Hawkes discovered the deposit in 1954. Between 1962 and 1967, Mount Pleasant Mines Limited explored the North zone doing extensive surface work and underground exploration from a 1331 m adit driven into the 183 m level of the northwest side of Mount Pleasant, and installed a concentrating plant. Brunswick Tin Mines Limited explored the Fire Tower zone from 1968 to 1973 from two adits driven into the west side of Mount Pleasant at elevations of 229 m (750 adit) and 275 m (900 adit), respectively. Brunswick Tin Mines Limited and Billiton Exploration Canada Limited jointly mined the Fire Tower zone for tungsten and molybdenum from 1983 until 1985 when mining ended due to low metal prices. Exploration for tin ore in the North zone consisted of



1. Kedron Stream occurrence 2. Mount Pleasant mine

Map 4. Mount Pleasant

an underground adit and a decline driven from the Fire Tower zone. In 1985 and 1986, Lac Minerals Limited did underground exploration using a 1220 m ramp, 1 km from the original mine. From 1994 to 1997, Adex Mining Corporation conducted a feasibility study.

The mine is about 35 km north of St. George. Lat. 45°26′44″N, Long. 66°49′33″W (North zone adit); Lat. 45°26′33″N, Long. 66°49′08″W (North zone trenches); Lat. 45°26′00″N, Long. 66°48′55″W (Fire zone 900 adit); Lat. 45°25′52″N, Long. 66°49′10″W (Fire zone 750 adit). *See* Map 4.

Road log from Highway 1 (Fundy Coastal Drive) at **km 42.1** (*see* the Main Road Log on page 4):

km		
	0	Junction, Highway 1 and the road to Lake Utopia; proceed northeast toward Lake Utopia.
	2.8	Junction; turn left (north) onto Highway 785.
	33.0	Junction; turn left (northwest).
	37.0	Mine plant on left; continue straight ahead.
	39.2	Junction; turn right (northeast).
	40.2	Junction. The road straight ahead leads northeast 375 m to the North zone adit. To continue along the road log turn right (southeast).
	40.7	Junction; turn left (east).
	41.1	North zone trenches. Continue east along the road to the Fire Tower zone.
	41.4	Junction; turn right (south).
	42.3	Junction: turn right (west).
	42.6	Fire Tower zone 900 adit.
	43.0	Fire Tower zone 750 adit.

Refs.: 48 p. 21-G/7W-1; 136; 192 p. 20-29; 199 p. 1-14; 212 p. 1356-1372; 234 p. 82-89; 265 p. 118-123; 288 p. 4-29; 289 p. 113-126; 293 p. 32-34; 306 p. 104-112; 312 p. 11-16; 323 p. 78-83; 324 p. 9-17; 325 p. 38-39; 346 p. 86-91; 362 p. 26-29; 401 p. 213-214; 402 p. 243-244, 340-341; 403 p. 313; 404 p. 305; 406 p. 55, 361; 407 p. 63, 383; 408 p. 62, 239, 355; 409 p. 59; 410 p. 70; 416 p. 21.

Maps (T): 21 G/7 McDougall Lake
(G): 20-1966 St. Stephen-Pleasant Mountain area, New Brunswick (GSC,1:63 360)
143 St. Stephen, New Brunswick, Map Sheet 1 S.W. (GSC, 1:253 440)
NR-2 Mineral occurrence map of New Brunswick (NBDNR, 1:500 000)
NR-5 Geological map of southwestern New Brunswick (NBDNR, 1:250 000)
Geological highway map of New Brunswick and Prince Edward Island, Special Publication No. 2 (Atlantic Geoscience Society, 1:638 000)

Grand Manan Island

Collecting localities in the Grand Manan Island side trip are described in the text that follows. The localities described are: Sawpit Cove occurrence (p. 33), Fish Head occurrence (p. 33), Whale Cove occurrences (p. 35), Seven Days Work occurrence (p. 36), Northern Head

occurrences (p. 37), Dark Harbour occurrence (p. 38), Sloop Cove mine (p. 40), Red Point occurrence (p. 40), Harrington Cove occurrence (p. 41), Deep Cove occurrence (p. 42), and Southwest Head occurrence (p. 43). A page reference is indicated in parenthesis following the name of each mine or occurrence.

The side trip proceeds along Highway 776; the starting point is in North Head, Grand Manan Island at the junction of Highway 776 and the road to the ferry terminal. The description of collecting localities along the the main road log, Highway 1, is resumed on page 43.

Grand Manan Island

SCOLECITE, HEULANDITE, LEVYNE, LAUMONTITE, ANALCIME, NATROLITE, EPISTILBITE, THOMSONITE, STILBITE, CHABAZITE, APOPHYLLITE, PREHNITE, NATIVE COPPER, CHALCEDONY (AGATE), JASPER, HEMATITE, CHLORITE, CALCITE CRYSTALS, QUARTZ CRYSTALS, CLAY MINERALS

In basalt

These minerals occur in amygdaloidal cavities and in veins. The openings range from a few millimetres to several centimetres across, and are commonly lined with greyish-green clay minerals (glauconite, montmorillonite). The basalt containing these minerals is exposed along shoreline cliffs at various localities around the island; weathering of the basalt releases the minerals which are then accumulated on beaches below.

The description of the collecting localities is given in the text following the road log to Grand Manan Island.

Grand Manan Island is in the Bay of Fundy, about 50 km south of St. George. Lat. 44°45′48″N, Long. 66°44′56″W (North Head ferry landing). *See* Map 5.

Road log to Grand Manan Island from Highway 1 (Fundy Coastal Drive) at **km 47.5** (*see* the Main Road Log on page 4):

km		
	0	Junction, highways 1 and 778; proceed south along Highway 778.
	0.2	Junction; turn right onto Highway 176 to Blacks Harbour.
	10.3	Blacks Harbour, at the Grand Manan Island ferry terminal. The distance from this point to the ferry terminal at North Head, Grand Manan Island is about 35 km.

Maps (T): 21 B/10 and 21 B/6,7,11 Grand Manan Island
21 B/15 and 21/B14 Campobello Island

(G): 143 St. Stephen, New Brunswick, Map Sheet 1 S.W. (GSC, 1:253 440)
965A Grand Manan, New Brunswick (GSC, 1:63 360)
2000-29 (Revised 2003) Geology of Grand Manan Island (parts of NTS 21 B/10 and B/15), New Brunswick (NBDNR, 1:50 000)
NR-2 Mineral occurrence map of New Brunswick (NBDNR, 1:500 000)
NR-5 Geological map of southwestern New Brunswick (NBDNR, 1:250 000)
Geological highway map of New Brunswick and Prince Edward Island, Special Publication No. 2 (Atlantic Geoscience Society, 1:638 000)

Sawpit Cove occurrence

BARITE, GALENA, SPHALERITE, HEMATITE, CHALCOPYRITE

In sheared volcanic rocks

White barite occurs with quartz and calcite in veins up to 30 cm wide. Galena, sphalerite, hematite, and chalcopyrite occur in minor amounts.

The occurrence is exposed along seacliffs at Sawpit Cove on the northeastern coast of Grand Manan Island, about 1 km east of North Head. Lat. 44°45′51″N, Long. 66°44′02″ W to Lat. 44°45′58″N, Long. 66°44′07″W. *See* Map 5.

Road log from North Head:

km		
	0	North Head, junction of the ferry road, Highway 776 and the road to the airport (this junction is 0.2 km from the ferry terminal); proceed east along the road to the airport.
	0.5	Junction; turn right (east) onto the road to the Swallow Tail lighthouse.
	1.3	End of the road at the lighthouse. The Sawpit Cove occurrence is exposed along the shore of Sawpit Cove, at points about 100 m and 365 m respectively northwest of the Swallow Tail lighthouse. Collect at low tide.

Refs.: 12 p. 125M; 16 p. 103, 237; 46 p. 21-B/15W-5; 178 p. 11; 313 p. 2-4.

Maps (T): 21 B/15 and 21/B14 Campobello Island
(G): 143 St. Stephen, New Brunswick, Map Sheet 1 S.W. (GSC, 1:253 440)
965A Grand Manan, New Brunswick (GSC, 1:63 360)
2000-29 (Revised 2003) Geology of Grand Manan Island (parts of NTS 21 B/10 and B/15), New Brunswick (NBDNR, 1:50 000)
NR-2 Mineral occurrence map of New Brunswick (NBDNR, 1:500 000)
NR-5 Geological map of southwestern New Brunswick (NBDNR, 1:250 000)
Geological highway map of New Brunswick and Prince Edward Island, Special Publication No. 2 (Atlantic Geoscience Society, 1:638 000)

Fish Head occurrence

CHLORITE

In volcanic rocks

Massive dark green chlorite occurs in quartz veins in andesite and rhyolite. The chlorite was used for making pipes and functional vessels by the Indian people who came to the location annually to collect the mineral. Chlorite was also extracted by fishermen from the United States for sale as specimens.

The occurrence is exposed along the shore of Fish Head at the northern tip of the North Head peninsula on the northeastern coast of Grand Manan Island, about 2 km north of North Head. Lat. 44°46′46″N, Long. 66°44′33″W. *see* Map 5.

Road log from North Head:

km		
	0	North Head, junction of the ferry road and Highway 776 (0.2 km from the ferry terminal); proceed west along Highway 776.



1. Sawpit Cove occurrence 2. Fish Head occurrence 3. Whale Cove occurrences 4. Seven Days Work occurrence 5. Northern Head occurrences 6. Dark Harbour occurrence 7. Sloop Cove mine 8. Red Point occurrence 9. Harrington Cove occurrence 10. Deep Cove occurrence 11. Southwest Head occurrence

Map 5. Grand Manan Island

1.0 Junction; turn right (north) onto the road to Whale Cove.

1.6 End of the road at Whale Cove. Proceed along the trail leading northeastward along the shore.

2.8 Fish Head occurrence. Collect at low tide.

Refs.: 46 p. 21-B/15W-11; 151 p. 6; 152 p. 37.

Maps (T): 21 B/15 and 21/B14 Campobello Island
(G): 143 St. Stephen, New Brunswick, Map Sheet 1 S.W. (GSC, 1:253 440)
965A Grand Manan, New Brunswick (GSC, 1:63 360)
2000-29 (Revised 2003) Geology of Grand Manan Island (parts of NTS 21 B/10 and B/15), New Brunswick (NBDNR, 1:50 000)
NR-2 Mineral occurrence map of New Brunswick (NBDNR, 1:500 000)
NR-5 Geological map of southwestern New Brunswick (NBDNR, 1:250 000)
Geological highway map of New Brunswick and Prince Edward Island, Special Publication No. 2 (Atlantic Geoscience Society, 1:638 000)

Whale Cove occurrences

EPISTILBITE, SCOLECITE, HEULANDITE, CHABAZITE, STILBITE, CLINOPYROXENE, QUARTZ, CHALCEDONY (AGATE, HELIOTROPE), NATIVE COPPER, CHALCOPYRITE, MALACHITE, EPIDOTE, CLINOAMPHIBOLE

In basalt; in chloritized volcanic rocks

Amygdaloidal cavities in basalt contain epistilbite, as colourless radiating prismatic, blocky, fibrous, and platy crystal aggregates; scolecite, as white porcellaneous and pearly compact fibrous masses, and as colourless transparent prisms; heulandite, as colourless, pink to orange-red, and greenish fibrous and platy aggregates; chabazite, as pink tabular and cleavable aggregates; stilbite, as white to reddish platy aggregates; and clinopyroxene, as yellowish green transparent crystal aggregates. The cavities are commonly 2 cm across and are lined with greyish green clay minerals (montmorillonite, glauconite). Colourless to white quartz and chalcedony (agate and heliotrope) occur in cavities and in veins. Native copper, chalcopyrite, and malachite occur in basaltic flows. Epidote occurs as yellowish green prismatic crystals forming aggregates and nodules in chloritized volcanic rocks; white fibrous clinoamphibole is associated with epidote.

The occurrences are exposed along the shore of Whale Cove on the northeastern coast of Grand Manan Island, about 1.5 km northwest of North Head. Lat. 44°46′23″N, Long. 66°45′41″W (zeolite occurrence); Lat. 44°46′23″N, Long. 66°45′07″W (copper occurrence). *See* Map 5.

Road log from North Head:

km 0 North Head, junction of the ferry road and Highway 776 (0.2 km from the ferry terminal); proceed west along Highway 776.

1.2 Junction; turn right (north) onto the road to Whale Cove.

2.2 End of the road at Whale Cove and the Whale Cove occurrences. The zeolite-bearing basalt occurs as boulders along the shore of the cove, and along the seacliffs beginning at the first headland north of km 2.2 and extending north about 2 km to the Seven Days Work cliffs. The

volcanic rocks containing copper minerals and epidote are exposed along the eastern shore of Whale Cove, directly east of km 2.2. Collect at low tide.

Refs.: 16 p. 219; 149 p. 1620-1624; 151 p. 5; 152 p. 37; 313 p. 2-4.

Maps (T): 21 B/15 and 21/B14 Campobello Island
(G): 143 St. Stephen, New Brunswick, Map Sheet 1 S.W. (GSC, 1:253 440)
965A Grand Manan, New Brunswick (GSC, 1:63 360)
2000-29 (Revised 2003) Geology of Grand Manan Island (parts of NTS 21 B/10 and B/15), New Brunswick (NBDNR, 1:50 000)
NR-2 Mineral occurrence map of New Brunswick (NBDNR, 1:500 000)
NR-5 Geological map of southwestern New Brunswick (NBDNR, 1:250 000)
Geological highway map of New Brunswick and Prince Edward Island, Special Publication No. 2 (Atlantic Geoscience Society, 1:638 000)

Seven Days Work occurrence

SCOLECITE, STILBITE, HEULANDITE, EPISTILBITE, LEVYNE, THOMSONITE, LAUMONTITE, CALCITE CRYSTALS, QUARTZ CRYSTALS, CHLORITE, CHALCEDONY (AGATE, CARNELIAN)

In basalt

Amygdaloidal cavities in basalt contain scolecite, as white radiating fibres and porcellaneous masses; stilbite, as white to pink radiating fibrous, acicular, platy to tabular aggregates; heulandite, as pink to orange and white platy to tabular crystals, and as crystal aggregates; epistilbite, as white prismatic and platy aggregates; levyne, as white blocky crystal aggregates; thomsonite, as light bluish-green and greenish-yellow compact masses and crusts; laumontite, as white to pink columnar aggregates; white and colourless calcite crystals; colourless to amethystine quartz crystals; and dark green flaky chlorite. Chalcedony (agate and carnelian) occur in veins. The cavities are up to 5 cm across and the veins are up to 10 cm wide and several centimetres long. Green waxy glauconite commonly lines the openings.

The occurrence is exposed along the Seven Days Work seacliffs, on the northeastern coast of Grand Manan Island, about 3 km northwest of North Head. Lat. 44°47′34″N, Long. 66°46′18″W to Lat. 44°47′08″N, Long. 66°46′02″W. *See* Map 5.

Road log from North Head:

km		
	0	North Head, junction of the ferry road and Highway 776 (0.2 km from the ferry terminal); proceed west along Highway 776.
	1.4	Junction; turn right (north).
	4.8	Junction, trail on right just beyond a municipal dump; proceed east along this trail to Eel Brook beach.
	5.6	End of the trail at the beach. The Seven Days Work occurrence extends southward from this beach. Collect at low tide.

Refs.: 149 p. 1620-1624; 151 p. 5; 152 p. 37.

Maps (T): 21 B/15 and 21/B14 Campobello Island
(G): 143 St. Stephen, New Brunswick, Map Sheet 1 S.W. (GSC, 1:253 440)
965A Grand Manan, New Brunswick (GSC, 1:63 360)

2000-29 (Revised 2003) Geology of Grand Manan Island (parts of NTS 21 B/10 and B/15), New Brunswick (NBDNR, 1:50 000)
NR-2 Mineral occurrence map of New Brunswick (NBDNR, 1:500 000)
NR-5 Geological map of southwestern New Brunswick (NBDNR, 1:250 000)
Geological highway map of New Brunswick and Prince Edward Island, Special Publication No. 2 (Atlantic Geoscience Society, 1:638 000)

Northern Head occurrences

SCOLECITE, STILBITE, HEULANDITE, THOMSONITE, ANALCIME, LEVYNE, APOPHYLLITE, EPISTILBITE, CHABAZITE, NATROLITE, PREHNITE, LAUMONTITE, QUARTZ CRYSTALS, CHALCEDONY (AGATE), JASPER, HEMATITE, CALCITE CRYSTALS

In basalt

Minerals occurring in amygdaloidal cavities in basalt are scolecite, as white porcellaneous compact fibrous masses and nodules up to 10 cm across; stilbite, as colourless platy and fibrous masses, and as yellow vitreous platy aggregates; heulandite, as colourless and pink crystals; thomsonite, as white to pink fibrous and compact masses; analcime, as white to greenish-white masses and fibrous aggregates; levyne, as white granular, fibrous and blocky aggregates; apophyllite, as white tabular to square crystal aggregates; epistilbite, as colourless to white radiating fibres and acicular crystals, commonly forming nodules up to 5 cm across; chabazite, as pink transparent masses; natrolite, as pearly white and orange-pink and yellow-green vitreous patches in epistilbite; prehnite, as greyish pink compact fibrous masses associated with scolecite; and laumontite, as white flaky aggregates. The cavities are lined with green fine-grained and flaky clay minerals (glauconite, montmorillonite). Minerals occurring in veins are colourless to amethystine quartz crystals; white, grey, and pink chalcedony (agate); red jasper; earthy red and specular hematite; and colourless to white calcite crystals.

The occurrence is exposed along Northern Head coastal seacliffs on the northern tip of Grand Manan Island, Bay of Fundy about 5 km northwest of North Head. Lat. 44°48′44″N, Long. 66°46′14″W (Ashburton Head), Lat. 44°48′00″N, Long. 66°47′05″W (Whistle Beach), Lat. 44°46′30″N, Long. 66°49′18″W (Money Cove). *See* Map 5.

Road log from North Head:

km		
	0	North Head, junction of the ferry road and Highway 776 (0.2 km from the ferry terminal); proceed west along Highway 776.
	1.4	Junction; turn right (north).
	4.4	Northern Head, end of road on the shore 300 m southwest of the lighthouse at Whistle Beach. The Northern Head occurrences extend west from Ashburton Head to Whistle Beach and southwest to Money Cove on the western shore of the island. Collect at low tide.

Refs.: 46 p. 21-B/15W-9; 151 p. 4-5; 152 p. 36-37.

Maps (T): 21 B/15 and 21/B14 Campobello Island
(G): 143 St. Stephen, New Brunswick, Map Sheet 1 S.W. (GSC, 1:253 440)
965A Grand Manan, New Brunswick (GSC, 1:63 360)
2000-29 (Revised 2003) Geology of Grand Manan Island (parts of NTS 21 B/10 and B/15), New Brunswick (NBDNR, 1:50 000)



Plate 1.

Zeolite-bearing basalt seacliffs, Seven Days Work, Grand Manan Island, 1963.
(GSC 138652)

NR-2 Mineral occurrence map of New Brunswick (NBDNR, 1:500 000)
NR-5 Geological map of southwestern New Brunswick (NBDNR, 1:250 000)
Geological highway map of New Brunswick and Prince Edward Island, Special Publication No. 2 (Atlantic Geoscience Society, 1:638 000)

Dark Harbour occurrence

ANALCIME, NATROLITE, THOMSONITE, CHLORITE, QUARTZ CRYSTALS, CHALCEDONY (AGATE), JASPER, HEMATITE, MAGNETITE

In basalt

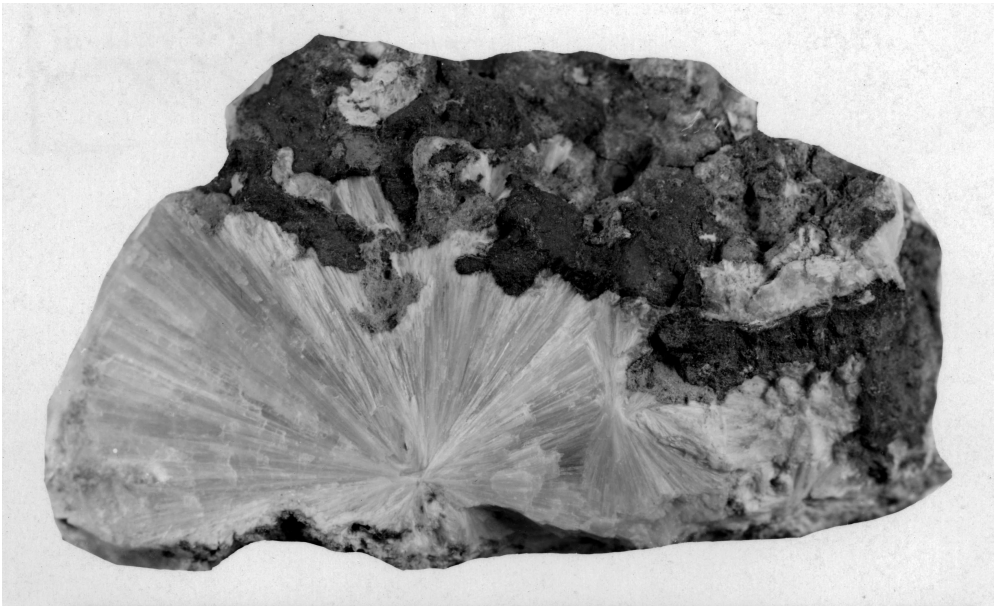


Plate 2.

Scolecite in basalt, Seven Days Work, Grand Manan Island. The specimen measures 8 cm across. (GSC 112624-A)

Minerals occurring in amygdaloidal cavities in basalt are: analcime, as colourless and pink granular masses, and as colourless transparent crystals; natrolite, as pink radiating fibrous aggregates; thomsonite, as white radiating fibres; and chlorite, as green flaky aggregates. Amethystine and colourless quartz crystals, chalcedony (agate), jasper, white calcite, specular hematite, and magnetite occur in veins.

The occurrence is exposed along the shore of Dark Harbour on the western coast of Grand Manan Island, about 7 km southwest of North Head. Lat. 44°44′44″N, Long. 66°50′13″W. *See* Map 5.

Road log from North Head:

km		
	0	North Head, junction of the ferry road and Highway 776 (0.2 km from the ferry terminal); proceed west along Highway 776.
	1.4	Junction; turn left (south).
	4.9	Castalia, junction; turn right (west).
	7.0	Junction; turn left (south).
	7.4	Junction; turn right (west).
	13.3	Dark Harbour. Proceed to the Dark Harbour occurrence along the shore. Collect at low tide.

Refs.: 151 p. 3-4; 152 p. 36.

Maps (T): 21 B/10 and 21 B/6,7,11 Grand Manan Island
21 B/15 and 21/B14 Campobello Island

(G): 143 St. Stephen, New Brunswick, Map Sheet 1 S.W. (GSC, 1:253 440)
965A Grand Manan, New Brunswick (GSC, 1:63 360)
2000-29 (Revised 2003) Geology of Grand Manan Island (parts of NTS 21 B/10 and B/15), New Brunswick (NBDNR, 1:50 000)
NR-2 Mineral occurrence map of New Brunswick (NBDNR, 1:500 000)
NR-5 Geological map of southwestern New Brunswick (NBDNR, 1:250 000)
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Sloop Cove mine

CHALCOCITE, NATIVE COPPER, CHALCOPYRITE, MALACHITE, AZURITE, MAGNETITE, HEMATITE

In shale

Copper mineralization consisting of chalcocite, native copper, chalcopyrite, malachite, and azurite occurs in calcite veins. Magnetite, hematite, and chlorite are minor constituents.

Moses Bagley discovered the copper mineralization along a shoreline cliff at Sloop Cove in 1862. In about 1870, Messrs. Gray and Company drove an adit 76 m into the cliff. In 1958, Keevil Mining Group did some drilling and excavating.

The mine is on the shore of Sloop Cove on the western coast of Grand Manan Island, about 14 km southwest of North Head. Lat. 44°41′18″N, Long. 66°52′19″W. *See* Map 5.

Road log from North Head:

km		
	0	North Head, junction of the ferry road and Highway 776 (0.2 km from the ferry terminal); proceed west along Highway 776.
	1.4	Junction; turn left (south).
	4.9	Castalia, junction; turn right (west).
	7.0	Junction; turn left (south).
	7.4	Junction; turn right (west).
	13.3	Dark Harbour. Proceed south by boat 7 km to the Sloop Cove mine. The location can be recognized by green malachite staining on the talus along the shore. Collect at low tide.

Refs.: 46 p. 21-B/10W-1; 59 p. 1-7; 60 p. 234-239; 149 p. 1620-1624; 308 p. 12.

Maps (T): 21 B/10 and 21 B/6,7,11 Grand Manan Island
(G): 143 St. Stephen, New Brunswick, Map Sheet 1 S.W. (GSC, 1:253 440)
965A Grand Manan, New Brunswick (GSC, 1:63 360)
2000-29 (Revised 2003) Geology of Grand Manan Island (parts of NTS 21 B/10 and B/15), New Brunswick (NBDNR, 1:50 000)
NR-2 Mineral occurrence map of New Brunswick (NBDNR, 1:500 000)
NR-5 Geological map of southwestern New Brunswick (NBDNR, 1:250 000)
Geological highway map of New Brunswick and Prince Edward Island, Special Publication No. 2 (Atlantic Geoscience Society, 1:638 000)

Red Point occurrence

MAGNETITE

In beach sand

Magnetite occurs as fine grains in beach sand in an area underlain by Precambrian quartzite, argillite, conglomerate, and mica schist. In about 1830, considerable quantities of the magnetic sand were shipped to the United States for filling hour glasses and for other purposes. The occurrence is at Red Point on the southeastern shore of Grand Manan Island, about 2 km east of Seal Cove and 14 km southwest of North Head. Lat. 44°38′55″N, Long. 66°49′03″W. *See* Map 5.

Road log from North Head:

km		
	0	North Head, junction of the ferry road and Highway 776 (0.2 km from the ferry terminal); proceed west along Highway 776.
	1.4	Junction; proceed south along Highway 776.
	15.0	Junction, road leading south to The Anchorage Provincial Park; continue along Highway 776.
	18.4	Junction; turn left (east).
	20.4	Red Point occurrence. The magnetite sand occurs along the beach. The contact between the Precambrian volcanic rocks and Jurassic basalt is exposed along the shore about 200 m west of this point. Collect at low tide.

Refs.: 16 p. 108-109, 220-221; 46 p. 21-B/10W-25; 136; 151 p. 8; 152 p. 39.

Maps (T): 21 B/10 and 21 B/6,7,11 Grand Manan Island
(G): 143 St. Stephen, New Brunswick, Map Sheet 1 S.W. (GSC, 1:253 440)
965A Grand Manan, New Brunswick (GSC, 1:63 360)
2000-29 (Revised 2003) Geology of Grand Manan Island (parts of NTS 21 B/10 and B/15), New Brunswick (NBDNR, 1:50 000)
NR-2 Mineral occurrence map of New Brunswick (NBDNR, 1:500 000)
NR-5 Geological map of southwestern New Brunswick (NBDNR, 1:250 000)
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Harrington Cove occurrence

SCOLECITE, EPISTILBITE, HEULANDITE, STILBITE, CLINOPYROXENE

In basalt

Minerals occurring in amygdaloidal cavities in basalt are: scolecite, as pearly white, compact, fibrous masses; epistilbite, as colourless transparent prismatic crystals, and as radiating aggregates; heulandite, as colourless and pink platy and sugary aggregates; stilbite, as colourless transparent platy aggregates; clinopyroxene, as yellowish-green vitreous micro-prisms; and white massive calcite and quartz.

The occurrence is exposed along the shore of Harrington Cove on the southeastern coast of Grand Manan Island, about 18 km southwest of North Head. Lat. 44°37′22″N, Long. 66°51′45″W. *See* Map 5.

Road log from North Head:

km		
	0	North Head, junction of the ferry road and Highway 776 (0.2 km from the ferry terminal); proceed west along Highway 776.

	1.4	Junction; proceed south along Highway 776.
	20.3	Quarry on the left (east) side of the road. Basalt containing minerals listed above occur in the quarry.
	22.6	Harrington Cove occurrence, on the east side of the road. Collect at low tide.

Maps (T): 21 B/10 and 21 B/6,7,11 Grand Manan Island
(G): 143 St. Stephen, New Brunswick, Map Sheet 1 S.W. (GSC, 1:253 440)
965A Grand Manan, New Brunswick (GSC, 1:63 360)
2000-29 (Revised 2003) Geology of Grand Manan Island (parts of NTS 21 B/10 and B/15), New Brunswick (NBDNR, 1:50 000)
NR-2 Mineral occurrence map of New Brunswick (NBDNR, 1:500 000)
NR-5 Geological map of southwestern New Brunswick (NBDNR, 1:250 000)
Geological highway map of New Brunswick and Prince Edward Island, Special Publication No. 2 (Atlantic Geoscience Society, 1:638 000)

Deep Cove occurrence

SCOLECITE, EPISTILBITE, LEVYNE, CHABAZITE, STILBITE, HEULANDITE, ANALCIME

In basalt

The minerals occur in amygdaloidal cavities in basalt: scolecite, as white fine-grained compact to porcellaneous masses, and as radiating fibrous to prismatic aggregates forming oblong nodules up to 5 by 15 cm; epistilbite, as colourless transparent radiating prismatic and blocky aggregates; levyne, as white pearly translucent to opaque blocky crystal aggregates, and as colourless transparent vitreous masses; chabazite, as pink transparent vitreous cleavable masses; stilbite, as colourless platy crystal aggregates, and as light yellow radiating columnar aggregates; heulandite, as colourless pearly platy aggregates, as colourless to white blocky crystal aggregates, and as pink to white compact porcellaneous masses; and analcime, as colourless to greenish vitreous masses. Dull green clay minerals (montmorillonite, glauconite) commonly line the cavities.

The occurrence is exposed along the shore of Deep Cove and the cove immediately to the south, on the southeastern coast of Grand Manan Island, about 20 km southwest of North Head. Lat. 44°36′49″N, Long. 66°52′41″W to Lat. 44°36′14″N, Long. 66°52′53″W. *See* Map 5.

Road log from North Head:

km		
	0	North Head, junction of the ferry road and Highway 776 (0.2 km from the ferry terminal); proceed west along Highway 776.
	1.4	Junction; proceed south along Highway 776.
	23.9	Bridge over Deep Cove Brook.
	24.8	Access to the Deep Cove occurrence on the shore just east of the highway.
	25.5	Access to the Deep Cove occurrence on the shore just east of the highway. Collect at low tide.

Maps (T): 21 B/10 and 21 B/6,7,11 Grand Manan Island

(G): 143 St. Stephen, New Brunswick, Map Sheet 1 S.W. (GSC, 1:253 440)
965A Grand Manan, New Brunswick (GSC, 1:63 360)
2000-29 (Revised 2003) Geology of Grand Manan Island (parts of NTS 21 B/10 and B/15), New Brunswick (NBDNR, 1:50 000)
NR-2 Mineral occurrence map of New Brunswick (NBDNR, 1:500 000)
NR-5 Geological map of southwestern New Brunswick (NBDNR, 1:250 000)
Geological highway map of New Brunswick and Prince Edward Island, Special Publication No. 2 (Atlantic Geoscience Society, 1:638 000)

Southwest Head occurrence

NATIVE COPPER

In basalt

Native copper occurs as small nodules, stringers, and bunches in veins and cavities.

The copper-bearing basalt is exposed along the southern shore of Grand Manan Island at Southwest Head. Native copper is also reported to occur in red sandstone underlying basalt at various points along the western shore of the island from Southwest Head to Dark Harbour; the sandstone is exposed at very low tide.

The occurrence is exposed at Southwest Head on the southern tip of Grand Manan Island, about 23 km southwest of North Head. Lat. 44°35′53″ N, Long. 66°54′06″W. *See* Map 5.

Road log from North Head:

km		
	0	North Head, junction of the ferry road and Highway 776 (0.2 km from the ferry terminal); proceed west along Highway 776.
	1.4	Junction; proceed south along Highway 776.
	26.7	Junction; proceed south to the shore at South Head Beach. Note: this junction is 0.8 km from the end of the road at Gull Cliff, Southwest Head.
	26.95	South Head Beach. To reach the Southwest Head occurrence, proceed west along the shore for about 500 m. Collect at low tide.

Refs.: 12 p. 19M-20M; 16 p. 225, 226; 46 p. 21-B/10W-2.

Maps (T): 21 B/10 and 21 B/6,7,11 Grand Manan Island
(G): 143 St. Stephen, New Brunswick, Map Sheet 1 S.W. (GSC, 1:253 440)
965A Grand Manan, New Brunswick (GSC, 1:63 360)
2000-29 (Revised 2003) Geology of Grand Manan Island (parts of NTS 21 B/10 and B/15), New Brunswick (NBDNR, 1:50 000)
NR-2 Mineral occurrence map of New Brunswick (NBDNR, 1:500 000)
NR-5 Geological map of southwestern New Brunswick (NBDNR, 1:250 000)
Geological highway map of New Brunswick and Prince Edward Island, Special Publication No. 2 (Atlantic Geoscience Society, 1:638 000)

This is the end of the description of collecting localities in Grand Manan Island. The description of collecting localities along the main collecting route (*see* p.4) along Highway 1 (Fundy Coastal Drive) continues from **km 47.5**.

Beaver Harbour occurrences

FOSSILS

In shale

Plant fossils (*Psilophyton, Protolepidendron*) of Devonian age are exposed along the shore of Beaver Harbour. One of the exposures is in light grey shale on the north side of the mouth of Cripps Stream immediately above an old mill dam on the shore of the northeast arm of Beaver Harbour. Another exposure is in black siliceous shale exposed on a headland on the west side of the Beaver Harbour.

The occurrences are exposed at Beaver Harbour, Bay of Fundy, about 10 km southeast of St. George. Lat. 45°05′05″N, Long. 66°42′42″W (Cripps Stream); Lat. 45°03′57″N, Long. 66°44′12″W (west side of Beaver Harbour). *See* Map 6.

Road log from Highway 1 (Fundy Coastal drive) at **km 47.5** (*see* the Main Road Log on page 4):

km		
	0	Junction of highways 1 and 778; proceed south along Highway 778.
	2.3	Junction; the road on left leads to the occurrence at the mouth of Cripps Stream. To reach this occurrence, follow this road east for 2 km to a T-junction, then turn right (south) continuing 0.9 km to the end of the road at the shore of Beaver Harbour on the north side of the mouth of Cripps Stream. The fossil-bearing shale is exposed along the shore in the vicinity of the mouth of the stream. To reach the Beaver Harbour (west side) fossil occurrence, proceed south from km 2.3, continuing along Highway 778.
	5.8	Beaver Harbour village. Proceed to the wharf and walk south 450 m to the headland where the fossil-bearing rock is exposed along the Beaver Harbour western shore. Collect at low tide.

Ref.: 82 p. 20.

Maps (T): 21 G/2 St. George
(G): 21 G/2E St. George, east half, Geology of the Caledonia area, southern New Brunswick (NBDNR, 1:50 000)
98-23 Bedrock geological compilation of the St. George area (NTS 21 G/02), Charlotte County, New Brunswick (NBDNR, 1:50 000)
143 St. Stephen, New Brunswick, Map Sheet 1 S.W. (GSC, 1:253 440)
1094A St. George, Charlotte County, New Brunswick (GSC, 1:63 360)
NR-5 Geological map of southwestern New Brunswick (NBDNR, 1:250 000)
Geological highway map of New Brunswick and Prince Edward Island, Special Publication No. 2 (Atlantic Geoscience Society, 1:638 000)

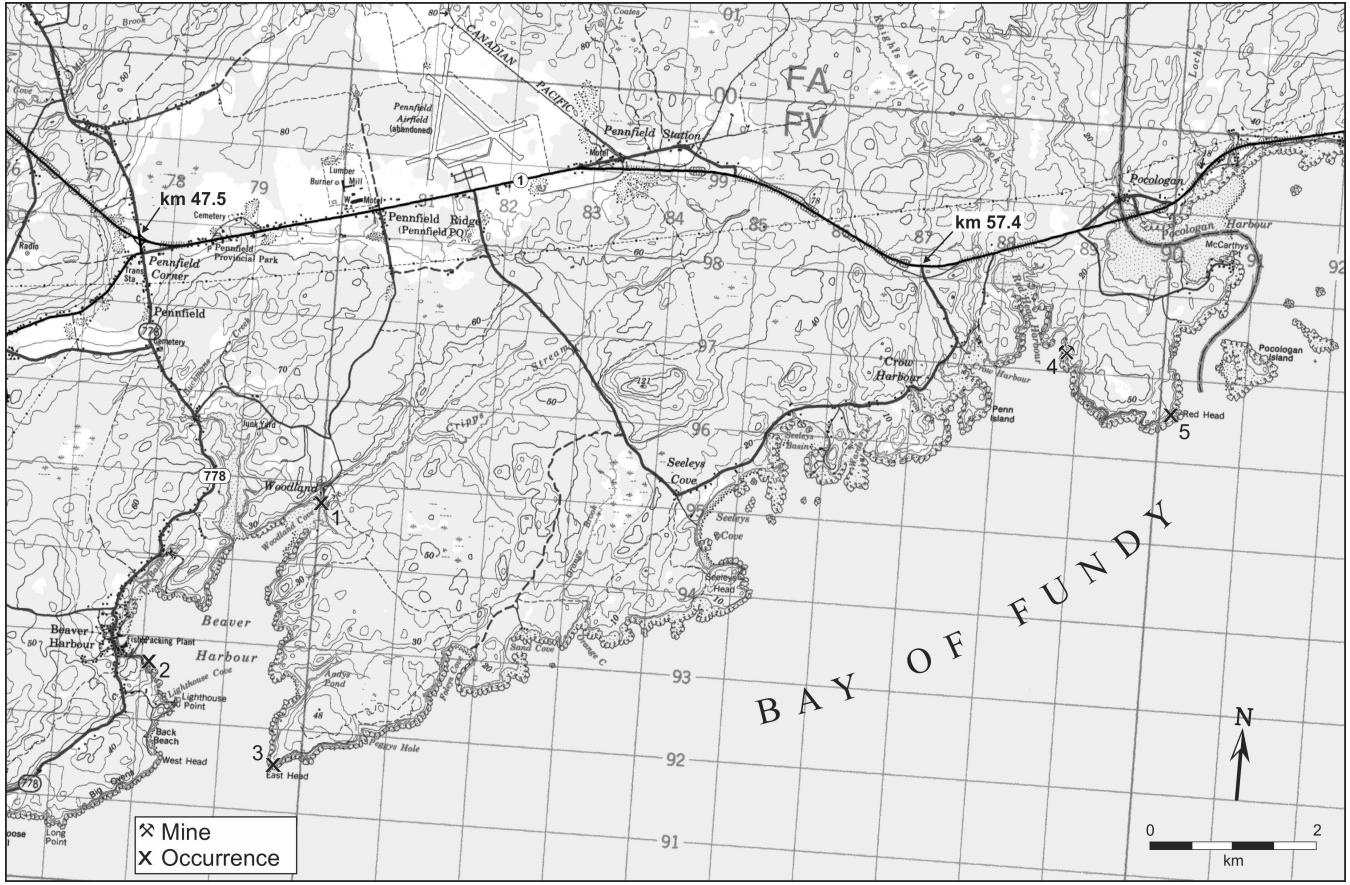
East Head occurrence

JASPER

In volcanic rocks

Red jasper occurs in veins several metres across.

The occurrence is exposed at East Head at the southeastern entrance to Beaver Harbour, Bay of Fundy, about 12 km southeast of St. George. Lat. 45°03′23″N, Long. 66°43′05″W. *See* Map 6.



1. Beaver Harbour (Cripps Stream) occurrence 2. Beaver Harbour occurrence 3. East Head occurrence 4. Red Head Harbour mine 5. Red Head occurrence

Map 6. St. George East

To reach the East Head occurrence, follow the road log to the Beaver Harbour occurrences. From Beaver Harbour village, proceed by boat 2.5 km southeast across the harbour to East Head where the occurrence is exposed. Collect at low tide.

Refs.: 46 p. 21-G/2E-20; 152 p. 50.

Maps (T): 21 G/2 St. George
(G): 21 G/2E St. George, east half, Geology of the Caledonia area, southern New Brunswick (NBDNR, 1:50 000)
143 St. Stephen, New Brunswick, Map Sheet 1 S.W. (GSC, 1:253 440)
1094A St. George, Charlotte County, New Brunswick (GSC, 1:63 360)
NR-2 Mineral occurrence map of New Brunswick (NBDNR, 1:500 000)
NR-5 Geological map of southwestern New Brunswick (NBDNR, 1:250 000)
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Red Head Harbour mine

CHALCOPYRITE, PYRITE

In schist

Chalcopyrite and pyrite occur as disseminations in talc-mica schist at its contact with diorite.

The mine was opened as a copper prospect in 1878 to 1879. In 1899, considerable development work was done.

The mine is on the east side of Red Head Harbour, Bay of Fundy, about 18 km southeast of St. George. Lat. 45°06′20″N, Long. 66°35′58″W. *See* Map 6.

Road log from Highway 1 (Fundy Coastal Drive) at **km 57.4** (*see* the Main Road Log on page 4):

km		
	0	Junction, Highway 1 and the road to Crow Harbour; proceed south to Crow Harbour.
	1.0	End of the road at the shore of Crow Harbour. The Red Head Harbour mine is on the opposite side of the harbour, 1400 m east of this point. Access is by boat. Collect at low tide.

Refs.: 12 p. 24M; 16 p. 226; 46 p. 21-G/2E-7; 108 p. 271A; 311 p. 143.

Maps (T): 21 G/2 St. George
(G): 21 G/2E St. George, east half, Geology of the Caledonia area, southern New Brunswick (NBDNR, 1:50 000)
98-23 Bedrock geological compilation of the St. George area (NTS 21 G/02), Charlotte County, New Brunswick (NBDNR, 1:50 000)
143 St. Stephen, New Brunswick, Map Sheet 1 S.W. (GSC, 1:253 440)
1094A St. George, Charlotte County, New Brunswick (GSC, 1:63 360)
NR-2 Mineral occurrence map of New Brunswick (NBDNR, 1:500 000)
NR-5 Geological map of southwestern New Brunswick (NBDNR, 1:250 000)
Geological highway map of New Brunswick and Prince Edward Island, Special Publication No. 2 (Atlantic Geoscience Society, 1:638 000)

Red Head occurrence

JASPER

In volcanic rocks

Compact red jasper occurs in reddish volcanic rocks.

The occurrence is exposed along seacliffs at Red Head, Bay of Fundy, about 18 km southeast of St. George. Lat. 45°05′55″N, Long. 66°35′00″W. *See* Map 6.

Road log from Highway 1 (Fundy Coastal Drive) at **km 57.4** (*see* the Main Road Log on page 4):

km		
	0	Junction, Highway 1 and the road to Crow Harbour; proceed south to Crow Harbour.
	1.0	End of the road at the shore of Crow Harbour. From the Crow Harbour shore, proceed by boat southeast across the harbour for about 3 km to Red Head where the occurrence is exposed. Collect at low tide.

Refs.: 46 p. 21-G/2E-21; 152 p. 51.

Maps (T): 21 G/2 St. George
(G): 21 G/2E St. George, east half, Geology of the Caledonia area, southern New Brunswick (NBDNR, 1:50 000)
143 St. Stephen, New Brunswick, Map Sheet 1 S.W. (GSC, 1:253 440)
1094A St. George, Charlotte County, New Brunswick (GSC, 1:63 360)
NR-2 Mineral occurrence map of New Brunswick (NBDNR, 1:500 000)
NR-5 Geological map of southwestern New Brunswick (NBDNR, 1:250 000)
Geological highway map of New Brunswick and Prince Edward Island, Special Publication No. 2 (Atlantic Geoscience Society, 1:638 000)

Lepreau mine

MAGNETITE

In rhyolite

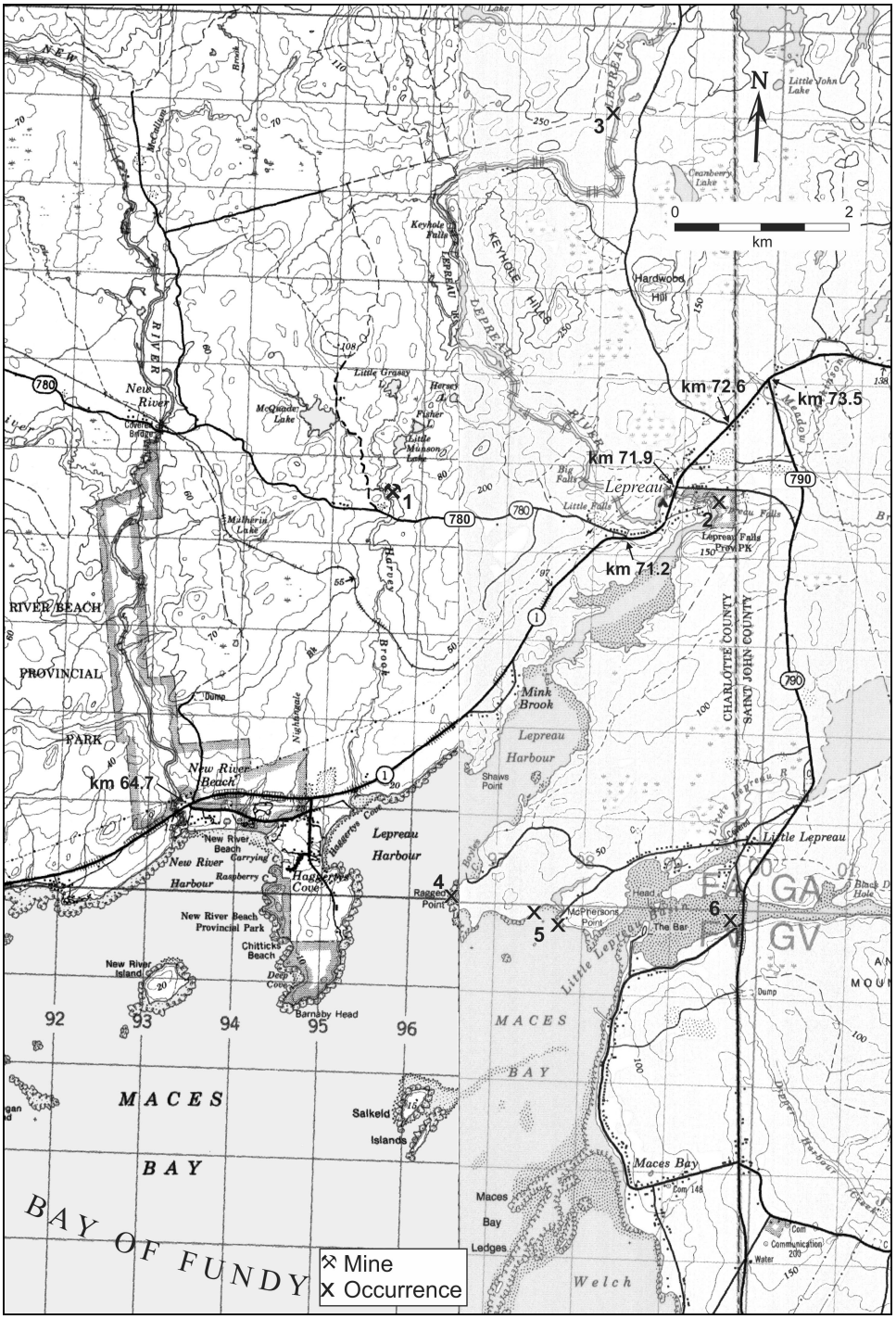
Magnetite occurs as granular masses forming bands in the host rock.

The occurrence of pure magnetite bands, 5 to 8 cm wide, was noted during a geological survey conducted in 1869 and 1870. By 1899, the iron deposit was explored by the sinking of several pits on the John A. Wright farm. A few years later, a Swedish expert, Axel Anderberg, investigated the deposit with a Thalen-Tiberg magnetometer and located a much larger deposit. A 4.6 m shaft was sunk on the deposit in 1904, but subsequent diamond drilling failed to locate economic ore. In about 1955, exploration consisting of stripping, drilling, and shaft sinking was done.

The mine is about 3.5 km west of Lepreau. Lat. 45°10′10″N, Long. 66°30′36″W. *See* Map 7.

Road log from Highway 1 (Fundy Coastal Drive) at **km 71.2** (*see* the main Road Log on page 4):

km		
	0	Junction, highways 1 and 780; proceed west along Highway 780.



1. Lepreau mine 2. Lepreau Falls occurrence 3. Lepreau River occurrence 4. Ragged Point occurrence 5. Maces Bay occurrences 6. Little Lepreau Basin occurrence

Map 7. Lepreau

2.5 F.J. Wright farm house on the right (north) side of the road. A trail leads northwest about 800 m to the Lepreau mine.

Refs.: 12 p. 17M; 14 p. 283A-284A; 16 p. 222-223; 46 p. 21-G/2E-16; 109 p. 84-85.

Maps (T): 21 G/2 St. George
(G): 21 G/2E St. George, east half, Geology of the Caledonia area, southern New Brunswick (NBDNR, 1:50 000)
98-23 Bedrock geological compilation of the St. George area (NTS 21 G/02), Charlotte County, New Brunswick (NBDNR, 1:50 000)
143 St. Stephen, New Brunswick, Map Sheet 1 S.W. (GSC, 1:253 440)
1094A St. George, Charlotte County, New Brunswick (GSC, 1:63 360)
NR-2 Mineral occurrence map of New Brunswick (NBDNR, 1:500 000)
NR-5 Geological map of southwestern New Brunswick (NBDNR, 1:250 000)
Geological highway map of New Brunswick and Prince Edward Island, Special Publication No. 2 (Atlantic Geoscience Society, 1:638 000)

Lepreau Falls occurrence

FOSSILS

In sandstone

Fossil reptile footprints occur in red sandstone of Triassic age. The tracks are assigned to the ichnegenus *Isocampe*. The footprints are 28 to 41 mm long.

The occurrence is exposed along the Lepreau River, just east of Lepreau. Lat. 45°10′08″N, Long. 66°27′45″W. *See* Map 7.

Road log from Highway 1 (Fundy Coastal Drive) at **km 71.9** (*see* the main Road Log on page 4):

km 0 Lepreau, junction; proceed east along the road to Lepreau Falls.

0.5 From this point, walk south to the Lepreau River. The fossil-bearing sandstone exposure is below the north bank of the Lepreau River, a few metres upstream from the Lepreau Falls.

Ref: 315 p. 594-601.

Maps (T): 21 G/1 Musquash
(G): 21 G/1W Musquash, west half, Geology of the Caledonia area, southern New Brunswick (NBDNR, 1:50 000)
143 St. Stephen, New Brunswick, Map Sheet 1 S.W. (GSC, 1:253 440)
1084A Musquash, Charlotte, Kings and Saint Johns counties, New Brunswick (GSC, 1:63 360)
NR-5 Geological map of southwestern New Brunswick (NBDNR, 1:250 000)
Geological highway map of New Brunswick and Prince Edward Island, Special Publication No. 2 (Atlantic Geoscience Society, 1:638 000)

Lepreau River occurrence

NATIVE GOLD

In gravel

Native gold flakes, up to 5 mm across, occur in gravel in the bed of the Lepreau River. Mr. Walton of Saint John discovered the occurrence.

The occurrence is about 4 km north of Lepreau. Lat. 45°12′23″N, Long. 66°28′36″W. *See* Map 7.

Road log from Highway 1 (Fundy Coastal Drive) at **km 72.6** (*see* the Main Road Log on page 4):

km		
	0	Junction, Highway 1 and the road to the Lepreau River; proceed northwest toward the Lepreau River.
	3.8	Junction, trail on left; proceed west along this trail to the Lepreau River.
	4.1	Lepreau River; walk to the Lepreau River occurrence in the bed of the river.

Ref.: 46 p. 21-G/1W-23.

Maps (T): 21 G/1 Musquash
(G): 21 G/1W Musquash, west half, Geology of the Caledonia area, southern New Brunswick (NBDNR, 1:50 000)
98-22 Bedrock geological compilation of the Musquash area (NTS 21 G/01), Saint John, Charlotte, and Kings counties, New Brunswick (NBDNR, 1:50 000)
143 St. Stephen, New Brunswick, Map Sheet 1 S.W. (GSC, 1:253 440)
1084A Musquash, Charlotte, Kings and Saint Johns counties, New Brunswick (GSC, 1:63 360)
NR-2 Mineral occurrence map of New Brunswick (NBDNR, 1:500 000)
NR-5 Geological map of southwestern New Brunswick (NBDNR, 1:250 000)
Geological highway map of New Brunswick and Prince Edward Island, Special Publication No. 2 (Atlantic Geoscience Society, 1:638 000)

Ragged Point occurrence

FOSSILS

In sandstone

Fossil trees and plants of Pennsylvanian age occur at this locality. Trees measuring 1 m across and 6 m long were found by the Geological Survey of Canada during a field investigation of the area in 1869.

The occurrence is exposed at Ragged Point at the eastern end of Lepreau Harbour, Bay of Fundy, about 5 km southwest of Lepreau. Lat. 45°07′39″N, Long. 66°30′03″W. *See* Map 7.

Road log from Highway 1 (Fundy Coastal Drive) at **km 73.5** (*see* the Main Road Log on page 4):

km		
	0	Junction, highways 1 and 790; proceed south along Highway 790.
	5.0	Junction; follow the road on right leading southwest to Little Lepreau.
	5.7	Little Lepreau, junction; turn right (west).
	7.3	Junction; turn right (west).

9.5 End of the road on the eastern shore of Lepreau Harbour. The Ragged Point occurrence is exposed along the shore of Ragged Point about 300 m west of this point. Collect at low tide.

Refs.: 16 p. 177; 152 p. 52-53.

Maps (T): 21 G/2 St. George
(G): 21 G/2E St. George, east half, Geology of the Caledonia area, southern New Brunswick (NBDNR, 1:50 000)
143 St. Stephen, New Brunswick, Map Sheet 1 S.W. (GSC, 1:253 440)
1094A St. George, Charlotte County, New Brunswick (GSC, 1:63 360)
NR-5 Geological map of southwestern New Brunswick (NBDNR, 1:250 000)
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Maces Bay occurrences

FOSSILS

In sandstone

Plant fossils of Pennsylvanian age occur in sandstone.

The occurrences are exposed along the north shore of Maces Bay, Bay of Fundy, about 5 km southwest of Lepreau. Lat. 45°07′32″N, Long. 66°29′04″W; Lat. 45°07′38″N, Long. 66°29′13″W. *See* Map 7.

Road log from Highway 1 (Fundy Coastal Drive) at **km 73.5** (*see* the Main Road Log on page 4):

km		
	0	Junction, highways 1 and 790; proceed south along Highway 790.
	5.0	Junction; follow the road on right leading southwest to Little Lepreau.
	5.7	Little Lepreau, junction; turn right (west).
	7.3	Junction; follow the road on left leading southwest.
	8.1	End of the road at the shore of Maces Bay. The Maces Bay occurrence is exposed along the shore at this point, and along the shore 300 m to the northwest. Collect at low tide.

Refs.: 16 p. 176-178; 152 p. 53.

Maps (T): 21 G/1 Musquash
(G): 21 G/1W Musquash, west half, Geology of the Caledonia area, southern New Brunswick (NBDNR, 1:50 000)
143 St. Stephen, New Brunswick, Map Sheet 1 S.W. (GSC, 1:253 440)
1084A Musquash, Charlotte, Kings and Saint Johns counties, New Brunswick (GSC, 1:63 360)
NR-5 Geological map of southwestern New Brunswick (NBDNR, 1:250 000)
Geological highway map of New Brunswick and Prince Edward Island, Special Publication No. 2 (Atlantic Geoscience Society, 1:638 000)

Little Lepreau Basin occurrence

EPIDOTE

In conglomerate

Epidote, associated with minor calcite and quartz, occurs as pebbles and boulders up to 60 cm across in conglomerate, and as encrustations up to 6 mm thick on granite boulders. The epidote is suitable for lapidary purposes.

The occurrence is exposed along the south shore of Little Lepreau Basin, Bay of Fundy, about 5 km south of Lepreau. Lat. 45°07′32″N, Long. 66°27′30″W. *See* Map 7.

Road log from Highway 1 (Fundy Coastal Drive) at **km 73.5** (*see* the Main Road Log on page 4):

km		
	0	Junction, highways 1 and 790; proceed south along Highway 790.
	5.0	Junction, road to Little Lepreau; continue straight ahead along Highway 790.
	6.5	Junction; turn right (west). This road leads southwest along the southern shore of Little Lepreau Basin. The Little Lepreau Basin occurrence is exposed along this shoreline. Collect at low tide.

Maps (T): 21 G/1 Musquash
(G): 21 G/1W Musquash, west half, Geology of the Caledonia area, southern New Brunswick (NBDNR, 1:50 000)
143 St. Stephen, New Brunswick, Map Sheet 1 S.W. (GSC, 1:253 440)
1084A Musquash, Charlotte, Kings and Saint John counties, New Brunswick (GSC, 1:63 360)
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Scott Falls occurrence

MOLYBDENITE, CHALCOPYRITE, TETRAHEDRITE

In granite

Molybdenite occurs as coarse flaky aggregates in fractures in the host rock. Chalcopyrite and tetrahedrite are associated with the molybdenite. The mineralized zone is about 1 m wide and up to 3 m long.

The occurrence is about 2 km southwest of Musquash. Lat. 45°11′02″N, Long. 66°21′09″W. *See* Map 8.

The Scott Falls molybdenite-copper zone is exposed just north of Highway 1 (Fundy Coastal Drive) at **km 81.9** (*see* the Main Road Log on page 4) in the vicinity of the bridge over the West Musquash River.

Refs.: 46 p. 21-G/1W-3; 309 p. 14-20.

Maps (T): 21 G/1 Musquash

98-22 Bedrock geological compilation of the Musquash area (NTS 21 G/01), Saint John, Charlotte, and Kings counties, New Brunswick (NBDNR, 1:50 000)
143 St. Stephen, New Brunswick, Map Sheet 1 S.W. (GSC, 1:253 440)
1084A Musquash, Charlotte, Kings and Saint Johns counties, New Brunswick (GSC, 1:63 360)
NR-2 Mineral occurrence map of New Brunswick (NBDNR, 1:500 000)
NR-5 Geological map of southwestern New Brunswick (NBDNR, 1:250 000)
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Cranberry Head occurrence

HEMATITE

In conglomerate, sandstone, and shale

Specularite variety of hematite occurs in veins up to 5 cm wide in white-weathering sedimentary rocks.

The iron mineralization was explored by the sinking of several pits on the farm of Mr. Murray sometime before 1897.

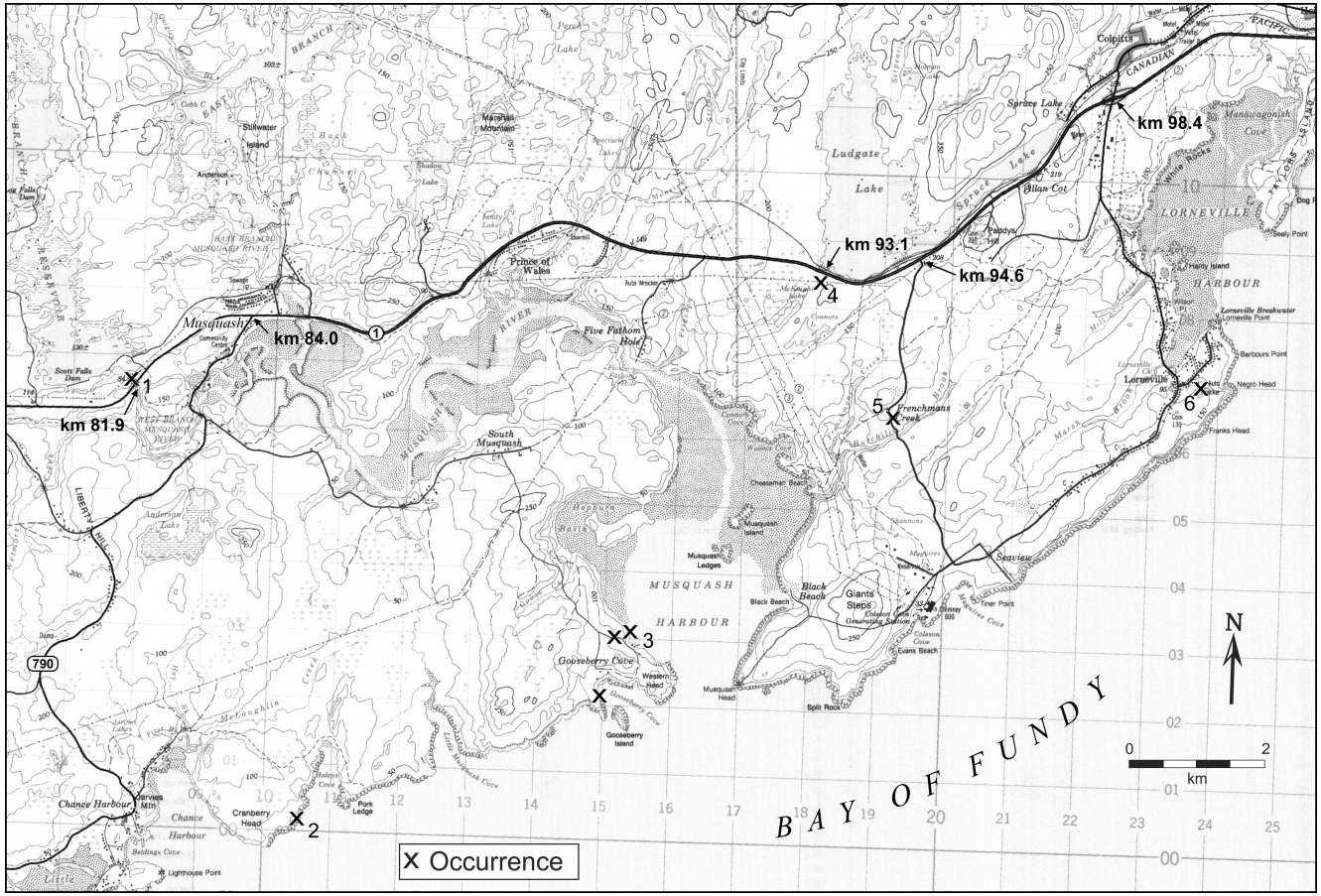
The occurrence is exposed at Cranberry Head, Bay of Fundy, about 7 km south of Musquash and 2.5 km east of Chance Harbour village. Lat. 45°07′34″N, Long. 66°19′29″W. *See* Map 8.

Road log from Highway 1 (Fundy Coastal Drive) at **km 84.0** (*see* the Main Road Log on page 4):

km		
	0	Musquash, junction of highways 1 and 790; proceed south along Highway 790.
	2.0	Junction; continue south along Highway 790.
	10.0	Chance Harbour village, at the wharf. Cranberry Head is about 2.5 km east of this point. The Cranberry Head occurrence is on the east side of Cranberry Head, about 600 m from its southern tip and inland 100 m west of the Bay of Fundy shore. Access is by boat from Chance Harbour village. Collect at low tide.

Refs.: 12 p. 17M-18M; 46 p. 21-G/1W-11.

Maps (T): 21 G/1 Musquash
(G): 21 G/1W Musquash, west half, Geology of the Caledonia area, southern New Brunswick (NBDNR, 1:50 000)
98-22 Bedrock geological compilation of the Musquash area (NTS 21 G/01), Saint John, Charlotte, and Kings counties, New Brunswick (NBDNR, 1:50 000)
143 St. Stephen, New Brunswick, Map Sheet 1 S.W. (GSC, 1:253 440)
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1. Scott Falls occurrence 2. Cranberry Head occurrence 3. Gooseberry Cove occurences 4. Ludgate Lake occurrence 5. Frenchmans Creek occurrence 6. Lorneville occurrence

Map 8. Musquash

Gooseberry Cove occurrences

NATIVE GOLD, PYRITE

At the contact of sedimentary rocks and granite

Native gold occurs with abundant pyrite in quartz veins.

In 1962 and 1963, Mount Costigan Mines Limited investigated the deposit. The work consisted of mapping, drilling, and excavating several trenches north of Gooseberry Cove. Native gold occurs in veins exposed in two shoreline localities: one along the Gooseberry Cove shore, the other along the Musquash Harbour shore.

The occurrences are exposed on the shore of Gooseberry Cove and Musquash Harbour, about 7 km southeast of Musquash. Lat. 45°08′28″N, Long. 66°15′54″W (Gooseberry Cove shore); Lat. 45°08′59″N, Long. 66°15′43″W (trenches); Lat. 45°09′01″N, Long. 66°15′36″W (Musquash Harbour shore). *See* Map 8.

Road log from Highway 1 (Fundy Coastal Drive) at **km 84.0** (*see* the Main Road Log on page 4):

km		
	0	Musquash, junction of highways 1 and 790; proceed south along Highway 790.
	2.0	Junction; turn left.
	7.5	South Musquash, junction; turn right (south).
	11.0	Junction. The road on right leads south 500 m to the shore of Gooseberry Cove where gold-bearing veins are exposed. To reach the trenches and the Musquash Harbour shore locality, turn left (southeast) at this junction.
	11.2	House on left (north) side of the road; the trenches are behind the house. The Musquash Harbour shore locality where gold-bearing veins are exposed is about 250 m due east of this point.

Refs.: 46 p. 21-G/1W-7; 311 p. 145.

Maps (T): 21 G/1 Musquash
(G): 21 G/1W Musquash, west half, Geology of the Caledonia area, southern New Brunswick (NBDNR, 1:50 000)
98-22 Bedrock geological compilation of the Musquash area (NTS 21 G/01), Saint John, Charlotte, and Kings counties, New Brunswick (NBDNR, 1:50 000)
144 St. John, New Brunswick, Map Sheet 1 S.E. (GSC, 1:253 440)
1084A Musquash, Charlotte, Kings and Saint Johns counties, New Brunswick (GSC, 1:63 360)
NR-2 Mineral occurrence map of New Brunswick (NBDNR, 1:500 000)
NR-5 Geological map of southwestern New Brunswick (NBDNR, 1:250 000)
Geological highway map of New Brunswick and Prince Edward Island, Special Publication No. 2 (Atlantic Geoscience Society, 1:638 000)

Ludgate Lake occurrence

CHALCOCITE, MALACHITE, AZURITE

In altered quartzite and argillite

Chalcocite and minor malachite and azurite occur in quartz veins.

Messrs. D. Cormier and M. Grant of Lancaster, discovered the deposit and staked it for copper in 1967.

The occurrence is about 9 km east of Musquash. Lat. 45°11′51″N, Long. 66°13′20″W. *See* Map 8.

The Ludgate Lake occurrence is exposed in a quarry on the south side of Highway 1 (Fundy Coastal Drive) at **km 93.1** (*see* the Main Road Log on page 4).

Ref.: 46 p. 21-G/1E-2.

Maps (T): 21 G/1 Musquash
(G): 21 G/1E Musquash, east half, Geology of the Caledonia area, southern New Brunswick (NBDNR, 1:50 000)
98-22 Bedrock geological compilation of the Musquash area (NTS 21 G/01), Saint John, Charlotte, and Kings counties, New Brunswick (NBDNR, 1:50 000)
144 St. John, New Brunswick, Map Sheet 1 S.E. (GSC, 1:253 440)
1084A Musquash, Charlotte, Kings and Saint Johns counties, New Brunswick (GSC, 1:63 360)
NR-2 Mineral occurrence map of New Brunswick (NBDNR, 1:500 000)
NR-5 Geological map of southwestern New Brunswick (NBDNR, 1:250 000)
Geological highway map of New Brunswick and Prince Edward Island, Special Publication No. 2 (Atlantic Geoscience Society, 1:638 000)

Frenchmans Creek occurrence

SPHALERITE, GALENA, TETRAHEDRITE

In crystalline limestone

Yellow sphalerite, galena, and tetrahedrite occur as grains and granular aggregates in quartz-dolomite-calcite veins.

In 1897, C.J. Weldon of Saint John opened the lead-zinc occurrence on the Jno. Burchill farm. The opening consisted of a trench 8.8 m deep. Analysis by the Geological Survey of Canada indicated silver values of 25.08 ounces per ton (860 g/t).

The occurrence is about 10 km southeast of Musquash. Lat. 45°10′43″N, Long. 66°12′34″W. *See* Map 8.

Road log from Highway 1 (Fundy Coastal Drive) at **km 94.6** (*see* the Main Road Log on page 4):

km		
	0	Junction, Highway 1 and Coleson Cove Road; proceed south along Coleson Cove Road.
	2.4	Junction; follow the road on left leading south.

2.6 Frenchmans Creek occurrence, at the edge of a wooded area about 100 m east of the road.

Refs.: 12 p. 35M; 46 p. 21-G/1E-3; 109 p. 93-94; 309 p. 14-19; 311 p. 144.

Maps (T): 21 G/1 Musquash
(G): 21 G/1E Musquash, east half, Geology of the Caledonia area, southern New Brunswick (NBDNR, 1:50 000)
98-22 Bedrock geological compilation of the Musquash area (NTS 21 G/01), Saint John, Charlotte, and Kings counties, New Brunswick (NBDNR, 1:50 000)
144 St. John, New Brunswick, Map Sheet 1 S.E. (GSC, 1:253 440)
1084A Musquash, Charlotte, Kings and Saint Johns counties, New Brunswick (GSC, 1:63 360)
NR-2 Mineral occurrence map of New Brunswick (NBDNR, 1:500 000)
NR-5 Geological map of southwestern New Brunswick (NBDNR, 1:250 000)
Geological highway map of New Brunswick and Prince Edward Island, Special Publication No. 2 (Atlantic Geoscience Society, 1:638 000)

Lorneville occurrence

HEMATITE, CHALCOPYRITE, MALACHITE, EPIDOTE

In basic volcanic rocks

Specularite variety of hematite occurs with chalcopyrite and malachite in calcite veins. Epidote occurs in veins and as encrustations on the host rock. The volcanic rock was quarried to supply rock for the construction of the Lorneville breakwater.

The occurrence is in Lorneville, about 15 km southeast of Musquash. Lat. 45°10′57″N, Long. 66°09′06″W. *See* Map 8.

Road log from Highway 1 (Fundy Coastal Drive) at **km 98.4** (*see* the Main Road Log on page 4):

km		
	0	Junction, Highway 1 and King William Road; proceed south along King William Road.
	4.6	Lorneville, junction; turn left (east).
	5.0	Junction; turn right (south).
	5.15	Quarry. The Lorneville occurrence is exposed along the northeastern side of this quarry.

Ref.: 46 p. 21-G/1E-7, 21-G/1E-17.

Maps (T): 21 G/1 Musquash
(G): 21 G/1E Musquash, east half, Geology of the Caledonia area, southern New Brunswick (NBDNR, 1:50 000)
98-22 Bedrock geological compilation of the Musquash area (NTS 21 G/01), Saint John, Charlotte, and Kings counties, New Brunswick (NBDNR, 1:50 000)
144 St. John, New Brunswick, Map Sheet 1 S.E. (GSC, 1:253 440)
497A Saint John, Saint John and Kings counties, New Brunswick (GSC, 1:63 360)

1084A Musquash, Charlotte, Kings and Saint Johns counties, New Brunswick (GSC, 1:63 360)
NR-2 Mineral occurrence map of New Brunswick (NBDNR, 1:500 000)
NR-5 Geological map of southwestern New Brunswick (NBDNR, 1:250 000)
Geological highway map of New Brunswick and Prince Edward Island, Special Publication No. 2 (Atlantic Geoscience Society, 1:638 000)

Nerepis occurrences

GALENA, SPHALERITE, CHALCOPYRITE, PYRITE, PYRRHOTITE

In altered volcanic rocks

Galena, sphalerite, chalcopyrite, and minor pyrite and pyrrhotite occur in veins in shear zones. The minerals occur as massive aggregates in zones up to one metre wide.

The occurrence has been known since the 1860s. It consists of base-metal mineralization exposed along Matthews Brook and along West Brook. In the mid-1950s, F. Dugay discovered a high-grade base-metal vein in Matthews Brook. Subsequent investigations consisted of surveying by Fundy Bay Copper Mines Limited, surveying and trenching by Rio Tinto Mining Company Limited, and trenching by Franc R. Joubin and Associates. In 1968, Merrill Obalski Mines Limited discovered additional mineralization.

The occurrence is about 23 km northwest of Saint John, and about 1.5 km northwest of Nerepis. Lat. 45°23′33″N, Long. 66°18′23″W to Lat. 45°23′45″N, Long. 66°18′05″W (Matthews Brook exposures at the highway bridge); Lat. 45°23′52″N, Long. 66°18′28″W (West Brook exposures). *See* Map 9.

Road log from Highway 1 (Fundy Coastal Drive) at **km 101.0** (*see* the Main Road Log on page 4):

km		
	0	Junction, highways 1 and 7 (Martinon By-Pass); proceed onto Highway 7.
	23.7	Highway 7 bridge over Matthews Brook. The galena-sphalerite-chalcopyrite zone is exposed along Matthews Brook about 350 m northeast of the bridge. Pyrite-pyrrhotite mineralization extends westward from the Highway 7 bridge for about 300 m.
	24.4	Highway 7 bridge over West Brook. Galena-sphalerite-chalcopyrite mineralization is exposed along West Brook about 150 m east of the highway bridge.

Refs.: 16 p. 227; 17 p. 227; 48 p. 21-G/8W-3; 237 p. 105; 309 p. 2-8.

Maps (T): 21 G/8 Saint John
(G): 51-15 Westfield, Kings, Queens, Saint John and Charlotte counties, New Brunswick (GSC, 1:40 000)
84-1 Saint John, Annidale-Nerepis area, southern New Brunswick (NBDNR, 1:50 000)
98-26 Bedrock geological compilation of the Saint John area (NTS 21 G/08), Saint John, Kings, Queens, and Charlotte counties, New Brunswick (NBDNR, 1:50 000)
144 St. John, New Brunswick, Map Sheet 1 S.E. (GSC, 1:253 440)
1113A Saint John, New Brunswick (GSC, 1:63 360)
NR-2 Mineral occurrence map of New Brunswick (NBDNR, 1:500 000)

NR-5 Geological map of southwestern New Brunswick (NBDNR, 1:250 000)
Geological highway map of New Brunswick and Prince Edward Island, Special Publication No. 2 (Atlantic Geoscience Society, 1:638 000)

Square Lake occurrences

WOLFRAMITE, MOLYBDENITE, ARSENOPYRITE, PYRITE, CHALCOPYRITE, PYRRHOTITE, FLUORITE, GALENA, TOPAZ, BISMUTHINITE, NATIVE BISMUTH, HEMATITE

In greisen zones in biotite granite

Wolframite, molybdenite, arsenopyrite, pyrite, chalcopyrite, pyrrhotite, fluorite, and galena occur in greisen composed of white and smoky quartz, white mica, greenish-grey topaz, and green fluorite. Quartz veins in the host rock contain wolframite, molybdenite, bismuthinite, native bismuth, hematite (specularite), and topaz. The wolframite crystals are dark brown and up to 12 mm long. The greisen zones are generally up to 30 cm wide, but may be as much as 3 m wide.

In 1932, L. Leslie discovered wolframite-molybdenite mineralization in the Square Lake area. Investigation of the occurrence was done during the next five years. In 1967, Union Carbide Exploration Company Limited did some exploration in the area.

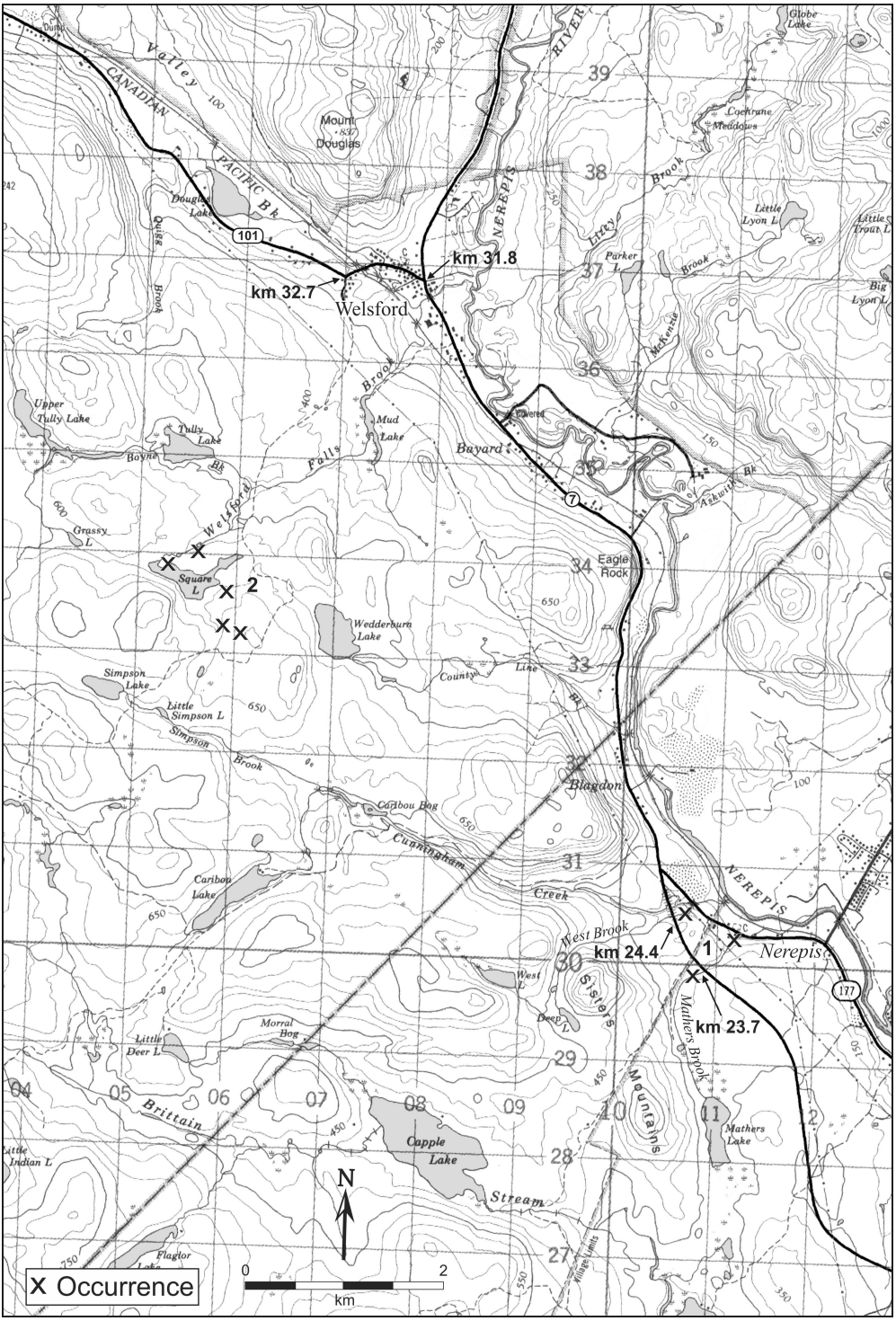
The occurrences are about 30 km northwest of Saint John, and 4 km southwest of Welsford. Lat. 45°25′38″N, Long. 66°21′58″W (1); Lat. 45°25′27″N, Long. 66°22′03″W (2); Lat. 45°25′26″N, Long. 66°21′54″W (3); Lat. 45°25′52″N, Long. 66°22′17″W (4); Lat. 45°25′48″N, Long. 66°22′32″W (5). *See* Map 9.

Road log from Highway 1 (Fundy Coastal Drive) at **km 101.0** (*see* the Main Road Log on page 4):

km		
	0	Junction, highways 1 and 7 (Martinon By-Pass); proceed onto Highway 7.
	31.8	Welsford, junction of Highway 101; proceed onto Highway 101 (west).
	32.7	Junction; turn left (south).
	33.3	The road becomes a trail; continue south along the trail.
	34.8	Junction; continue along the trail leading south. (The trail on right leads west to Tully Lake.)
	35.9	East end of Square Lake. From this point, walk to the Square Lake pits located at the following points: 1) 250 m south; 2) 550 m south; and 3) 600 m south; 4) 350 m north of the lake; 5) on the northwestern shore of the lake, just east of the outlet of Welsford Brook.

Refs.: 48 p. 21-G/8W-2; 219 p. 191; 291 p. 56D-57D; 309 p. 8-9; 312 p. 11; 381 p. 2-6.

Maps (T): 21 G/8 Saint John
(G): 51-15 Westfield, Kings, Queens, Saint John and Charlotte counties, New Brunswick (GSC, 1:40 000)
84-1 Saint John, Annidale-Nerepis area, southern New Brunswick (NBDNR, 1:50 000)



1. Nerepis occurrences 2. Square Lake occurrences

Map 9. Nerepis-Welsford

98-26 Bedrock geological compilation of the Saint John area (NTS 21 G/08), Saint John, Kings, Queens, and Charlotte counties, New Brunswick (NBDNR, 1:50 000)
143 St. Stephen, New Brunswick, Map Sheet 1 S.W. (GSC, 1:253 440)
1113A Saint John, New Brunswick (GSC, 1:63 360)
NR-2 Mineral occurrence map of New Brunswick (NBDNR, 1:500 000)
NR-5 Geological map of southwestern New Brunswick (NBDNR, 1:250 000)
Geological highway map of New Brunswick and Prince Edward Island, Special Publication No. 2 (Atlantic Geoscience Society, 1:638 000)

Shear mine

PYRITE, ARSENOPYRITE

In metasedimentary rocks

Gold-bearing pyrite and arsenopyrite occur in quartz veins in a shear zone.

Exploration for gold in the area began in the 1930s. In 1940, Robert Bryson sank a 10.7 m shaft reaching an ore zone grading 17.1 g/t (0.5 oz/ton) gold, and mined high-grade gold ore from this zone. In 1986, P. Fenety and J.A.R. McIntyre of Moncton prospected the deposit and recovered gold-bearing specimens from the shaft and the dump. The samples assayed 4.5 to 9.6 g/t gold. Between 1986 and 1988, Stratabound Minerals Corporation did geophysical and geochemical surveys, drilling, trenching, and sampling, and mined some gold-bearing ore.

The mine is about 44 km northwest of Saint John, and 9 km southwest of Wirral. Lat. 45°27′05″N, Long. 66°33′27″W.

Road log from Highway 1 (Fundy Coastal Drive) at **km 101.0** (*see* the Main Road Log on page 4):

km		
	0	Junction, highways 1 and 7 (Martinon By-Pass); proceed onto Highway 7.
	31.8	Welsford, junction; proceed west onto Highway 101.
	32.7	Junction, road to the Square Lake occurrences; continue along Highway 101.
	45.7	Wirral, junction; turn left (west) onto Oromocto Lake Road.
	54.8	Bridge over Bear Brook. The road to the Shear mine leaves the Oromocto Lake Road about 150 m north of the bridge, and leads southwest 350 m to the mine.

Refs.: 48 p. 21-G/7E-1, 21-G/7E-7; 51 p. 73; 53 p. 90; 410 p. 424.

Maps (T): 21 G/7 McDougall Lake
(G): 59-2 McDougall Lake map-area (east half), Charlotte County, New Brunswick (NBDNR, 1:31 680)
143 St. Stephen, New Brunswick, Map Sheet 1 S.W. (GSC, 1:253 440)
2000-35 Geology of the South Oromocto lake area (part of NTS 21 G/07), Charlotte County, New Brunswick (NBDNR, 1:50 000)
NR-2 Mineral occurrence map of New Brunswick (NBDNR, 1:500 000)
NR-5 Geological map of southwestern New Brunswick (NBDNR, 1:250 000)
Geological highway map of New Brunswick and Prince Edward Island, Special Publication No. 2 (Atlantic Geoscience Society, 1:638 000)

Taylors Island, Saints Rest Beach, Sheldon Point occurrences

NATIVE GOLD; EPIDOTE, ZOISITE, AMPHIBOLE; FOSSILS

In beach sand and gravel; in granite and volcanic rocks; in moraine

Native gold occurs in beach sand and gravel. The original discovery of placer gold in 1939 sparked a small gold rush to the location. The discovery was on the beach at the base of a 10 m gravel cliff on the northeastern shore of Taylors Island between high and low tide levels. The source was a 10 cm bed of Pleistocene gravel which assayed 23 g/t gold. Panning of the sand on the beach 915 m to the west of the discovery location also detected some gold. In 1946, B.L. Smith mapped the occurrence and excavated an open cut at the high tide level. Epidote occurs as pebbles, and as encrustations up to 2 cm thick on granite boulders along the shore of Saints Rest Beach; pink feldspar veins up to 12 cm wide cut the granite. Pink fibrous zoisite, epidote, fibrous amphibole, and red calcite occur in veins in volcanic rocks exposed at Sheldon Point.

Quaternary pelecypod fossils occur in a glacial moraine ridge known as the Sheldon Point moraine which extends about 1 km northeastward from Saints Rest Beach to Sand Cove. The fossil species include *Hiatella arctica*, *Macoma balthica*, and *Portlandia arctica*. Fossils, released by erosion of the moraine, are found along the beach.

The occurrences are exposed along the shore of Saint John Harbour between Taylors Island and Sheldon Point, Bay of Fundy, about 7 km southwest of Saint John. Lat. 45°13′21″N, Long. 66°07′37″W (Taylors Island); Lat. 45°13′25″N, Long. 66°06′53″W (Saints Rest Beach); Lat. 45°13′30″N, Long. 66°05′49″W (Sheldon Point). *See* Map 10.

Road log from Highway 1 (Fundy Coastal Drive) at **km 105.5** (*see* the Main Road Log on page 4):

km		
	0	Saint John, Highway 1 (Saint John Throughway) at the Catherwood Street Exit; follow this exit to Catherwood Street.
	0.5	Turn right (south) onto Bleury Street.
	1.0	Turn right (southwest) onto Sand Cove Road.
	4.3	End of the road at Saints Rest Beach, Irving Nature Park. The Taylors Island placer gold occurrence is about 790 m west of this point, the Sheldon Point moraine fossil occurrence is about 450 m east of this point, and the Sheldon Point zoisite-epidote-amphibole occurrence is about 1700 m east of this point.

Refs.: 16 p. 61, 237-238, 240; 46 p. 21-G/1E-21; 136; 316 p. 58-61; 380 p. 72-73; 386 p. 108.

Maps (T): 21 G/1 Musquash

(G): 21 G/1E Musquash, east half, Geology of the Caledonia area, southern New Brunswick (NBDNR, 1:50 000)

98-22 Bedrock geological compilation of the Musquash area (NTS 21 G/01), Saint John, Charlotte, and Kings counties, New Brunswick (NBDNR, 1:50 000)

144 St. John, New Brunswick, Map Sheet 1 S.E. (GSC, 1:253 440)

497A Saint John, Saint John and Kings counties, New Brunswick (GSC, 1:63 360)

1084A Musquash, Charlotte, Kings and Saint Johns counties, New Brunswick (GSC, 1:63 360)

NR-2 Mineral occurrence map of New Brunswick (NBDNR, 1:500 000)
NR-5 Geological map of southwestern New Brunswick (NBDNR, 1:250 000)
Geological highway map of New Brunswick and Prince Edward Island, Special Publication No. 2 (Atlantic Geoscience Society, 1:638 000

Calamites Ledges, Fern Ledges occurrences

FOSSILS

In shale and sandstone

Pennsylvanian plant fossils, including ferns and trees, and fossil insects occur in alternating beds of durable grey sandstone and easily-weathering dark grey laminated shale. The plant fossils occur as graphitized plant impressions coated with bright black films. A mixed flora of over eighty species including *Calamites, Dadoxylon, Annularia, Stigmaria, Neuropteris, Asterophyllites, Cyclopteris, Sphenopteris, Pecopteris, Cardiocarpum,* and *Cordaites* has been found. Since its discovery in about 1860, the locality has yielded fossil plant specimens to paleontologists and museums here and abroad. By about 1900, the locality was almost completely worked out.

The fossil-bearing rocks are exposed in ledges along the Saint John Harbour shore between high and low-tide levels from Duck Cove to Seaside Park. This shoreline includes two famous occurrences: Calamites Ledges and Fern Ledges. The Calamites Ledges occurrence is at Duck Cove. The Fern Ledges occurrence is at Seaside Park.

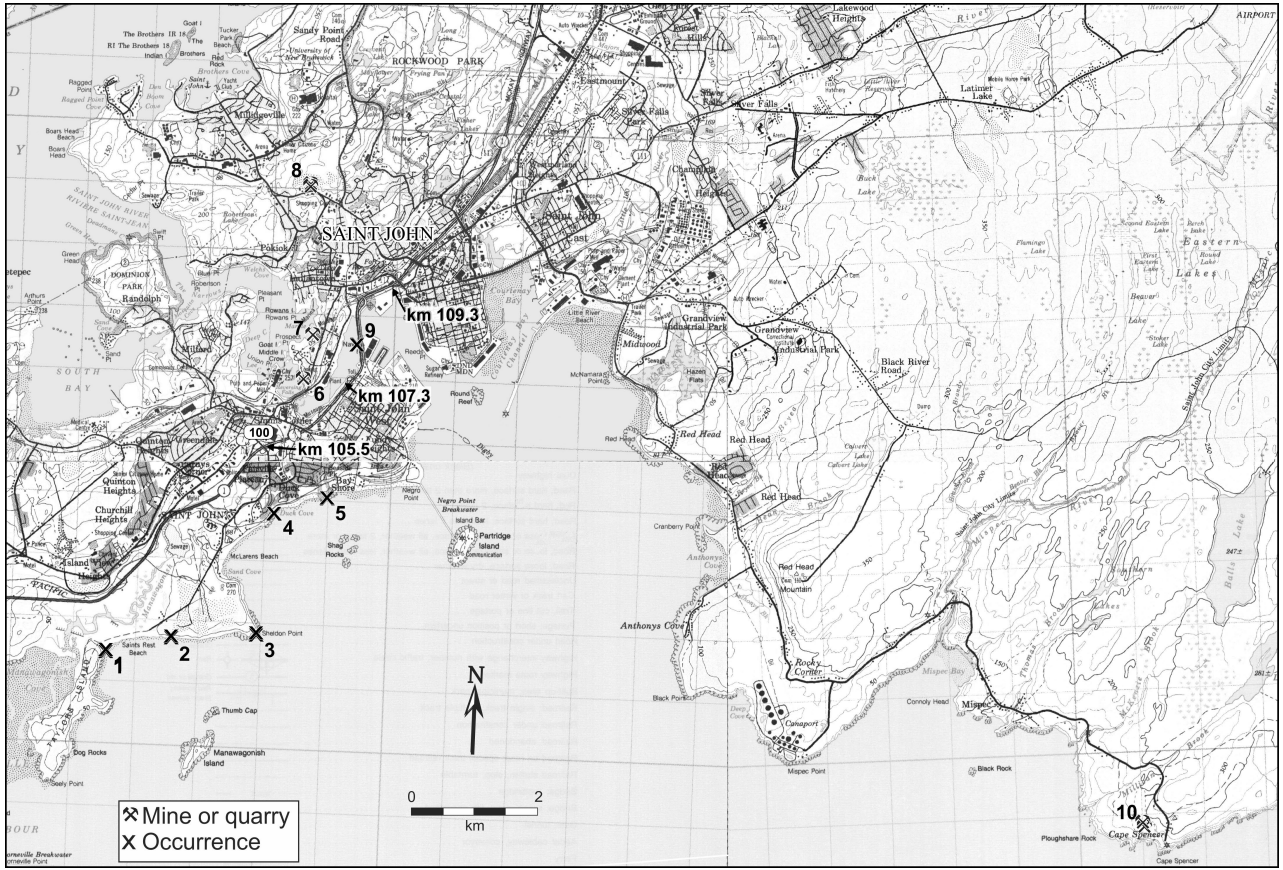
The occurrences are exposed along the shore of Saint John Harbour, about 7 km southwest of Saint John. Lat. 45°14′31″N, Long. 66°05′35″W (Calamites Ledges); Lat. 45°14′41″N, Long. 66°04′56″W (Fern Ledges). *See* Map 10.

Road log from Highway 1 (Fundy Coastal Drive) at **km 105.5** (*see* the Main Road Log on page 4):

km		
	0	Saint John, Highway 1 (Saint John Throughway) at the Catherwood Street Exit; follow this exit to Catherwood Street.
	0.5	Turn right (south) onto Bleury Street.
	1.0	Turn left (east) onto Sand Cove Road.
	1.5	Turn right (southeast) onto Argyle Street.
	2.0	Seaside Park. Proceed south to the shore.
	2.5	Seaside Park shore. The Fern Ledges occurrence is here. The Calamites Ledges occurrence is at Duck Cove, about 840 m to the west.

Refs.: 7 p. 37-39; 16 p. 171-174; 87 p. 513-523; 136; 180 p.77-78; 293 p. 25-26; 339 p. 390-395; 340 p. 8-10, 14-112; 391 p. 373, 389-390.

Maps (T): 21 G/1 Musquash
(G): 21 G/1E Musquash, east half, Geology of the Caledonia area, southern New Brunswick (NBDNR, 1:50 000)
144 St. John, New Brunswick, Map Sheet 1 S.E. (GSC, 1:253 440)
497A Saint John, Saint John and Kings counties, New Brunswick (GSC, 1:63 360)



1. Taylors Island occurrence 2. Saints Rest Beach occurrence 3. Sheldon Point occurrence 4. Calamites Ledges occurrence 5. Fern Ledges occurrence 6. Split Rock mine 7. Marble Cove mine 8. Indiantown quarries 9. Navy Island occurrence 10. Cape Spencer mine

Map 10. Saint John

1084A Musquash, Charlotte, Kings and Saint Johns counties, New Brunswick (GSC, 1:63 360)
NR-5 Geological map of southwestern New Brunswick (NBDNR, 1:250 000)
Geological highway map of New Brunswick and Prince Edward Island, Special Publication No. 2 (Atlantic Geoscience Society, 1:638 000

Split Rock, Marble Cove mines

GRAPHITE, PYRITE

In crystalline limestone

Graphite and small amounts of pyrite occur in crystalline limestone associated with a dark igneous rock.

The occurrence of graphite-bearing rock on the northeastern side of the Saint John River at the Reversing Falls was originally reported in 1840. During the next few years, intermittent small-scale operations recovered some graphite which was used to varnish stoves. In 1853, about 40 t of crude graphite were produced at the Split Rock mine located just north of the railway bridge. In 1868 and 1869, Mr. A. Garrett reopened the mine, producing ore valued at $12 000. The workings consisted of some pits and an adit 6 m long. In about 1872, Mr. S.S. Mayer of Carleton mined an extension of the graphite-bearing zone on the property of Messrs. Hazen and Botsford located 600 m northeast of the Split Rock mine. A few hundred tonnes of ore were extracted and shipped to the United States. Later, Mr. W.F. Best and associates sank a 15 m shaft near the face of a limestone cliff on the south side of Marble Cove about 1 km northeast of the Split Rock mine. The Best operation, known as the Marble Cove mine, produced hand-picked ore for several years until a mill was installed for cleaning and preparing the graphite for market. Annual production recorded for 1885 to 1888 was 90 to 360 t of crushed and screened graphite for use as foundry facings, and for the manufacture of stove-polish. The Marble Cove mine operation was halted in 1892 due to the low price of graphite in the United States where most of the ore was marketed. From 1895 to 1908, Canada Paint Company of Montréal renewed the Marble Cove mine operations producing about 90 t of graphite annually; the graphite was shipped to the company's paint manufacturing works in Montréal.

The sites where the mines were formerly operated are in the Reversing Falls-Marble Cove area in Saint John. Lat. 45°15′40″N, Long. 66°06′11″W (Split Rock mine); Lat. 45°16′04″N, Long. 66°05′00″W (Marble Cove mine). *See* Map 10.

Road log from Highway 1 (Fundy Coastal Drive) at **km 105.5** (*see* the Main Road Log on page 4):

km		
	0	Saint John, Highway 1 (Saint John Throughway) at the Catherwood Street Exit; proceed north along Catherwood Street.
	0.3	Turn right (east) onto Highway 100 (Bridge Road).
	1.5	Junction, Highway 100 (Chesley Road) and Douglas Avenue; proceed onto Douglas Avenue. The Split Rock mine site is on the east side of the St. John River north of the falls and north of this junction.
	2.3	Marble Cove mine site, on the north side of Douglas Avenue behind the high school and just west of Riverview Park.

Refs.: 7 p. 50; 12 p. 72M-74M; 16 p. 230-231; 38 p. 63S; 48 p. 21-G/8E-32; 106 p. 7-10; 109 p. 114-115; 184 p. 242; 187 p. 3H-4H; 196 p. 63S; 330 p. 22-24.

Maps (T): 21 G/8 Saint Joh

(G): 21 G/8E Saint John, east half, Geology of the Caledonia area, southern New Brunswick (NBDNR, 1:50 000)
62-4B Saint John area (east half), New Brunswick, Map 2 (NBDNR, 1:15 840)
144 St. John, New Brunswick, Map Sheet 1 S.E. (GSC, 1:253 440)
497A Saint John, Saint John and Kings counties, New Brunswick (GSC, 1:63 360)
1113A Saint John, New Brunswick (GSC, 1:63 360)
NR-2 Mineral occurrence map of New Brunswick (NBDNR, 1:500 000)
NR-5 Geological map of southwestern New Brunswick (NBDNR, 1:250 000)
Geological highway map of New Brunswick and Prince Edward Island, Special Publication No. 2 (Atlantic Geoscience Society, 1:638 000

Indiantown quarries

SERPENTINE, FLUORITE, PYRITE, CHLORITE

In crystalline limestone

Dark green massive serpentine occurs in banded white and bluish grey crystalline limestone of Precambrian age. The serpentine is suitable for lapidary purposes. Fluorite, pyrite, and chlorite occur in massive calcite.

The crystalline limestone forms a ridge north of Indiantown. In the early 1880s, Mr. Stetson opened a quarry on the south side of the ridge. In 1900, Messrs. Stetson and Cutler operated a quarry at the southeastern end of the ridge, and Purdy and Green Limited operated an adjoining quarry to the southwest. Snowflake Lime Limited eventually took over both quarry operations. The quarries produced limestone for building stone, ballast, crushed stone (gravel), industrial grits, agricultural limestone, quicklime, and hydrated lime. After a fire destroyed the kiln in 1968, the quarry produced only aggregate. Lofstrom Construction Company Limited operated a quarry in the 1960s immediately to the west of these quarries. The limestone was used for the construction of the Negro Point Breakwater in Saint John Harbour.

The quarries are in Indiantown, Saint John. Lat. 45°17′20″N, Long. 66°05′05″W. *See* Map 10.

Road log from Highway 1 (Fundy Coastal Drive) at **km 105.5** (*see* the Main Road Log on page 4):

km		
	0	Saint John, Highway 1 (Saint John Throughway) at the Catherwood Street Exit; proceed north along Catherwood Street.
	0.3	Turn right (east) onto Highway 100 (Bridge Road).
	1.5	Junction, Highway 100 (Chesley Road) and Douglas Avenue; proceed east along Highway 100 (Chesley Drive which continues as Lancaster Avenue east of the Main Street intersection).
	3.7	Turn right (east) onto Wellesley Avenue.
	4.3	Turn left (north) onto Somerset Street.
	6.0	Indiantown quarries on right.

Refs.: 12 p. 78M-82M; 48 p. 21-G/8E-15; 161 p. 159-163; 177 p. 109-112; 184 p. 239-240, 243; 285 p. 164-168.

Maps (T): 21 G/8 Saint John
(G): 21 G/8E Saint John, east half, Geology of the Caledonia area, southern New Brunswick (NBDNR, 1:50 000)
62-4B Saint John area (east half), New Brunswick, Map 2 (NBDNR, 1: 15 840)
144 St. John, New Brunswick, Map Sheet 1 S.E. (GSC, 1:253 440)
497A Saint John, Saint John and Kings counties, New Brunswick (GSC, 1:63 360)
1113A Saint John, New Brunswick (GSC, 1:63 360)
NR-2 Mineral occurrence map of New Brunswick (NBDNR, 1:500 000)
NR-5 Geological map of southwestern New Brunswick (NBDNR, 1:250 000)
Geological highway map of New Brunswick and Prince Edward Island, Special Publication No. 2 (Atlantic Geoscience Society, 1:638 000)

Navy Island occurrence

PYRITE, FOSSILS

In shale

Pyrite concretions composed of pyrite crystals embedded in massive pyrite occur in black shale. The concretions are up to 2 cm across. Graptolite and trilobite fossils of Ordovician age occur in the shale.

The occurrence is exposed at low tide along the shore of the north end of Navy Island, Saint John River, beneath the Harbour Bridge in Saint John. Lat. 45°16′03″N, Long. 66°04′26″W. *See* Map 10.

To reach the occurrence, leave Highway 1 (Saint John Throughway) at the Market Place exit at **km 107.3** (*see* the Main Road Log on page 4), and proceed along Market Place to the junction of King Street West; from this junction, proceed northeast along Middle Street for about 750 m to the Navy Island occurrence on the shore.

Ref.: 391 p. 386-387.

Maps (T): 21 G/8 Saint John
(G): 21 G/8E Saint John, east half, Geology of the Caledonia area, southern New Brunswick (NBDNR, 1:50 000)
144 St. John, New Brunswick, Map Sheet 1 S.E. (GSC, 1:253 440)
497A Saint John, Saint John and Kings counties, New Brunswick (GSC, 1:63 360)
1113A Saint John, New Brunswick (GSC, 1:63 360)
NR-5 Geological map of southwestern New Brunswick (NBDNR, 1:250 000)
Geological highway map of New Brunswick and Prince Edward Island, Special Publication No. 2 (Atlantic Geoscience Society, 1:638 000)

Cape Spencer mine

NATIVE GOLD, PYRITE

In metasedimentary rocks and granite

Gold mineralization consists of native gold and gold-bearing pyrite in quartz veins in metasedimentary rocks. Native gold also occurs in quartz veins in granite.

The gold-bearing zone extends about 2400 m northeastward from the Cape Spencer lighthouse to Millican Lake. In 1979 and 1980, Morton Gordon staked the gold prospect at Cape Spencer. In 1982, Gordex Minerals Limited explored the deposit and discovered an alteration zone containing numerous gold-bearing quartz veins. In 1985, the company mined 30 000 t of ore from surface workings, and put an on-site leaching plant in operation in the following year. From 1986 to closure in 1989, mining was from an open pit. The first gold bar was poured in June, 1986. The proven ore reserves amounted to 550 358 t of ore averaging 2.50 g/t gold.

The mine is about 15 km southeast of Saint John. Lat. 45°11′52″N, Long. 65°54′54″W. *See* Map 10.

Road log from Highway 1 (Fundy Coastal Drive) at **km 109.3** (*see* the Main Road Log on page 4):

km		
	0	Saint John, Highway 1 (Saint John Throughway) at the Main Street Exit; proceed onto Main Street.
	0.3	Main Street at Union Street; proceed east along Union Street.
	2.6	Junction; turn right (south) onto Bayside Drive.
	4.3	Junction; turn right (southwest) onto Red Head Road.
	12.1	Rocky Corner, junction; continue straight ahead (east) toward Mispec.
	20.2	Junction; turn right (west) onto the mine road.
	20.7	Cape Spencer mine.

Refs.: 51 p. 93-94; 52 p. 76; 53 p. 101, 131-132; 54 p. 90; 411 p. 212; 412 p. 210.

Maps (T): 21 H/4 Cape Spencer

(G): 21 H/4W Cape Spencer, west half, Geology of the Caledonia area, southern New Brunswick (NBDNR, 1:50 000)
93-15A Geology of Cape Spencer-Black River area, New Brunswick (NBDNR, 1:20 000)
99-17 Bedrock geological compilation of the Cape Spencer map area (NTS 21 H/04), Saint John County, New Brunswick (NBDNR, 1:50 000)
144 St. John, New Brunswick, Map Sheet 1 S.E. (GSC, 1:253 440)
478A Loch Lomond (west half) Saint John, and Kings counties, New Brunswick (GSC, 1:63 360)
NR-2 Mineral occurrence map of New Brunswick (NBDNR, 1:500 000)
NR-6 Geological map of southeastern New Brunswick (NBDNR, 1:250 000)
Geological highway map of New Brunswick and Prince Edward Island, Special Publication No. 2 (Atlantic Geoscience Society, 1:638 000)

Golden Grove occurrence

GRAPHITE

In limestone and schist

Graphite occurs as fine flakes along bedding planes in limestone and in graphite schist.

In the early 1900s, the occurrence was prospected using a 5 m shaft and a few pits. In 1982 to 1985, Glenvet Resources Limited did some drilling, trenching, and geophysical and geological surveys and discovered a high-grade graphite zone. In 1986, Morton Gordon explored a zone averaging 35 to 40% graphite; in places, it showed nearly 100% graphite within 1 m widths.

The occurrence is about 10 km northeast of Saint John. Lat. 45°20′37″N, Long. 65°58′50″W. *See* Map 11.

Road log from Highway 1 (Fundy Coastal Drive) at **km 115.7** (*see* the Main Road Log on page 4):

km		
	0	Highway 1 (Saint John Throughway) at the Rothesay Road (Highway 100) Exit; proceed south along Rothesay Road.
	1.5	Junction; turn left (southeast) onto McAllister Drive.
	1.65	Junction; turn left (east) onto Golden Grove Road.
	7.1	Junction, overgrown trail on left leading north. Proceed 450 m along this trail to the Golden Grove occurrence.

Refs.: 7 p. 50; 49 p. 21-H/5W-11; 51 p. 52, 74; 52 p. 75, 91; 268 p. 20; 409 p. 160.

Maps (T): 21 H/5 Loch Lomond
(G): 21 H/5E Loch Lomond, west half, Geology of the Caledonia area, southern New Brunswick (NBDNR, 1:50 000)
99-18 Bedrock geological compilation of the Loch Lomond map area (NTS 21 H/05), Saint John and Kings counties, New Brunswick (NBDNR, 1:50 000)
144 St. John, New Brunswick, Map Sheet 1 S.E. (GSC, 1:253 440)
478A Loch Lomond, west half (GSC, 1:63 360)
NR-2 Mineral occurrence map of New Brunswick (NBDNR, 1:500 000)
NR-6 Geological map of southeastern New Brunswick (NBDNR, 1:250 000)
Geological highway map of New Brunswick and Prince Edward Island, Special Publication No. 2 (Atlantic Geoscience Society, 1:638 000)

Brookville quarry

PYRITE, SERPENTINE

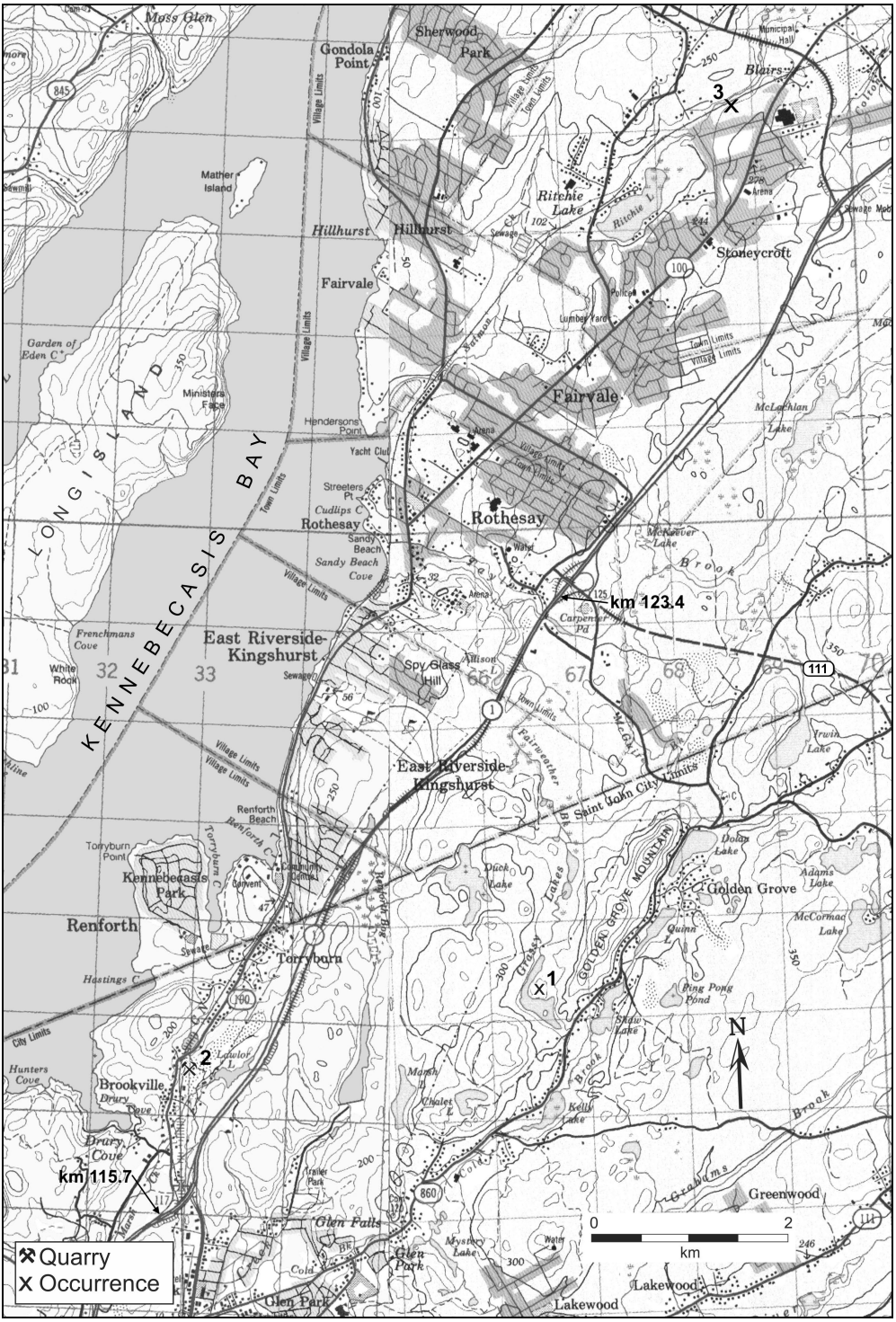
In crystalline limestone

Small pyrite crystals and dark green massive serpentine occur in white, bluish-grey and greenish-grey crystalline limestone. The limestone contains bands of dolomitic limestone.

Wm. Lawlor and Sons operated a quarry in Brookville for several years beginning in the 1870s. In 1920, Brookville Manufacturing Limited, the current operator, undertook operations. The company produces limestone and dolomitic limestone for use as stone dust, agricultural limestone, construction material (concrete), rubble, road metal, and railway ballast.

The quarry is in Brookville, about 7 km northeast of Saint John. Lat. 45°20′12″N, Long. 66°01′32″W. *See* Map 11.

Road log from Highway 1 (Fundy Coastal Drive) at **km 115.7** (*see* the Main Road Log on page 4):



1. Golden Grove occurrence 2. Brookville quarry 3. Quispamsis occurrence

Map 11. Rothesay

km		
	0	Highway 1 (Saint John Throughway) at the Rothesay Road (Highway 100) Exit; proceed north along Rothesay Road.
	1.3	Turnoff (right) to an abandoned Brookville quarry.
	1.8	Turnoff (right) to the operating Brookville quarry.

Refs.: 12 p. 81M; 48 p. 21-G/8E-22; 53 p. 150-151; 55 p. 106-107; 56 p. 20; 136; 161 p. 165-170; 177 p. 101-103; 179 p.8-9; 285 p. 165-168.

Maps (T): 21 G/8 Saint John

(G): 21 G/8E Saint John, east half, Geology of the Caledonia area, southern New Brunswick (NBDNR, 1:50 000)
62-4B Saint John area (east half), New Brunswick, Map 2 (NBDNR, 1: 15 840)
98-16 Geology of the Kingston Peninsula (parts of NTS 21 G/08, G/09, H/05, H/12), Kings and Queens counties, New Brunswick (NBDNR, 1:50 000)
144 St. John, New Brunswick, Map Sheet 1 S.E. (GSC, 1:253 440)
497A Saint John, Saint John and Kings counties, New Brunswick (GSC, 1:63 360)
1113A Saint John, New Brunswick (GSC, 1:63 360)
NR-2 Mineral occurrence map of New Brunswick (NBDNR, 1:500 000)
NR-5 Geological map of southwestern New Brunswick (NBDNR, 1:250 000)
Geological highway map of New Brunswick and Prince Edward Island, Special Publication No. 2 (Atlantic Geoscience Society, 1:638 000)

Quispamsis occurrence

PYRITE, SPHALERITE, GALENA

In crystalline limestone and greisen

Pyrite, dark brown sphalerite, and galena occur as small crystals and as crystal aggregates in crystalline limestone and along joint planes in greisen.

In 1955, Sylvanite Gold Mines Limited located a mineralized zone by drilling. In 1957, G.S. MacKenzie examined a mineralized outcrop on the property. Some small pits expose the zone.

The occurrence is about 18 km northeast of Saint John. Lat. 45°25′30″N, Long. 65°57′18″W. *See* Map 11.

Road log from Highway 1 (Fundy Coastal Drive) at **km 115.7** (*see* the Main Road Log on page 4):

km		
	0	Highway 1 (Saint John Throughway) at the Rothesay Road (Highway 100) Exit; proceed north along Rothesay Road.
	8.4	Highway 100 (Rothesay) turns right (east) and continues as Hampton Road.
	12.4	Junction; turn left (north).
	13.5	Railway crossing. The Quispamsis occurrence is on the south side of the railway about 450 m east of this crossing.

Refs.: 7 p. 47; 49 p. 21-H/5W-1; 380 p. 72-73; 387 p. 112.

Maps (T): 21 H/5 Loch Lomond

(G): 21 H/5W Loch Lomond, west half, Geology of the Caledonia area, southern New Brunswick (NBDNR, 1:50 000)
99-18 Bedrock geological compilation of the Loch Lomond map area (NTS 21 H/05), Saint John and Kings counties, New Brunswick (NBDNR, 1:50 000)
144 St. John, New Brunswick, Map Sheet 1 S.E. (GSC, 1:253 440)
478A Loch Lomond, west half (GSC, 1:63 360)
NR-2 Mineral occurrence map of New Brunswick (NBDNR, 1:500 000)
NR-6 Geological map of southeastern New Brunswick (NBDNR, 1:250 000)
Geological highway map of New Brunswick and Prince Edward Island, Special Publication No. 2 (Atlantic Geoscience Society, 1:638 000)

Quaco Head occurrence

PSILOMELANE, PYROLUSITE, MANGANITE, BARITE, GYPSUM

In shale, limestone, and conglomerate

Psilomelane, pyrolusite, and manganite occur with barite and calcite in shale and limestone and, less commonly, in conglomerate. The manganese minerals occur as small irregular veins, and as nodules up to 60 cm across. Acicular crystals of pyrolusite and manganite occur in cavities in the massive ore. Selenite (gypsum) crystals occur in massive gypsum.

In about 1870, the original occurrence was found on the farm of Mr. Molaskey. Between 1878 and 1889, intermittent operations yielded several hundred tonnes of manganese ore. In 1889, Brunswick Manganese Company drove an adit 18 m into the face of a 45 m cliff and extracted masses of manganite from numerous pockets in the host rock. A mill was built on the site and preparations for shipment were made: the ore was to be transported from the adit to the mill, then loaded onto self-dumping cars and run directly to the wharf for shipment, but there is no record of production. In 1918 and in 1941, some additional work was done, and in 1957, Salisbury Mines Limited examined the property. Small scattered nodules of manganese minerals occur in the beach gravel along the shore north of Quaco Head. Gypsum occurs in sedimentary rock exposed in cliffs at Quaco Head.

The occurrence is at Quaco Head, Bay of Fundy, about 3 km south of St. Martins, and 40 km east of Saint John. Lat. 45°19′41″N, Long. 65°32′16″W. *See* Map 12.

Road log from Highway 1 (Fundy Coastal Drive) at **km 123.4** (*see* the main Road Log on page 4):

km		
	0	Highway 1 at Highway 111; proceed onto Highway 111 (Fundy Coastal Drive).
	38.0	West Quaco, junction. Highway 111 turns left (north); turn right (south).
	39.8	Junction; turn left (east).
	40.5	Junction; turn left (northeast).
	40.8	End of the road at Quaco Bay, Bay of Fundy. Proceed southeast about 300 m along the shore to the Quaco Head occurrence at the foot of a sea cliff in a small bay. (This is about 500 m north of the Quaco Head lighthouse.)



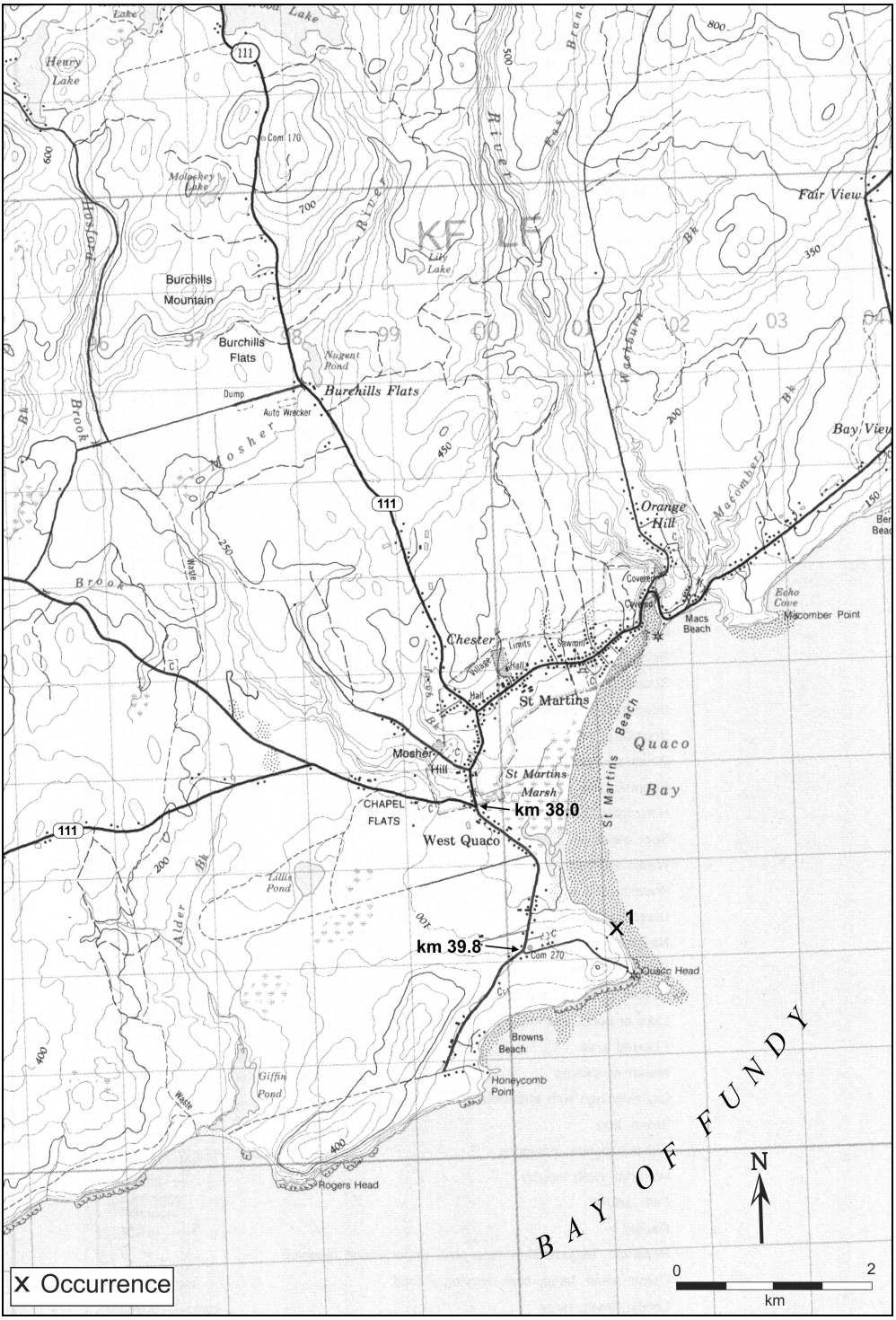
Plate 3.

Flower Pot, an isolated block of Triassic conglomerate-sandstone rock detached from the West Quaco seacliffs by wave erosion and by weathering, 1976. (GSC 159200)

Refs.: 7 p. 52; 12 p. 52M-54M; 16 p. 224; 18 p. 24D; 49 p. 21-H/5E-3, 21-H/5E-6; 182 p. 90-91; 195 p. 94S-95S; 206 p. 40-41.

Maps (T): 21 H/5 Loch Lomond

(G): 21 H/5E Loch Lomond, east half, Geology of the Caledonia area, southern New Brunswick (NBDNR, 1:50 000)
99-18 Bedrock geological compilation of the Loch Lomond map area (NTS 21 H/05), Saint John and Kings counties, New Brunswick (NBDNR, 1:50 000)
144 St. John, New Brunswick, Map Sheet 1 S.E. (GSC, 1:253 440)
477A Loch Lomond, east half (GSC, 1:63 360)
NR-2 Mineral occurrence map of New Brunswick (NBDNR, 1:500 000)
NR-6 Geological map of southeastern New Brunswick (NBDNR, 1:250 000)
Geological highway map of New Brunswick and Prince Edward Island, Special Publication No. 2 (Atlantic Geoscience Society, 1:638 000)



1. Quaco Head occurrence

Map 12. Quaco Head

Dick (Annidale) mine

CHALCOPYRITE, BORNITE, PYRITE, SPHALERITE, TENNANTITE, LANGITE, AZURITE, MALACHITE, GOETHITE, SULPHUR, YARROWITE

In sheared andesite tuff

Chalcopyrite and bornite, the principal copper ore minerals, occur in fractures in brecciated pyrite. Sphalerite and tennantite are associated with chalcopyrite. Secondary minerals occurring as encrustations or coatings on quartz and on the chloritic host rock include: blue to blue-green langite, blue azurite, green malachite, and rusty yellow goethite. Sulphur occurs as a white coating on pyrite. Yarrowite occurs as black velvety and violet to blue and green iridescent microscopic rounded aggregates on the sulphide minerals and on quartz. Gold-bearing quartz-carbonate veins occur in a chrome-mica alteration zone.

Thaddeus Dick discovered the deposit in 1902. During the next 20 years, Thaddeus, his brother Edward, and G.W. Ganong explored the deposit; the work consisted of drilling and excavating several shallow shafts and pits. In about 1920, they shipped two carloads of high-grade silver-bearing copper ore to the American Metal Refinery Company, leaving about 90 t of 5% copper ore on the dump. In 1928, Canadian International Corporation Limited sank a 33 m shaft, and built a mine office building, bunk house, cook house, and blacksmith shop at the site. In 1947, Norman Black and Duncan McLeod did some geophysical surveys on the property. In 1969, Cities Service Company trenched the western part of the property and discovered gold-bearing quartz-carbonate veins. Between 1983 and 1988, Lac Minerals did some drilling, trenching, and geological, geophysical and geochemical surveys in this zone.

The mine is about 16 km northwest of Norton. Lat. 45°46′42″N, Long. 65°46′36″W. *See* Map 13.

Road log from Highway 1 at **km 162.2** (*see* the Main Road Log on page 4):

km		
	0	Junction, Highway 1 and the road to Norton; turn left (north) and proceed to Norton.
	1.5	Norton, junction of highways 121 and 124; proceed north along Highway 124.
	3.9	Junction; turn right (north).
	12.2	Belleisle Creek, junction of Highway 870; turn right (east) onto Highway 870.
	12.7	Junction; turn left (north).
	19.1	Junction; turn right (east).
	20.5	Junction; turn left (north).
	21.5	Dick (Annidale) mine. There are shafts on both sides of the road.

Refs.: 53 p. 91-92, 99-100; 148 p. 44; 237 p. 104-105; 241 p. 58; 310 p. 9-15; 370 p. 96C-99C; 386 p. 108.

Maps (T): 21 H/13 Codys
(G): 59-5 Codys (west half), Queens and Kings counties, New Brunswick (NBDNR, 1:31 680)
84-3 Codys, Annidale-Nerepis area, southern New Brunswick (NBDNR, 1:50 000)

145 Grand Lake, New Brunswick, Map Sheet 1 N.E. (GSC, 1:253 440)
NR-2 Mineral occurrence map of New Brunswick (NBDNR, 1:500 000)
NR-6 Geological map of southeastern New Brunswick (NBDNR, 1:250 000)
Geological highway map of New Brunswick and Prince Edward Island, Special Publication No. 2 (Atlantic Geoscience Society, 1:638 000)

Marrtown mine

NATIVE COPPER

In volcanic rocks

Native copper occurs as laminated fragments in a fault zone.

In 1928, the mineralization was explored by trenches and two shafts, 4.3 and 9.1 m deep, respectively.

The mine is about 19 km northwest of Sussex. Lat. 45°50′58″N, Long. 65°41′12″W. *See* Map 13.

Road log from Highway 1 at **km 179.4** (*see* the Main Road Log on page 4):

km		
	0	Sussex, junction of highways 1 and 10; proceed west along Highway 10.
	8.4	Berwick, junction of Highway 880; continue along Highway 10.
	17.1	Junction; turn right (northeast).
	19.4	Marrtown, junction; turn left (northwest).
	20.9	Marrtown mine on left, about 175 m south of the road.

Ref.: 241 p. 58.

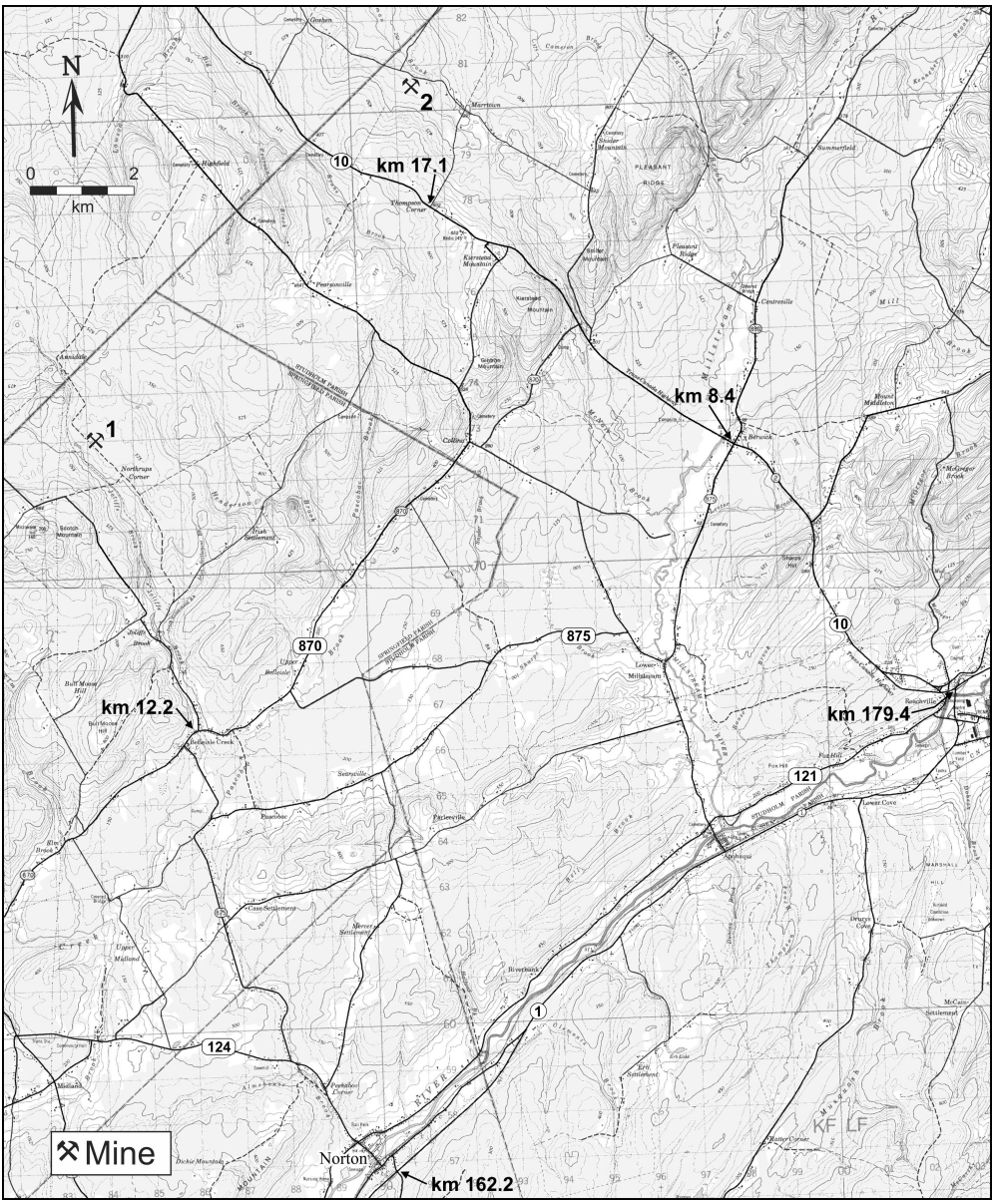
Maps (T): 21 H/13 Codys
(G): 59-5 Codys (west half), Queens and Kings counties, New Brunswick (NBDNR, 1:31 680)
84-3 Codys, Annidale-Nerepis area, southern New Brunswick (NBDNR, 1:50 000)
145 Grand Lake, New Brunswick, Map Sheet 1 N.E. (GSC, 1:253 440)
NR-2 Mineral occurrence map of New Brunswick (NBDNR, 1:500 000)
NR-6 Geological map of southeastern New Brunswick (NBDNR, 1:250 000)
Geological highway map of New Brunswick and Prince Edward Island, Special Publication No. 2 (Atlantic Geoscience Society, 1:638 000)

Jordan Mountain copper mine

CHALCOCITE, MALACHITE, CHRYSOCOLLA, MIXITE, YARROWITE, DIGENITE, HEMATITE, PYRITE, BARITE

In sheared rhyolite

The ore mineral is chalcocite. Associated minerals include: malachite, as bright green fibrous aggregates; chrysocolla, as greenish-blue encrustations; mixite, as yellowish-green granular aggregates; yarrowite, as black iridescent and velvety flaky aggregates; and digenite, as greenish-brown to black fine flaky aggregates. Hematite, pyrite, and barite are also present.



1. Dick (Annidale) mine 2. Marrtown mine

Map 13. Norton

A prospector discovered this deposit in about 1900. In 1906, a 30 m shaft was sunk on a copper-bearing vein. In the 1950s, Anthonian Mining Corporation investigated the property. About ten years later, Mija Mines Limited trenched the property and found a mineralized zone 210 m long. A bulk sample assayed 1.33% copper.

The mine is on the western slope of Jordan Mountain, about 11 km north of Sussex. Lat. 45°49′25″N, Long. 65°29′42″W. *See* Map 14.

Road log from Highway 1 at **km 182.2** (*see* the Main Road Log on page 4):

km		
	0	Sussex, junction of Highway 1 and Smiths Creek Road (Highway 890); proceed north along Smiths Creek Road.
	5.2	Smiths Creek, junction; proceed northwest along Highway 890.
	6.1	Junction; turn right (northeast) continuing along Highway 890.
	7.3	Junction; turn left (northwest).
	10.7	Junction; turn right (northeast).
	11.7	Jordan Mountain copper mine on right, about 30 m east of the road.

Refs.: 51 p. 77; 310 p. 15-17.

Maps (T): 21 H/14 Petitcodiac

(G): 99-23 Bedrock geological compilation of the Petitcodiac area (NTS 21 H/14), Kings, Westmorland, and Queens counties, New Brunswick (NBDNR, 1:50 000)
145 Grand Lake, New Brunswick, Map Sheet 1 N.E. (GSC, 1:253 440)
643A Petitcodiac (west half), Kings, and Westmorland counties, New Brunswick (GSC, 1:63 360)
NR-2 Mineral occurrence map of New Brunswick (NBDNR, 1:500 000)
NR-6 Geological map of southeastern New Brunswick (NBDNR, 1:250 000)
Geological highway map of New Brunswick and Prince Edward Island, Special Publication No. 2 (Atlantic Geoscience Society, 1:638 000)

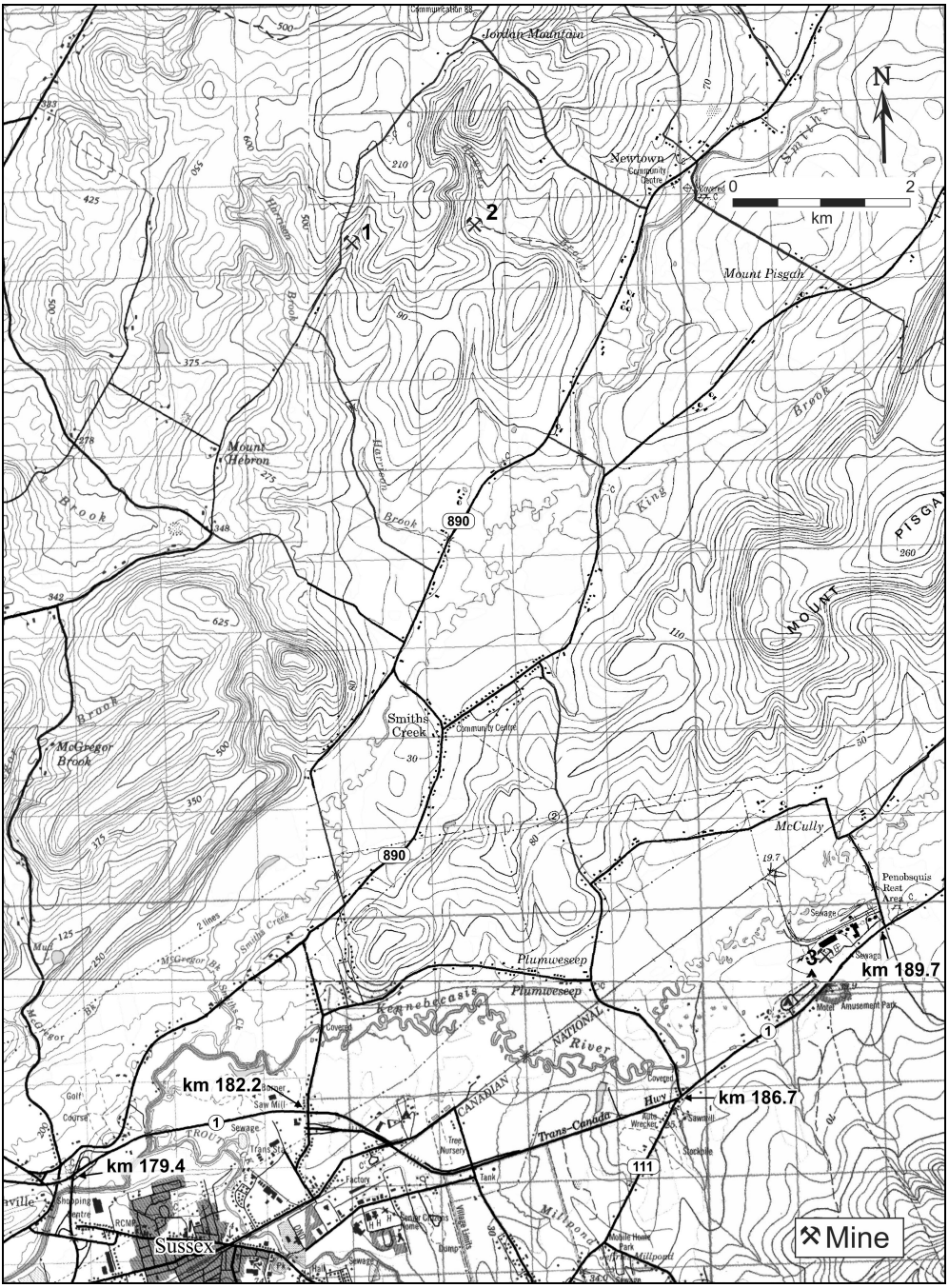
Jordan Mountain manganese mine

PYROLUSITE, PSILOMELANE, HAUSMANNITE, MANGANITE, BARITE, HEMATITE

In conglomerate and shale

Massive manganese ore occurs in a shear zone. The ore consists mainly of fine-grained massive pyrolusite containing disseminated grains of manganite and hausmannite. The manganese minerals also occur as crystal aggregates in the massive ore. During early mining operations, fine specimens of compact radiating fibrous aggregates of manganite were found in the deposit. Barite, hematite, and calcite are gangue minerals. Specimens of pyrolusite were displayed in the Geological Survey of Canada economic minerals exhibit at the Paris International Exposition held in 1900.

F.W. Stockton of Sussex discovered the deposit in 1882. From 1882 to 1887, about 360 t of ore were mined. In 1899 and 1900, several thousand tonnes of ore were extracted, but only high-grade ore, amounting to about 450 t, was shipped. The original workings consisted of a trench 21 m long and 3.5 m deep. In 1940 to 1942, Sussex Manganese Company Limited



1. Jordan Mountain copper mine 2. Jordan Mountain manganese mine 3. Penobsquis (Sussex) mine

Map 14. Sussex north

did additional development work consisting of a 9.1 m shaft, several shallow shafts, pits, and trenches, and four adits. Several buildings and a mill were built at the mine site. In 1942 and 1943, British Manganese Mines Limited undertook mining from the main shaft which it deepened to 30 m. The company shipped some ore to Welland, Ontario and left the remainder on the property.

The mine is on the south slope of Jordan Mountain near the head of Hawkes Brook, about 13 km north of Sussex. Lat. 45°49′32″N, Long. 65°28′34″W. *See* Map 14.

Road log from Highway 1 at **km 182.2** (*see* the Main Road Log on page 4):

km		
	0	Sussex, junction of Highway 1 and Smiths Creek Road (Highway 890); proceed north along Smiths Creek Road.
	5.2	Smiths Creek, junction; continue along Highway 890.
	6.1	Junction; turn right (northeast) continuing along Highway 890.
	10.9	Junction; turn left (northwest) onto the mine road.
	12.9	Jordan Mountain manganese mine. The mine workings extend over about 800 m in a north-south direction.

Refs.: 89 p. 60; 109 p. 96; 182 p. 84-86; 195 p. 94S; 206 p. 40; 397 p. 395.

Maps (T): 21 H/14 Petitcodiac



Plate 4.

Jordan Mountain manganese mine, Sussex Manganese property, 1941.
(GSC 89833)

(G): 99-23 Bedrock geological compilation of the Petitcodiac area (NTS 21 H/14), Kings, Westmorland, and Queens counties, New Brunswick (NBDNR, 1:50 000)
145 Grand Lake, New Brunswick, Map Sheet 1 N.E. (GSC, 1:253 440)
643A Petitcodiac (west half), Kings, and Westmorland counties, New Brunswick (GSC, 1:63 360)
NR-2 Mineral occurrence map of New Brunswick (NBDNR, 1:500 000)
NR-6 Geological map of southeastern New Brunswick (NBDNR, 1:250 000)
Geological highway map of New Brunswick and Prince Edward Island, Special Publication No. 2 (Atlantic Geoscience Society, 1:638 000)

Glebe mine

MANGANITE, PYROLUSITE

In limestone

The manganese ore minerals, manganite and pyrolusite, occur as dense fine crystalline aggregates forming veinlets and nests in the host rock. The minerals also occur as nodules and thin layers associated with calcite.

The mine was worked intermittently from 1867 to 1882. The production of about 36 t of ore was sold to Colonel Markham of the Markhamville mine. The workings consist of several shafts up to 26 m deep, and an adit 152 m long.

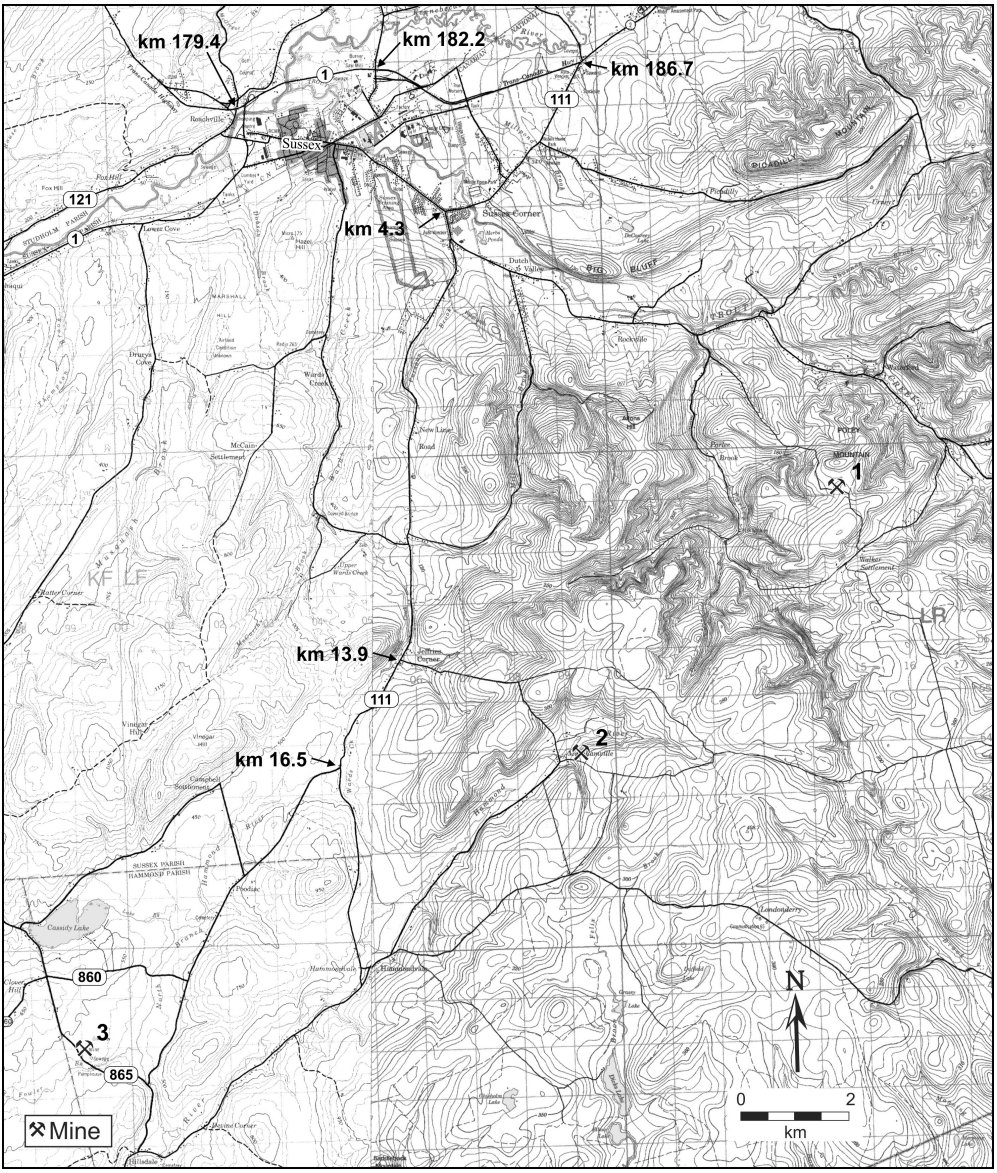
The mine is about 12 km southeast of Sussex. Lat. 45°39′38″N, Long. 65°22′48″W. *See* Map 15.

Road log from Highway 1 at **km 186.7** (*see* the Main Road Log on page 4):

km		
	0	Sussex, junction of highways 1 and 111; proceed onto Highway 111 (Fundy Coastal Drive).
	4.3	Sussex Corner, junction; proceed south continuing along Highway 111.
	4.9	Junction; turn left (east).
	10.5	Junction; turn right (south).
	11.1	Junction; follow the road on left leading southeast.
	15.3	Glebe mine.

Refs.: 49 p. 21 H/11W-13; 109 p. 95-96; 182 p. 86-87; 384 p. 71.

Maps (T): 21 H/11 Waterford
(G): 99-20 Bedrock geological compilation of the Waterford map area (NTS 21 H/11), Saint John, Kings, and Albert counties, New Brunswick (NBDNR, 1:50 000)
145 Grand Lake, New Brunswick, Map Sheet 1 N.E. (GSC, 1:253 440)
829A Waterford, Kings and Saint John counties, New Brunswick (GSC, 1:63 360)
NR-2 Mineral occurrence map of New Brunswick (NBDNR, 1:500 000)
NR-6 Geological map of southeastern New Brunswick (NBDNR, 1:250 000)
Geological highway map of New Brunswick and Prince Edward Island, Special Publication No. 2 (Atlantic Geoscience Society, 1:638 000)



1. Glebe mine 2. Markhamville mine 3. Salt Springs (Clover Hill) mine

Map 15. Sussex south

Markhamville mine

PYROLUSITE, MANGANITE, HAUSMANNITE, BRAUNITE, GOETHITE, HEMATITE, DOLOMITE, BARITE

In stromatolitic limestone

The principal manganese ore minerals, pyrolusite and manganite, occur with hausmannite and braunite forming nodular and botryoidal masses. Goethite, hematite, and fine crystals of dolomite are associated with the manganese minerals. The manganese ore occurs in calcite-barite veins and as irregular lenses widening into pockets and flat layers in the limestone. Several hundred tonnes of ore were recovered from the pockets including one pocket that yielded 3600 t of ore. Specimens of pyrolusite and manganite were displayed in the Geological Survey of Canada economic minerals exhibit at the Philadelphia International Exhibition held in 1876, the Colonial and Indian Exhibition held in London in 1886, and the Paris International Exposition held in 1900.

G.F. Matthew discovered the manganese mineralization in 1862. William Davidson of Saint John mined the deposit from 1862 until 1865 when Victoria Manganese Company took over operations continuing to 1889. Between 1890 and 1894, Pope Manganese Company located two large orebodies, and extracted ore from them and from the old mine dumps. An on-site mill crushed, sorted, and milled the ore for shipment. Two types of ore were produced: chemical ore consisting of pyrolusite, and furnace ore consisting almost entirely of manganite. The mine produced 20 883 t of ore, much of it reputed to be of the highest grade manganese in the world. The ore was shipped to Boston and to England. Development consisted of several pits, open cuts, and adits. More recent exploration was done in 1941 and 1942 and in 1973 and 1974.

The mine is about 14 km south of Sussex. Lat. 45°36′42″N, Long. 65°26′50″W. *See* Map 15.

Road log from at **km 186.7** (*see* the Main Road Log on page 4):

km		
	0	Sussex, junction of highways 1 and 111; proceed onto Highway 111 (Fundy Coastal Drive).
	4.3	Sussex Corner, junction; proceed south continuing along Highway 111.
	13.9	Jeffries Corner, junction; turn left (east).
	16.3	Junction; turn right (south).
	18.2	Markhamville, junction; turn left (east).
	18.35	Scott farmhouse on right. The Markhamville mine is on the north side of the road, about 200 m east of the farmhouse.

Refs.: 12 p. 43M-49M; 16 p. 65, 224; 89 p. 60; 174 p. V-4; 182 p. 87- 90; 195 p. 93S-94S; 235 p. 25-27; 393 p. 67; 395 p. 96; 397 p. 133-134.

Maps (T): 21 H/11 Waterford
(G): 21 H/11W Waterford, west half, Geology of the Caledonia area, southern New Brunswick (NBDNR, 1:50 000)
78-29A R-25 Apohaqui-Markhamville (NBDNR, 1:25 000)
99-20 Bedrock geological compilation of the Waterford map area (NTS 21 H/11), Saint John, Kings, and Albert counties, New Brunswick (NBDNR, 1:50 000)
145 Grand Lake, New Brunswick, Map Sheet 1 N.E. (GSC, 1:253 440)

829A Waterford, Kings and Saint John counties, New Brunswick (GSC, 1:63 360)
NR-2 Mineral occurrence map of New Brunswick (NBDNR, 1:500 000)
NR-6 Geological map of southeastern New Brunswick (NBDNR, 1:250 000)
Geological highway map of New Brunswick and Prince Edward Island, Special Publication No. 2 (Atlantic Geoscience Society, 1:638 000)

Salt Springs (Clover Hill) mine

SYLVITE, HALITE, ANHYDRITE, GYPSUM, BORACITE, HYDROBORACITE, HILGARDITE, SZAIBELYITE, PRICEITE, COLEMANITE, DANBURITE, VOLKOVSKITE, ULEXITE, TREMBATHITE

In evaporite between limestone and claystone

Massive orange to orange-red sylvite and colourless halite occur in evaporite composed of anhydrite, gypsum, halite, and mudstone. Sylvite is the potash ore mineral. A unique assemblage of borate minerals occurs in the deposit, including: boracite (the major borate), as colourless, light green and blue cubes to 2 mm and crystal aggregates to 4 cm in halite; hydroboracite, as colourless to light brown and greenish prismatic crystals to 1 cm long commonly forming rosettes or gypsum-like swallow-tails to 2 cm long; hilgardite, as colourless to reddish-brown transparent platy crystals, as clusters of brownish triangular crystals to 5 cm, and as parallel multiple growths to 5 cm; szaibelyite, as white fine acicular radiating crystal aggregates to 9 mm; priceite, as chalky white nodules to 1 mm, as light orange cubes to 0.5 mm, and as clusters to 16 mm in halite; colemanite, as white to light brown crystals to 1 mm, and as crystal aggregates to 1 cm; danburite, as white earthy nodules to 8 mm in anhydrite and in colourless halite; volkovskite, as light orange granular rounded masses to 5 cm; ulexite, as white fine fibrous aggregates; and trembathite, as colourless to light blue transparent rhombohedra to 2 mm associated with halite and hilgardite. Trembathite is a new mineral species first found in this deposit.

The New Brunswick Department of Natural Resources discovered potash in this area during a 1973 drilling program. In 1975, International Minerals and Chemical Corporation (Canada) Limited did some drilling. Denison Mines Limited took over exploration in 1979, and sank an 835 m exploration shaft followed by an 854 m production shaft. Denison-Potacan Potash Company of Canada began production in 1985 continuing until 1997 when flooding of the underground workings brought operations to a close. Annual production was about 1 300 000 t of potash. Potash Corporation of Saskatchewan Inc. (Cassidy Lake Division) acquired the property in 1998.

The mine is about 25 km southwest of Sussex. Lat. 45°33′27″N, Long. 65°34′25″W. *See* Map 15.

Road log from Highway 1 at **km 186.7** (*see* the Main Road Log on page 4):

km		
	0	Sussex, junction of highways 1 and 111; proceed onto Highway 111 (Fundy Coastal Drive).
	4.3	Sussex Corner, junction; proceed south continuing along Highway 111.
	13.9	Jeffries Corner, junction; continue south along Highway 111.
	16.5	Junction; turn right (west).

24.4 Junction; turn right (west) onto Highway 865.

25.8 Salt Springs (Clover Hill) mine, on the right (north) side of the road.

Refs.: 40 p. 445-448; 56 p. 22-23; 136; 176 p. 13-18; 236 p. 26-29; 268 p. 39-40; 295 p. 689-693; 305 p. 291-301; 417 p. 372; 418 p. 368.

Maps (T): 21 H/12 Sussex
(G): 145 Grand Lake, New Brunswick, Map Sheet 1 N.E. (GSC, 1:253 440)
845A Sussex, Kings and Queens counties, New Brunswick (GSC, 1:63 360)
NR-2 Mineral occurrence map of New Brunswick (NBDNR, 1:500 000)
NR-6 Geological map of southeastern New Brunswick (NBDNR, 1:250 000)
Geological highway map of New Brunswick and Prince Edward Island, Special Publication No. 2 (Atlantic Geoscience Society, 1:638 000)

Penobsquis (Sussex) mine

SYLVITE, HALITE, ANHYDRITE, GYPSUM, HOWLITE, BORACITE, HYDROBORACITE, VOLKOVSKITE, HILGARDITE, DANBURITE, SZAIBELYITE, COLEMANITE, VEATCHITE, PENOBSQUISITE, PRINGLEITE, RUITENBERGITE, BRIANROULSTONITE, WALKERITE, TREMBATHITE, SELLAITE, FLUORITE, HEMATITE, MALACHITE, CONGOLITE, STRONTIOGINORITE

In evaporite between limestone and claystone

Massive orange to orange-red sylvite and colourless halite occur in evaporite composed of anhydrite, gypsum, halite, and mudstone. Sylvite is the potash ore mineral and halite is the source of salt. A unique assemblage of borate minerals occurs in the deposit, including howlite, as white nodules to 15 mm forming nodular aggregates and bands; boracite, as colourless to white and light yellow, green and blue cubes to 2 cm, and as aggregates of cubes to 4 cm; hydroboracite, as colourless to yellow, light brown and greenish prismatic crystals to 2 cm long forming rosettes or gypsum-like swallow-tails to 2 cm long; volkovskite, as colourless to light orange rounded granular masses to 5 cm associated with howlite and hydroboracite, and as colourless to pink transparent thin plates to 1 cm; hilgardite, as colourless to yellow and orange to reddish-brown transparent plates, as clusters of brownish triangular crystals in parallel multiple growths to 2 cm, and as individual crystals to 5 mm; danburite, as white microcrystalline to earthy nodules several cm across; szaibelyite, as silky colourless to white radiating acicular crystals, and as dense nodules up to 9 mm across; colemanite, as colourless, yellow to orange and light brown crystals to 1 mm, and as crystal aggregates to 1 cm; veatchite, as brownish to orange-red platy crystal aggregates; penobsquisite, as yellow to orange transparent crystals to 1.5 mm associated with halite, boracite, hilgardite, trembathite, sellaite, fluorite, hematite, and malachite; pringleite, as colourless to orange transparent lustrous platy masses to 4 mm, and as colourless to light yellow transparent platy or prismatic crystals to 2 mm; ruitenbergite, as single grains in pringleite; brianroulstonite, as colourless to white transparent thin plates and cleavable masses to 2 mm; walkerite, as colourless to white fibrous and acicular bundles to 7 mm long; congolite, as colourless to grey aggregates of cubes up to 17 mm across; and strontioginorite, as colourless transparent to translucent tabular crystals. Penobsquisite, pringleite, ruitensbergite, brianroulstonite, and walkerite are new mineral species first found in this deposit. Specimens of salt (halite) were displayed in the Geological

Survey of Canada economic minerals exhibit at the Philadelphia International Exhibition in 1876, the Colonial and Indian Exhibition held in London in 1886, and the Paris International Exposition held in 1900.

The production of salt (halite) in the Sussex area began in about 1790. A salt spring at Plumweseep was the original source of the initial production. Operations were small-scale and production was for local consumption. In 1887, George N. Hendricks began production on a somewhat larger scale producing about 150 barrels of salt per year until about the turn of that century. Salt production involved evaporating the brine in two 150-gallon and two 200-gallon kettles heated by two wood-burning furnaces. Two men operated the furnaces, each on a 12-hour Monday to Saturday shift. Weekly production was 21 barrels which sold for $3.00 per barrel. The salt was used chiefly for butter-making and for table salt, meat-curing, and dairy. Just before World War I, an English company drilled the salt springs area and sank a shaft to 12 m. The outbreak of war in 1914 brought this venture to a close. A joint Federal-Provincial government drilling program in 1971 located a potash-salt deposit 520 m thick, the top of it being 305 m below the surface. In 1973 to 1975, Potash Corporation of America did extensive drilling in the Plumweseep-Penobsquis area with encouraging results; this prompted the company to proceed with underground development. The company sank one shaft in 1980 and another in 1983, each to 610 m. Full production began in 1984. In 1993, Potash Corporation of Saskatchewan Inc. (the current operator) took over operations. Annual production in 2004 and 2005 amounted to nearly 800 000 t of potash, and about 550 000 t of salt (halite). There are no mine dumps at the mine site as the mine tailings are returned underground.

The mine is about 5 km east of Sussex. It is on the north side of Highway 1 at **km 189.7** Lat. 45°45′19″N, Long. 65°25′13″W. *See* Map 14.

(*see* the Main Road Log on page 4).

Refs.: 12 p. 121M-122M; 56 p. 22; 78 p. 19-20; 136; 168 p. 1469-1486; 169 p.657-665; 170 p. 751-758; 171 p. 1675-1686; 176 p. 13-16; 230 p. 351-356; 268 p. 31-44; 295 p. 689-693; 302 p.795-800; 304 p. 29-33; 305 p. 291-301; 393 p. 81; 395 p. 108; 397 p. 166; 415 p. 301; 418 p. 368; 419 p. 340-341; 420 p. 355-356.

Maps (T): 21 H/14 Petitcodiac
(G): 99-23 Bedrock geological compilation of the Petitcodiac area (NTS 21 H/14), Kings, Westmorland, and Queens counties, New Brunswick (NBDNR, 1:50 000)
145 Grand Lake, New Brunswick, Map Sheet 1 N.E. (GSC, 1:253 440)
643A Petitcodiac (west half), Kings, and Westmorland counties, New Brunswick (GSC, 1:63 360)
NR-2 Mineral occurrence map of New Brunswick (NBDNR, 1:500 000)
NR-6 Geological map of southeastern New Brunswick (NBDNR, 1:250 000)
Geological highway map of New Brunswick and Prince Edward Island, Special Publication No. 2 (Atlantic Geoscience Society, 1:638 000)

Alma Beach, Cape Enrage occurrences

EPIDOTE, RHYOLITE, VOLCANIC BRECCIA, PORPHYRITIC DACITE; FOSSILS

In beach gravels; in sandstone

A variety of attractive rocks occur as pebbles and boulders up to 60 cm across. These include: epidote containing veinlets of quartz and streaks of dark green chlorite; pink to dark purple rhyolite; volcanic breccia composed of irregular, rounded, fine-grained, pea-green fragments

embedded in a brownish purple matrix; and porphyritic dacite composed of irregular white to cream-white plagioclase phenocrysts up to 12 mm long in a dark green pyroxene-quartz-feldspar matrix. They take a good polish and are suitable for lapidary purposes.

Fossil plants and trees occur in grey sandstone of Pennsylvanian age. The tree trunks measuring up to 25 cm across lie horizontally in the rock. White calcite and pyrite partially replace the trees trunks. The original structure is preserved, and shows up on the polished surface.

The occurrences occur along the shore of Shepody Bay at Alma. Lat. 45°35′59″N, Long. 64°56′43″W (Alma Beach); Lat. 45°35′37″N, Long. 64°46′51″W (Cape Enrage). *See* Map 16.

Access to Alma is by Highway 114 (Fundy Coastal Drive) which leaves Highway 1 at **km 196.5** (*see* the Main Road Log on page 4), a distance of 43 km. The beach deposits are easily accessible at low tide. The pebbles and boulders are scattered along the beach on both sides of the mouth of the Upper Salmon River. The fossil-bearing sandstone is exposed along the cliffs on the north side of Upper Salmon River, and at Cape Enrage in the vicinity of the Cape Enrage lighthouse, about 16 km by Highway 915 (Fundy Coastal Drive) east of Alma.

Ref.: 136.

Maps (T): 21 H/10 Alma
(G): 21 H/10W Alma, west half, Geology of the Caledonia area, southern New Brunswick (NBDNR, 1:50 000)
97-9 Carboniferous geology of the Alma map area, (NTS 21 H/10), Albert and Westmorland counties, New Brunswick (NBDNR, 1:50 000)
99-25 Bedrock geological compilation of the Alma map area (NTS 21 H/10), Albert County, New Brunswick (NBDNR, 1:50 000)
145 Grand Lake, New Brunswick, Map Sheet 1 N.E. (GSC, 1:253 440)
648A Albert, Albert County, New Brunswick (GSC, 1:63 360)



Plate 5.

Fossil wood replaced by calcite, Shebody beach. The specimen measures 7 cm across. (GSC 112624-I)

1109A Point Wolfe, Albert, Kings, and Saint John counties, New Brunswick (GSC, 1:63 360)
NR-2 Mineral occurrence map of New Brunswick (NBDNR, 1:500 000)
NR-6 Geological map of southeastern New Brunswick (NBDNR, 1:250 000)
Geological highway map of New Brunswick and Prince Edward Island, Special Publication No. 2 (Atlantic Geoscience Society, 1:638 000)

Point Wolfe mine

BORNITE, CHALCOPYRITE, CHALCOCITE, HEMATITE, PYRITE, PYRRHOTITE

In diorite, andesite, and schist

Copper mineralization consisting of bornite, chalcopyrite, and chalcocite occurs with hematite (specularite), pyrite, and pyrrhotite in quartz veins in a fault zone.

The deposit was worked in the 1870s and in the early 1900s. The workings consist of a 20 m shaft and two adits.

The mine is on the Bay of Fundy shore in Fundy National Park, about 9 km southwest of Alma. Lat. 45°32′29″N, Long. 65°01′30″W. *See* Map 16.

Access to Alma is by Highway 114 (Fundy Coastal Drive) which leaves Highway 1 at **km 196.5** (*see* the Main Road Log on page 4), a distance of 43 km. An 8 km road leads southwest from Alma to Point Wolfe; the mine is on the Bay of Fundy shore about 1400 m southwest of the Point Wolfe Lookout and bridge over Point Wolfe River. Collecting is prohibited in national parks; the mine is described in this guidebook for historical interest.

Ref.: 16 p. 225, 227.

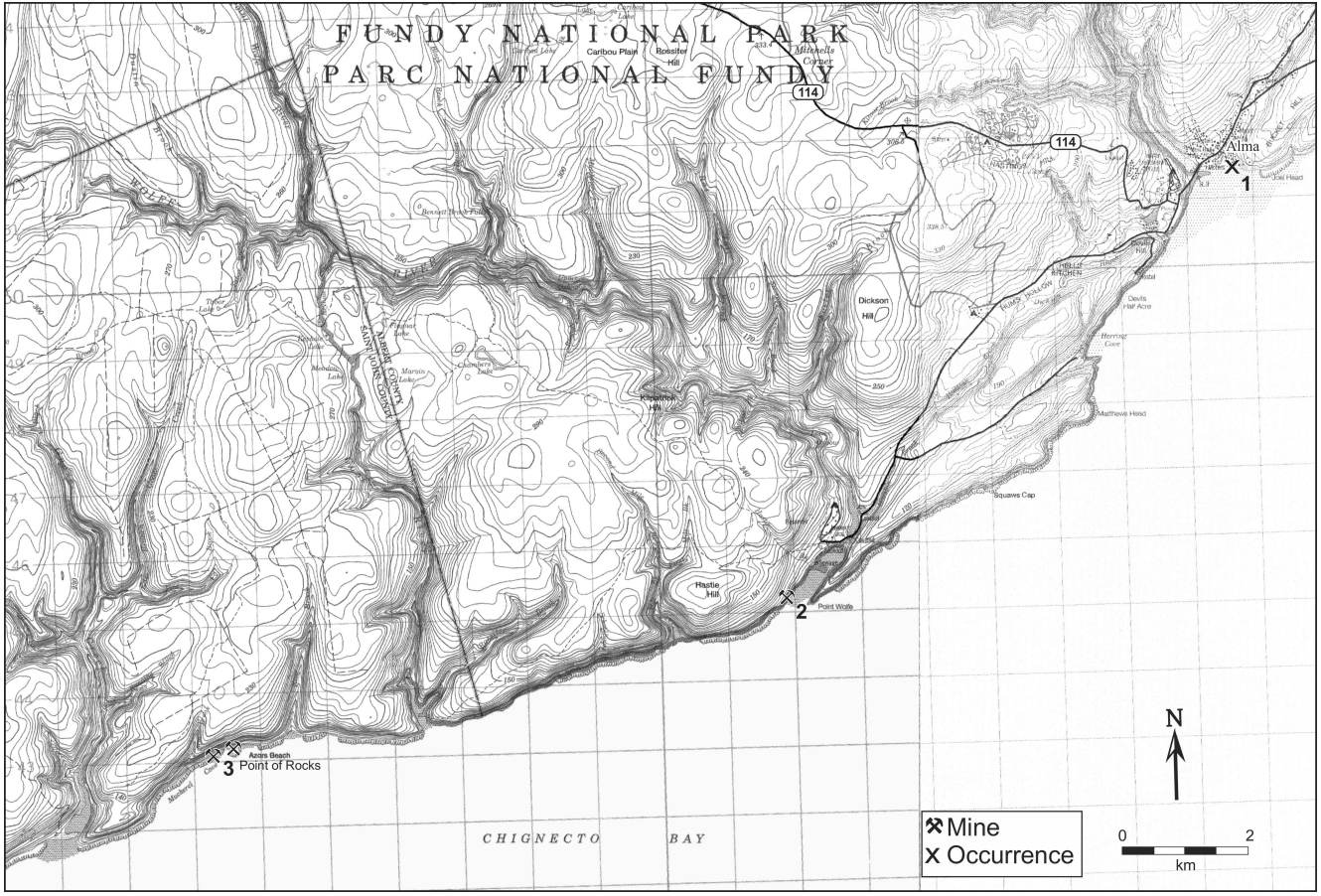
Maps (T): 21 H/11 Waterford
(G): 21 H/11E Waterford, east half, Geology of the Caledonia area, southern New Brunswick (NBDNR, 1:50 000)
99-20 Bedrock geological compilation of the Waterford map area (NTS 21 H/11), Saint John, Kings, and Albert counties, New Brunswick (NBDNR, 1:50 000)
145 Grand Lake, New Brunswick, Map Sheet 1 N.E. (GSC, 1:253 440)
1109A Point Wolfe, Albert, Kings, and Saint John counties, New Brunswick (GSC, 1:63 360)
NR-2 Mineral occurrence map of New Brunswick (NBDNR, 1:500 000)
NR-6 Geological map of southeastern New Brunswick (NBDNR, 1:250 000)
Geological highway map of New Brunswick and Prince Edward Island, Special Publication No. 2 (Atlantic Geoscience Society, 1:638 000)

Vernon (Goose Creek) mine

BORNITE, CHALCOPYRITE, MALACHITE, CUPRITE

In rhyolite

Bornite and minor chalcopyrite occur as grains, clusters of grains, and small pods in calcite-quartz veins in a fault zone. Malachite and cuprite also occur in the veins. Some rich bornite ore and fine bornite specimens were recovered during early mining operations.



1. Alma Beach occurrence 2. Point Wolfe mine 3. Vernon (Goose Creek) mine

Map 16. Alma

Prospecting and exploration for copper on the shore of Mackerel Bay, Bay of Fundy, dates back to 1855. In 1863 to 1865, about forty men undertook development; they built buildings and a wharf, and drove an adit 32 m into the steep shoreline cliff at 22 m above the high-tide level. A considerable amount of ore assaying 18 to 25% copper was recovered. In 1892, Messrs. Van Mater and Gue opened the original workings. In 1902 to 1904, small quantities of ore containing about 8% copper were mined from another adit driven 150 m into the cliff 7 m above high-tide level. This adit is on a point of land (locally known as Point of Rocks) about 950 m west of the mouth of Rose Brook, and about 320 m east of the original adit. In 1908 and 1909, 45 t of ore were mined. In 1915, Maritime Copper Company of Moncton drove another adit 55 m into the cliff about 30 m southwest of the original adit. Subsequent exploration was done by the following: Leonard Martin of Alma (1928); New Ireland Mines Limited of Moncton (1945); Tidelands Copper Mines Limited (1954); and Centennial Mines Limited (1969).

The mine is on the Bay of Fundy coast about 19 km southwest of Alma. Lat. 45°31′19″N, Long. 65°07′54″W (Point of Rocks adit); Lat. 45°31′16″N, Long. 65°08′08″W (original adit). *See* Map 16.

Access to the Vernon (Goose Creek) mine is by boat from Alma. To reach Alma proceed on Highway 114 (Fundy Coastal Drive) from its junction with Highway 1 at **km 196.5** (*see* the Main Road Log on page 4), a distance of 43 km. The Vernon (Goose Creek) mine is on the shore of Mackerel Cove, Bay of Fundy between Rose Brook and Jim Brook, 9.6 km west of Point Wolfe, and 4.8 km east of Martin Head. Boats may be anchored at the mouth of Goose River, 4 km east of the mine, or at Goose Creek, 2.4 km west of the mine.

Refs.: 7 p. 12; 12 p. 22M-23M; 14 p. 285A; 16 p. 227; 38 p. 57S-58S; 49 p. 21-H/11E-1; 87 p. 527; 109 p. 89; 226 p. 1-8; 241 p. 59; 311 p. 140-141; 360 p. 3-12; 368 p. 72.

Maps (T): 21 H/11 Waterford

(G): 21 H/11E Waterford, east half, Geology of the Caledonia area, southern New Brunswick (NBDNR, 1:50 000)
99-20 Bedrock geological compilation of the Waterford map area (NTS 21 H/11), Saint John, Kings, and Albert counties, New Brunswick (NBDNR, 1:50 000)
145 Grand Lake, New Brunswick, Map Sheet 1 N.E. (GSC, 1:253 440)
1109A Point Wolfe, Albert, Kings, and Saint John counties, New Brunswick (GSC, 1:63 360)
NR-2 Mineral occurrence map of New Brunswick (NBDNR, 1:500 000)
NR-6 Geological map of southeastern New Brunswick (NBDNR, 1:250 000)
Geological highway map of New Brunswick and Prince Edward Island, Special Publication No. 2 (Atlantic Geoscience Society, 1:638 000)

Glenvale (Petitcodiac) mine

GYPSUM, ANHYDRITE

In limestone

White to grey massive granular gypsum occurs with bluish white to grey massive anhydrite. Selenite occurs as large colourless and orange crystals and as platy aggregates in massive white granular to flaky gypsum. The deposit was notable for the abundance of fibrous gypsum and selenite it contained.

Amasa Brown mined gypsum in the Glenvale-Intervale area in the 1870s. He supplied specimens of selenite, and fibrous, crude, and ground gypsum for display in the Geological Survey of Canada economic minerals exhibit at the Philadelphia International Exhibition held in 1876. To about 1913, a small amount of mining was done intermittently on gypsum outcrops for the production of fertilizer. From 1932 to 1935, Albert Manufacturing Company resumed operations and produced 1179 t of gypsum annually. From 1950 to 1987, Canada Cement LaFarge Limited operated the mine producing 4550 to 22 600 t annually, the amount depending on the requirements of its portland cement plant in Havelock.

The mine is 4 km northwest of Petitcodiac. Lat. 45°56′40″N, Long. 65°12′48″W.

Road log from Highway 1 at **km 218.4** (*see* the Main Road Log on page 4):

km		
	0	Junction, highways 1 and 905; proceed west along Highway 905 through Petitcodiac.
	1.4	Junction; proceed west along Highway 885.
	2.2	Junction; follow the road on left leading west toward Glenvale.
	3.1	Junction; follow the road on right leading northwest.
	3.7	Junction; continue along the road leading west.
	4.15	Junction; turn right (north) onto the mine road.
	4.5	Glenvale (Petitcodiac) mine.

Refs.: 53 p. 151-52; 76 p.45; 77 p. 24; 181 p. 31-35; 267 p. 132; 268 p. 22; 343 p. 3-16; 393 p. 70.

Maps (T): 21 H/14 Petitcodiac

(G): 99-23 Bedrock geological compilation of the Petitcodiac area (NTS 21 H/14), Kings, Westmorland, and Queens counties, New Brunswick (NBDNR, 1:50 000)
145 Grand Lake, New Brunswick, Map Sheet 1 N.E. (GSC, 1:253 440)
642A Petitcodiac (east half), Kings, Westmorland, and Albert counties, New Brunswick (GSC, 1:63 360)
2001-2 Carboniferous geology and gypsum resources of the Intervale-Hillgrove area (part of NTS 21 H/14), Westmoreland County, southeast New Brunswick (NBDNR, 1:10 000)
NR-2 Mineral occurrence map of New Brunswick (NBDNR, 1:500 000)
NR-6 Geological map of southeastern New Brunswick (NBDNR, 1:250 000)
Geological highway map of New Brunswick and Prince Edward Island, Special Publication No. 2 (Atlantic Geoscience Society, 1:638 000)

Gowland Mountain mine

BRAUNITE, PYROLUSITE, MANGANITE, BARITE

In schist and altered granite

The manganese ore minerals, braunite, pyrolusite, and manganite, occur as fibrous, stalactitic, and botryoidal masses, stringers, and fine bunches in fractures in the host rocks. White to brownish barite is associated with the manganese minerals. Some very large chunks of high-grade ore were recovered from surface cuts during early mining operations.

The deposit was known as early as 1885. In 1890, Messrs. H.A. Whitney, C.J. Butcher, and others sank several pits, drove an adit, and removed about 18 t of manganese-bearing rock. In 1915, F.M. Thompson of Hillsborough did some work on the property. In 1917, Ernest Harrison discovered a vein carrying manganese ore and did some sampling. Between 1934 and 1937, Manganese Limited mined high-grade ore from an open cut 3 to 6 m deep; the company dug 11 additional trenches over 70 m along the vein. The ore was shipped to steel mills in Sydney, Nova Scotia, and to Sault Ste. Marie, Ontario. In 1941, Nabco Manganese Mining Company Limited drove an adit into the vein, installed a mill, and shipped about 305 t of manganese concentrates to Welland, Ontario.

The mine is on the north side of Gowland Mountain, about 15 km southeast of Petitcodiac. Lat. 45°49′08″N, Long. 65°03′00″W. *See* Map 17.

Road log from Highway 1 at **km 218.4** (*see* the Main Road Log on page 4):

km		
	0	Junction, highways 1 and 905; proceed southeast along Highway 905.
	8.0	Pollett River, junction; continue south along Highway 905.
	16.5	Junction; turn left (east) onto Highway 895.
	21.15	Junction; turn right (south) onto the mine road.
	21.8	Gowland Mountain mine, at a level about 100 m above a creek.

Refs.: 109 p. 97; 182 p. 77-78; 195 p. 95S-96S; 379 p. 282-287; 384 p. 72-73; 385 p. 70.

Maps (T): 21 H/14 Petitcodiac

(G): 21 H/14E Petitcodiac, east half, Geology of the Caledonia area, southern New Brunswick (NBDNR, 1:50 000)
99-23 Bedrock geological compilation of the Petitcodiac area (NTS 21 H/14), Kings, Westmorland, and Queens counties, New Brunswick (NBDNR, 1:50 000)
145 Grand Lake, New Brunswick, Map Sheet 1 N.E. (GSC, 1:253 440)
642A Petitcodiac (east half), Kings, Westmorland, and Albert counties, New Brunswick (GSC, 1:63 360)
NR-2 Mineral occurrence map of New Brunswick (NBDNR, 1:500 000)
NR-6 Geological map of southeastern New Brunswick (NBDNR, 1:250 000)
Geological highway map of New Brunswick and Prince Edward Island, Special Publication No. 2 (Atlantic Geoscience Society, 1:638 000)

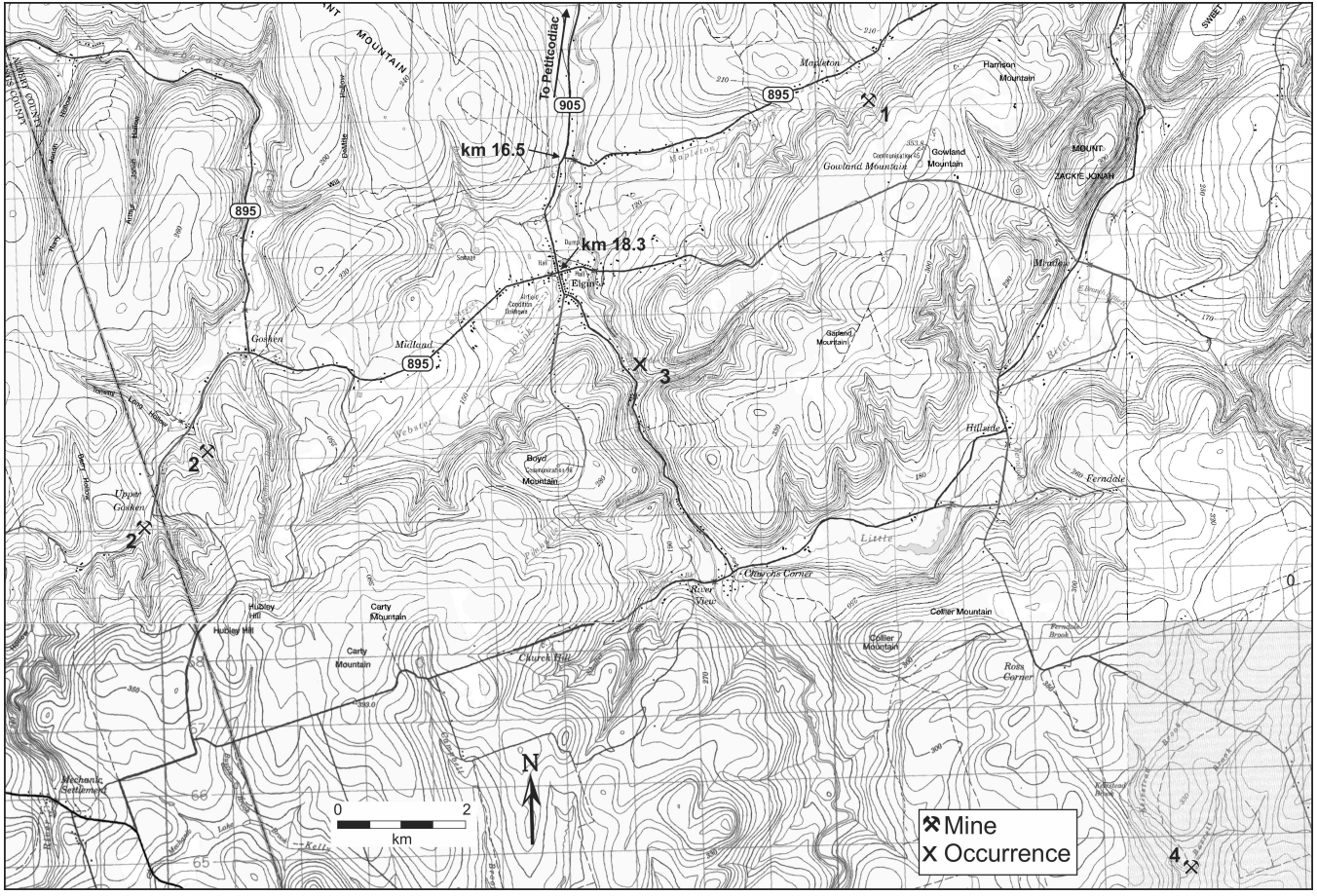
Goshen mine

CHALCOCITE, MALACHITE

In conglomerate

Chalcocite, the copper ore mineral, occurs as disseminated grains and as aggregates up to 1 cm across. Malachite occurs in fractures and as coatings on pebbles making up the conglomerate.

John B. Graves discovered the deposit on his property in 1925. In 1926, N.A. Timmins of Montreal sank several prospect pits. Subsequent investigations included drilling by Consolidated Mining and Smelting Company of Canada Limited (1928); trenching by Bunker Hill Extension Company (1928); trenching and sampling by Oakwood Mines Limited (1955–1956); and stripping and sampling by Omni Mines Limited (1982).



1. Gowland Mountain mine 2. Goshen mine 3. Elgin occurrence 4. km 93.1 Teahan (Goodfellow) mine

Map 17. Petitcodiac

The mine is about 17 km south of Petitcodiac. Lat. 45°45′45″N, Long. 65°11′21″W (pits at km 25.0); Lat. 45°46′20″N, Long. 65°10′35″W (pits at km 26.7). *See* Map 17.

Road log from Highway 1 at **km 218.4** (*see* the Main Road Log on page 4):

km		
	0	Junction, highways 1 and 905; proceed southeast along Highway 905.
	8.0	Pollett River, junction; continue south along Highway 905.
	16.5	Junction, Highway 895; continue straight ahead (south) along Highway 895.
	18.3	Elgin, junction; turn right (west) continuing along Highway 895.
	23.5	Goshen, junction. Highway 895 turns right; the road log continues straight ahead (west).
	25.0	Bridge over a brook. There are several Goshen mine pits along the brook, 450 m to 600 m southeast of the road. The road log continues to additional workings.
	26.5	Junction; continue straight ahead (south).
	26.7	Goshen mine pit on the slope on the left (east) side of the road, and a trench on the slope on the right (west) side of the road.

Refs.: 241 p. 58; 267 p. 110; 370 p. 92C-96C.

Maps (T): 21 H/14 Petitcodiac
(G): 99-23 Bedrock geological compilation of the Petitcodiac area (NTS 21 H/14), Kings, Westmorland, and Queens counties, New Brunswick (NBDNR, 1:50 000)
145 Grand Lake, New Brunswick, Map Sheet 1 N.E. (GSC, 1:253 440)
642A Petitcodiac (east half), Kings, Westmorland, and Albert counties, New Brunswick (GSC, 1:63 360)
NR-2 Mineral occurrence map of New Brunswick (NBDNR, 1:500 000)
NR-6 Geological map of southeastern New Brunswick (NBDNR, 1:250 000)
Geological highway map of New Brunswick and Prince Edward Island, Special Publication No. 2 (Atlantic Geoscience Society, 1:638 000)

Elgin occurrence

CHALCOPYRITE, GALENA, SPHALERITE, PYRITE, BORNITE, CHALCOCITE

In volcanic rocks

Chalcopyrite, galena, sphalerite, pyrite, and small amounts of bornite and chalcocite occur in quartz veins.

In 1947, the mineralization was explored by trenching and stripping. Assay results did not encourage further investigation.

The occurrence is about 18 km southeast of Petitcodiac. Lat. 45°47′03″N, Long. 65°05′40″W. *See* Map 17.

Road log from Highway 1 at **km 218.4** (*see* the Main Road Log on page 4):

km		
	0	Junction, highways 1 and 905; proceed southeast along Highway 905.

	8.0	Pollett River, junction; continue south along Highway 905.
	18.3	Elgin, junction of the road to Goshen; continue straight ahead (south).
	18.65	Junction; follow the road on left leading southeast to Churchs Corner.
	20.2	Elgin occurrence, on the east side of Pollett River just east of this point.

Ref.: 386 p. 105.

Maps (T): 21 H/14 Petitcodiac

(G): 21 H/14E Petitcodiac, east half, Geology of the Caledonia area, southern New Brunswick (NBDNR, 1:50 000)
99-23 Bedrock geological compilation of the Petitcodiac area (NTS 21 H/14), Kings, Westmorland, and Queens counties, New Brunswick (NBDNR, 1:50 000)
145 Grand Lake, New Brunswick, Map Sheet 1 N.E. (GSC, 1:253 440)
642A Petitcodiac (east half), Kings, Westmorland, and Albert counties, New Brunswick (GSC, 1:63 360)
NR-2 Mineral occurrence map of New Brunswick (NBDNR, 1:500 000)
NR-6 Geological map of southeastern New Brunswick (NBDNR, 1:250 000)
Geological highway map of New Brunswick and Prince Edward Island, Special Publication No. 2 (Atlantic Geoscience Society, 1:638 000)

Teahan (Goodfellow) mine

CHALCOPYRITE, GALENA, SPHALERITE, TENNANTITE, PYRITE, MAGNESITE, DOLOMITE, ALUNITE, BARITE

In altered andesite and rhyolite

Chalcopyrite, galena, sphalerite, and minor tennantite occur with abundant pyrite in a carbonate-quartz-talc matrix enclosed in a chloritic alteration zone. The gangue minerals are quartz, magnesite, dolomite, alunite, and barite.

In about 1880, William Goodfellow discovered the copper deposit on the east side of Kierstead Brook; some copper ore was mined, and a primitive smelter built. The mine was then known as the Goodfellow mine. From 1883 to 1887, Mr. Frieze sank a 27 m shaft and produced about 2 t of copper matte. In 1919, J.E. Teahan discovered mineralization on the west bank of the brook about 300 m from the original shaft. In 1927, N.A. Timmins Inc. excavated seven trenches over 300 m along the south side of Barrett Brook; the trenches are 1.5 to 21 m long. The ore contained values in copper, zinc, silver, and gold. In 1928, Consolidated Mining and Smelting Company trenched and drilled the area west of the Salmon River. From 1935 to 1939, New Ireland Mines Limited examined the property. Recent exploration was done by: Anthonian Mining Corporation Limited (1953); Cities Service Minerals Corporation (1967); Mija Mines Limited (1968–1978); and Kidd Creek Mines Limited (1981). Development consisted of 3 shafts and several trenches.

The mine is about 29 km southeast of Petitcodiac. Lat. 45°42′58″N, Long. 64°59′20″W. *See* Map 17.

Road log from Highway 1 at **km 218.4** (*see* the Main Road Log on page 4):

km	0	Junction, highways 1 and 905; proceed southeast along Highway 905.
	8.0	Pollett River, junction; continue south along Highway 905.

18.3 Elgin, junction of the road to Goshen; continue straight ahead (south).

18.65 Junction; proceed southeast along the road on left to Churchs Corner.

23.9 Churchs Corner, junction; turn left (east).

27.3 Junction; continue straight ahead (east).

28.3 Junction; turn right (south).

33.9 Junction; turn right (southwest).

36.8 Teahan (Goodfellow) mine.

Refs.: 7 p. 66-67; 49 p. 21-H/10W-3; 267 p. 110; 311 p. 135-140; 382 p. 1-10.

Maps (T): 21 H/10 Alma

(G): 21 H/10W Alma, west half, Geology of the Caledonia area, southern New Brunswick (NBDNR, 1:50 000)
99-25 Bedrock geological compilation of the Alma map area (NTS 21 H/10), Albert County, New Brunswick (NBDNR, 1:50 000)
145 Grand Lake, New Brunswick, Map Sheet 1 N.E. (GSC, 1:253 440)
1109A Point Wolfe, Albert, Kings, and Saint John counties, New Brunswick (GSC, 1:63 360)
NR-2 Mineral occurrence map of New Brunswick (NBDNR, 1:500 000)
NR-6 Geological map of southeastern New Brunswick (NBDNR, 1:250 000)
Geological highway map of New Brunswick and Prince Edward Island, Special Publication No. 2 (Atlantic Geoscience Society, 1:638 000)

Turtle Creek (Berryton) mine

PSILOMELANE, PYROLUSITE, BARITE, GOETHITE

In limestone

Psilomelane occurs as botryoidal masses enclosing concentric layers of pyrolusite. Barite and goethite are associated with the manganese minerals.

Manganese-bearing limestone occurs on both sides of Berry (Berryton) Brook, a short distance upstream from its junction with Turtle Creek. Sometime before 1912, three adits were driven into the north side of Berry (Berryton) Brook. In 1929, Manganese Mines Limited and Moncton Mining Syndicate held claims. In 1930, Maritime Manganese Syndicate investigated the old adits, drove new adits, and excavated trenches and test pits on the north side of the brook over 125 m. Production amounted to several hundred tonnes of ore; shipments were made to metallurgical companies in Welland, Ontario; Sydney, Nova Scotia; and Pennsylvania. In 1939, Manganese Limited mined the deposit and shipped about 272 t of ore to Canadian Furnace Limited at Port Colborne, Ontario. In 1941, Mount Forest Manganese Mines Limited removed four carloads of ore from a bulldozer stripping on the south side of the brook; the company shipped two carloads and left two carloads on the dump. In 1942 and 1943, Turtle Creek Manganese Prospecting Syndicate operated the mine and shipped ore to Metals Reserve in Pittsburgh.

The mine is about 15 km south of Moncton. Lat. 45°53′13″N, Long. 64°52′36″W. *See* Map 18.

Road log from Highway 2 (Trans-Canada Highway) at **km 253.3** (*see* the Main Road Log on page 4):

km		
	0	Moncton, junction of highways 2 and 126; proceed southeast along Highway 126.
	4.3	Junction, Highway 15 (Wheeler Boulevard); proceed south along Highway 15.
	9.7	Junction of highways 106 and 114; proceed south along Highway 114 (Fundy Coastal Drive).
	11.0	Junction; proceed east continuing along Highway 114.
	31.4	Junction; turn right (west) and proceed to Turtle Creek.
	48.6	Turtle Creek, junction; turn left (south) onto Highway 910.
	57.2	Bridge over Berry (Berryton) Brook. The Turtle Creek (Berryton) mine is on both sides of the brook, about 100 m west of the highway.

Refs.: 174 p. V-8; 182 p. 78-81; 380 p. 75-76; 385 p. 71.

Maps (T): 21 H/15 Hillsborough

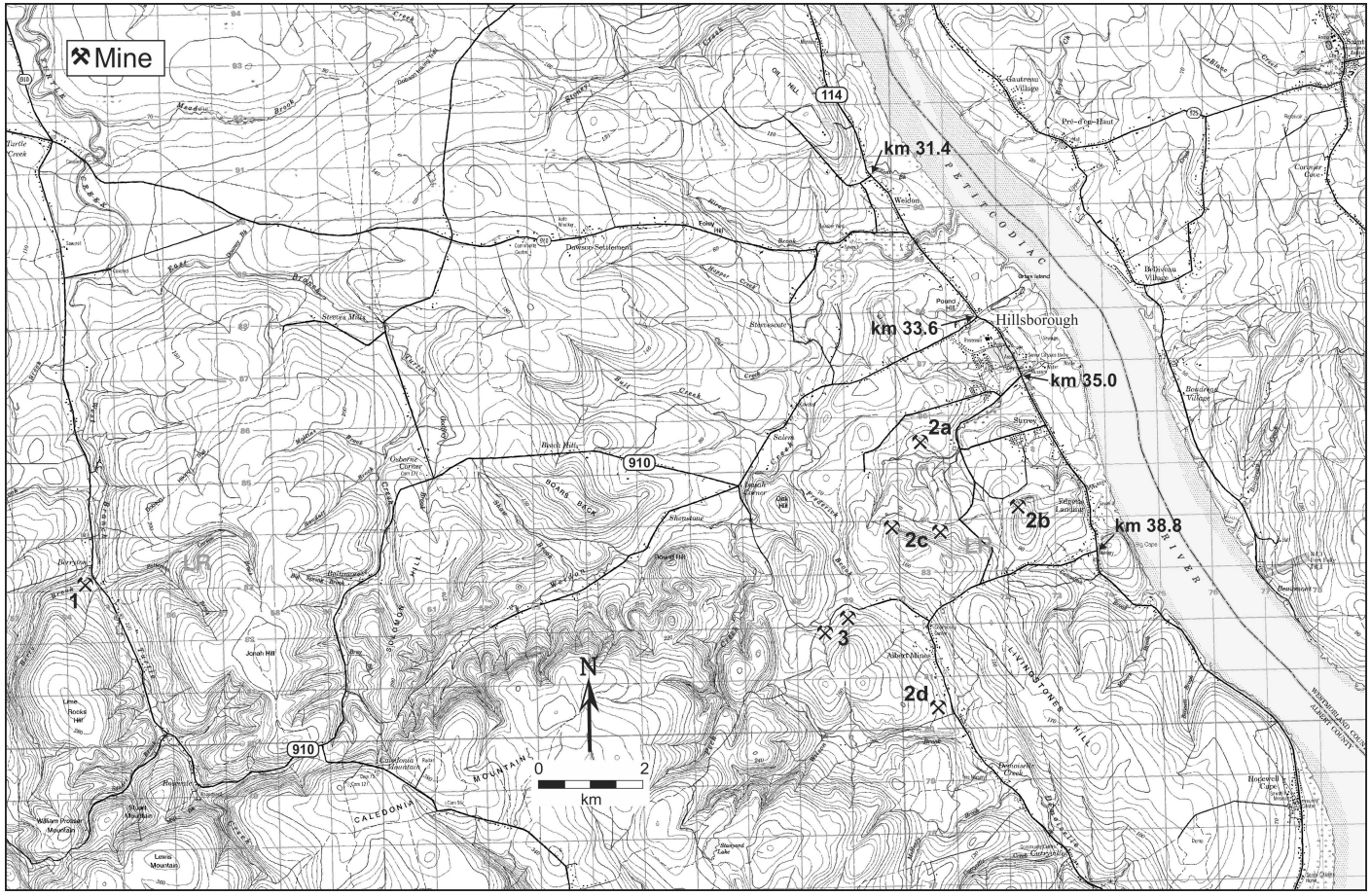
(G): 97-8 Carboniferous geology of the Hillsborough area, (NTS 21 H/15), Albert and Westmorland counties, New Brunswick (NBDNR, 1:50 000)
99-26 Bedrock geological compilation of the Hillsborough map area (NTS 21 H/15), Albert and Westmorland counties (NBDNR, 1:50 000)
145 Grand Lake, New Brunswick, Map Sheet 1 N.E. (GSC, 1:253 440)
243A Hillsborough Sheet, Albert and Westmorland counties, New Brunswick (GSC, 1:63 360)
647A Hillsborough, Albert and Westmorland counties, New Brunswick (GSC, 1:63 360)
NR-2 Mineral occurrence map of New Brunswick (NBDNR, 1:500 000)
NR-6 Geological map of southeastern New Brunswick (NBDNR, 1:250 000)
Geological highway map of New Brunswick and Prince Edward Island, Special Publication No. 2 (Atlantic Geoscience Society, 1:638 000)

Hillsborough-Albert Mines mines

GYPSUM, ANHYDRITE, ULEXITE, INYOITE

In limestone

Colourless, white and grey, fine-grained, massive gypsum is associated with white to light grey, massive anhydrite. Transparent colourless and grey selenite occurs as small crystals and as bands in massive gypsum. Ulexite and inyoite have been found in the deposit. The gypsum was renowned for its purity and for the abundance of pure white alabaster it contained; the alabaster is suitable for use as an ornamental stone. In 1890, an alabaster carving in the shape of a cross was acquired by the Geological Survey of Canada for its mineral collection. A display collection representing the various grades of gypsum, including cut blocks of very pure alabaster, land-plaster, plaster of Paris, and terra alba was assembled by Mr. C.J. Osman, manager of the Albert Manufacturing Company, and displayed in the Geological Survey of Canada economic minerals exhibit at the Philadelphia International Exhibition held in 1876. The company provided a large block of alabaster for the Survey's exhibit at the Colonial and Indian Exhibition held in London in 1886, and a suite consisting of crude, manufactured, and calcined gypsum for the Survey's exhibit at the Paris International Exposition held in 1900.



1. Turtle Creek (Berryton) mine 2 a, b, c, d. Hillsborough-Albert Mines mines 3. Albertite mines

Map 18. Hillsborough

Small-scale gypsum production in the area dates back to the early 1800s. At that time farmers mined gypsum outcrops on their properties, hauled the gypsum on sleds during the winters to points along the Petitcodiac River where boats transported the material to the Fowler Brothers mill in Lubec, Maine and to points as far away as New York. The Hillsborough gypsum deposits produced a superior quality of plaster of Paris resulting in a demand from manufacturing plants in the United States. In 1847, the Fowler Brothers undertook mining operations which lasted for a few years. In 1854, Albert Manufacturing Company, under the direction of Calvin Tomkins, took over operations and installed a crushing-grinding-calcining mill, the largest mill in North America at that time. The company produced plaster of Paris. In the 1920s, Hillsborough Plaster, Quarrying and Manufacturing Company operated quarries south of Hillsborough. In 1930, Canadian Gypsum Company Limited took over all operations continuing until 1980 when all Hillsborough mining operations ended. The wallboard plant operated in Hillsborough until 1982. Development consisted of several quarries between Hillsborough and Albert Mines. In the 1990s, Mactaquac Mining Limited shipped gypsum from the Albert Mines mine to various points in the Maritime provinces for use as a soil conditioner.

The mines are about 24 to 30 km southeast of Moncton, and 3 to 7 km southwest of Hillsborough. Lat. 45°54′33″N, Long. 64°40′06″W (mine west of km 36.9, 2a on Map 18); Lat. 45°54′05″N, Long. 64°38′56″W (mine southeast of km 37.6, 2b on Map 18); Lat. 45°54′05″N, Long. 64°38′56″W to Lat. 48°53′53″N, Long. 64°40′35″W (mines southwest of km 37.6, 2c on Map 18). *See* Map 18.

Road log from Highway 2 (Trans-Canada Highway) at **km 253.3** (*see* the Main Road Log on page 4):

km		
	0	Moncton, junction of highways 2 and 126; proceed southeast along Highway 126.
	4.3	Junction, Highway 15 (Wheeler Boulevard); proceed south along Highway 15.
	9.7	Junction, highways 106 and 114; proceed south along Highway 114 (Fundy Coastal Drive).
	11.0	Junction; proceed east along Highway 114.
	33.6	Hillsborough, junction of Highway 910; continue along Highway 114.
	35.0	Hillsborough, junction; turn right onto the road leading southwest.
	36.9	Junction; the road on right leads west 0.8 km to a former gypsum mine. The road log continues south from this junction.
	37.6	Junction: the road on left leads southeast 0.8 km to a former gypsum mine; the road on right leads southwest to former gypsum mines 0.8 to 2.0 km from the junction.

To reach the former gypsum mine at Albert Mines, see the road log to the Albertite mines (p. 101).

Note: gypsum mines commonly become overgrown when inactive for several years; the site of former operations may be indicated only by the remnants of a wall of the opening or by a depression in the topography.

Refs.: 9 p. C2-C3; 12 p. 85M-96M; 13 p. 156A, 160A; 56 p. 21; 76 p. 47-56; 77 p. 25-29; 109 p. 119-121; 136; 181 p. 36-42; 189 p. 147; 204 p. 93-95; 214 p. 14-65; 239 p. 24; 267 p. 132-133; 268 p. 20-22; 359 p. 7-29; 393 p. 70; 395 p. 100; 397 p. 214.



Plate 6.

Gypsum mine, Hillsborough, 1913. (GSC 24279)

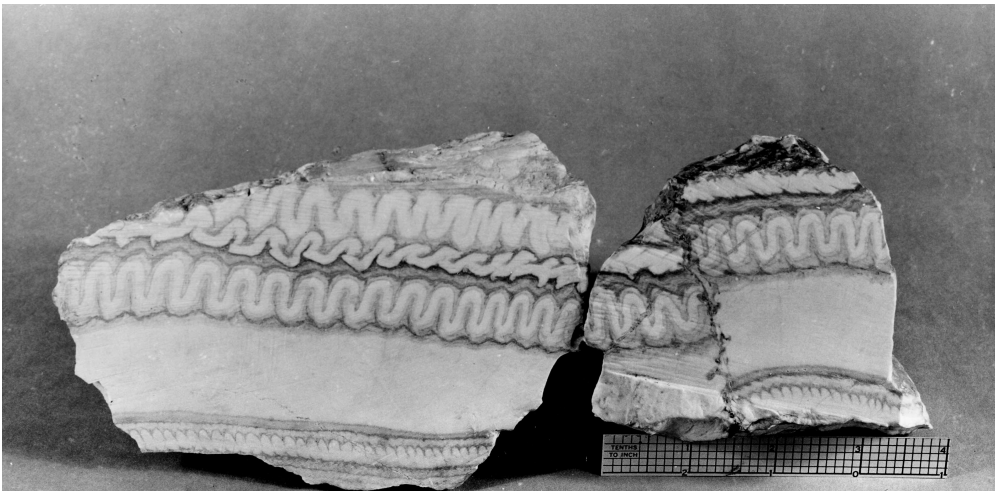


Plate 7.

Crenulated gypsum, Hillsborough. (GSC 112324-N)

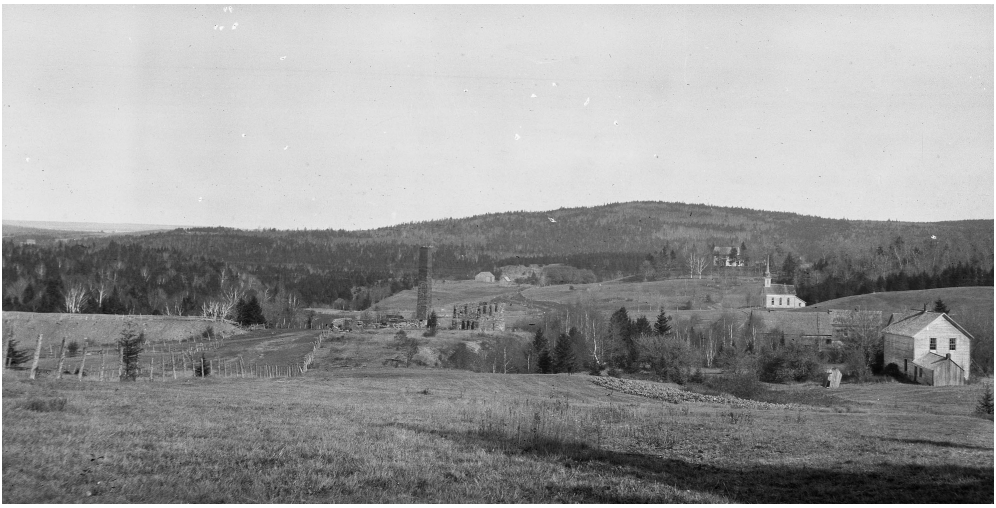


Plate 8.

Albert Mines, 1913. The tall chimney marks the location of the Albertite mines main shaft. (GSC 26239)

Maps (T): 21 H/15 Hillsborough
(G): 80-78 V-22 Hillsborough-Stony Creek (NBDNR, 1:25 000)
80-79 V-23 Albert Mines-Curryville (NBDNR, 1:25 000)
97-8 Carboniferous geology of the Hillsborough area (NTS 21 H/15), Albert and Westmorland counties, New Brunswick (NBDNR, 1:50 000)
243A Hillsborough Sheet, Albert and Westmorland counties, New Brunswick (GSC, 1:63 360)
647A Hillsborough, Albert and Westmorland counties, New Brunswick (GSC, 1:63 360)
2000-31 Carboniferous geology and gypsum/anhydrite resources of the Hillsborough area (part of NTS 21 H/15), Albert County, southeastern New Brunswick (NBDNR, 1:10 000)
NR-2 Mineral occurrence map of New Brunswick (NBDNR, 1:500 000)
NR-6 Geological map of southeastern New Brunswick (NBDNR, 1:250 000)
Geological highway map of New Brunswick and Prince Edward Island, Special Publication No. 2 (Atlantic Geoscience Society, 1:638 000)

Albertite mines

ALBERTITE, FOSSILS

In shale

Albertite, a coal-like hydrocarbon, occurs as fissure fillings and veins in bituminous shale. It is jet-black with a brilliant lustre and conchoidal fracture. Specimens of albertite were displayed in the Geological Survey of Canada economic minerals exhibit at the Philadelphia International Exhibition held in 1876, the Colonial and Indian Exhibition held in London in 1886, and at the Paris International Exhibition held in 1900. Fossil fish (*Paleoniscus*) of Carboniferous age occur in the shale.

John Duffy discovered the deposit in about 1839. In 1849, Cairns, Allison and Company undertook mining the albertite vein which was about 850 m long and up to 5 m wide. The workings consisted of two shafts 730 m apart: a 305 m East shaft, and a 445 m West (main) shaft. Most of the mining was from the West shaft. From 1863 to 1869, the average annual recovery was 15 400 t, decreasing to 5442 t from 1870 to 1876. Operations ended in 1879. The total production amounted to 181 400 t of albertite. Its principal use was as an enricher in the production of gas. It was also distilled to produce oil and gas, and used as a burning oil, then known as albertine.

The mines are about 24 km southeast of Moncton, and 6 km southwest of Hillsborough. Lat. 45°52′57″N, Long. 64°41′19″W (East shaft); Lat. 45°52′42″N, Long. 64°41′42″ W (West (main) shaft). *See* Map 18.

Road log from Highway 2 (Trans-Canada Highway) at **km 253.3** (*see* the Main Road Log on page 4):

km		
	0	Moncton, junction of highways 2 and 126; proceed southeast along Highway 126.
	4.3	Junction, Highway 15 (Wheeler Boulevard); proceed south along Highway 15.
	9.7	Junction, highways 106 and 114; proceed south along Highway 114 (Fundy Coastal Drive) toward Hillsborough.
	33.6	Hillsborough, junction of Highway 910; continue along Highway 114.
	38.8	Junction; turn right (west) and proceed toward Albert Mines.
	42.6	Junction. The road on right leads northwest 1.7 km to the Albertite mine East shaft, and continues 0.9 km to the Albertite mine West (main) shaft.
		To reach the former Albert Mines gypsum mine, proceed south from the junction at km 42.6 for 1.8 km to the mine on the west side of the road. Lat. 45°51′50″N, Long. 64°39′51″W.

Refs.: 12 p. 68M-70M; 13 p. 155A; 15 p. 365-369, 385-393; 86 p. l10-ll4; 109 p. 107-109; 136; 188 p. 15T-16T; 239 p. 22-23; 377 p. 30-49; 390 p. 365-367; 393 p. 57-58; 395 p. 83-84; 397 p.150-151.

Maps (T): 21 H/15 Hillsborough

(G): 68A Moncton, Westmorland and Albert counties, New Brunswick (GSC, 1:62 500)
80-79 V-23 Albert Mines-Curryville (NBDNR, 1:25 000)
97-8 Carboniferous geology of the Hillsborough area (NTS 21 H/15), Albert and Westmorland counties, New Brunswick (NBDNR, 1:50 000)
243A Hillsborough Sheet, Albert and Westmorland counties, New Brunswick (GSC, 1:63 360)
647A Hillsborough, Albert and Westmorland counties, New Brunswick (GSC, 1:63 360)
NR-2 Mineral occurrence map of New Brunswick (NBDNR, 1:500 000)
Geological highway map of New Brunswick and Prince Edward Island, Special Publication No. 2 (Atlantic Geoscience Society, 1:638 000)

Shepody Mountain (Hopewell) mine

PYROLUSITE, MANGANITE

In clay and limestone

Pyrolusite, the principal manganese ore mineral, occurs as nodules to 20 cm across in red to grey clay. The nodules contain grains of manganite. Pyrolusite also occurs as thin sheets in laminated limestone.

Mining began in 1860 when Mr. Steadman of Hopewell drove an adit about 305 m into the northwest side of Shepody Mountain. He operated the mine for a few years and shipped 453 t of manganese ore to England and to the United States. A treatment plant built on the mine site operated for a short time. In 1926, J.C. Wright and B. J. Fales did surface work and put down a 76 m inclined shaft. In 1940, Norman Vincent of Toronto did additional surface work. In 1942, British Manganese Mines Limited reopened an old adit.

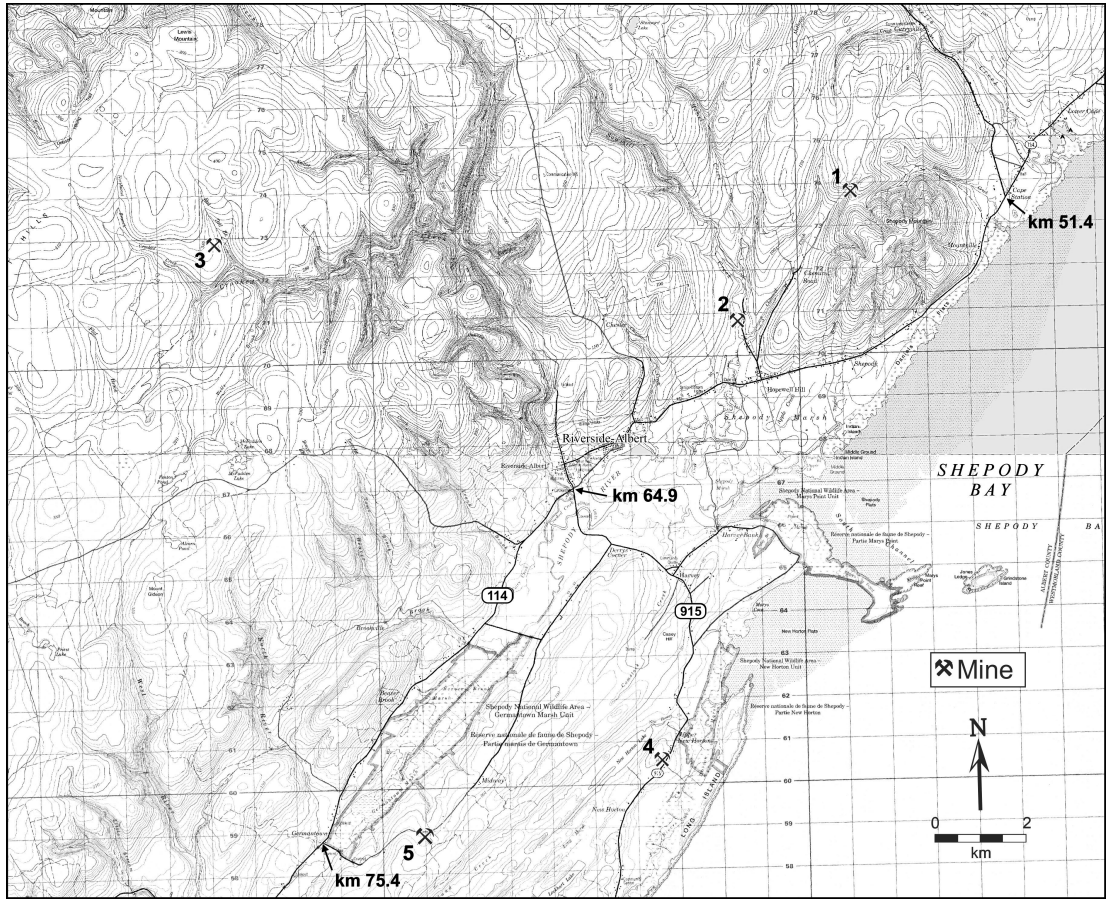
The mine is about 30 km south of Moncton and 13 km south of Hillsborough. Lat. 45°48′26″N, Long. 64°39′21″W. *See* Map 19.

Road log from Highway 2 (Trans-Canada Highway) at **km 253.3** (*see* the main Road Log on page 4):

km		
	0	Moncton, junction of highways 2 and 126; proceed southeast along Highway 126.
	4.3	Junction, Highway 15 (Wheeler Boulevard); proceed south along Highway 15.
	9.7	Junction, highways 106 and 114; proceed south along Highway 114 (Fundy Coastal Drive).
	51.4	Junction; turn right (north) toward Albert Mines.
	56.0	Junction; turn left (west).
	59.9	Shepody Mountain (Hopewell) mine, on the left (east) side of the road.

Refs.: 12 p. 54M-55M; 16 p. 224; 89 p. 61; 109 p. 97-98; 182 p. 70-72; 239 p. 24-25; 384 p. 71; 385 p. 71.

Maps (T): 21 H/15 Hillsborough
(G): 80-79 V-23 Albert Mines-Curryville (NBDNR, 1:25 000)
97-8 Carboniferous geology of the Hillsborough area (NTS 21 H/15), Albert and Westmorland counties, New Brunswick (NBDNR, 1:50 000)
99-26 Bedrock geological compilation of the Hillsborough map area (NTS 21 H/15), Albert and Westmorland counties (NBDNR, 1:50 000)
243A Hillsborough Sheet, Albert and Westmorland counties, New Brunswick (GSC, 1:63 360)
647A Hillsborough, Albert and Westmorland counties, New Brunswick (GSC, 1:63 360)
NR-2 Mineral occurrence map of New Brunswick (NBDNR, 1:500 000)
NR-6 Geological map of southeastern New Brunswick (NBDNR, 1:250 000)
Geological highway map of New Brunswick and Prince Edward Island, Special Publication No. 2 (Atlantic Geoscience Society, 1:638 000)



1. Shepody Mountain (Hopewell) mine 2. Memel mine 3. Lumsden mine
4. New Horton mine 5. Midway (Copp) mine

Map 19. Riverside-Albert

Memel mine

PYROLUSITE, PSILOMELANE

In conglomerate

Pyrolusite and minor psilomelane, the ore minerals, occur as lumps about 5 cm across in loosely cemented conglomerate.

The property was worked in the 1880s and a small quantity of ore was shipped. The workings consisted of open cuts, and two short adits up to 15 m long. In 1897 and 1898, Mr. R.P. Hoyt of Hillsborough exploited the deposit. In 1940, Pilot Molybdenite Mines Limited excavated 12 shallow pits, stripped both sides of a gully over 15 m, extended an old adit, installed a small rock crusher, and shipped about 225 kg of manganese ore to the Mines Branch, Ottawa. Some high-grade ore was stockpiled on the site.

The mine is about 37 km south of Moncton, and 16 km southwest of Hillsborough. Lat. 45°46′42″N, Long. 64°41′26″W. *See* Map 19.

Road log from Highway 2 (Trans-Canada Highway) at **km 253.3** (*see* the Main Road Log on page 4):

km		
	0	Moncton, junction of highways 2 and 126; proceed southeast along Highway 126.
	4.3	Junction, Highway 15 (Wheeler Boulevard); proceed south along Highway 15.
	9.7	Junction, highways 106 and 114; proceed south along Highway 114 (Fundy Coastal Drive) toward Hillsborough.
	48.0	Junction, follow the road on left leading east 1 km to Hopewell Rocks on the shore of Shepody Bay.
	59.0	Hopewell Hill, junction; turn right (north).
	59.5	Junction, follow the road on left leading to Sawmill Creek.
	60.7	Memel mine, on the west side of Sawmill Creek about 100 m west of the road.

Refs.: 12 p. 57M; 182 p. 70; 384 p. 71-72; 399 p. 138.

Maps (T): 21 H/15 Hillsborough

(G): 80-79 V-23 Albert Mines-Curryville (NBDNR, 1:25 000)
97-8 Carboniferous geology of the Hillsborough area (NTS 21 H/15), Albert and Westmorland counties, New Brunswick (NBDNR, 1:50 000)
99-26 Bedrock geological compilation of the Hillsborough map area (NTS 21 H/15), Albert and Westmorland counties (NBDNR, 1:50 000)
243A Hillsborough Sheet, Albert and Westmorland counties, New Brunswick (GSC, 1:63 360)
647A Hillsborough, Albert and Westmorland counties, New Brunswick (GSC, 1:63 360)
NR-2 Mineral occurrence map of New Brunswick (NBDNR, 1:500 000)
NR-6 Geological map of southeastern New Brunswick (NBDNR, 1:250 000)
Geological highway map of New Brunswick and Prince Edward Island, Special Publication No. 2 (Atlantic Geoscience Society, 1:638 000)

Lumsden mine

GALENA, SPHALERITE, CHALCOPYRITE, TENNANTITE, PYRITE

In altered andesite and rhyolite

Galena, sphalerite, chalcopyrite and minor tennantite occur with abundant pyrite in a carbonate-quartz-talc matrix enclosed in a chloritic alteration zone.

In 1917 and 1918, Federal Zinc and Lead Company of Montreal drilled the property and intersected a lead-zinc-mineralized zone. Development to 1927 consisted of two inclined shafts 12 m and 15 m deep respectively and 110 m apart, a 47 m adit, and several trenches. In 1928, Huronian Belt Company examined the shafts, excavated five trenches (up to 18 m long and 5 m deep), and sampled the deposit.

The mine is about 33 km southwest of Moncton, and 10 km northwest of Riverside-Albert. Lat. 45°47′47″N, Long. 64°50′51″W. *See* Map 19.

Road log from Highway 2 (Trans-Canada Highway) at **km 253.3** (*see* the Main Road Log on page 4):

km		
	0	Moncton, junction of highways 2 and 126; proceed southeast along Highway 126.
	4.3	Junction, Highway 15 (Wheeler Boulevard); proceed south along Highway 15.
	9.7	Junction, highways 106 and 114; proceed south along Highway 114 (Fundy Coastal Drive) toward Hillsborough.
	64.9	Riverside-Albert, junction of Highway 915; proceed north into town and continue north along Cripple Creek Road.
	71.7	Bridge over Crooked Creek.
	73.0	Junction; follow the road on left leading northwest.
	79.0	Lumsden mine. The workings extend over distances of 150 m to the east and to the west of Rat Tail (Ratty) Brook, south of the mine road.

Refs.: 6 p. 67-70; 241 p. 58; 311 p. 135-139.

Maps (T): 21 H/15 Hillsborough

(G): 21 H/15 W Hillsborough west half, Geology of the Caledonia area, southern New Brunswick (NBDNR, 1:50 000)
99-26 Bedrock geological compilation of the Hillsborough map area (NTS 21 H/15), Albert and Westmorland counties (NBDNR, 1:50 000)
243A Hillsborough Sheet, Albert and Westmorland counties, New Brunswick (GSC, 1:63 360)
647A Hillsborough, Albert and Westmorland counties, New Brunswick (GSC, 1:63 360)
NR-2 Mineral occurrence map of New Brunswick (NBDNR, 1:500 000)
NR-6 Geological map of southeastern New Brunswick (NBDNR, 1:250 000)
Geological highway map of New Brunswick and Prince Edward Island, Special Publication No. 2 (Atlantic Geoscience Society, 1:638 000)

New Horton mine

CHALCOCITE, MALACHITE, CHALCOPYRITE, BORNITE, COVELLITE, AZURITE, FOSSILS

In sandstone and conglomerate

Chalcocite, malachite, and minor chalcopyrite, bornite, covellite, and azurite occur as fine disseminated particles and as irregular veins in grey sandstone and conglomerate, and as a replacement of Pennsylvanian plant fossils (*Calamites*).

Sometime before 1898, Mr. Gideon Vernon opened the deposit and shipped about 45 t of copper ore. In 1928, Mr. J.P. Gormley staked the property and did some trenching. In 1929 and 1930, Lake George Mines Limited explored the deposit by strippings and trenches, sank a 30 m shaft, and discovered a new vein. Subsequent investigation was done by the New Brunswick Department of Lands and Mines (1947), Strategic Metals Corporation Limited (1953), Anaconda Company (Canada) Limited (1964), and Gulf Minerals Canada Limited (1981).

The mine is about 45 km southeast of Moncton, and 8 km south of Riverside-Albert. Lat. 45°41′10″N, Long. 64°42′45″W. *See* Map 19.

Road log from Highway 2 (Trans-Canada Highway) at **km 253.3** (*see* the Main Road Log on page 4):

km		
	0	Moncton, junction of highways 2 and 126; proceed southeast along Highway 126.
	4.3	Junction, Highway 15 (Wheeler Boulevard); proceed south along Highway 15.
	9.7	Junction, highways 106 and 114; proceed south along Highway 114 (Fundy Coastal Drive).
	64.9	Riverside-Albert, junction of Highway 915; proceed south along Highway 915 (Fundy Coastal Drive).
	73.3	New Horton mine, on a rocky knoll about 55 m west of the road.

Refs.: 49 p. 21-H/10E-1; 137 p. 1-9; 267 p. 111-112; 378 p. 1206-1209; 389 p. 1-15.

Maps (T): 21 H/10 Alma
(G): 648A Albert, Albert County, New Brunswick (GSC, 1:63 360)
NR-2 Mineral occurrence map of New Brunswick (NBDNR, 1:500 000)
NR-6 Geological map of southeastern New Brunswick (NBDNR, 1:250 000)
Geological highway map of New Brunswick and Prince Edward Island, Special Publication No. 2 (Atlantic Geoscience Society, 1:638 000)

Midway (Copp) mine

CHALCOCITE, MALACHITE, COVELLITE, AZURITE, FOSSILS

In sandstone and conglomerate

Chalcocite occurs as a replacement of Pennsylvanian plant fossils (*Calamites*), and as specks and veinlets in the host rocks. Malachite and minor covellite and azurite occur as alteration products of chalcocite.

The openings consisting of several pits and shafts extend over 6100 m along the Midway copper belt, a 5.6 km long northeasterly trending copper-bearing fossiliferous sedimentary rock zone within 300 m of the Midway road. The Copp property is at the centre of the Midway belt. Sometime before 1918, Vaughan and Emmerson Copp sank two shafts (each to about 3 m) and excavated several pits on their farm at Midway. Between 1918 and 1928, they located all the known copper showings in the Midway belt. In 1930 and 1933, Lake George Mines Limited cleaned out and sampled several old pits, and excavated several new pits. In 1941, The New Brunswick Department of Land and Mines did some drilling. Subsequent exploration was done by: MacFee Explorations Limited (1953), Maritime Explorations (1963), Noranda Exploration Limited (1964), and Gulf Minerals Canada Limited (1976).

The mine is about 48 km south of Moncton, and 9 km southwest of Riverside-Albert. Lat. 45°40′11″N, Long. 64°47′15″W. *See* Map 19.

Road log from Highway 2 (Trans-Canada Highway) at **km 253.3** (*see* the Main Road Log on page 4):

km		
	0	Moncton, junction of highways 2 and 126; proceed southeast along Highway 126.
	4.3	Junction, Highway 15 (Wheeler Boulevard); proceed south along Highway 15.
	9.7	Junction, highways 106 and 114; proceed south along Highway 114 (Fundy Coastal Drive) toward Hillsborough.
	64.9	Riverside-Albert, junction of Highway 915; continue along Highway 114.
	75.4	Germantown, junction; turn left (east).
	78.1	Midway (Copp) mine, on the Copp farm on the south side of the road. The pits are about 185 m from the road.

Refs.: 49 p. 21-H/10W-6; 137 p. 9-10; 267 p. 111; 389 p. 2-13, 24-28.

Maps (T): 21 H/10 Alma
(G): 99-25 Bedrock geological compilation of the Alma map area (NTS 21 H/10), Albert County, New Brunswick (NBDNR, 1:50 000)
648A Albert, Albert County, New Brunswick (GSC, 1:63 360)
NR-2 Mineral occurrence map of New Brunswick (NBDNR, 1:500 000)
NR-6 Geological map of southeastern New Brunswick (NBDNR, 1:250 000)
Geological highway map of New Brunswick and Prince Edward Island, Special Publication No. 2 (Atlantic Geoscience Society, 1:638 000)

Memramcook (Gouldville) mine

BARITE, FLUORITE, GALENA, CHALCOCITE, COVELLITE, SPHALERITE, CHALCOPYRITE, MALACHITE, AZURITE, BROCHANTITE, YARROWITE, QUARTZ CRYSTALS

In shale

Barite occurs as white and colourless transparent tabular crystals and granular masses. Green and violet fluorite occurs in quartz veins, and as a cement in brecciated rock. Colourless to white and amethystine quartz crystals occur in massive quartz. Chalcocite, covellite, and minor galena, sphalerite, and chalcopyrite occur as small patches and as fracture fillings. Malachite, azurite, brochantite, and velvety and iridescent black flaky yarrowite occur on the vein minerals.

In 1869, copper mineralization was discovered in a fluorite-quartz vein. Surface exploration in the 1870s exposed a vein containing barite. Sometime before 1897, an 18 m shaft and a few pits were sunk and a considerable quantity of barite was removed and shipped. In 1940, Gilman Exploration Company investigated the deposit. In 1959, Sheraton Mining Corporation stripped the vein and discovered a barite-fluorite zone 240 m long with an average width of 22 m. In 1964, McIntyre Porcupine Mines Limited investigated the deposit for base metal sulphides.

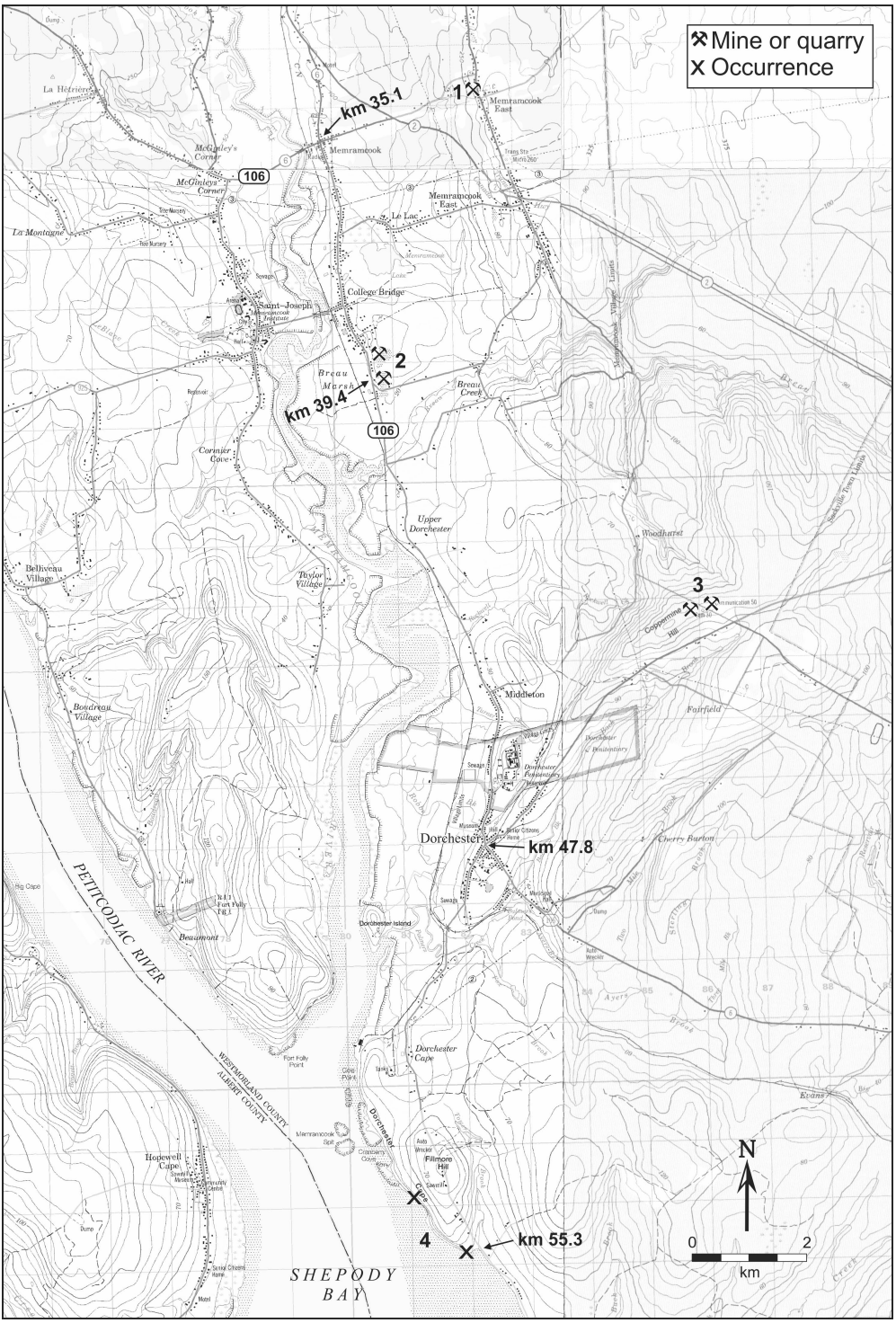
The mine is about 22 km southeast of Moncton. Lat. 46°00′55″N, Long. 64°31′12″W. *See* Map 20.

Road log from Highway 2 (Trans-Canada Highway) at **km 253.3** (*see* the Main Road Log on page 4):

km		
	0	Moncton, junction of highways 2 and 126; proceed southeast along Highway 126.
	4.3	Junction, Highway 15 (Wheeler Boulevard); proceed south along Highway 15.
	9.7	Junction, highways 106 and 114 (Fundy Coastal Drive); proceed east along Highway 106.
	15.2	Junction; continue southeast along Highway 106 (Acadia Avenue).
	35.1	Memramcook; Highway 106 turns right (south). Continue straight ahead (east) toward Memramcook East.
	37.3	Junction; follow the road on left.
	38.0	Hector Leblanc farm house on the left (north) side of the road. The Memramcook (Gouldville) mine workings are on the farm in an area of low shrubs beginning 100 m north of the road and extending north over about 275 m.

Refs.: 12 p. 125M; 16 p. 227; 103 p. 23D; 177 p. 5-10; 240 p. 18; 327 p. 5; 331 p. 35; 362 p. 19-22; 384 p. 76-77.

Maps (T): 21 I/2 Moncton
(G): 78-25 W-22 Memramcook-St. Joseph (NBDNR, 1:25 000)
97-7 Carboniferous geology of the Moncton map area (NTS 21 I/02), Westmorland and Albert counties, New Brunswick (NBDNR, 1:50 000)
646A Moncton, Westmorland and Albert counties, New Brunswick (GSC, 1:63 360)
NR-2 Mineral occurrence map of New Brunswick (NBDNR, 1:500 000)
NR-6 Geological map of southeastern New Brunswick (NBDNR, 1:250 000)
Geological highway map of New Brunswick and Prince Edward Island, Special Publication No. 2 (Atlantic Geoscience Society, 1:638 000)



1. Memramcook (Gouldville) mine 2. College Bridge quarries
3. Dorchester mine 4. Cape Dorchester occurrence

Map 20. Dorchester

Dorchester mine

CHALCOCITE, PYRITE, COVELLITE, BIRNESSITE, NACRITE, MALACHITE, AZURITE, DIGENITE, YARROWITE, SPIONKOPITE, BARITE, FOSSILS

In sandstone

Chalcocite, the copper ore mineral, occurs in chalcocite-pyrite-quartz nodules up to 5 cm across. It also occurs as stringers and patches replacing pyrite and plant fossils, and as fine disseminations in the host rock. Covellite is associated with chalcocite. Birnessite forms black sooty encrustations on sandstone. Nacrite occurs as silky white flaky aggregates on birnessite and in voids in sandstone. Malachite occurs as fibrous and flaky aggregates on chalcocite nodules and on copper-bearing carbonized plant material. Minerals associated with malachite on plant material include: azurite, as blue granular and powdery crusts; digenite, as bluish- to greyish-black metallic flaky aggregates; yarrowite, as dark green, iridescent, fine, flaky aggregates; and spionkopite, as black metallic patches and specks associated with yarrowite. Colourless to white barite occurs as layers between the plant-replacing minerals and the host sandstone. The fossil plants are of Pennsylvanian age.

The deposit was first recorded in 1870 and explored between 1877 and 1878. Westmorland Mining Company began mining in the fall of 1881 continuing to 1883. In 1884 and 1885, Colonial Copper Company took over operations and sank a 30 m shaft. A considerable amount of rich ore was extracted. Intercolonial Company mined the deposit intermittently beginning in 1898 and built a mill for recovering copper metal by a process that included grinding, roasting, leaching, and electrolytic precipitation. In 1901, copper plates were produced. The processing of copper ore proved to be very expensive and the mill ended operations in 1903. Mining continued until 1915. Ore shipments were made to New York for use as convertor linings in copper smelters. The ore contained 1.3 to 3% copper along with some silver. National Chemical Copper Company took over operations in 1916 continuing to 1917. The workings, consisting of three shafts (9 m, 12 m, and 38 m deep, respectively) and two adits (122 m and 427 m long, respectively), extended over 3 km along the face of a north-trending escarpment. In 1951, Kennco Explorations (Canada) Limited reopened the main adit and sampled the old workings. Exploration over the next thirty years by several companies consisted of drilling, and geochemical and geophysical surveys. Gordel Investments Limited investigated the old adits and openings in 1992.

The Dorchester mine is about 28 km southeast of Moncton, and about 5 km northeast of Dorchester. Lat. 45°56′06″N, Long. 64°28′08″W (eastern workings); Lat. 45°56′03″N, Long. 64°28′19″W (western workings). *See* Map 20.

Road log from Highway 2 (Trans-Canada Highway) at **km 253.3** (*see* the Main Road Log on page 4):

km		
	0	Moncton, junction of highways 2 and 126; proceed southeast along Highway 126.
	4.3	Junction, Highway 15 (Wheeler Boulevard); proceed south along Highway 15.
	9.7	Junction, highways 106 and 114 (Fundy Coastal Drive); proceed east onto Highway 106.
	35.1	Memramcook; Highway 106 turns right (south). The road log continues along Highway 106.

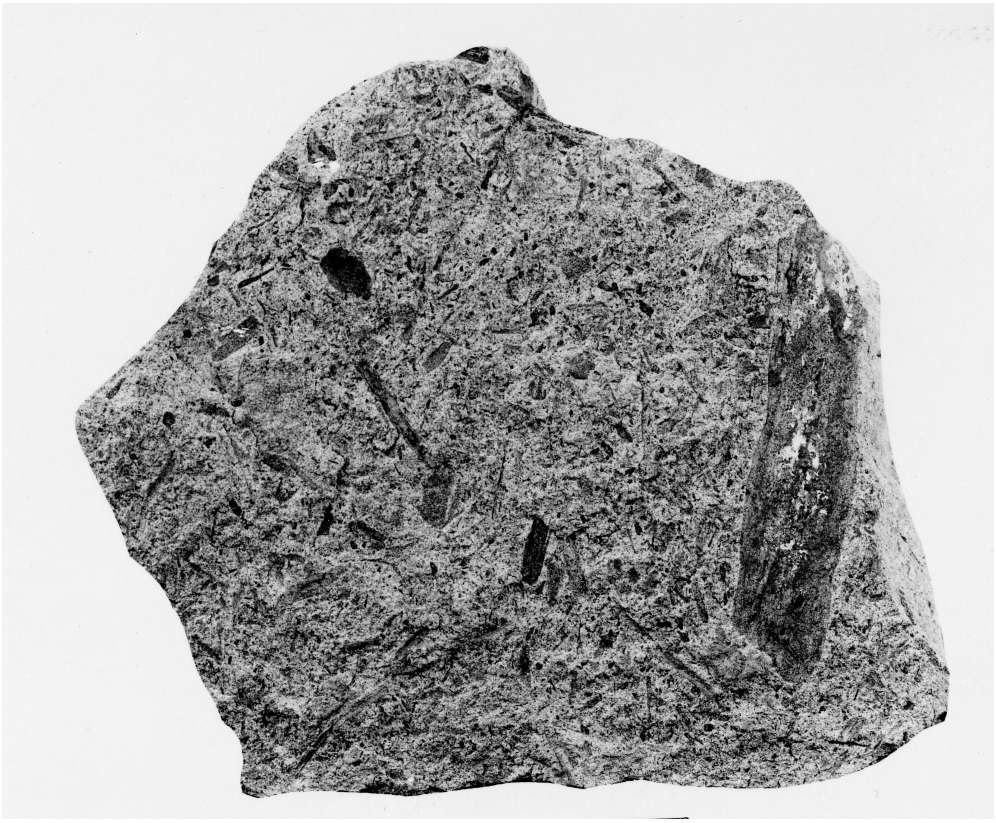


Plate 9.

Fossil plants replaced by copper-bearing minerals in grey sandstone, Dorchester mine. The specimen measures 16 cm across. (GSC 112624-F)

37.9 College Bridge, junction of highways 106 and 925; the road log continues south along Highway 106 (Fundy Coastal Drive).

39.4 Junction. College Bridge limestone quarries, on the east side of Highway 106 just north of this junction. The quarries expose Carboniferous grey sandstone and quartz-pebble conglomerate. Lat. 45°58′01″N, Long. 64°32′19″W (south quarry); Lat. 45°58′21″N, Long. 64°32′23″W (north quarry).

47.8 Dorchester, junction; turn left (northeast).

53.4 Junction; turn left (northwest).

54.3 Junction; Dorchester mine road on right leading northeast 60 m to the eastern workings (shaft and dump), continuing to an adit and the site of the mill.

54.5 Junction; Dorchester mine road on left leading southwest 60 m to the western workings (two mine shafts, an adit, and dumps).

Refs.: 12 p. 23M-24M; 14 p. 284A-285A; 16 p. 227; 54 p. 93; 102 p. 12D; 103 p. 23D; 107 p. 21-22; 109 p. 89-90; 240 p. 17-19; 267 p. 108-109; 327 p. 6; 346 p. 46; 368 p. 72; 378 p. 1205-1206; 388 p. 1-6.

Maps (T): 21 H/16 Amherst
(G): 59-12 Southern New Brunswick (Figure 1) (GSC, 1:126 720)
78-26 W-23 Dorchester-Hopewell Cape (NBDNR, 1:25 000)
NR-2 Mineral occurrence map of New Brunswick (NBDNR, 1:500 000)
NR-6 Geological map of southeastern New Brunswick (NBDNR, 1:250 000)
Geological highway map of New Brunswick and Prince Edward Island, Special Publication No. 2 (Atlantic Geoscience Society, 1:638 000)

Dorchester Cape occurrence

CUPRITE, NATIVE COPPER, SCHACHNERITE, ROSCOELITE, MALACHITE, AZURITE

In orange-red arkosic sandstone

Cuprite, native copper, schachnerite, and roscoelite occur in the dark core and outer haloes of grey reduction spheres 1 to 6 cm across. The inner dark cores range from a few millimetres to about 1 cm across. In places, the spheres coalesce and make up 50% of the rock. Malachite and azurite occur on the spheres and in the host rock.

The occurrence is exposed along the Dorchester Cape coast on the eastern side of Shepody Bay, about 32 km southeast of Moncton and about 7 km southwest of Dorchester. Lat. 45°50′17″N, Long. 64°31′15″W to Lat 45°50′47″N, Long. 64°31′58″W. *See* Map 20.

Road log from Highway 2 (Trans-Canada Highway) at **km 253.3** (*see* the Main Road Log on page 4):

km		
	0	Moncton, junction of highways 2 and 126; proceed southeast along Highway 126.
	4.3	Junction, Highway 15 (Wheeler Boulevard); proceed south along Highway 15.
	9.7	Junction, highways 106 and 114; proceed east onto Highway 106.
	37.9	College Bridge, junction of highways 106 and 925; the road log continues south along Highway 106 (Fundy Coastal Drive).
	47.8	Dorchester, junction; proceed southwest along Highway 935.
	55.3	Shepody Bay and Dorchester Cape (southern end) come into view on the west side of the highway. From this point on the highway, walk west 300 m to the southern end of Dorchester Cape. The sandstone containing the copper-bearing nodules is exposed over a distance of about 1350 m along the cape extending north from the southern end of the cape. Collect at low tide.

Refs.: 240 p. 19; 347 p. 781-789.

Maps (T): 21 H/15 Hillsborough
(G): 78-26 W-23 Dorchester-Hopewell Cape (NBDNR, 1:25 000)

97-1 Bedrock geology of the Maringouin Peninsula, Cumberland Subbasin, New Brunswick (NBDNR, 1:20 000)
97-8 Carboniferous geology of the Hillsborough area, (NTS 21 H/15), Albert and Westmorland counties, New Brunswick (NBDNR, 1:50 000)
99-26 Bedrock geological compilation of the Hillsborough map area (NTS 21 H/15), Albert and Westmorland counties (NBDNR, 1:50 000)
647A Hillsborough, Albert and Westmorland counties, New Brunswick (GSC, 1:63 360)
NR-2 Mineral occurrence map of New Brunswick (NBDNR, 1:500 000)
NR-6 Geological map of southeastern New Brunswick (NBDNR, 1:250 000)
Geological highway map of New Brunswick and Prince Edward Island, Special Publication No. 2 (Atlantic Geoscience Society, 1:638 000)

Shepody Bay occurrence

FOSSILS

In sandstone and shale

Pennsylvanian fossil plants and fossil trees occur in sandstone and in shale. Calcite partially replaces the fossil trees.

The occurrence is exposed along the shore of Shepody Bay, about 40 km southeast of Moncton and 15 km south of Dorchester. Lat. 45°46′13″N, Long. 64°31′01″W to Lat. 45°45′15″N, Long. 64°31′13″W. *See* Map 21.

Road log from Highway 2 (Trans-Canada Highway) at **km 253.3** (*see* the Main Road Log on page 4):

km		
	0	Moncton, junction of highways 2 and 126; proceed southeast along Highway 126.
	4.3	Junction, Highway 15 (Wheeler Boulevard); proceed south along Highway 15.
	9.7	Junction, highways 106 and 114; proceed east onto Highway 106 toward Dorchester.
	37.9	College Bridge, junction of highways 106 and 925; the road log continues south along Highway 106 (Fundy Coastal Drive).
	47.8	Dorchester, junction; proceed southwest along Highway 935.
	64.1	Johnson Mills, junction. Highway 935 turns left (east); continue along the road leading south toward Cape Maringouin.
	64.3	Walk to the beach. The Shepody Bay occurrence outcrops along seacliffs southward for about 1600 m. Collect at low tide.

Ref.: 238 p. 47.

Maps (T): 21 H/15 Hillsborough
(G): 97-1 Bedrock Geology of the Maringouin Peninsula, Cumberland Subbasin, New Brunswick (NBDNR, 1:20 000)
243A Hillsborough Sheet, Albert and Westmorland counties, New Brunswick (GSC, 1:63 360)

647A Hillsborough, Albert and Westmorland counties, New Brunswick (GSC, 1:63 360)
NR-6 Geological map of southeastern New Brunswick (NBDNR, 1:250 000)
Geological highway map of New Brunswick and Prince Edward Island, Special Publication No. 2 (Atlantic Geoscience Society, 1:638 000)

Pink Ledge (Pink Rocks) occurrence

GYPSUM, ANHYDRITE

In shale

Gypsum is white, pink, and grey, granular to compact massive. Selenite occurs as colourless transparent layers and crystals, and as pink crystal aggregates in massive gypsum. Grey massive anhydrite is associated with gypsum. The gypsum was reputed to be of excellent quality. Original work on the deposit was done in 1901 by Mr. Herbert W. Ladd. In 1905, New Brunswick Gypsum Company Limited undertook mining operations. The company constructed a wharf near the mine and continued operations until 1920. The gypsum was shipped to the United States. The mine site is marked by a depression adjacent to the east end of the wharf on the eastern shore of Shepody Bay. Shale containing gypsum and anhydrite is exposed for about 250 m along the Shepody Bay shore near the wharf. Sinkholes extending about 1200 m northeast from the mine site to Pink Rock Lake are the topographic expression of an underlying gypsum-anhydrite deposit. The name of the occurrence is derived from the pink colour of the gypsum-bearing rock exposures along the shore.

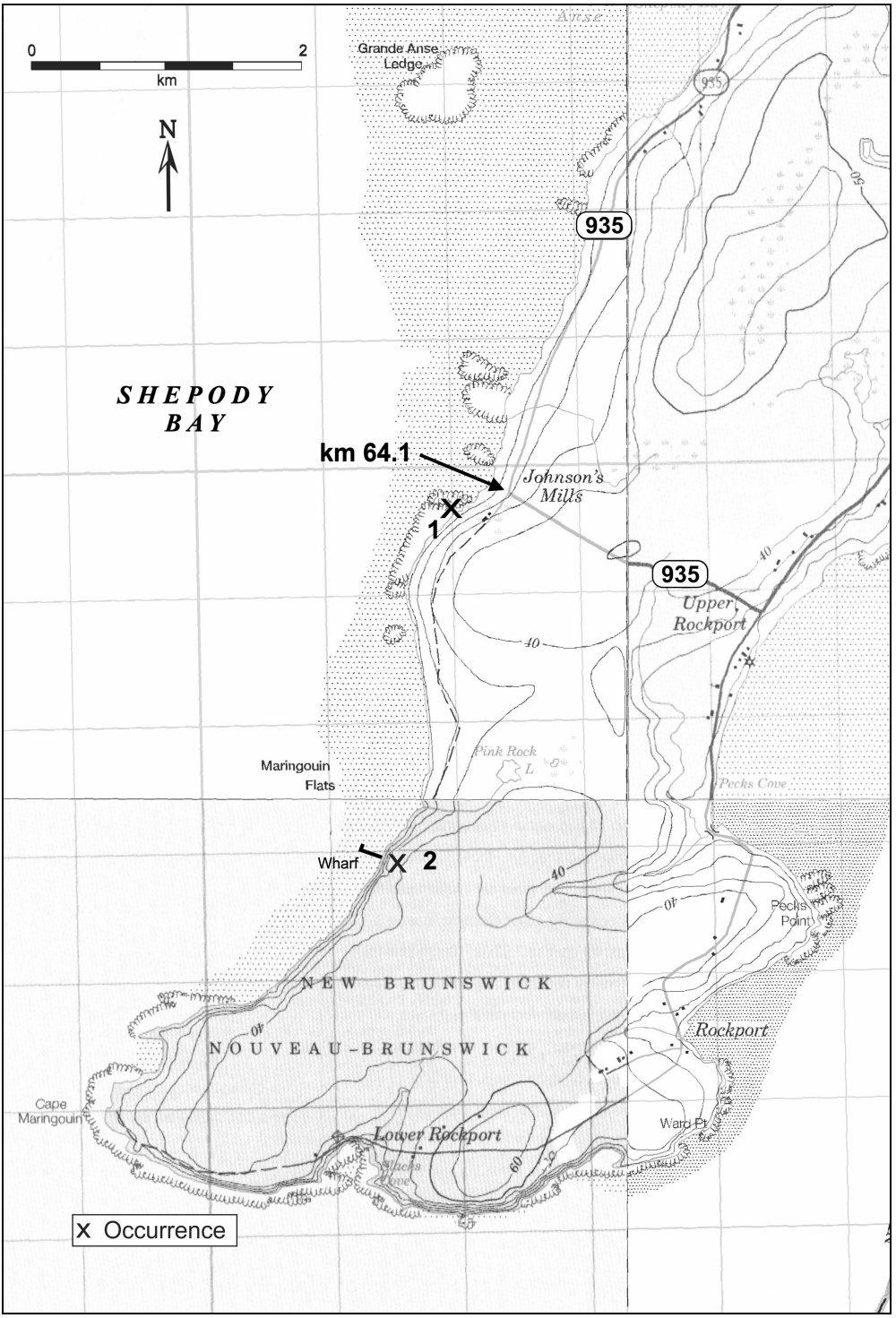
The occurrence is exposed along the shore of Shepody Bay about 42 km southeast of Moncton, and 17 km south of Dorchester. Lat. 45°44′43″N, Long. 64°31′25″W. *See* Map 21.

Road log from Highway 2 (Trans-Canada Highway) at **km 253.3** (*see* the Main Road Log on page 4):

km		
	0	Moncton, junction of highways 2 and 126; proceed southeast along Highway 126.
	4.3	Junction, Highway 15 (Wheeler Boulevard); proceed south along Highway 15.
	9.7	Junction, highways 106 and 114; proceed east onto Highway 106 toward Dorchester.
	37.9	College Bridge, junction of highways 106 and 925; the road log continues south along Highway 106 (Fundy Coastal Drive).
	47.8	Dorchester, junction; proceed onto Highway 935 toward Rockport.
	64.1	Johnson Mills, junction. Highway 935 turns left (east); continue south along the road leading toward Cape Maringouin.
	67.4	End of the road at the wharf. The Pink Ledge (Pink Rocks) occurrence is on the shore at the wharf. The old mine site is just east of the wharf.

Refs.: 76 p. 46; 77 p. 24-25; 109 p. 121-122; 110 p. 137; 111 p. 75; 181 p. 51-54; 204 p. 96; 361 p. 3-12.

Maps (T): 21 H/10 Alma



1. Shepody Bay occurrence 2. Pink Ledge (Pink Rocks) occurrence

Map 21. Cape Maringouin

(G): 97-1 Bedrock Geology of the Maringouin Peninsula, Cumberland Subbasin, New Brunswick (NBDNR, 1:20 000)
647A Hillsborough, Albert and Westmorland counties, New Brunswick (GSC, 1:63 360)
NR-2 Mineral occurrence map of New Brunswick (NBDNR, 1:500 000)
NR-6 Geological map of southeastern New Brunswick (NBDNR, 1:250 000)
Geological highway map of New Brunswick and Prince Edward Island, Special Publication No. 2 (Atlantic Geoscience Society, 1:638 000)

BAY OF FUNDY, NOVA SCOTIA: AMHERST TO WINDSOR

The Main Road Log — Amherst to Windsor

The main road log proceeds along the Glooscap Trail: Highway 2 from Amherst to Truro; Highway 236 from Truro to South Maitland; Highway 215 from South Maitland to Brooklyn; and Highway 14 from Brooklyn to Windsor. The starting point is the junction of highways 2 and 104 in Amherst. Kilometre distances along these highways is shown in bold type. The collecting localities are described in the text following the road log. A page reference is indicated in parenthesis following the name of each mine, occurrence, or quarry.

km **0** Amherst, junction of highways 2 and 104; the main road log proceeds south along Highway 2 (Glooscap Trail).

km **1.3** Upper Nappan, junction of the road to the Nappan salt mine (p. 120) and the Nappan gypsum mine (p. 121).

km **2.5** Junction, Highway 302 and the road leading east to the Lime-kiln Brook quarry (p. 121) and the Brookdale mine (p. 123); Highway 302 leads west to the Blenkhorn mine (p. 123), the Lower Maccan occurrence (p. 124), and the Joggins Fossil Cliffs occurrence (p. 125).

km **22.3** Springhill, junction of Black River Road to the Springhill Miners' Museum.

km **32.8** Junction, road to South Brook and the South Brook occurrence (p. 128).

km **62.4** Junction, road to New Prospect and the Parrsboro barite occurrence (p. 128).

km **63.0** Junction, Highway 209 to Cape d′Or and the Cape d′Or mine (p. 129) and the Spicers Cove occurrence (p. 133).

km **65.3** Parrsboro, at Eastern Avenue (Highway 2) and Main Street. Main Street provides access to: the Partridge Island occurrences (p. 134), the West Bay occurrences (p. 136), the Black Rock occurrence (p. 137) Clarke Head occurrence (p. 138), the Swan Creek occurrences (p. 140), the Wasson Bluff occurrences (p. 141), the The Brothers (Two Islands) occurrences (p. 142), the McKay (McCoy) Head occurrence (p. 144), and the Cape Blomidon-Cape Split occurrences (p. 145). The main road log continues along Highway 2 (Glooscap Trail).

km **86.2** Lower Five Islands, at the bridge over North River and access to the North River (North River of Five Islands) occurrences (p. 147).

km	**87.1**	Lower Five Islands, junction of Little York Road to the Lower Five Islands occurrence (p. 149).
km	**89.1**	Junction, road to Sand Point and access to the Five Islands occurrences (p. 151).
km	**90.5**	Five Islands, junction of the road to the Eureka (Bass River, Duncan) mine (p. 152).
km	**91.9**	Junction, road to Five Islands Provincial Park.
km	**93.8**	Junction, path to the Economy (Gerrish) Mountain occurrence (p. 153).
km	**96.0**	Access to the Lower Economy occurrence (p. 153).
km	**112.8**	Bass River, junction of the road to the Bass River mine (p. 154).
km	**128.9**	Great Village, junction of the road to Londonderry and the Londonderry (Acadia) mines (p. 155).
km	**135.2**	Glenholme, junction of Highway 4 to the Folly Lake quarry (p. 158).
km	**139.4**	Masstown, junction of the road to Debert and the Londonderry East mines (p. 159).
km	**145.5**	Lower Onslow, junction of the road to Belmont and the Frog Lake quarries (p. 161).
km	**152.5**	Truro, junction; Highway 2 joins Highway 102 and continues south as Highway 2/102 (Glooscap Trail). The road to Onslow leads east from this junction to the East Mountain quarry (p. 162), the East Mountain (Fraser) mine (p. 163), and the Manganese Mines mine (p. 165). The main road log continues along Highway 2/102 (Glooscap Trail).
km	**154.0**	Truro, junction of highways 2/102 and 236. The Truro to Waverley side trip begins in Truro, at the junction of Prince and Willow streets, 2.5 km east of this junction; the road log for this side trip is given on page 166. The main road log proceeds west along Highway 236 (Glooscap Trail).
km	**163.4**	Junction, road to Clifton and the Clifton (Old Barns) mine (p. 197) and the Black Rock mine (p. 198).
km	**175.0**	South Maitland, at the bridge over Shubenacadie River and access to the South Maitland occurrence (p. 199).
km	**176.3**	South Maitland, junction of Highway 215; the main road log proceeds north along Highway 215 (Glooscap Trail).
km	**181.8**	Access to the Stephens occurrence (p. 199).
km	**187.4**	Selma, junction of the path to the Selma mine (p. 201).
km	**188.3**	Selma, junction of the road to the Minas Basin shore.
km	**194.3**	Lower Selma, at Anthony Provincial Park.
km	**201.3**	Access to the Densmore Mills mine (p. 202).

km 205.9 Noel, junction of Highway 354 to Kennetcook and the West Gore mine (p. 202), the East Rawdon mines (p. 203), and the Rawdon mines (p. 205). The road leading north from this junction leads to the Burntcoat Head occurrences (p. 206).

km 210.0 Junction, road to Burntcoat Head and the Burntcoat Head occurrences (p. 206).

km 210.3 Minasville, junction of the road to the Minasville School mine (p. 208).

km 211.4 Minasville, at the bridge over Moose Brook and junction of the road to the MacDonald mine (p. 208).

km 214.8 Junction, road to the Faulkner mine (p. 209).

km 216.3 Tennycape, bridge over Tennycape River and access to the Cape Tenny occurrence (p. 209).

km 217.3 Tennycape, junction of the road to the Tennycape mine (p. 211).

km 219.3 Junction, road to the Parker mine (p. 212).

km 227.0 Bridge over Whale Creek and access to the Whale Creek mine site (p. 212).

km 227.2 Junction, road to the Whale Cove occurrence (p. 213).

km 228.6 Walton, junction at a sharp bend to the right; the road straight ahead leads southeast to the Walton gypsum mines (South Mountain, North Mountain, Fry's Mountain, and Stevens mines) (p. 215), and the Hibernia mine (p. 217).

km 228.7 Walton, at the bridge (west end) over Walton River and access to the Shaw and Churchill mine (p. 217).

km 229.3 Walton, junction of the road to the Stephens mine (p. 218).

km 230.4 Junction, road to the Walton (Magnet Cove) mine (p. 219) and the Sturgis and Feuchtwanger mines (p. 221).

km 232.8 Pembroke, junction of the road to the Pembroke shoreline occurrences (p. 222).

km 234.1 Pembroke, at the bridge over Rainy Cove Brook and junction of the road to the Pembroke shoreline occurrences (p. 222).

km 237.0 Cambridge, junction of the road to Cheverie Mountain and the Goshen mine (p. 222).

km 243.7 Bramber, junction of the road to the Johnson Cove occurrence (p. 223).

km 246.2 Junction, road to Riverside and a former Cheverie gypsum mine (p. 223).

km 246.5 Junction, road to the Cheverie wharf and the Cheverie cliffs occurrence (p. 223). A former Cheverie gypsum mine (p. 227) is on the west side of the highway at this junction.

km 247.1 Junction, road to the Lake (Macumber) mine (p. 225), and a road to a former Cheverie gypsum mine (p. 227).

km	**247.7**	Junction, road to a former Cheverie gypsum mine (p. 227).
km	**248.3**	Junction, road to a former Cheverie gypsum mine (p. 227).
km	**254.0**	Summerville, junction of the road to the Summerville occurrence (p. 228).
km	**257.3**	Junction of a road leading southwest at the Highway 215 crossing over Cabin Brook, and access to the Lower Burlington occurrence (p. 228).
km	**271.1**	Junction, Highway 236 to the Miller Creek, Bailey mines (p. 229).
km	**272.1**	Junction; Highway 14 joins Highway 215. The main road log proceeds south along Highway 14/215 (Glooscap Trail).
km	**272.9**	Brooklyn, junction; Highway 14 leaves Highway 14/215 and proceeds west. The main road log continues along Highway 14 (Glooscap Trail). Highway 215 leads to the McKay Section (Maynard) mine (p. 230), the Meander River occurrence (p. 230), and the Ardoise mine (p. 232).
km	**277.2**	Sweets Corners, junction of the road to the Wentworth Creek mine (p. 233).
km	**279.4**	Junction, road to the Mosher mine (p. 234).
km	**281.2**	Junction, road to the Meadow mine (p. 235).
km	**284.7**	Garlands Crossing, junction of Highway 1 (Evangeline Trail); Highway 14 (Glooscap Trail) ends at this junction.

End of the Amherst to Windsor road log. The description of the occurrences follows.

Nappan salt mine

HALITE

In a halite horizon in a sedimentary formation

Halite is commonly white to colourless massive, and less commonly pink and reddish. It occurs in a formation composed of gypsum, anhydrite, sandstone, conglomerate, and limestone.

In 1927, the halite deposit was discovered as brine in a water well near Upper Nappan. Subsequent drilling by Imperial Oil Limited in 1931 and by the Nova Scotia Department of Mines in 1942 indicated salt at a depth of 235 to 280 m. Maritime Industries Limited began boring brine wells in 1945, and put its evaporated salt plant in operation in 1947. The mining method, known as a brining operation, involves pumping water into a cavity at depth to dissolve the salt and produce a saturated brine which is then pressure-pumped to the surface evaporation plant. Sifto Canada Inc., the current operator, acquired the operation in 1990. Annual production is 90 000 t. About 65 salt products are produced including table, pickling, fishery, and water conditioning salts.

The mine is 5 km southwest of Amherst. Lat. 45°46′57″N, Long. 64°14′03″W. *See* Map 22.

Road log from Highway 2 (Glooscap Trail) at **km 1.3** (*see* the Main Road Log on page 117):

km	0	Upper Nappan, junction of Highway 2 and a road leading west; proceed west along this road.
	3.3	Nappan salt mine, on the north side of the road.

Refs.: 30 p. 98-106; 294 p. 7; 314 p. 177-178.

Maps (T): 21 H/16 Amherst
(G): 85-1 Industrial mineral commodities map of the Province of Nova Scotia (NSDNR, 1:500 000)
90-12 Cumberland Basin geology map, Amherst, Springhill and Parrsboro, Cumberland County (NSDNR, 1:50 000)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

Nappan gypsum mine

GYPSUM, ANHYDRITE

In sandstone and clay

Gypsum is white, compact massive, commonly mottled with pink, yellow, light green, brown, and grey. Some grey anhydrite is associated with the gypsum. The deposit contained white alabaster suitable for carving.

Maritime Gypsum Company worked the deposit between 1904 and 1914. The company transported crude gypsum on its 4 km railway to its pier at Amherst Point for shipment by boat to New York. The shipments amounted to about 3600 t per year. Gypsum, Lime and Alabastine Canada Limited worked the deposit in 1959. Domtar Construction Materials Limited operated the mine from 1960 to 1962 and shipped the output to the company's wallboard plant in Montreal.

The mine is 5 km southwest of Amherst. Lat. 45°47′04″N, Long. 64°14′19″W. *See* Map 22.

Road log from Highway 2 (Glooscap Trail) at **km 1.3** (*see* the Main Road Log on page 117):

km		
	0	Upper Nappan, junction of Highway 2 and a road leading west; proceed west along this road.
	3.6	Junction; turn right (north).
	4.0	Nappan gypsum mine.

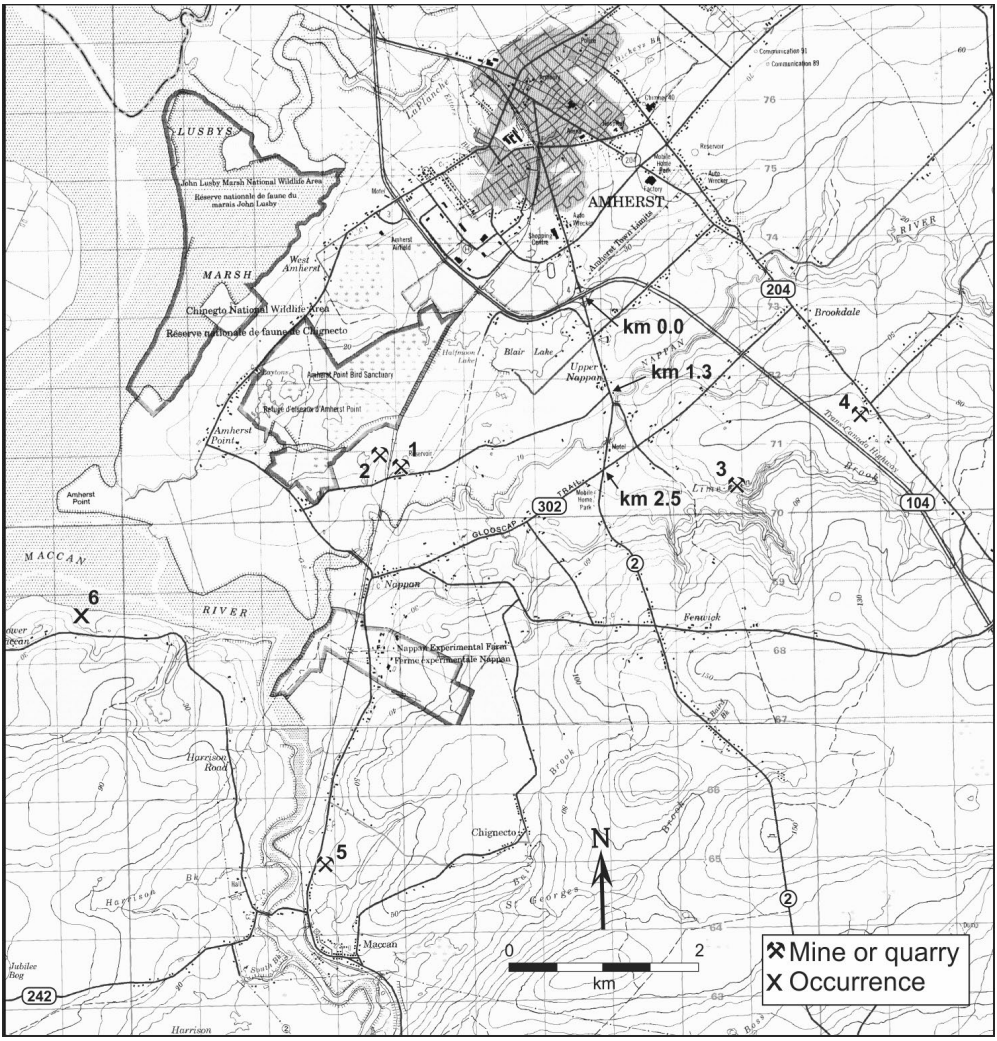
Refs.: 2 p. 55-56; 76 p. 42; 77 p. 15; 158 p. 40-41; 204 p. 87-88; 314 p. 178.

Maps (T): 21 H/16 Amherst
(G): 39A Nova Scotia Sheet (GSC, 1:506 880)
85-1 Industrial mineral commodities map of the Province of Nova Scotia (NSDNR, 1:500 000)
90-12 Cumberland Basin geology map, Amherst, Springhill and Parrsboro, Cumberland County (NSDNR, 1:50 000)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

Lime-kiln Brook quarry

CALCITE CRYSTALS, FOSSILS

In limestone



1. Nappan salt mine 2. Nappan gypsum mine
3. Lime-kiln Brook quarry 4. Brookdale mine 5. Blenkhorn mine
6. Lower Maccan occurrence

Map 22. Amherst

Small, light brown calcite crystals occur in cavities in light brown to light reddish-buff limestone. Pennsylvanian fossils including crinoids, brachiopods, corals, pelecypods, and gastropods, and worm trails occur in the rock.

The quarry is about 5 km south of Amherst. Lat. 45°46′50″N, Long. 64°10′23″W. *See* Map 22.

Road log from Highway 2 (Glooscap Trail) at **km 2.5** (*see* the Main Road Log on page 117):

km		
	0	Junction, Highway 2 and the road leading east to Brookdale; proceed on the road to Brookdale.
	0.5	Junction; turn right (south).

1.5 Junction; turn left (east).

2.3 Lime-kiln Brook quarry.

Refs.: 25 p. 43-45; 266 p. 79; 314 p. 48.

Maps (T): 21 H/16 Amherst
(G): 85-1 Industrial mineral commodities map of the Province of Nova Scotia (NSDNR, 1:500 000)
90-12 Cumberland Basin geology map, Amherst, Springhill and Parrsboro, Cumberland County (NSDNR, 1:50 000)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

Brookdale mine

BARITE, CALCITE CRYSTALS, MANGANITE, PYROLUSITE, HEMATITE, FOSSILS

In limestone

Barite occurs as white bladed aggregates in fractures and in irregular cavities in dense grey limestone. White calcite crystals, manganite, pyrolusite, and hematite are associated with barite. The limestone contains shell fossils (gastropods, pelecypods) of Mississippian age.

The mine was worked for manganese in about 1897. About 54 t of manganese ore were extracted from a sidehill pit 9 by 12 m and 6 m deep.

The mine is on the Kinnear farm on the west side of the Oxford-Amherst road, about 5 km southeast of Amherst. Lat. 45°47′23″N, Long. 64°08′53″W. *see* Map 22.

Road log from Highway 2 (Glooscap Trail) at **km 2.5** (*see* the Main Road Log on page 117):

km 0 Junction of Highway 2 and the road leading east to Brookdale; proceed along the road to Brookdale.

3.6 Brookdale, junction of Highway 204; turn right (southeast) onto Highway 204.

5.4 Brookdale mine, on the west side of the road.

Refs.: 25 p. 45; 29 p. 125-127; 128 p. 3F; 132 p. 201-203; 182 p. 37-38; 266 p. 84.

Maps (T): 21 H/16 Amherst
(G): 85-1 Industrial mineral commodities map of the Province of Nova Scotia (NSDNR, 1:500 000)
90-12 Cumberland Basin geology map, Amherst, Springhill and Parrsboro, Cumberland County (NSDNR, 1:50 000)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

Blenkhorn mine

CHALCOCITE, MALACHITE, GALENA, PYRITE, CHALCOPYRITE, MALACHITE, AZURITE, BARITE, FOSSILS

In sandstone

Chalcocite, the copper ore mineral, occurs with argentiferous galena, pyrite, chalcopyrite, malachite, and azurite. Barite occurs in veinlets. Carbonized fossil tree trunks and plant leaves of Pennsylvanian age occur in the host rock.

The deposit was discovered on the Amos Blenkhorn farm in about 1892. A few years later, Acadia Copper Company sank a 24.5 m inclined shaft and shipped a few tonnes of hand-picked copper ore to the Copper Crown smelter in Pictou.

The mine is about 10 km southwest of Amherst. Lat. 45°43′53″N, Long. 64°14′59″W. *See* Map 22.

Road log from Highway 2 (Glooscap Trail) at **km 2.5** (*see* the Main Road Log on page 117):

km		
	0	Junction, highways 2 and 302; proceed west along Highway 302.
	3.8	Nappan, junction; proceed south toward Maccan.
	8.1	Blenkhorn mine, on the east side of the road.

Refs.: 107 p. 13; 140 p. 101A.

Maps (T): 21 H/9 Springhill
(G): 51-11 Springhill, Cumberland and Colchester counties, Nova Scotia (GSC, 1:40 000)
90-12 Cumberland Basin geology map, Amherst, Springhill and Parrsboro, Cumberland County (NSDNR, 1:50 000)
337A Springhill Sheet, Cumberland and Colchester counties, Nova Scotia (GSC, 1:63 360)
Metallogenic map of the province of Nova Scotia, 1983 (NSDNR, 1:500 000)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

Lower Maccan occurrence

FOSSILS

In limestone

Fossils including brachiopods and worm burrows of Mississippian age occur in grey limestone cut by white calcite veins.

The fossil-bearing limestone is exposed at low tide along the south shore of the Maccan River. The fossiliferous zone extends eastward for 1500 m from the mouth of a brook.

The occurrence is about 1 km northeast of Lower Maccan, and about 9 km southwest of Amherst. Lat. 45°45′53″N, Long. 64°17′38″W. *See* Map 22.

Road log from Highway 2 (Glooscap Trail) at **km 2.5** (*see* the Main Road Log on page 117):

km		
	0	Junction, highways 2 and 302; proceed west along Highway 302.
	3.8	Nappan, junction; proceed south toward Maccan.
	8.8	Maccan, junction; turn right (west) onto Highway 242.
	9.6	Junction; turn right (north) onto the road to Lower Maccan.
	13.75	Crossing over a brook.

15.4 From this point on the road, walk north 350 m to the mouth of a brook on the Maccan River; the Lower Maccan occurrence begins at the mouth of the brook and extends eastward.

Ref.: 266 p. 86-88.

Maps (T): 21 H/16 Amherst
(G): 39A Nova Scotia Sheet (GSC, 1:506 880)
90-12 Cumberland Basin geology map, Amherst, Springhill and Parrsboro, Cumberland County (NSDNR, 1:50 000)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

Joggins Fossil Cliffs World Heritage Site occurrence

FOSSILS, COAL, CONCRETIONS

In sandstone, limestone, shale

Fossils occur in sandstone of the Joggins Formation in the Joggins-River Hebert coalfield of Pennsylvanian age. Fossil tree and plant species include: *Adiantites, Alethopteris, Annularia, Artisia, Calamites, Lepidodendron, Lepidophloios, Lepidostrobophyllum, Lepidostrobus, Mariopteris, Neuropteris, Pecopteris, Polypterocarpus, Samaropsis, Senftenbergia, Sigillaria, Sphenopteris, Stigmaria,* and *Zeilleria*. Fossil reptiles, amphibians, and fish teeth have been found in the tree stumps. In 1852, Sir. William Dawson and Sir Charles Lyell discovered fossil reptiles, *Hylonomus lyelli,* the oldest known fossil reptile species; the reptiles measuring up to 26 cm long were found in erect fossil tree stumps exposed along the Joggins seacliffs. The fossil reptile is the fossil emblem of Nova Scotia, as enacted by an Act of the Nova Scotia Legislative Assembly in 2002. Shell fossils including pelecypods, ostracods, annelids, gastropods (some replaced by pyrite), and fossil fish, and fish scales occur in bituminous limestone overlying black coal beds. Tracks of a fossil arthropod (probably *Arthropleura*) have been found on sandstone. Coal seams occur in carbonaceous shale. Ironstone concretions composed of hard iron-rich sedimentary rock occur in sandstone and shale.

In 1842, naturalist Sir Charles Lyell visited the locality and described it in one of his letters: "Whither I went to see a forest of fossil coal-trees — the most wonderful phenomenon perhaps that I have seen, so upright do the trees stand, or so perpendicular to the strata — trees twenty-five feet high, and some have been seen of forty feet, piercing the beds of sandstone and terminating downwards in the same beds, usually coal. This subterranean forest exceeds, in extent and quality of timber, all that have been discovered in Europe put together" (Ref.: 319 p. 72). The geology of the spectacular occurrence was described in an 1845 report by William E. Logan, director of the Geological Survey of Canada (Ref.: 220), following his visit in 1843. He noted fossil trees up to 45 cm across standing upright perpendicular to the rock strata along the shoreline cliffs, and fossil trees of various sizes in groups consisting of as many as three in the space of 30 cm and eleven in a space of 6 m. The Joggins coal seams were worked as early as 1826, continuing by various operators until the early 1930s. A large sandstone slab containing fossil tracks up to 23 cm wide is on display at Mount Allison University in Sackville, New Brunswick.

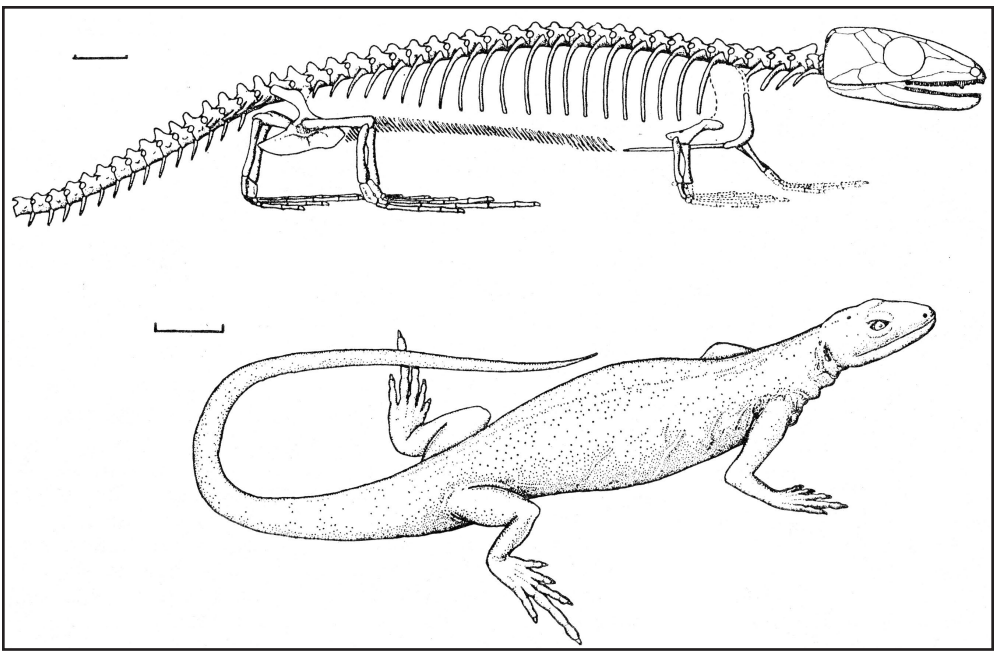


Figure 3. Skeleton and restoration of the primitive reptile *Hylonomus lyelli*. Scales are one centimetre in length. (After Ref.: 58 p.72).

In 1970, a 2050 m section of the fossiliferous limestone cliffs extending north from the Joggins wharf toward Lower Cove was designated by the Nova Scotia Legislative Assembly as a Protected Site; digging fossils at this site is prohibited except with a Heritage Research Permit. The Joggins Fossil Cliffs location was designated a UNESCO World Heritage Site in 2008. For further information on this occurrence contact the Joggins Fossil Centre in Joggins.

The fossil-bearing sedimentary rocks are exposed in seacliffs at Joggins, Chignecto Bay. Lat. 45°41′46″N, Long. 64°27′04″W.

Road log from Highway 2 (Glooscap Trail) at **km 2.5** (*see* the Main Road Log on page 117):

km		
	0	Junction, highways 2 and 302; proceed west along Highway 302.
	8.8	Maccan, junction; turn right (west) onto Highway 242.
	21.6	River Hebert, junction; continue straight ahead (west).
	29.2	Joggins; turn right onto Hardscrabble Avenue.
	30.0	Joggins, at the wharf. The Protected Site is north of the wharf; the shoreline cliffs south of the wharf are not restricted by the Protected Site legislation.

Refs.: 24 p. 326-346; 25 p. 19-20; 57 p. 61-83; 58 p. 64-80; 94; 134 p. 111-118; 135 p. 12-30; 150 p. 151-168; 153 p. 409-413; 220 p. 108-132; 238 p. 33-38, 47-48; 258 p. 89-90; 293 p. 16-17; 314 p. 44, 50; 318; 319 p. 69-72; 338 p. 109-113; 357 p. 74-80.

Maps (T): 21 H/9 Springhill

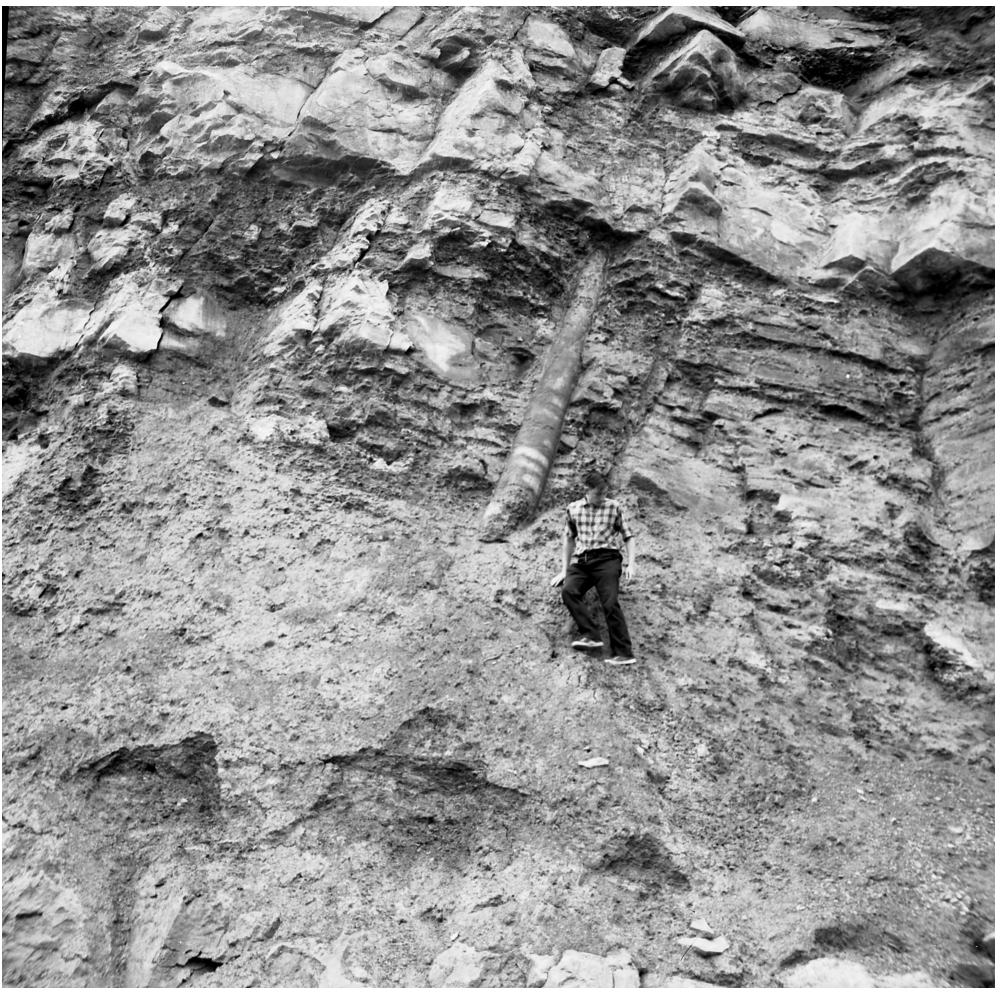


Plate 10.

Fossil tree trunk in sandstone cliffs, Joggins, 1963. (GSC 138645)

(G): 39A Nova Scotia Sheet (GSC, 1:506 880)
51-11 Springhill, Cumberland and Colchester counties, Nova Scotia (GSC, 1:40 000)
90-12 Cumberland Basin geology map, Amherst, Springhill and Parrsboro, Cumberland County (NSDNR, 1:50 000)
337A Springhill Sheet, Cumberland and Colchester counties, Nova Scotia (GSC, 1:63 360)
1070A Cumberland County (west part), Nova Scotia (GSC, 1:126 720)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

South Brook occurrence

BARITE, FOSSILS

In conglomerate; in siltstone

Barite occurs as white to pink coarse bladed aggregates in irregular fractures in brecciated conglomerate. Carbonized plant fossils of Carboniferous age occur in siltstone.

The occurrence is exposed along the southwestern bank of South Brook. Barite specimens weathered away from the outcrop occur in the stream bed downstream from the outcrop.

The occurrence is about 28 km south of Amherst, and 14 km southwest of Springhill. Lat. 45°33′45″N, Long. 64°11′07″W.

Road log from Highway 2 (Glooscap Trail) at **km 32.8** (*see* the Main Road Log on page 117):

km		
	0	Junction, Highway 2 and the road to South Brook; proceed south to South Brook.
	3.4	Bridge over South Brook. The South Brook occurrence is on the southwestern bank of South Brook about 410 m downstream (west) from the bridge.

Ref.: 132 p. 213-216.

Maps (T): 21 H/9 Springhill
(G): 82-7 Cobequid Highlands, Colchester, Cumberland & Pictou counties, Nova Scotia (NSDNR, 1:50 000)
85-1 Industrial mineral commodities map of the Province of Nova Scotia (NSDNR, 1:500 000)
90-12 Cumberland Basin geology map, Amherst, Springhill and Parrsboro, Cumberland County (NSDNR, 1:50 000)
337A Springhill Sheet, Cumberland and Colchester counties, Nova Scotia (GSC, 1:63 360)
840 Southampton Sheet 82, Cumberland County, Nova Scotia (GSC, 1:63 360)
1070A Cumberland County (west part), Nova Scotia (GSC, 1:126 720)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

Parrsboro barite occurrence

BARITE, GALENA, CHALCOPYRITE, SPHALERITE, HEMATITE

In sheared siltstone

Barite occurs as colourless to white tabular crystal aggregates in fractures and in brecciated siltstone. Galena, chalcopyrite, sphalerite, and specular hematite occur in minor amounts.

Merrill Island Mining Corporation Limited explored the occurrence in 1970. The work consisted of geochemical and geophysical surveys and drilling.

The occurrence outcrops on the south side of a ridge about 3.5 km northeast of Parrsboro. Lat. 45°25′51″N, Long. 64°17′53″W. *See* Map 23.

Road log from Highway 2 (Glooscap Trail) at **km 62.4** (*see* the Main Road Log on page 117):

km	0	Junction, Highway 2 and the road to New Prospect; proceed east toward New Prospect.
	1.9	Junction; continue straight ahead (east).
	3.7	Gate on left (north) side of the road. Proceed north 200 m to a fence; follow a trail east for 475 m up the ridge to the Parrsboro barite occurrence on the west side of a small stream. The trail continues 75 m crossing the stream to another barite-bearing rock outcrop.

Ref.: 132 p. 209-212.

Maps (T): 21 H/8 Parrsboro
(G): 82-7 Cobequid Highlands, Colchester, Cumberland & Pictou counties, Nova Scotia (NSDNR, 1:50 000)
85-1 Industrial mineral commodities map of the Province of Nova Scotia (NSDNR, 1:500 000)
840 Southampton Sheet 82, Cumberland County, Nova Scotia (GSC, 1:63 360)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

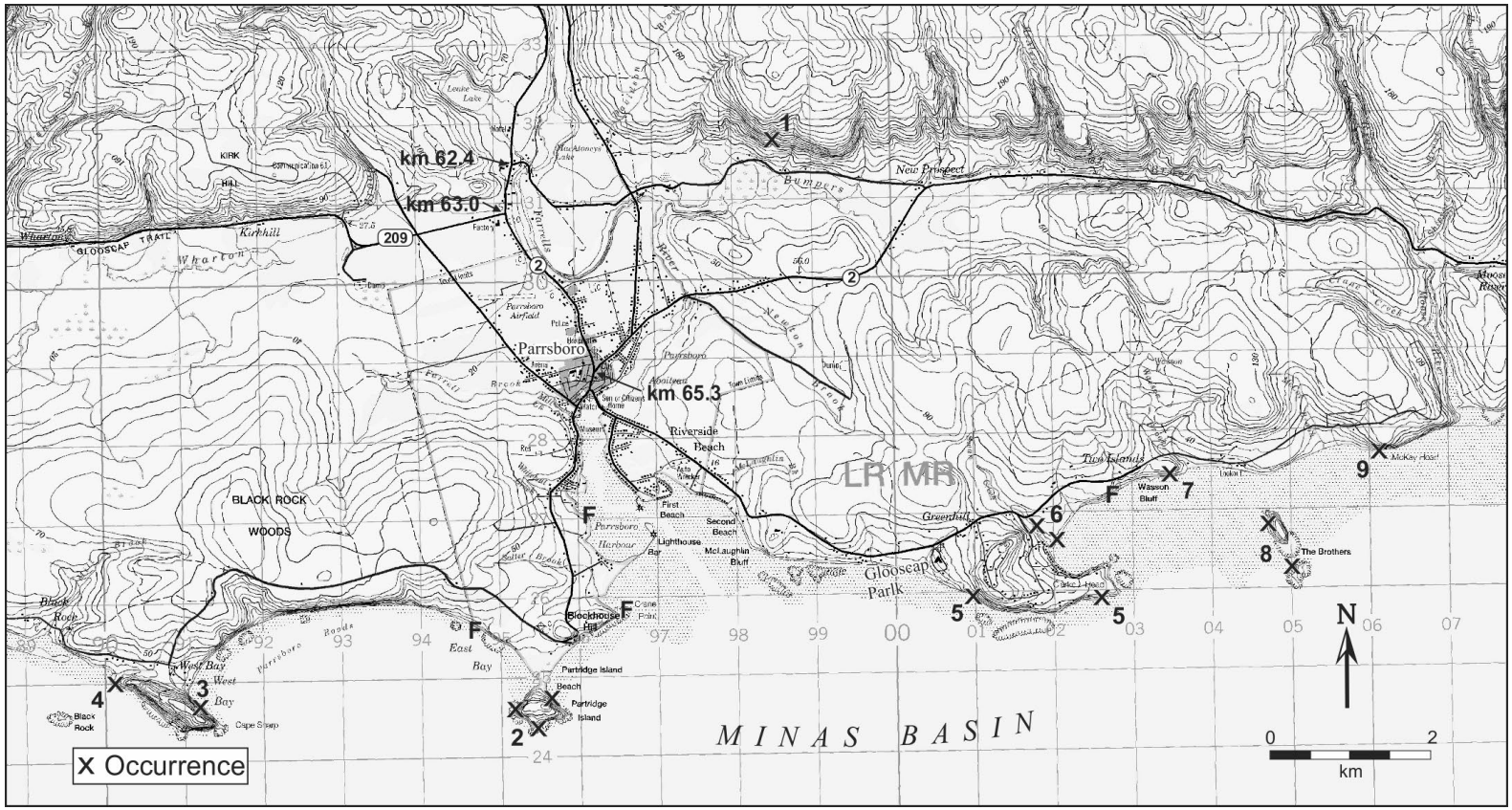
Cape d'Or mine

NATIVE COPPER, CUPRITE, MALACHITE, AZURITE, ANALCIME, STILBITE, HEULANDITE, MORDENITE, CHABAZITE, SCOLECITE, LAUMONTITE, APOPHYLLITE, MESOLITE, NATROLITE, JASPER, CHALCEDONY (AGATE), QUARTZ CRYSTALS, CALCITE CRYSTALS, HEMATITE, YARROWITE

In basalt

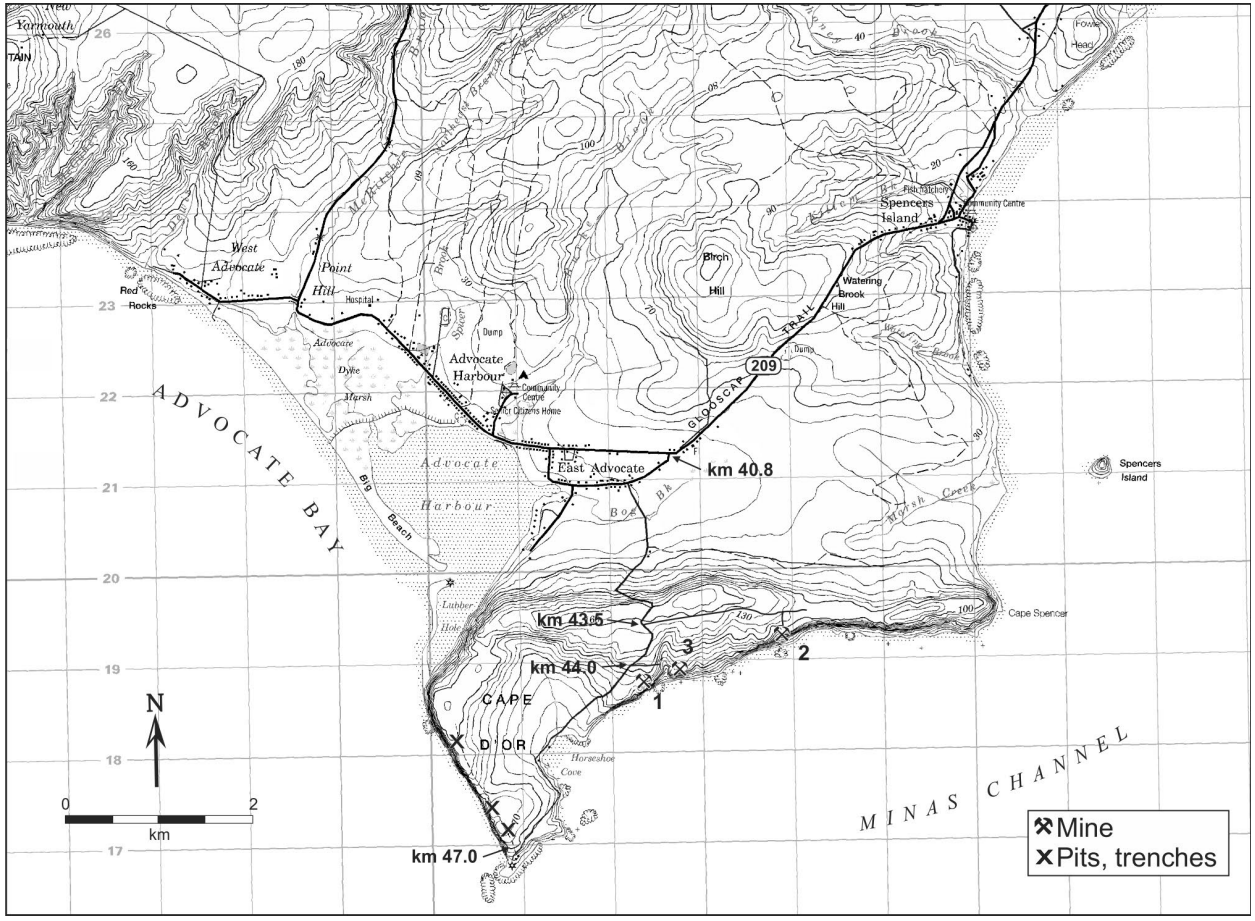
Native copper, the principal copper ore mineral, occurs as grains, scales, plates, nuggets, pellets, and dendritic and reniform pieces in fissures and cavities in brecciated and amygdaloidal basalt. Individual grains, plates, and fragments weigh up to a few grams, and aggregates weigh up to 22 kg. Fine specimens of analcime containing native copper filaments have been found. Cuprite is associated with native copper and malachite and azurite occur as alteration products. Zeolite minerals occurring in amygdaloidal basalt are: analcime, as large colourless transparent crystals; stilbite, as colourless transparent bladed aggregates; heulandite, as colourless to pink rhomboid and platy crystals; mordenite, as pink and white radiating platy and fibrous aggregates; chabazite, as light greenish-yellow glassy patches in quartz; scolecite, as white porcellaneous compact fibrous aggregates forming nodules; laumontite, as colourless to white radiating blades; apophyllite, as large crystals; and mesolite, as white radiating fibrous aggregates and as white beach pebbles (Horseshoe Cove). Natrolite has been reported. The quartz minerals include orange to reddish-brown jasper, white to bluish-white chalcedony (agate), and colourless quartz crystals in colourless to white massive quartz. Calcite occurs as colourless to white scalenohedral crystals. Orange-red hematite and bluish-green waxy glauconite/celadonite occur as cavity linings and crusts on the host rock. Yarrowite occurs as lustrous black dendritic coatings on quartz. Polished specimens of agate from Horseshoe Cove were displayed in the Geological Survey of Canada economic minerals exhibit at the Paris International Exhibition held in 1900.

Explorer Marc Lescarbot discovered native copper at Cape d'Or in 1608. The bright reddish-golden colour of the metal resembling the much sought after native gold gave the name to the locality. Specimens of native copper weighing up to seven kilograms were found. In



1. Parrsboro barite occurrence 2. Partridge Island occurrences 3. West Bay occurrences 4. Black Rock occurrence 5. Clarke Head occurrence 6. Swan Creek occurrences 7. Wasson Bluff occurrences 8. The Brothers (Two Islands) occurrences 9. McKay (McCoy) Head occurrence F Fossil occurrences

Map 23. Parrsboro



1, 2, 3 Cape d'Or mine shafts

Map 24. Cape d'Or

about 1826, a mining company from London explored the deposit but was unsuccessful. In 1900, Colonial Copper Company began exploration of a large area of the cape. The company sank several shafts, and built a concentrating plant, a 2 km railroad connecting the mine to the mill, and a wharf. The workings included: No. 1 shaft (114 m); No. 2 inclined shafts (99 m and 91 m respectively); and No. 3 shaft (91 m). Most of the production was from the Hanway Lode (No. 2 shafts) which yielded copper nodules, and copper sheets up to 600 cm^2 with thickness of 0.5 cm. The most productive period with a yield of about 5580 kg of copper from 1788 t of ore was realized in 1907, the last year of operations. Recent examination of the deposit was done by: Quebec Metallurgical Industries Limited (1952); Big Glen Mines Limited and Bathwick Mines Limited (1953); Sladden (Quebec) Limited (1967); and Mariner Mines Limited (1969–1971).

Native copper may be found in old mine workings, and in rock exposures along seacliffs from Cape d'Or to Cape Spencer and along the western coast of Cape d'Or. The zeolites, chalcedony (agate), and jasper (commonly containing native copper) occur in Cape d'Or basalt seacliffs, mainly along the eastern coast. Native copper occurs with chalcopyrite, cuprite, bornite, and quartz in basalt exposures along the shore of Spencers Island, 2 km northeast of Cape Spencer.

The Cape d'Or mine workings are between Horseshoe Cove (Cape d'Or) and Cape Spencer, Minas Channel, about 37 km southwest of Parrsboro. Lat. 45°18′30″N, Long. 64°45′25″W (No. 1 shaft); Lat. 45°18′33″N, Long. 64°45′16″W (No. 3 shaft); Lat. 45°18′48″N, Long. 64°44′16″W (No. 2 shafts). *See* Map 24.

Road log from Highway 2 (Glooscap Trail) at **km 63.0** (*see* the Main Road Log on page 117):

km		
	0	Junction, highways 2 and 209; proceed west along Highway 209.
	40.8	Junction; follow the road on left leading southwest to East Advocate.
	41.4	East Advocate, junction; turn left (south) onto the road to Cape d'Or.
	43.5	Junction of an old road; turn left (east) onto this road and proceed for about 1425 m, continuing southeast along a trail for about 100 m to No. 2 shafts (Hanway Lode) near the edge of the cliff.
	44.0	Junction of a trail leading east. Proceed along this trail for 300 m to another trail leading south about 30 m to No. 1 shaft near the edge of the cliff; there is an adit half way down the cliff. To reach No. 3 shaft proceed east along the trail for 400 m from the junction at km 44.0 to the top of the shoreline cliff, then down a trail along the face of the cliff to the shaft 15 m above the mouth of Bennett Brook; there is an adit driven 27 m at the base of the cliff just west of the mouth of Bennett Brook.
	45.3	Bridge over a brook at Horseshoe Cove. Shoreline access to the Cape d'Or mine shafts begins here. Proceed east along the shore at low tide. The workings are in an area 1400 m to 3000 m east of this cove.
	47.0	Junction of the road to the Communication Tower. From this junction, a trail leads northwest along the western coast of Cape d'Or to pits and trenches which were opened during exploration for native copper. The first pit is about 235 m from the junction; the next pits and trenches are about 350 m further up the trail; another pit and some trenches are a further 890 m up the trail.

Refs.: 75 p. 42; 92 p. 107; 96 p. 81-86; 107 p. 13-15; 113 CC-285-CC-292; 142 p. 170A-171A; 150 p. 233-236; 188 p. 30T, 31T; 201 p. 47-48; 232 p. 215; 244 p. 383-387; 270 p. 128-129; 353 p. 63-64; 397 p. 183.

Maps (T): 21 H/7 Cape Chignecto
(G): 39A Nova Scotia Sheet (GSC, 1:506 880)
82-6 Cobequid Highlands, Colchester, Cumberland & Pictou counties, Nova Scotia (NSDNR, 1:50 000)
85-1 Industrial mineral commodities map of the Province of Nova Scotia (NSDNR, 1:500 000)
826 Apple River Sheet No. 100 (and 101), Cumberland County, Nova Scotia (GSC, 1:63 360)
Metallogenic map of the province of Nova Scotia, 1983 (NSDNR, 1:500 000)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

Spicers Cove occurrence

BARITE, FLUORITE, CALCITE CRYSTALS; FOSSILS

In conglomerate; in siltstone and shale

Barite occurs as white, or pink to brick red coarse crystal aggregates in veins up to 25 cm wide in fractures and in brecciated zones in conglomerate. Associated vein minerals include fluorite, as colourless to amber coarse crystal aggregates and as cubic crystals, and dogtooth calcite crystals occurring in cavities. Carboniferous fossil plant remains including *Calamites, Cordaites,* and *Neuropteris* are abundant in siltstone and shale; the fossils are partly carbonized and hematite-stained. Minor coal seams occur in the fossil-bearing rocks.

The occurrence is exposed in seacliffs and on intertidal flats at Spicers Cove, Chignecto Bay, about 45 km west of Parrsboro. Lat. 45°25′44″N, Long. 64°53′49″W to Lat. 45°25′42″N, Long. 64°54′27″W.

Road log from Highway 2 (Glooscap Trail) at **km 63.0** (*see* the Main Road Log on page 117):

km		
	0	Junction, highways 2 and 209; proceed west along Highway 209.
	40.8	Junction, road to East Advocate; continue straight ahead (west) along Highway 209.
	58.5	Apple River, junction; turn left (northwest).
	63.2	West Apple River; continue straight ahead.
	69.0	Spicers Cove, at the bridge over Spicers Cove Brook. From this point, walk south 700 m along the shore to the Spicers Cove occurrence; the barite veins extend westward over a distance of about 900 m. Collect at low tide.

Ref.: 132 p. 217-222.

Maps (T): 21 H/7 Cape Chignecto
(G): 82-6 Cobequid Highlands, Colchester, Cumberland & Pictou counties, Nova Scotia (NSDNR, 1:50 000)
85-1 Industrial mineral commodities map of the Province of Nova Scotia (NSDNR, 1:500 000)

90-11 Cumberland Basin geology map, Apple River and Cape Chignecto, Cumberland County (NSDNR, 1:50 000)
826 Apple River Sheet No. 100 (and 101), Cumberland County, Nova Scotia (GSC, 1:63 360)
1070A Cumberland County (west part), Nova Scotia (GSC, 1:126 720)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

Partridge Island occurrences

STILBITE, LAUMONTITE, NATROLITE, HEULANDITE, CHABAZITE, ANALCIME, APOPHYLLITE, QUARTZ CRYSTALS, CHALCEDONY (AGATE), JASPER, CALCITE CRYSTALS, AMETHYST; FOSSILS

In basalt; in shale and sandstone

The minerals occur in cavities and in fractures in basalt. The zeolite minerals are stilbite, as white to pink, radiating fibrous and platy aggregates; laumontite, as colourless, white and pink platy aggregates; natrolite, as colourless, needle-like crystal aggregates; heulandite, as colourless to pink tabular crystals; chabazite, as colourless to orange, prismatic, crystal aggregates; analcime, as colourless cavity linings; and apophyllite, as colourless to white prismatic crystals. Small quartz crystals, bluish-grey chalcedony (agate), red jasper, and colourless transparent calcite crystals occur in fractures. Fine specimens of amethyst have been found at Partridge Island, including one consisting of splendid violet crystals, each 25 mm across, covering a slab 30 cm square. Explorer Pierre du Gua de Monts is reported to have presented amethyst crystals from this island to King Henry IV of France (Ref.: 213). Polished agate charms from Partridge Island were displayed in the Geological Survey of Canada cut and polished stones exhibit at the Paris International Exhibition held in 1900. Fossils occur in Mississippian-Pennsylvanian shale and sandstone.

The mineral-bearing basalt is exposed along seacliffs on the eastern, southern, and western coast of Partridge Island, Minas Basin, about 5 km south of Parrsboro. The Partridge Island occurrence begins at Lat. 45°22′06″N, Long. 64°19′52″W. The fossil-bearing rocks are exposed along the western shore of Parrsboro Harbour at Lat. 45°23′20″N, Long. 64°19′42″W (Whitehall Creek fossils); Lat. 45°22′40″N, Long. 64°19′21″W (Crane Point fossils). *See* Map 23.

Road log from Highway 2 (Glooscap Trail) at **km 65.3** (*see* the Main Road Log on page 117):

km		
	0	Parrsboro, at Eastern Avenue (Highway 2) and Main Street; proceed south along Main Street.
	0.3	Parrsboro, at the Cenotaph; follow the road on right leading southwest toward Partridge Island.
	1.8	Bridge over Whitehall Creek. Fossils occur in Mississippian-Pennsylvanian shale exposed along the Parrsboro Harbour shoreline between Whitehall Creek inlet and a headland known locally as Pinky Point, about 400 m southeast of the creek; the fossils include fossil fish, arthropods, pelecypods, and amphibian tracks. Fossil tree stumps and plant remains occur in sandy and carbonaceous shale of Pennsylvanian age.



Plate 11.

Partridge Island, east side, 1963. (GSC 138646)

3.7 Junction, at a sharp curve; the road on left leads east to the Ottawa House Museum and provides access to the Parrsboro Harbour shore. To reach the Parrsboro Harbour fossil occurrence, follow this road for about 50 m to a bend to the right (southwest) in the road; from this point proceed northeast along the shore toward Crane Point. The Mississippian-Pennsylvanian sandstone containing fossil amphibian trackways is exposed along the shore between this point and the north side of Crane Point, about 800 m to the northeast. The road log continues toward Partridge Island.

3.8 Junction; proceed south.

4.4 Partridge Island, end of the road. The mineral-bearing basalt is exposed in seacliffs along the eastern, southern and western coast of the island, a total distance of about 1700 m. Collect at low tide.

Refs.: 25 p. 9-10, 17-18; 31 p. 76-77; 58 p. 58-64; 94; 138 p. 101P; 150 p. 244-249; 201 p. 51-58; 213 p. 70S; 270 p. 129; 353 p. 38-40, 68-69; 397 p. 182.

Maps (T): 21 H/8 Parrsboro

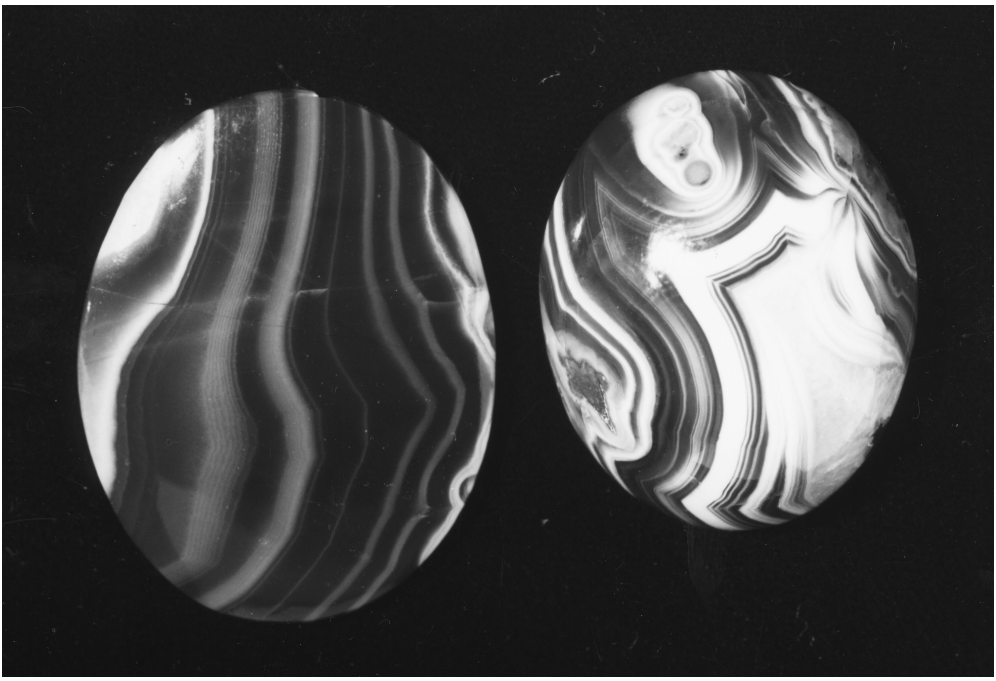


Plate 12.

Agate cabochons. Agate is the gemstone emblem of Nova Scotia, as enacted by an Act of the Nova Scotia Legislative Assembly in 1999. Agate and jasper occur in numerous localities along the Bay of Fundy shores. (GSC 203033-Z)

(G): 39A Nova Scotia Sheet (GSC, 1:506 880)
82-7 Cobequid Highlands, Colchester, Cumberland & Pictou counties, Nova Scotia (NSDNR, 1:50 000)
85-1 Industrial mineral commodities map of the Province of Nova Scotia (NSDNR, 1:500 000)
841 Parrsboro Sheet No. 83, Cumberland and Kings counties, Nova Scotia (GSC, 1:63 360)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

West Bay occurrences

GYPSUM; JASPER, QUARTZ CRYSTALS, STILBITE, CHALCEDONY (AGATE); FOSSILS

In sandstone; in basalt; in limestone

Gypsum occurs as colourless and pink compact fibrous masses in veins up to 15 cm wide in red sandstone. Some white calcite and dark green chlorite are associated with gypsum. Dark red jasper and massive white quartz containing colourless quartz crystals occur in veins in sandstone. White stilbite, blue-grey to reddish chalcedony (agate), and colourless

to amethystine quartz crystals occur as fracture fillings in basalt. Fossils occur in grey limestone of Mississippian age in a fault contact with grey shale of late Carboniferous age; fossils include pelecypods, ostracods, brachiopods, gastropods, insects, and fossil fish.

The occurrences are exposed along the shore of Minas Basin. The minerals occur in sandstone and basalt seacliffs at West Bay, about 6 km southwest of Parrsboro. Lat. 45°22′04″N, Long. 64°23′26″W. The fossil occurrence is exposed at East Bay, about 4 km south of Parrsboro. Lat. 45°22′32″N, Long. 64°20′39″W. *See* Map 23.

Road log from Highway 2 (Glooscap Trail) at **km 65.3** (*see* the Main Road Log on page 117):

km		
	0	Parrsboro, at Eastern Avenue (Highway 2) and Main Street; proceed south along Main Street.
	0.3	Parrsboro, at the Cenotaph; follow the road on right leading southwest toward Partridge Island.
	3.7	Junction, at a sharp curve; proceed west along West Bay Road.
	4.2	Junction, road leading south 400 m to the shore of East Bay. The fossil occurrence is exposed along seacliffs about 700 m west of the end of the road.
	9.8	Junction; turn left (east).
	10.2	West Bay shore; proceed southwest along the shore for about 200 m to the gypsum-bearing sandstone seacliffs, and another 150 m to the zeolite-quartz-bearing basalt cliffs. Collect at low tide.

Refs.: 25 p. 9-10, 17-18; 58 p. 58-64; 94; 266 p. 92.

Maps (T): 21 H/8 Parrsboro
(G): 82-7 Cobequid Highlands, Colchester, Cumberland & Pictou counties, Nova Scotia (NSDNR, 1:50 000)
85-1 Industrial mineral commodities map of the Province of Nova Scotia (NSDNR, 1:500 000)
841 Parrsboro Sheet No. 83, Cumberland and Kings counties, Nova Scotia (GSC, 1:63 360)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

Black Rock occurrence

CHALCEDONY (AGATE), JASPER, CALCITE, STILBITE, CHABAZITE,

HEULANDITE, ANALCIME, APOPHYLLITE

In basalt

Bluish-grey chalcedony (agate), brownish-yellow jasper, white calcite (fluoresces pink in ultraviolet light), and colourless massive quartz occur in fractures. The zeolite minerals occurring in cavities are stilbite, as white radiating aggregates; chabazite, as colourless to pearly white platy aggregates, white microscopic cube-like crystals, and pink vitreous patches; heulandite, as colourless to white platy aggregates; analcime, as colourless crystals; and apophyllite, as white tabular crystals. Polished specimens of jasper-agate were displayed in the Geological Survey of Canada cut and polished stones exhibit at the Paris International Exhibition held in 1900.

The occurrence is exposed in seacliffs forming the headland at Black Rock, Minas Basin, about 7 km southwest of Parrsboro. Lat. 45°22′12″N, Long. 64°24′16″W. *See* Map 23.

Road log from Highway 2 (Glooscap Trail) at **km 65.3** (*see* the Main Road Log on page 117):

km		
	0	Parrsboro, at Eastern Avenue (Highway 2) and Main Street; proceed south along Main Street.
	0.3	Parrsboro, at the Cenotaph; follow the road on right leading southwest toward Partridge Island.
	3.7	Junction, at a sharp curve; proceed west along West Bay Road.
	9.8	Junction; follow the road on right leading west.
	9.95	Junction; turn left (south).
	l0.5	End of the road at Black Rock headland. The Black Rock occurrence extends eastward from the headland to and around Cape Sharp, and includes Black Rock, a rock in Minas Basin about 800 m southwest of the headland. Collect at low tide.

Ref.: 397 p. 183.

Maps (T): 21 H/8 Parrsboro
(G): 82-7 Cobequid Highlands, Colchester, Cumberland & Pictou counties, Nova Scotia (NSDNR, 1:50 000)
85-1 Industrial mineral commodities map of the Province of Nova Scotia (NSDNR, 1:500 000)
841 Parrsboro Sheet No. 83, Cumberland and Kings counties, Nova Scotia (GSC, 1:63 360)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

Clarke Head occurrence

GYPSUM, CALCITE, DOLOMITE; EPIDOTE, TITANITE, CLINOAMPHIBOLE, ANALCIME, HEULANDITE, STILBITE, CHABAZITE, CALCITE CRYSTALS, QUARTZ CRYSTALS, HEMATITE, CHLORITE, PYRITE, PREHNITE

In sandstone and siltstone; in basalt

Gypsum occurs as colourless, white, and orange fibrous, platy, and sugary aggregates in red sandstone and in grey siltstone. White to pink cleavable massive calcite, yellowish-white sugary dolomite, and colourless to white massive quartz occur in siltstone. Cavities in basalt contain epidote, as small yellow-green prismatic crystals and granular aggregates; titanite, as small greenish-yellow tabular crystals; clinoamphibole, as colourless to green prismatic crystals; analcime, as colourless transparent crystals; heulandite, as light yellow crystals associated with white stilbite; chabazite, as cream-white to pink crystals associated with stilbite; calcite, as colourless to white rhombs; quartz, as tiny colourless transparent crystals; hematite, as black metallic platy crystals; chlorite, as green flaky aggregates; and pyrite, as tiny cubes. Fine specimens of prehnite have been collected from this locality. The basalt containing these minerals forms a sea stack adjacent to the seacliffs.



Plate 13.

Zeolite-bearing basalt stack, Clarke Head, 1976. (GSC 159230)

The occurrence is exposed in seacliffs along the south shore of Clarke Head peninsula from Glooscap Park to Clarke Head, Minas Basin, about 6 km southeast of Parrsboro. Lat. 45°22′46″N, Long. 64°14′43″W (basalt sea stack). *see* Map 23.

Road log from Highway 2 (Glooscap Trail) at **km 65.3** (*see* the Main Road Log on page 117):

km		
	0	Parrsboro, at Eastern Avenue (Highway 2) and Main Street; proceed south along Main Street.
	0.3	Parrsboro, at the Cenotaph; proceed east along the road to Two Islands.
	5.3	Glooscap Park on right. Proceed south about 500 m through Glooscap Park to the Minas Basin shore; from this point, walk east along the shore toward Clarke Head. The gypsum-bearing sandstone-siltstone shoreline exposure extends over about 800 m east of the park.

The basalt sea stack is on the southern shore of Clarke Head, about 2000 m east of Glooscap Park (300 m west of the southeastern tip of Clarke Head). Collect at low tide.

Refs.: 138 p. 100-101; 213 p. 77S; 335 p. 415-418; 353 p. 28, 43, 54.

Maps (T): 21 H/8 Parrsboro
(G): 82-7 Cobequid Highlands, Colchester, Cumberland & Pictou counties, Nova Scotia (NSDNR, 1:50 000)
85-1 Industrial mineral commodities map of the Province of Nova Scotia (NSDNR, 1:500 000)
841 Parrsboro Sheet No. 83, Cumberland and Kings counties, Nova Scotia (GSC, 1:63 360)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

Swan Creek occurrences

NATIVE COPPER, CUPRITE, YARROWITE, PARATACAMITE, CHRYSOCOLLA, MALACHITE, CALCITE CRYSTALS, ANALCIME, CHABAZITE, HEULANDITE, APOPHYLLITE, QUARTZ CRYSTALS, CHALCEDONY (AGATE), JASPER, CHLORITE, HEMATITE

In basalt

Native copper occurs as irregular, platy, wire-like, dendritic, and reniform fragments in brown basalt. Copper minerals associated with native copper are orange-red powdery cuprite; iridescent green to black, fine, flaky yarrowite; blue-green powdery paratacamite; bluish-green to green translucent chrysocolla; and malachite spheres up to 3 mm across. Cavities in basalt contain crystals of colourless to white calcite, colourless analcime, colourless to white chabazite, pink heulandite, colourless to white apophyllite, and colourless quartz. White-pink-and-grey banded chalcedony (agate), brownish red jasper, green flaky chlorite, black flaky specularite, and red earthy hematite occur in veins.

The occurrence is exposed at Swan Creek, about 6 km southeast of Parrsboro. Lat. 45°23′16″N, Long. 64°15′20″W (Swan Creek Falls); Lat. 45°23′09″N, Long. 64°15′06″W (Minas Basin shore). *See* Map 23.

Road log from Highway 2 (Glooscap Trail) at **km 65.3** (*see* the Main Road Log on page 117):

km		
	0	Parrsboro, at Eastern Avenue (Highway 2) and Main Street; proceed south along Main Street.
	0.3	Parrsboro, at the Cenotaph; proceed east along the road to Two Islands.
	6.65	Bridge over Swan Creek.
	6.7	Junction, trail leading south to the Minas Basin shore. To reach the native copper occurrence, proceed south along this trail; at the 200 m mark, turn right (west) and proceed 50 m to the copper occurrence at the Swan Creek falls. To reach the other occurrences, return to the 200 m mark on the trail and continue south 250 m to the Minas Basin shore. Native copper in brecciated basalt occurs at the point on the west side of the mouth of Swan Creek. The basalt containing the zeolite and

quartz minerals is exposed along the Minas Basin shore at the mouth of the creek. Flakes of native copper and hematite-carbonate veins occur in amygdaloidal basalt exposed along the Minas Basin shore 735 m northeast of the mouth of Swan Creek. Collect at low tide.

Refs.: 96 p. 85; 113 CC-257, CC-260; 150 p. 254-255; 353 p. 39.

Maps (T): 21 H/8 Parrsboro

(G): 82-7 Cobequid Highlands, Colchester, Cumberland & Pictou counties, Nova Scotia (NSDNR, 1:50 000)
85-1 Industrial mineral commodities map of the Province of Nova Scotia (NSDNR, 1:500 000)
841 Parrsboro Sheet No. 83, Cumberland and Kings counties, Nova Scotia (GSC, 1:63 360)
Metallogenic map of the province of Nova Scotia, 1983 (NSDNR, 1:500 000)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

Wasson Bluff occurrences

CHABAZITE, HEULANDITE, ANALCIME, STILBITE, NATROLITE, CALCITE CRYSTALS; QUARTZ CRYSTALS, EPIDOTE, CHALCEDONY (AGATE), JASPER, NATIVE COPPER; GYPSUM, FOSSILS

In basalt; in sandstone and conglomerate

Chabazite, heulandite, analcime, stilbite, natrolite, and calcite (dog-tooth spar) occur as crystals in cavities. Colourless to white quartz occurs as sugary, platy and porcellaneous masses, and as nodules in cavities and in veins. Small crystals of epidote and colourless to amethystine quartz occur in cavities in massive quartz. Grey to blue chalcedony (agate) and red jasper occur in fissures. These minerals, including flakes of native copper, occur in basalt. Native copper also occurs as malachite-coated nodules in sandstone. White to orange gypsum occurs in veins in conglomerate.

Jurassic fossil reptile bone and teeth fragments and dinosaur skeletons occur in sandstone and conglomerate associated with basalt. In 1990, the fossil occurrence, known as the Parrsboro Fossil Site, was designated by the Nova Scotia Legislative Assembly as a Protected Site; digging for fossils at this site is prohibited except with a Heritage Research Permit.

The occurrence is exposed along seacliffs at Wasson Bluff, Minas Basin, about 7 km southeast of Parrsboro. Lat. 45°23′39″N, Long. 64°13′51″W to Lat. 45°23′30″N, Long. 64°14′33″W. *See* Map 23.

Road log from Highway 2 (Glooscap Trail) at **km 65.3** (*see* the Main Road Log on page 117):

km		
	0	Parrsboro, at Eastern Avenue (Highway 2) and Main Street; proceed south along Main Street.
	0.3	Parrsboro, at the Cenotaph; proceed east along the road to Two Islands.

8.1 Two Islands, at a bridge over a brook known locally as Cow Creek. A trail on the east side of the brook leads to the Minas Basin shore providing access to the western end of the Wasson Bluff occurrence. The road log continues east along the Two Islands road to an alternate (recommended) access to the occurrence.

9.1 Junction, trail on right at a parking site; proceed south along this trail to the shore; this is the eastern end of the Wasson Bluff occurrence. Walk west along the shore to the mineral-bearing basalt seacliffs forming the Wasson Bluff headland on the west side of Wasson Brook; the basalt is exposed over a distance of 1 km toward the west ending at the fossil-bearing sedimentary rock seacliffs. These fossil-bearing seacliffs extend west over a distance of 500 m. The seacliffs from this point to the mouth of the brook (Cow Creek) expose the western end of the Wasson Bluff occurrence. Collect at low tide.

Refs.: 31 p. 70-71; 93; 113 CC-255, CC-260; 133 p. 129-133; 270 p. 129; 335 p. 416, 419-420; 341 p. 35-37; 353 p. 29, 33, 43, 53, 62-63; 367 p. 28L.

Maps (T): 21 H/8 Parrsboro
(G): 82-7 Cobequid Highlands, Colchester, Cumberland & Pictou counties, Nova Scotia (NSDNR, 1:50 000)
85-1 Industrial mineral commodities map of the Province of Nova Scotia (NSDNR, 1:500 000)
841 Parrsboro Sheet No. 83, Cumberland and Kings counties, Nova Scotia (GSC, 1:63 360)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

The Brothers (Two Islands) occurrences

GMELINITE, ANALCIME, CHABAZITE, HEULANDITE, NATROLITE,

APOPHYLLITE, SCOLECITE, CALCITE CRYSTALS, CHALCEDONY (AGATE)

In basalt

Crystals of gmelinite, analcime, chabazite, heulandite, natrolite, apophyllite, scolecite, and calcite occur in cavities. Grey to bluish grey chalcedony (agate) occurs in fractures. Ornamental objects fashioned from Two Islands agate were displayed in the Geological Survey of Canada cut and polished stones exhibit at the Paris International Exhibition held in 1900; the ornaments included buttons, match boxes, knives, paperweights, ink bottles, and a variety of cut stones.

The occurrences are exposed along the shore of The Brothers (Two Islands), Minas Basin, about 9 km southeast of Parrsboro. Lat. 45°23′18″N, Long. 64°13′03″W (north island); Lat. 45°22′57″N, Long. 64°12′44″W (south island). *See* Map 23.

Road log from Highway 2 (Glooscap Trail) at **km 65.3** (*see* the Main Road Log on page 117):

km 0 Parrsboro, at Eastern Avenue (Highway 2) and Main Street; proceed south along Main Street.

0.3 Parrsboro, at the Cenotaph; proceed east along the road to Two Islands.

9.5 Junction; turn right (south) onto a single lane road.

9.6 Lookout, Minas Basin shore. The larger of the two islands is 750 m southeast of the Lookout; the smaller island is 1500 m southeast of the Lookout. Recommended access is by boat. Collect at low tide.

Refs.: 31 p. 72-74; 150 p. 256-259; 270 p. 129; 353 p. 39, 49, 63, 67; 397 p. 182.

Maps (T): 21 H/8 Parrsboro
(G): 82-7 Cobequid Highlands, Colchester, Cumberland & Pictou counties, Nova Scotia (NSDNR, 1:50 000)
85-1 Industrial mineral commodities map of the Province of Nova Scotia (NSDNR, 1:500 000)
841 Parrsboro Sheet No. 83, Cumberland and Kings counties, Nova Scotia (GSC, 1:63 360)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)



Plate 14.

The Brothers (Two Islands), 1976. (GSC 159189)

McKay (McCoy) Head occurrence

ANALCIME, HEULANDITE, CHABAZITE, CHALCEDONY (AGATE), JASPER, SILICEOUS SINTER, CALCITE CRYSTALS, QUARTZ CRYSTALS

In basalt

Analcime, heulandite, and chabazite crystals occur in cavities commonly 5 to 7 cm wide. Bluish-white, blue, and white-pink-and-grey banded chalcedony (agate) and red to brownish-red to brown jasper occur in fractures. White to pink siliceous sinter is common and generally associated with jasper. Small crystals of colourless quartz and calcite occur in cavities in massive quartz; the calcite crystals fluoresce pink in 'short' ultraviolet light.

The occurrence is exposed along seacliffs at McKay (McCoy) Head, Minas Basin, about 10 km southeast of Parrsboro. Lat. 45°23′47″N, Long. 64°11′52″W. *See* Map 23.

Road log from Highway 2 (Glooscap Trail) at **km 65.3** (*see* the Main Road Log on page 117):

km		
	0	Parrsboro, at Eastern Avenue (Highway 2) and Main Street; proceed south along Main Street.
	0.3	Parrsboro, at the Cenotaph; proceed east along the road to Two Islands.
	9.5	Junction; turn right (south).
	9.6	Lookout, Minas Basin shore. Walk east 1800 m along the shore to the McKay (McCoy) Head occurrence.

For alternate access, the road log continues from km 9.5:

	9.5	Junction; proceed along the road leading east.
	10.7	Bridge over McCoy Brook. Walk south 300 m along the brook to the Minas Basin shore, and continue 500 m east along the shore to the McKay (McCoy) Head occurrence. For another access, continue along the road leading east from this bridge.
	10.95	Road crosses a creek. Walk south 200 m along the creek to the Minas Basin shore, and continue 300 m east along the shore to the McKay (McCoy) Head occurrence. Collect at low tide.

Refs.: 31 p. 69; 93; 270 p. 129; 353 p. 22.

Maps (T): 21 H/8 Parrsboro

(G): 82-7 Cobequid Highlands, Colchester, Cumberland & Pictou counties, Nova Scotia (NSDNR, 1:50 000)
85-1 Industrial mineral commodities map of the Province of Nova Scotia (NSDNR, 1:500 000)
841 Parrsboro Sheet No. 83, Cumberland and Kings counties, Nova Scotia (GSC, 1:63 360)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

Cape Blomidon-Cape Split occurrences

APOPHYLLITE, HEULANDITE, NATROLITE, STILBITE, CHABAZITE, ANALCIME, GMELINITE, LAUMONTITE, MESOLITE, THOMSONITE, LEVYNE, CELADONITE, AMETHYST, CHALCEDONY (AGATE, CARNELIAN), JASPER, MAGNETITE; GYPSUM

In basalt; in sandstone

The zeolite and quartz minerals occur in cavities measuring several centimetres across. The zeolite minerals are colourless to light green apophyllite, colourless to pink heulandite, colourless to white natrolite, colourless to white stilbite, white and pink chabazite, colourless analcime, colourless gmelinite, pink laumontite, white mesolite, pink thomsonite, and white levyne. Greyish green celadonite commonly occurs as a lining in the cavities. Amethyst, as violet transparent crystals, is generally associated with white chalcedony. Early French settlers sent amethyst crystals to France; one crystal divided in two was set in the crown of a king of France. Chalcedony occurs as bluish grey-and-white banded agate, commonly showing lacy patterns, and as orange-red carnelian. Jasper varies from orange-red to brownish red to yellowish brown, and may contain yellow, dark green, or blue specks. Polished slabs of agate and jasper and dessert knives with agate handles were displayed in the Geological Survey of Canada exhibit at the World's Columbian Exposition held in Chicago in 1893. Magnetite occurs in veins up to 15 cm wide; in the 1830s, a quantity of the iron ore (magnetite) was extracted and shipped to the United States. In the spring of 1834, an enormous rock slide from the top of a seacliff released large mineral blocks including an 85 kg agate-carnelian mass and 30 cm square blocks of amethyst crystals; the roar of the slide was heard on the opposite (north) shore of Minas Basin. This slide occurred about 12 km east of Cape Split. Gypsum occurs as colourless transparent selenite and as pink to orange fibrous masses in veins in brownish-red sandstone on the eastern shore of Cape Blomidon (*see* Cape Blomidon occurrence on page 242).

The zeolite and quartz minerals occur in the Minas Basin seacliffs between Cape Blomidon and Cape Split, a distance of about 14 km. Well-known localities include: Cape Split Lat. 45°20′00″N, Long. 64°29′40″W; Long Beach Lat. 45°19′38″N, Long. 64°27′28″W; Captain Kidd Cove Lat. 45°19′25″N, Long. 64°25′42″W; Amethyst Cove Lat. 45°19′15″N, Long. 64°23′49″W; Small Slide Lat. 45°19′08″N, Long. 64°23′04″W; and Big Slide Lat. 45°18′06″N, Long. 64°20′34″W. *See* Map 25, Map 41.

Access to the Cape Blomidon-Cape Split shoreline is by boat from Parrsboro, a distance of about 14 km. An alternate access is from Scots Bay: a partly overgrown 1200 m trail leads from the end of Highway 358 (Scots Bay road) to the top of the basalt seacliffs on the Minas Basin shore; the descent down the 100 m high cliffs at the end of the trail is hazardous and the use of ropes is advisable. Collect at low tide.

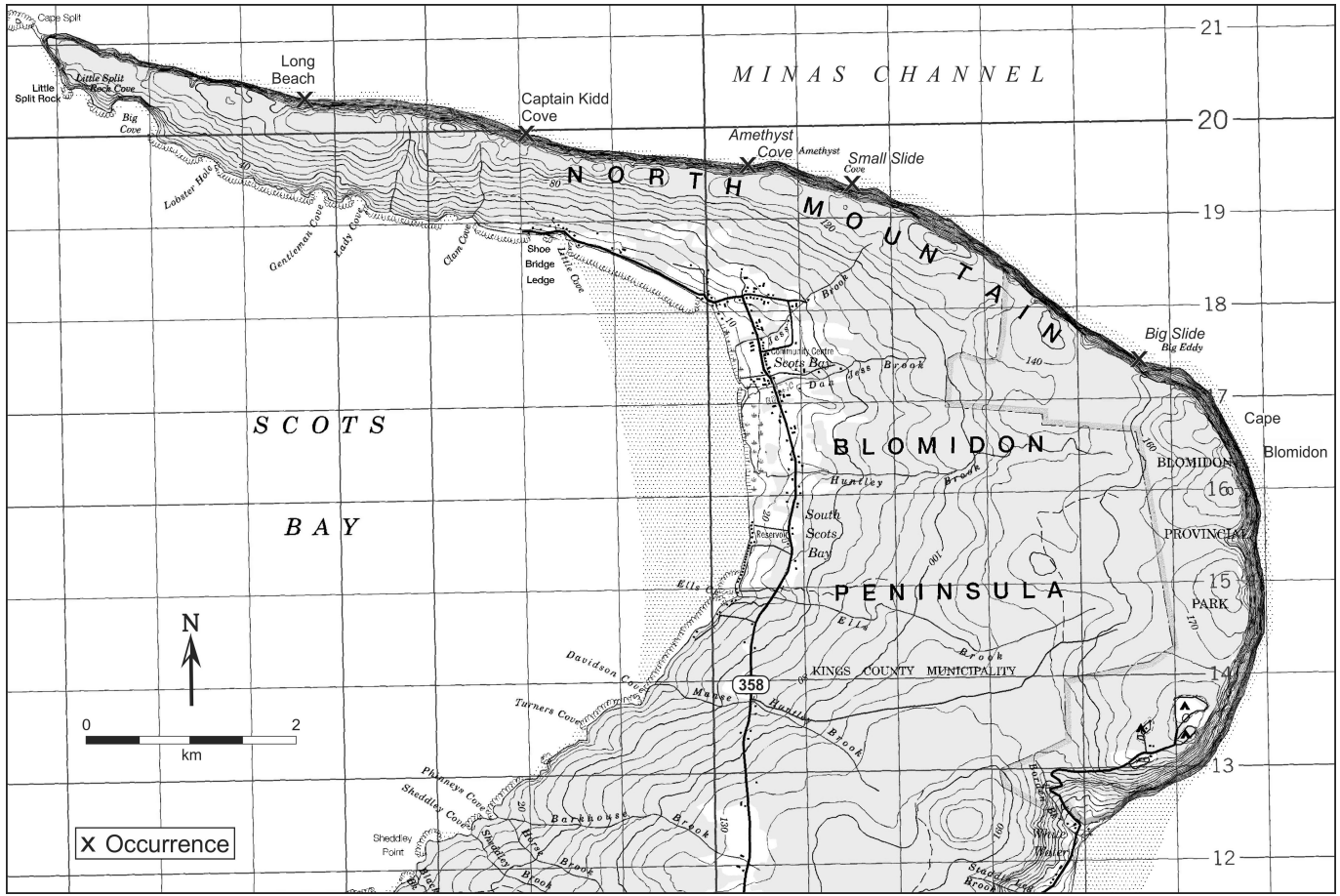
Refs.: 31 p. 54-59; 150 p. 210-224; 154 p. 117; 200 p. 328-330; 201 p. 34-39; 213 p. 70S; 232 p. 216; 270 p. 132; 353 p. 28, 33, 39, 43, 48, 49, 53, 57, 62, 63, 72; 396 p. 171.

Maps (T): 21 H/8 Parrsboro

(G): 85-1 Industrial mineral commodities map of the Province of Nova Scotia (NSDNR, 1:500 000)

841 Parrsboro Sheet No. 83, Cumberland and Kings counties, Nova Scotia (GSC, 1:63 360)

Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)



x Cape Blomidon-Cape Split occurrences

Map 25. Cape Blomidon



Plate 15.

Collecting amethyst, agate, and zeolites, Cape Blomidon, 1964. (GSC 202506)

North River (North River of Five Islands) occurrences

MARBLE, FOSSILS

In shale

The marble consists of white crystalline limestone containing blotches of yellow-green serpentine and pink calcite; the rock is attractively patterned and suitable for ornamental purposes. It is of Precambrian age. Pelecypod fossils (*Naiadites)* occur in carbonaceous shale interbedded with sandstone. Plant fossils (*Cordaites*, ferns, and other plants) occur in fissile shale commonly breaking in knife-shaped pieces. The fossils are of Mississippian-Pennsylvanian age.



Plate 16.

Basalt seacliffs, Cape Split, 1963. (GSC 138648)

The marble occurs at three localities along North River: in outcrops at the top of the 22 m falls, 2500 m due north of the Highway 2 bridge over North River; and in two exposures in the bed of the North River, 300 m and 450 m, respectively north of the falls. The pelecypod fossil occurrence is just above a dam (old saw mill site) about 750 m north of the Highway 2 bridge, and the plant fossil occurrence is about 700 m further north.

The occurrences are about 18 km east of Parrsboro and 750 m to 3 km north of Lower Five Islands. Lat. 45°26′03″N, Long. 64°04′54″W (marble outcrop at the falls); Lat. 45°26′13″N, Long. 64°04′53″W (marble outcrop 300 m north of the falls); Lat. 45°26′16″N, Long. 64°04′57″W (marble outcrop 450 m north of the falls); Lat. 45°25′05″N, Long. 64°04′51″W (pelecypod fossil occurrence); Lat. 45°25′24″N, Long. 64°04′58″W (plant fossil occurrence). *See* Map 26.

Access to the North River (North River of Five Islands) occurrences begins at the junction of a trail 150 m east of the Highway 2 (Glooscap Trail) bridge over North River at **km 86.2** (*see* the Main Road Log on page 117). To reach the pelecypod fossil occurrence, proceed north along the trail for 750 m from Highway 2 to the dam where the occurrence is exposed;

to reach the plant fossil occurrence, continue north along the river for 700 m from the dam to the exposure. To reach the marble outcrops from Highway 2 (Glooscap Trail), proceed north 2500 m along the river to the outcrops at the top of the falls, continuing north to the exposures in the bed of the river 300 m and 450 m respectively from the falls.

Refs.: 92 p. 97; 104 p. 59E; 138 p. 160P; 285 p. 190.

Maps (T): 21 H/8 Parrsboro
(G): 82-7 Cobequid Highlands, Colchester, Cumberland & Pictou counties, Nova Scotia (NSDNR, 1:50 000)
85-1 Industrial mineral commodities map of the Province Nova Scotia (NSDNR, 1:500 000)
838 Five Islands and Tennycape Sheet No. 75, Colchester and Hants counties, Nova Scotia (GSC, 1:63 360)
839 Economy River Sheet No. 76, Cumberland and Colchester counties, Nova Scotia (GSC, 1:63 360)
Nova Scotia geology map (Atlantic Geoscience Society, 1:640 000)

Lower Five Islands occurrence

HEMATITE

In hornfels

The specularite variety of hematite occurs in veins up to 3 mm wide in hornfels at the contact of granite. The hematite-bearing rock is exposed in two pits just east of North River.

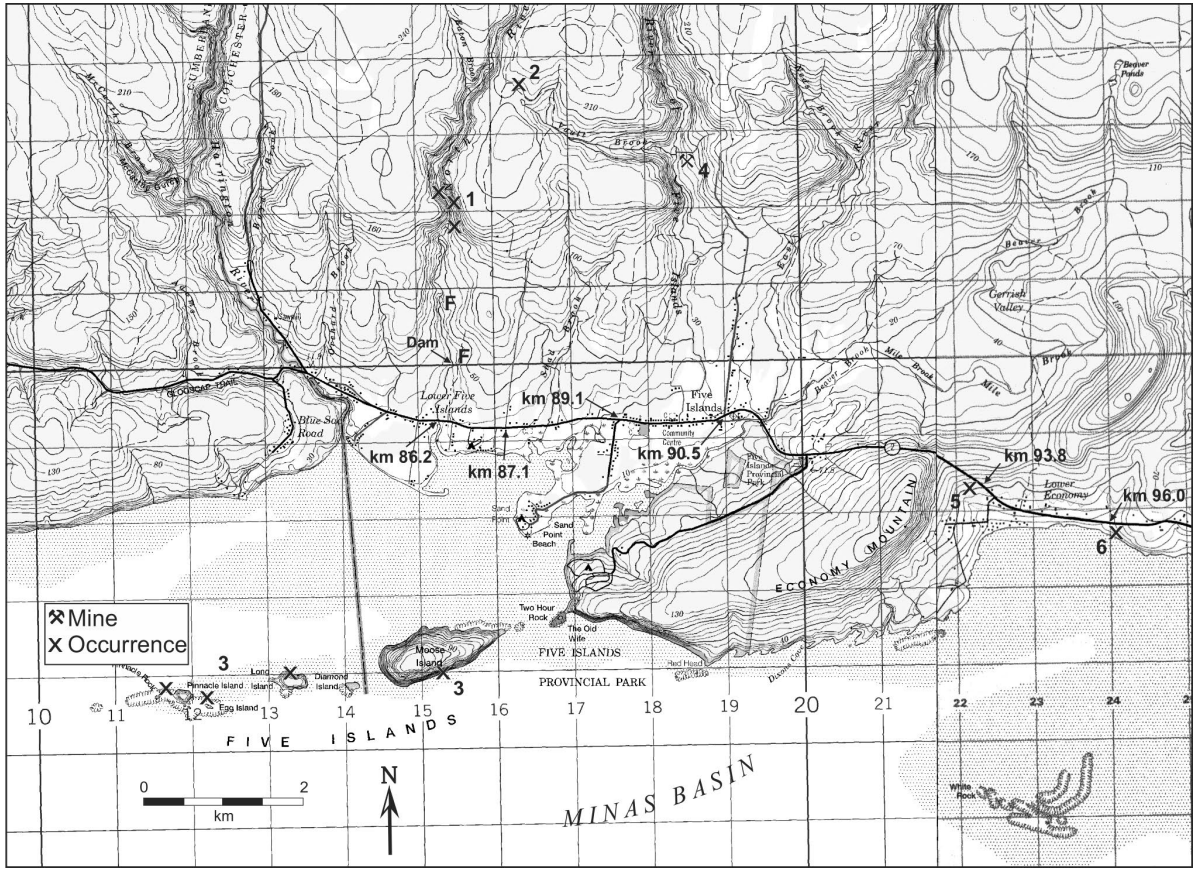
The occurrence is about 5 km north of Lower Five Islands. Lat. 45°27′04″N, Long. 64°04′14″W. *See* Map 26.

Road log from Highway 2 (Glooscap Trail) at **km 87.1** (*see* the Main Road Log on page 117):

km		
	0	Lower Five Islands, junction of Highway 2 and Little York Road; proceed north along Little York Road.
	2.2	Junction; proceed onto the road on left leading west.
	5.1	Lower Five Islands occurrence on right (small pit).
	5.2	Junction; proceed onto the road on right leading east.
	5.35	Lower Five Islands occurrence (large pit).

Refs.: 113 CC-237; 366 p. 61; 374 p. 34-35.

Maps (T): 21 H/8 Parrsboro
(G): 39A Nova Scotia Sheet (GSC, 1:506 880)
82-7 Cobequid Highlands, Colchester, Cumberland & Pictou counties, Nova Scotia (NSDNR, 1:50 000)
839 Economy River Sheet No. 76, Cumberland and Colchester counties, Nova Scotia (GSC, 1:63 360)
Metallogenic map of the province of Nova Scotia, 1983 (NSDNR, 1:500 000)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)



1. North River (North River of Five Islands) occurrences 2. Lower Five Islands occurrence 3. Five Islands occurrences 4. Eureka (Bass River, Duncan) mine 5. Economy (Gerrish) Mountain occurrence 6. Lower Economy occurrence F Fossil occurrences

Map 26. Five Islands

Five Islands occurrences

ANALCIME, CHABAZITE, NATROLITE, STILBITE, HEULANDITE, THOMSONITE, GMELINITE, APOPHYLLITE, CHALCEDONY (AGATE), JASPER, AMETHYST, CHALCOPYRITE, CHALCOCITE, DIGENITE, ROXBYITE, SPIONKOPITE, BOTALLACKITE, ATACAMITE, MALACHITE, MAGNETITE, HEMATITE, GOETHITE, BIRNESSITE

In basalt

The zeolite minerals, analcime, chabazite, natrolite, stilbite, heulandite, thomsonite, gmelinite, and apophyllite occur as crystals and crystal aggregates in cavities. Greyish-blue to bluish-violet and light blue chalcedony (agate) commonly patterned with white and brownish red, red jasper, and colourless and amethystine quartz occur in cavities and in veins. Copper sulphide minerals occur in chalcedony and in quartz; these minerals include chalcopyrite, chalcocite, digenite, roxbyite, and iridescent green flaky spionkopite. Secondary copper minerals forming encrustations and patches on quartz and on chalcedony include bluish-green botallackite, green atacamite, and green malachite. Magnetite, hematite, goethite, and birnessite occur as irregular coatings on quartz.

These minerals occur in basalt seacliffs exposed along the shoreline of the Five Islands chain, Minas Basin, notably Moose Island and Pinnacle Island and, less commonly, the adjoining islands.

The Five Islands chain begins 5 km southwest of Five Islands village and extends westward 5 km. Lat. 45°23′07″N, Long. 64°05′23″W (Moose Island); Lat. 45°22′54″N, Long. 64°06′25″W (Long Island); Lat. 45°22′47″N, Long. 64°07′31″W (Pinnacle Island). *See* Map 26.

Road log from Highway 2 (Glooscap Trail) at **km 89.1** (*see* the Main Road Log on page 117):

km		
	0	Five Islands, junction of Highway 2 and the road to Sand Point; proceed south toward Sand Point.
	2.3	End of the road at Sand Point. Access to Moose Island and the adjacent islands is by boat. The distance to Moose Island is about 1500 m. Collect at low tide.

Refs.: 31 p. 68-69; 270 p. 128; 353 p. 28, 33, 48, 49, 62, 63.

Maps (T): 21 H/8 Parrsboro

(G): 82-7 Cobequid Highlands, Colchester, Cumberland & Pictou counties, Nova Scotia (NSDNR, 1:50 000)
85-1 Industrial mineral commodities map of the Province of Nova Scotia (NSDNR, 1:500 000)
838 Five Islands and Tennycape Sheet No. 75, Colchester and Hants counties, Nova Scotia (GSC, 1:63 360)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

Eureka (Bass River, Duncan) mine

BARITE, FLUORITE, CHALCOPYRITE, PYRITE, HEMATITE, CALCITE CRYSTALS, DOLOMITE CRYSTALS

In siltstone, sandstone, and argillite

Barite occurs as colourless, white, pink, and reddish tabular to blocky crystal aggregates associated with colourless, amber to violet fluorite crystal aggregates in fractures in brecciated zones. Chalcopyrite, pyrite, hematite (specularite), and coarsely crystalline calcite occur in thin veins. During mining operations, splendid crystals of calcite, dolomite, and barite associated with chalcopyrite and specular hematite were recovered; individual barite crystals measured up to 1 cm thick and several cm long. Specimens of barite and chalcopyrite were displayed in the Geological Survey of Canada economic minerals exhibit at the Philadelphia International Exhibition held in 1876, the Colonial and Indian Exhibition held in London in 1886, and the Paris International Exhibition held in 1900. A specimen consisting of a large mass of barite crystals weighing 68 kg provided by the Colchester Baryta Company was displayed at the Paris International Exposition in 1867.

The barite deposit was known as early as 1849. In the early 1860s, Colchester Baryta Company mined the deposit and exported about 450 t of barite to the United States. In 1866 and 1876, Mr. Sewell of Bath, Maine mined about 2700 t of barite. The crude barite was shipped to the United States, and to the Dolphin Manufacturing Company paint works in St. Catharines, Ontario; a small quantity was used locally for the manufacture of paints. Further work was sporadic until 1907 and 1908 when renewed exploration resulted in locating a new vein 15 m south of the main adit. About 272 t of barite were removed from this vein. The workings consist of the main adit driven about 100 m into the steep west bank of the Bass River of Five Islands 2 m above the river bed, and a shorter adit 7 m above the river bed. In the early days, some adits were driven into the east bank of the river. Recent investigations of the deposit consisted of geological surveys by Maritime Exploration Limited in 1945, and magnetic and geochemical surveys and drilling by Triton Exploration Limited in 1970.

The mine is on the west side of the Bass River of Five Islands, about 150 m southwest of the mouth of Vault Brook and 3.5 km north of Five Islands village. Lat. 45°26′30″N, Long. 64°02′40″W. *See* Map 26.

Road log from Highway 2 (Glooscap Trail) at **km 90.5** (*see* the Main Road Log on page 117):

km		
	0	Five Islands, junction of Highway 2 and a road leading north; proceed north along this road.
	3.15	Junction, trail at a clearing; proceed west along the trail.
	3.35	Trail bends to the north; trenches and a dump are located between the bend in the trail and the river. Continue north along the trail.
	4.0	End of the trail. The Eureka (Bass River, Duncan) mine is on the west bank of the river, opposite this point. Barite-bearing veins are exposed along the east bank of the river about 90 m north of this point.

Refs.: 92 p. 106; 113 CC-229; 132 p. 123-132; 138 p. 192P; 193 p. 160; 246 p. 206, 207; 331 p. 30-33; 358 p. 801-806; 367 p. 23L; 393 p. 77; 395 p. 105; 397 p. 163.

Maps (T): 21 H/8 Parrsboro
(G): 39A Nova Scotia Sheet (GSC, 1:506 880)

82-7 Cobequid Highlands, Colchester, Cumberland & Pictou counties, Nova Scotia (NSDNR, 1:50 000)
85-1 Industrial mineral commodities map of the Province of Nova Scotia (NSDNR, 1:500 000)
838 Five Islands and Tennycape Sheet No. 75, Colchester and Hants counties, Nova Scotia (GSC, 1:63 360)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

Economy (Gerrish) Mountain occurrence

MAGNETITE, CHALCEDONY (AGATE), QUARTZ CRYSTALS

In basalt

Massive magnetite occurs in quartz veins up to 35 cm wide occupying a zone 1 to 3 m wide. White to bluish-grey banded chalcedony (agate) and quartz crystals, including amethystine quartz, occur in cavities.

Prospecting for iron ore on Gerrish Mountain (now known as Economy Mountain) began in 1883. In 1904, two shallow shafts were sunk on the deposit on the east slope of the mountain. In 1906, some magnetite ore was shipped to the blast furnace in Londonderry. Investigation in 1960 consisted of drilling and a magnetometer survey.

The occurrence is on the east side of a wooded ridge about 3 km east of Five Islands village. Lat. 45°24′18″N, Long. 63°59′47″W. *See* Map 26.

Access to the Economy (Gerrish) Mountain occurrence is by walking along a 75 m path leading southwest from Highway 2 (Glooscap Trail) at **km 93.8** (*see* the Main Road Log on page 117); the path is opposite the junction of a single-lane road leading north.

Refs.: 92 p. 107; 113 CC-217; 138 p. 175P; 258 p. 85; 334 p. 28-29; 366 p. 61-62; 372 p. 130; 374 p. 35-36.

Maps (T): 11 E/5 Bass River
(G): 82-8 Cobequid Highlands, Colchester, Cumberland & Pictou counties, Nova Scotia (NSDNR, 1:50 000)
838 Five Islands and Tennycape Sheet No. 75, Colchester and Hants counties, Nova Scotia (GSC, 1:63 360)
867A Bass River, Colchester and Hants counties, Nova Scotia (GSC, 1:63 360)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

Lower Economy occurrence

PYROLUSITE, MANGANITE

In shale and sandstone

Pyrolusite occurs as aggregates of small crystals in veins. Manganite occurs as thin veinlets and films.

In 1891, several barrels of pyrolusite were removed from several pits. The pits have been destroyed by erosion, but manganese-bearing rocks may be seen in the beach along the shoreline seacliffs.

The occurrence is on the north shore of Minas Basin, just east of the mouth of a small brook at Lower Economy. Lat. 45°23′56″N, Long. 63°58′22″W. *See* Map 26.

Access to the Lower Economy occurrence is by walking south 200 m from Highway 2 (Glooscap Trail) at **km 96.0** (*see* the Main Road Log on page 117).

Refs.: 113 CC-215; 139 p. 61A; 182 p. 66; 198 p. 157S; 329 p. 125; 366 p. 77.

Maps (T): 11 E/5 Bass River
(G): 82-8 Cobequid Highlands, Colchester, Cumberland & Pictou counties, Nova Scotia (NSDNR, 1:50 000)
838 Five Islands and Tennycape Sheet No. 75, Colchester and Hants counties, Nova Scotia (GSC, 1:63 360)
867A Bass River, Colchester and Hants counties, Nova Scotia (GSC, 1:63 360)
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Bass River mine

BARITE

In conglomerate, siltstone, and arenite

Barite occurs as white to pink granular and bladed aggregates and tiny tabular crystals in cavities in massive barite, and as nodular concretions up to 10 cm across in the host rocks.

In 1952 and 1953, Gordon Minerals Limited discovered barite in an outcrop at the top of the steep west embankment of a tributary of Bass River and found barite-bearing boulders in talus along the slope to the stream bed. Further investigation involved trenching by Magnet Cove Barium Corporation Limited in 1957, and by the Milmor Syndicate in 1971. In 1979, I.M.C. Drilling Mud Inc. discovered another barite showing about 400 m southwest of the original discovery. In 1981, Atlantic Barite Company Limited investigated the deposit. From 1983 to 1985, Magcobar Division, Dresser Canada Inc. operated an open pit mine and produced 4216 t of barite for shipment to a processing mill in Walton.

The mine is about 9 km north of Bass River. Lat. 45°27′32″N, Long. 63°46′30″W. *See* Map 27.

Road log from Highway 2 (Glooscap Trail) at **km 112.8** (*see* the Main Road Log on page 117):

km		
	0	Bass River, junction of Highway 2 and a road leading north; proceed along the road leading north.
	2.8	Hoegs Corner, junction; turn right (east).
	3.1	Hoegs Corner, junction; turn left (north) onto Miller Brook road.
	5.4	Junction; turn left onto a road leading north.
	8.1	Junction; follow the road on left leading south.
	9.1	Bass River mine original trenches in a clearing near the top of a steep embankment on the west side of a tributary of Bass River; continue along the road leading southwest.

9.5 Bass River mine open pit.

Refs.: 113 CC-209; 132 p. 112-122; 145 p. 4; 273 p. 97; 274 p. 115, 120.

Maps (T): 11 E/5 Bass River
(G): 82-8 Cobequid Highlands, Colchester, Cumberland & Pictou counties, Nova Scotia (NSDNR, 1:50 000)
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Londonderry (Acadia) mines

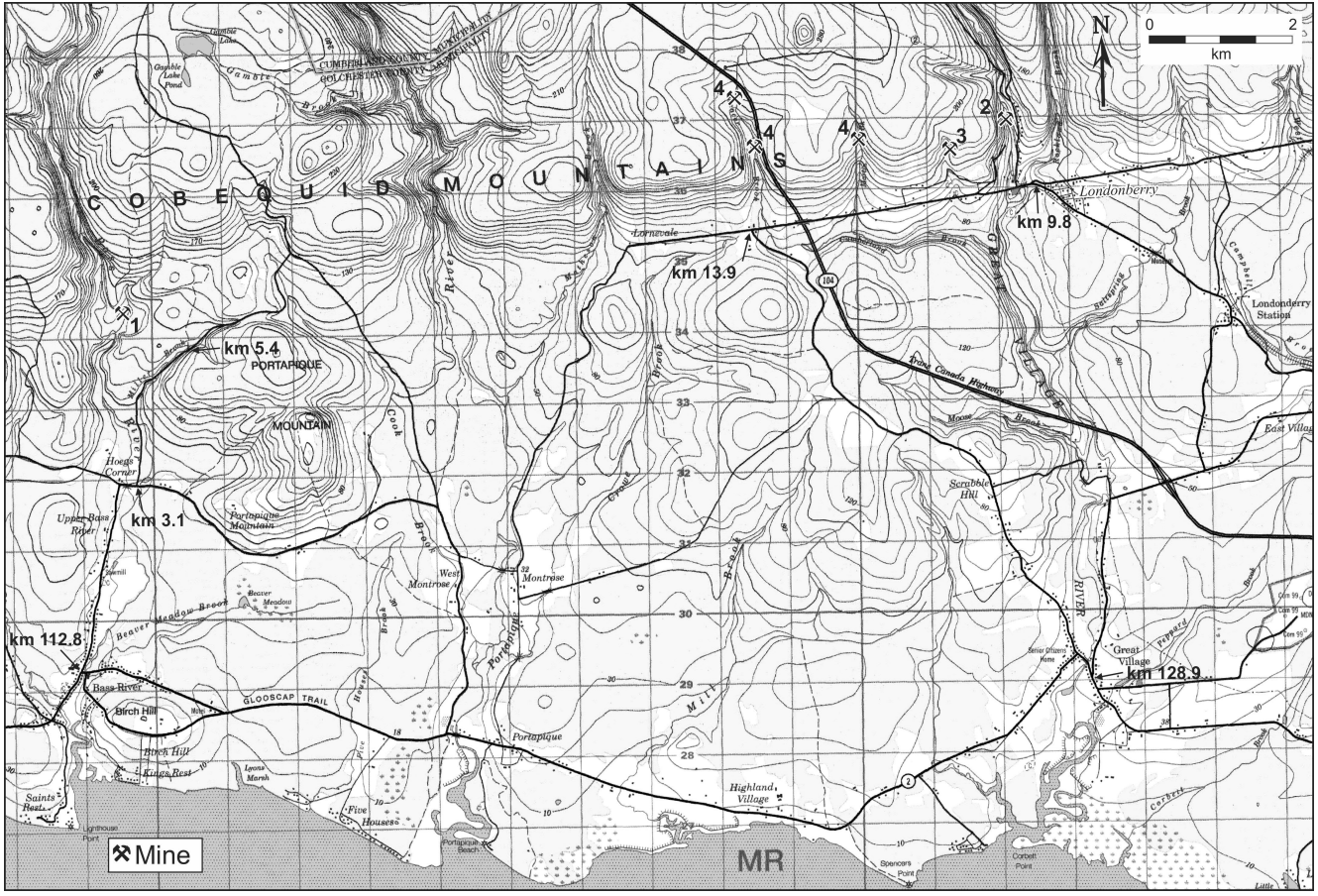
GOETHITE, HEMATITE, ANKERITE, SIDERITE, BARITE

In siltstone and greywacke

The iron ore consists of irregular masses of yellow-brown earthy goethite, red earthy hematite, specular hematite, ankerite, and siderite. Coarse, white crystal masses of barite intergrown with light yellow to brown ankerite, and massive barite associated with hematite and goethite are found in the mine dumps in Londonderry. Iron ore specimens including red hematite, brown hematite (limonite), and specular hematite were displayed in the Geological Survey of Canada economic minerals exhibit at the Philadelphia International Exhibition held in 1876 and at the Colonial and Indian Exhibition held in London in 1886; also exhibited were various iron ore smelting products including: pig iron (the first product of smelting); cast iron chains, bars, cylinders, rings, and horse-shoes; puddled iron (wrought iron) balls and bars; and steel axles and springs. Mr. E.A. Jones, manager of Acadia Iron Works, assembled a display consisting of specimens of iron ore and various smelting products for international exhibitions held in London (1851 and 1862) and Paris (1867); at the Grand Industrial Exhibition held in London in 1851, the company was awarded a gold medal for a display of steel cutlery.

The Londonderry (Acadia) mines consist of the Old Mountain mine, Cook Brook mine, and West mines in an area extending west about 3500 m from Great Village River. These mines are in the western end of a 20 kilometre iron-bearing belt extending along the southern slopes of the Cobequid Mountains from Matheson Brook to Totten Brook. The Londonderry East mines are in the eastern part of the belt.

Acadia Iron Works began mining in the Londonderry district in 1849 and produced the first iron in 1850 using a Catalan forge on the western bank of Great Village River. The first mine opened was the Old Mountain mine, followed a few years later by the Cook Brook mine and the West mines. From 1852 to 1874, Acadia Charcoal Iron Works operated a charcoal blast furnace producing pig iron. In 1865, the work force reached a daily average of 250 men and boys and 25 horses. In 1874, Steel Company of Canada Limited bought the property, mined the West mines section, and put into operation its newly invented open-hearth process for the commercial production of steel from molten iron; the company continued operations until 1899. Londonderry Iron and Mining Company Limited operated the mines and furnaces from 1904 to 1908 when mining ended. Total production from the Londonderry district amounted to over two million tonnes of iron ore. Railways connected the Londonderry mines to Londonderry station.



1. Bass River mine Londonderry (Acadia) mines: 2. Old Mountain mine 3. Cook Brook mine
4. West mines

Map 27. Londonderry

Most of the mining was done from adits driven into brook valleys and into hillsides. The westernmost and most extensive development was at West mines, on Cumberland Brook (now Spencer Brook) extending east 1400 m to Martin Brook. The workings consist of numerous pits and three adits driven into both the east and west banks of Cumberland (Spencer) Brook, and four into the west bank of Martin Brook. One adit, 1311 m long, was driven through the ridge with portals in the valley of each brook. Four shafts were sunk to the various adit levels. The mine was equipped with boilers, pumps, compressors, air-drills, hoisting engines, a blacksmith shop, and several other buildings connected by telephone to the general office. The Cook Brook mine consisted of three adits on the west side of Cook Brook and four on the east side; the longest was driven 244 m. The Old Mountain mine workings extended west 550 m from the west bank of Great Village River; they consist of six adits up to 396 m long, and several open pits worked for ankerite for use as flux in the furnaces. A narrow gauge railway connected the mines to the steel works at Acadia Mines (now Londonderry). The underground workings have caved and are inaccessible.

The mines are 7 to 8 km northwest of Great Village. Lat. 45°29′01″N, Long. 63°36′48″W (Old Mountain mine); Lat. 45°28′56″N, Long. 63°37′29″W (Cook Brook mine); Lat. 45°28′52″N, Long, 63°38′24″W (West mines, Martin Brook workings); Lat. 45°28′50″N, Long. 63°39′31″W and Lat. 45°29′11″N, Long. 63°39′47″W (West mines, Cumberland Brook workings). *See* Map 27.

Road log from Highway 2 (Glooscap Trail) at **km 128.9** (*see* the Main Road Log on page 117):

km		
	0	Great Village, junction of Highway 2 and the road to Londonderry; proceed north to Londonderry Station and Londonderry.
	9.8	Londonderry, junction of the road to Lornevale. There are some old Londonderry (Acadia) mine dumps north of the road at this junction. Pink barite and ankerite occur in a sandstone-conglomerate outcrop on



Plate 17.

Londonderry mines slag heaps, 1941. (GSC 89050)

the west bank of Rockland Brook, immediately west of the dumps and west of the junction at km 9.8. To reach the old iron mines, turn left (west) onto the road to Lornevale.

10.6 Junction, road leading northeast. To reach the Old Mountain mine, turn right onto the road leading northeast and proceed 1.2 km to the end of the road; continue north along a trail for about 300 m to the Old Mountain mine workings on the west bank of Great Village River extending west over a distance of about 550 m. The road log continues west along the road to Lornevale.

11.6 Junction, road leading north. To reach the Cook Brook mine, turn right onto the road leading north and proceed 1.1 km to Cook Brook; the Cook Brook mine is about 500 m north of this point. The adits are on both sides of the brook and extend north over a distance of about 250 m. The road log continues west along the road to Lornevale.

12.4 Junction, road leading north along the west side of Martin Brook. To reach the West mines Martin Brook workings, proceed north along this road to the workings about 700 m north of this junction. The road log continues west along the road to Lornevale.

13.9 Junction, Cumberland Road. To reach the West mines Cumberland Brook workings, proceed north along this road for 750 m to the end of the road at the falls on Spencer Brook; proceed north along an old road for 375 m to two adits driven into the east bank of Spencer Brook, and continue along the road for about 750 m to the West mines Cumberland Brook workings on a hill just northwest of a fork in the brook.

Refs.: 113 CC-162, CC-180, CC-186, CC-187, CC-189, CC-192; 132 p. 144-147; 143 p. 300A-301A; 173 p. 28-31; 193 p. 84-93; 218 p. 169-174; 364 p. 6-9; 366 p. 37-42; 372 p. 153-161; 374 p. 19-21, 26-29; 393 p. 20; 395 p. 34.

Maps (T): 11 E/5 Bass River
(G): 39A Nova Scotia Sheet (GSC, 1:506 880)
82-8 Cobequid Highlands, Colchester, Cumberland & Pictou counties, Nova Scotia (NSDNR, 1:50 000)
836 Londonderry Sheet No. 63, Cumberland and Colchester counties, Nova Scotia (GSC, 1:63 360)
874A Londonderry, Colchester and Hants counties, Nova Scotia (GSC, 1:63 360)
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Folly Lake quarry

GARNET

In quartzite and schist

Garnet occurs in biotite-quartzite and in mica schist. Diabase dykes cut the quartzite.

The quarry is operated by Permanent Concrete Limited which produces crushed stone from the quarry, and sand and gravel from an adjoining gravel pit.

The quarry is 17 km north of Glenholme. Lat. 45°31′23″N, Long. 63°32′18″W. *See* Map 28.

Road log from Highway 2 (Glooscap Trail) at **km 135.2** (*see* the Main Road Log on page 117):

km		
	0	Glenholme, junction of highways 2 and 4; proceed north along Highway 4.
	14.5	Junction; turn right (east).
	14.7	Junction; turn right onto the quarry road.
	15.2	Folly Lake quarry.

Refs.: 92 p. 104; 93 p. 21.

Maps (T): 11 E/12 Oxford
(G): 82-8 Cobequid Highlands, Colchester, Cumberland & Pictou counties, Nova cotia (NSDNR, 1:50 000)
85-1 Industrial mineral commodities map of the Province of Nova Scotia (NSDNR, 1:500 000)
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Londonderry East mines

GOETHITE, HEMATITE, ANKERITE, SIDERITE, BARITE

In siltstone and greywacke

The ore consists of irregular masses of yellow-brown earthy goethite, red earthy hematite, specular hematite, and siderite in massive ankerite.

The deposit is at the eastern end of the Londonderry iron-bearing belt. The Londonderry East mines consist of an east-west linear series of underground and surface workings extending over nearly 1700 m. The Gory Brook workings at the western end occupy the area from Slack Brook to Gory Brook (about 885 m apart), and consist of adits and several large open pits, the largest 160 by 30 m. The Weatherbe workings at the eastern end of the iron-bearing belt are about 800 m east of the Gory Brook workings; they consist of one long adit and several shorter adits driven into the side of Weatherby (formerly Weatherbe) Brook and numerous open cuts, the largest 70 by 25 m and 15 m deep. One of the open cuts at the eastern end of the workings was worked for ankerite for use as flux in the steel works at Acadia Mines (now Londonderry).

The East mines came into operation shortly after mining began in the Londonderry (Acadia) mines and continued until 1908. Ore was transported along a narrow gauge railway connecting the Weatherbe and Gory Brook workings to a full-gauge railway from East Mines station to Acadia Mines (now Londonderry) for processing. In 1964, Noranda Exploration Company Limited conducted geochemical surveys and drilling.

The mines are 12 km northwest of Masstown. Lat. 45°29′33″N, Long. 63°29′50″W (Weatherbe workings); Lat. 45°29′27″N, Long. 63°30′45″W and Lat. 45°29′27″N, Long. 63°30′58″W (Gory Brook workings). *See* Map 28.

Road log from Highway 2 (Glooscap Trail) at **km 139.4** (*see* the Main Road Log on page 117):



1. Folly Lake quarry Londonderry East mines: 2. Weatherbe Brook workings 3. Gory Brook workings 4. Frog Lake quarries

Map 28. Londonderry east

km 0 Masstown, junction of Highway 2 and the road to Debert; proceed north to Debert.

6.1 Debert, junction; turn left (west).

6.2 Debert, junction; turn right (north).

11.7 Junction, just east of the bridge over Pine Brook; turn left (west).

13.2 Junction, mine road leading north immediately west of the crossing over Weatherby Brook. To reach the Weatherbe Brook workings, turn right (north) onto the mine road and proceed 550 m to a sharp bend to the east in the road; the workings are about 50 m north of this bend. The road log continues west from the junction at km 13.2.

13.7 Junction, mine road leading north. To reach the Gory Brook workings, turn right (north) onto the mine road and proceed 600 m; the Gory Brook workings are 150 m and 400 m west of this point.

Refs.: 92 p. 88, 89; 113 CC-156, CC-161, CC-162; 143 p. 300A-301A; 173 p. 28-31; 218 p. 171-172; 317 p. 19-27; 336 p. 92; 364 p. 8-9; 366 p. 41-42; 373 p. 22-24.

Maps (T): 11 E/5 Bass River
11 E/6 Truro
(G): 39A Nova Scotia Sheet (GSC, 1:506 880)
82-8 Cobequid Highlands, Colchester, Cumberland & Pictou counties, Nova Scotia (NSDNR, 1:50 000)
82-9 Cobequid Highlands, Colchester, Cumberland & Pictou counties, Nova Scotia (NSDNR, 1:50 000)
836 Londonderry Sheet No. 63, Cumberland and Colchester counties, Nova Scotia (GSC, 1:63 360)
874A Londonderry, Colchester and Hants counties, Nova Scotia (GSC, 1:63 360)
1058A Truro, Colchester, Hants and Pictou counties, Nova Scotia (GSC, 1:63 360)
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Frog Lake quarries

DIORITE

Diorite is fine grained grading to a coarse pegmatitic phase. It is associated with quartzite and gabbro. The rock is exposed in three quarries south of Frog Lake.

The quarries are about 19 km north of Belmont. Lat. 45°30′15″N, Long. 63°23′30″W. *See* Map 28.

Road log from Highway 2 (Glooscap Trail) at **km 145.5** (*see* the Main Road Log on page 117):

km 0 Lower Onslow, junction of Highway 2 and the road to Belmont; proceed north to Belmont.

5.6 Belmont, junction; continue straight ahead (north).

	9.1	Staples Brook, at a bend in the main road; proceed straight ahead (north).
	15.5	Junction; turn left (west).
	16.2	Frog Lake quarries.

Ref.: 93 p. 18-19.

Maps (T): 11 E/11 Tatamagouche
(G): 82-9 Cobequid Highlands, Colchester, Cumberland & Pictou counties, Nova Scotia (NSDNR, 1:50 000)
85-1 Industrial mineral commodities map of the Province of Nova Scotia (NSDNR, 1:500 000)
637 Earltown Sheet No. 58, Colchester County, Nova Scotia (GSC, 1:63 360)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

East Mountain quarry

CALCITE CRYSTALS, FOSSILS

In limestone

Small crystals of white calcite (dogtooth spar) occur in veinlets in grey, fine-grained, dense limestone. Shell fossils of Mississippian age occur in the rock.

The quarry was formerly operated to produce crushed rock for use as fertilizer.

The quarry is about 10 km northeast of Truro. Lat. 45°25′31″N, Long. 63°10′20″W. *See* Map 29.

Road log from Highway 2 (Glooscap Trail) at **km 152.5** (*see* the Main Road Log on page 117):

km		
	0	Truro, junction of highways 2 and 102; proceed east along the road to Onslow.
	2.9	Junction; follow the road on right leading southeast.
	5.7	Junction; turn left (east) onto Pictou Road.
	12.5	Junction; proceed northeast along the road on left toward East Mountain.
	15.3	Junction; turn right (southeast).
	15.5	East Mountain quarry, on the McCullough farm.

Refs.: 161 p. 47-48; 336 p. 102.

Maps (T): 11 E/6 Truro
(G): 82-9 Cobequid Highlands, Colchester, Cumberland & Pictou counties, Nova Scotia (NSDNR, 1:50 000)
85-1 Industrial mineral commodities map of the Province of Nova Scotia (NSDNR, 1:500 000)
637 Earltown Sheet No. 58, Colchester County, Nova Scotia (GSC, 1:63 360)
1058A Truro, Colchester, Hants and Pictou counties, Nova Scotia (GSC, 1:63 360)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

East Mountain (Fraser) mine

PYROLUSITE, MANGANITE, BARITE

In limestone

Pyrolusite is the principal manganese ore mineral; manganite occurs in minor amounts. These minerals occur as nodules up to 10 cm across in the host rock. Cavities in the nodules contain acicular pyrolusite crystals and tiny barite plates.

Manganese mining began in the East Mountain area in the 1860s when Onslow East Mountain Manganese and Lime Company drove adits into the side of a small hill and recovered manganese nodules from the limestone. In about 1897, a discovery of manganese ore in a cattle watering hole dug in the bottom of a small creek led to further exploration. Trenching upstream 61 m resulted in the discovery of an orebody. An inclined shaft was sunk 7.6 m into it and 90 t of ore were removed. In 1918, W.S. Carlisle of Truro deepened the shaft 1.5 m and removed 9 t of ore. In 1938, Messrs. Munroe and McLennan resumed underground development and mined about 45 t of ore from a 36 m adit. In 1939 to 1941, the East Mountain Manganese Company stripped an area 61 by 12 m and 9 m deep, and removed about 2.3 t of manganese ore; a small plant on Highway 4 near Truro processed the ore and extracted about 3397 kg of metallic manganese. The Nova Scotia Department of Mines examined the property in 1967 and 1968.

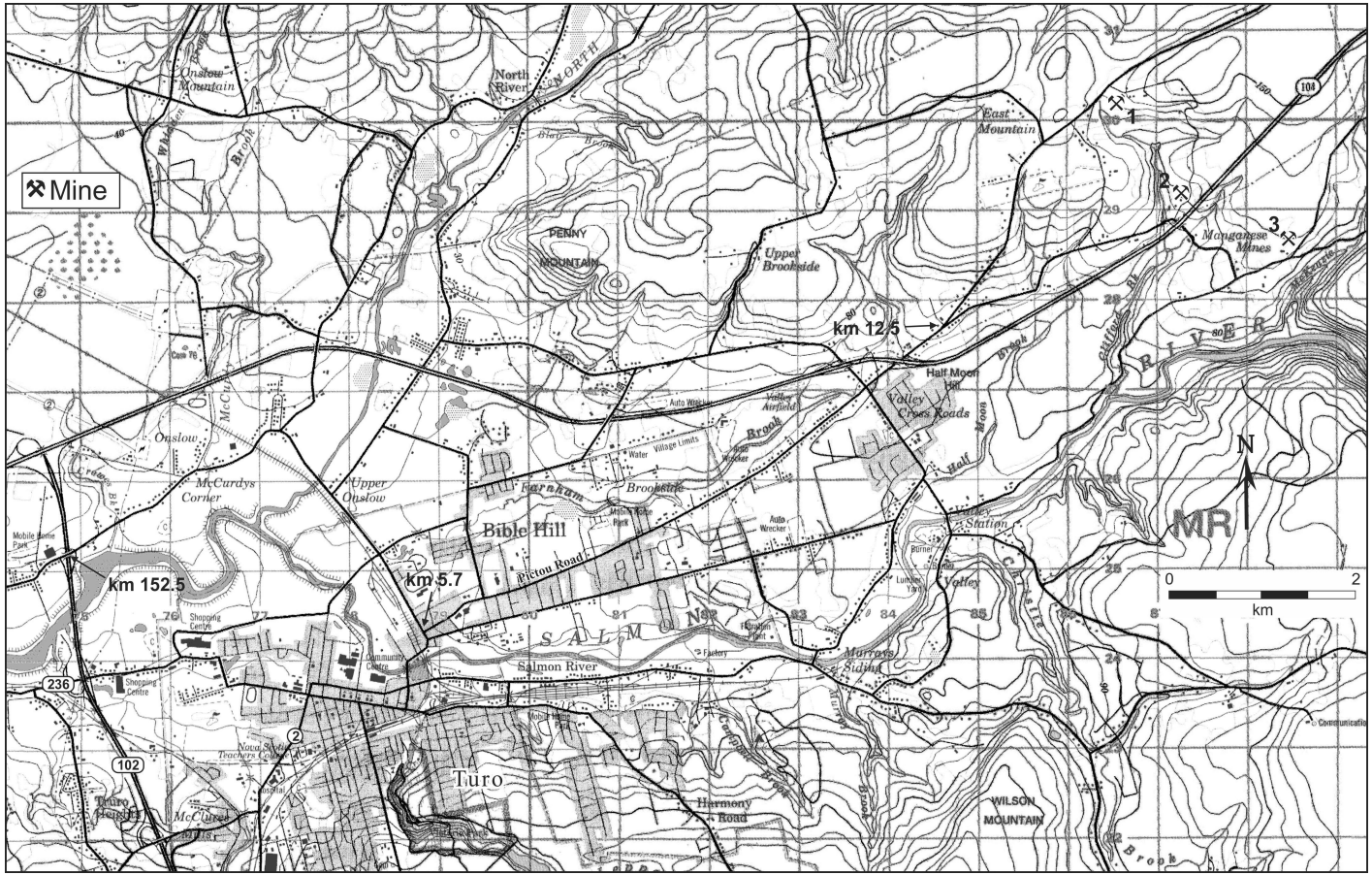
The mine is about 10 km northeast of Truro. Lat. 45°24′58″N, Long. 63°09′44″W. *See* Map 29.

Road log from Highway 2 (Glooscap Trail) at **km 152.5** (*see* the Main Road Log on page 117):

km		
	0	Truro, junction of highways 2 and 102; proceed east along the road leading to Onslow.
	2.9	Junction; follow the road on right leading southeast.
	5.7	Junction; turn left (east) onto Pictou Road.
	12.5	Junction; proceed east along the road on right toward Manganese Mines.
	15.4	Junction; turn left (north)
	15.7	McMasters farm on the left (west) side of the road. The East Mountain (Fraser) mine is on this property.

Refs.: 29 p. 98, 103-110; 113 CC-143; 144 p. 105-106; 182 p. 33-35; 193 p. 116-117; 329 p. 116-120; 336 p. 104-108.

Maps (T): 11 E/6 Truro
(G): 39A Nova Scotia Sheet (GSC, 1:506 880)
82-9 Cobequid Highlands, Colchester, Cumberland & Pictou counties, Nova Scotia (NSDNR, 1:50 000)
637 Earltown Sheet No. 58, Colchester County, Nova Scotia (GSC, 1:63 360)
1058A Truro, Colchester, Hants and Pictou counties, Nova Scotia (GSC, 1:63 360)
Metallogenic map of the province of Nova Scotia, 1983 (NSDNR, 1:500 000)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)



1. East Mountain quarry 2. East Mountain (Fraser) mine 3. Manganese Mines mine

Map 29. Truro

Manganese Mines mine

PYROLUSITE, MANGANITE

In sandstone

The manganese ore minerals are pyrolusite and manganite. Pyrolusite occurs as compact small prismatic crystals in veinlets, and as fine acicular crystals up to 2 cm long in joint and bedding planes up to 5 cm wide. Manganite occurs as small grains in pyrolusite. During mining operations nodules composed of the manganese minerals were recovered from soil overlying the host sandstone.

The mine was worked continuously from 1880 to 1895 producing about 136 t of ore. Operations were intermittent from 1896 to 1905. In 1917, 1814 t of crushed ore recovered from the old mine dumps were shipped to the Mines Branch in Ottawa for testing. The mine consists of a pit 30 by 21 m and 15 m deep, with a 21 m shaft sunk from the bottom of the pit. In 1938, the pit was pumped out and the workings examined.

The mine is about 11 km northeast of Truro. Lat. 45°24′40″N, Long. 63°08′49″W. *See* Map 29.

Road log from Highway 2 (Glooscap Trail) at **km 152.5** (*see* the Main Road Log on page 117):

km		
	0	Truro, junction of highways 2 and 102; proceed east along the road to Onslow.
	2.9	Junction; follow the road on right leading southeast.
	5.7	Junction; turn left (east) onto Pictou Road.
	12.5	Junction; proceed east along the road on right toward Manganese Mines.
	15.4	Turnoff to East Mountain (Fraser) mine; continue straight ahead (southeast).
	16.5	Junction; turn left (east).
	17.2	Junction; follow the road on left leading northeast.
	17.4	Manganese Mines mine, on the Coulter farm on the left (west) side of the road.

Refs.: 29 p. 98, 112-113; 113 CC-138; 138 p. 184P; 182 p. 35-37; 329 p. 114-116; 336 p. 108-110.

Maps (T): 11 E/6 Truro
(G): 39A Nova Scotia Sheet (GSC, 1:506 880)
82-9 Cobequid Highlands, Colchester, Cumberland & Pictou counties, Nova Scotia (NSDNR, 1:50 000)
637 Earltown Sheet No. 58, Colchester County, Nova Scotia (GSC, 1:63 360)
1058A Truro, Colchester, Hants and Pictou counties, Nova Scotia (GSC, 1:63 360)
Metallogenic map of the province of Nova Scotia, 1983 (NSDNR, 1:500 000)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

Truro to Waverley

Collecting localities between Truro and Waverley are described in the text following the road log. The road log for this side trip begins in Truro, at the intersection of Prince and Willow streets and proceeds along Highway 2. Kilometre distances along Highway 2 are shown in bold type. A page reference is indicated in parenthesis following the name of each mine, occurrence, or quarry. The description of collecting localities along the Glooscap Trail is resumed on page 197.

Road log for collecting localities described in the Truro to Waverley side trip:

km	**0**	Truro, at Prince and Willow streets; the road log proceeds south along Willow Street (Highway 2).
km	**6.7**	Hilden, junction of the road to the Hilden quarry (p. 167).
km	**12.9**	Brookfield, junction of Highway 289 (east) to the Brookfield mine (p. 167), the Chambers and Pearson mines (p. 168), the Middle Stewiacke mine (p. 170), the Smithfield (Leadvale) mine (p. 171), and the Glenbervie (Pembroke) mine (p. 172).
km	**34.2**	Shubenacadie, junction of Highway 224 to the Gays River (Coldstream) mine (p. 172), the Gays River Lead mine (p. 175), the Middle Musquodoboit (Murphy Brook) pit (p. 176), the South Branch (Upper Stewiacke) mine (p. 176), the Paint Brook occurrence (p. 178), the Caribou mines (p. 179), and the Upper Musquodoboit quarries (p. 181).
km	**35.5**	Shubenacadie, junction of Highway 215 to the Admiral Rock quarries (p. 182).
km	**36.0**	Shubenacadie (L.E. Shaw) pit (p. 183).
km	**43.9**	Milford, junction of the road to the East Milford mine (p. 184).
km	**48.6**	Lantz, junction of Highway 277 to the Lantz (L.E. Shaw) pit (p. 184).
km	**51.4**	Elmsdale, junction of Highway 214 to Renfrew and the Renfrew mines (p. 185).
km	**56.8**	Enfield, junction of the road to Oldham and the Oldham mines (p. 188).
km	**71.0**	Fletchers Lake, junction of the road to the Fletchers Lake occurrence (p. 189).
km	**76.9**	Waverley, junction of Highway 318 and access to the Waverley mine (eastern section) (p. 191).
km	**77.3**	Waverley, junction of Cobequid Road (Highway 2) to the Waverley mine (western section) (p. 191), to South Uniacke and the South Uniacke mines (p. 193), and to Mount Uniacke and the Mount Uniacke mines (p. 195).

End of the road log.

Hilden quarry

FOSSILS, CALCITE CRYSTALS, DOLOMITE CRYSTALS

In dolomitic limestone

Fossil shells and crinoids occur in limestone of Mississippian age. Some of the limestone is composed almost entirely of fossil shells and is referred to as coquina limestone. Small crystals of calcite and dolomite occur in cavities in limestone.

The limestone was quarried and burned in a nearby kiln in about 1890.

The quarry is about 9 km southwest of Truro. Lat. 45°18′03″N, Long. 63°20′58″W.

Road log from Highway 2 at **km 6.7** (*see* the Truro to Waverley road log on page 166):

km		
	0	Hilden, junction of Highway 2 and a road leading west; proceed along the road leading west.
	3.8	Junction, Pleasant Valley Road; continue straight ahead (west).
	5.1	Hilden quarry, on the left (west) side of the road.

Refs.: 161 p. 44-45; 336 p. 100.

Maps (T): 11 E/6 Truro
(G): 85-1 Industrial mineral commodities map of the Province of Nova Scotia (NSDNR, 1:500 000)
91-002 Sheet 3 Truro, Colchester County (NSDNR, 1:15 840)
636 Truro Sheet No. 57, Colchester County, Nova Scotia (GSC, 1:63 360)
1058A Truro, Colchester, Hants and Pictou counties, Nova Scotia (GSC, 1:63 360)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

Brookfield mine

BARITE, SIDERITE, GRAPHITE, HEMATITE

In shale and sandstone

Barite, the ore mineral, is massive and grades from white to pink to red. Olive-green and brown siderite is associated with barite. Graphite and specular hematite occur as flakes in the barite-siderite ore.

The deposit has been known since the 1860s. Prior to 1868, about 1088 t of barite were mined from a 12 m shaft. In 1899, Messrs. Henderson and Potts of Halifax produced a small amount of barite. In 1944 and 1945, Canadian Industrial Minerals Limited did some diamond drilling on the property then owned by Harding Nelson. In 1948, Maritime Barytes Limited undertook a drilling program and constructed a road to the property. The company conducted open pit mining in 1951 and 1952 and operated an on-site concentrating plant. In 1979, Nystone Chemicals Limited, the current operator, resumed mining. The crude barite is crushed at the North River Sand and Gravel Company then transported to the Nystone Chemicals mill in Debert Industrial Park where pharmaceutical-grade barium sulphate is produced. Production between 1980 and 1987 amounted to over 64 000 t of ore.

The mine is about 4 km northeast of Brookfield. Lat. 45°16′18″N, Long. 63°14′18″W. *See* Map 30.

Road log from Highway 2 at **km 12.9** (*see* the Truro to Waverley road log on page 166):

km		
	0	Brookfield, junction of highways 2 and 289; proceed east along Highway 289.
	1.4	Upper Brookfield, junction; turn left (northeast).
	4.3	Junction; turn left onto a road leading northwest.
	4.5	Junction of the road leading north to the Chambers and Pearson mines; continue straight ahead (west).
	5.1	Brookfield mine, in a conspicuous white outcrop on the north slope of the Little River valley, about 200 m above the river and just west of a small stream.

Refs.: 3 p. 53-54; 72 p. 60; 73 p. 58; 132 p. 175-189; 138 p. 192P; 145 p. 3-4; 162 p. 78-79; 165; 167 p. A3-9-A3-13; 193 p. 161; 271 p. 20; 297 p. 250; 331 p. 34; 336 p. 70-76.

Maps (T): 11 E/6 Truro
(G): 39A Nova Scotia Sheet (GSC, 1:506 880)
85-1 Industrial mineral commodities map of the Province of Nova Scotia (NSDNR, 1:500 000)
636 Truro Sheet No. 57, Colchester County, Nova Scotia (GSC, 1:63 360)
1058A Truro, Colchester, Hants and Pictou counties, Nova Scotia (GSC, 1:63 360)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

Chambers and Pearson mines

LIMONITE, HEMATITE, SIDERITE, BARITE

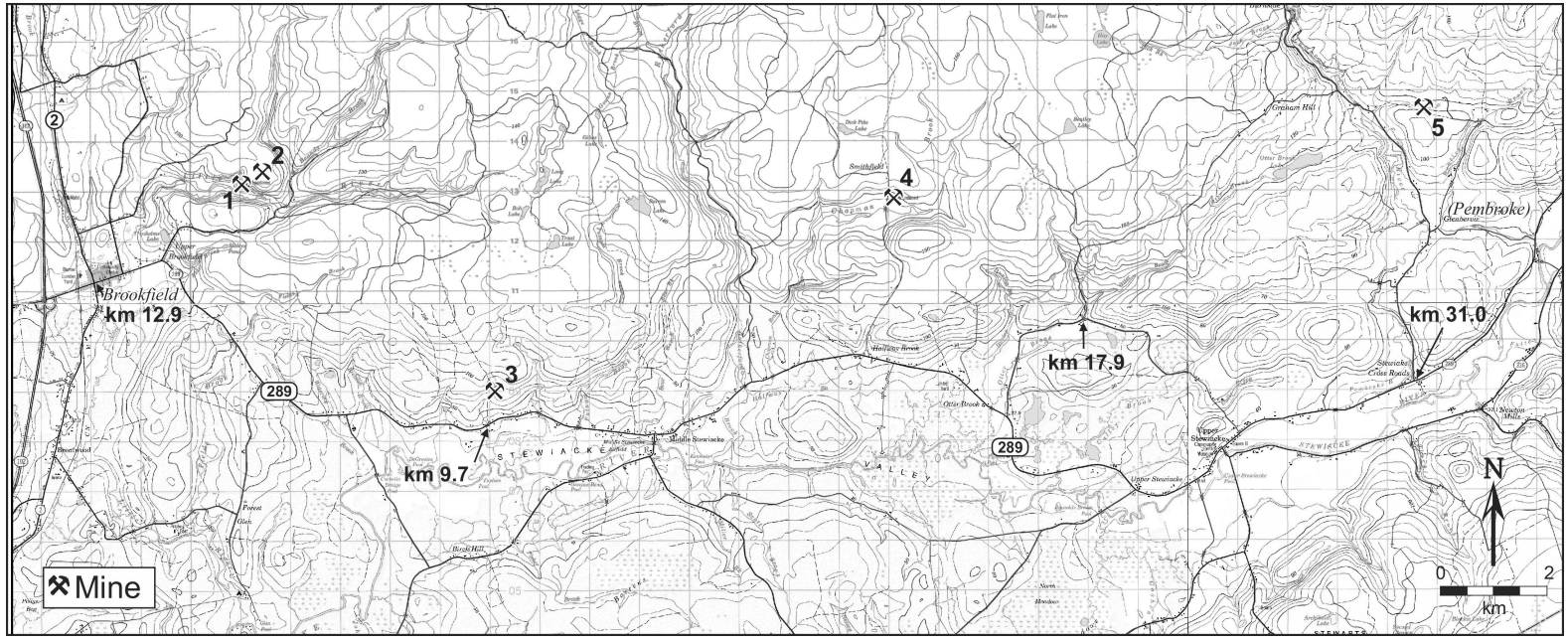
In shale

Limonite, the ore mineral, occurs in massive and botryoidal forms. It is brown to black and consists mainly of goethite. Hematite, siderite, and barite occur in the ore.

The iron deposit on the Nelson farm was originally investigated by open cuts in the 1860s. The limonite ore, then referred to as brown hematite, occurred as masses up to a metre across in the rock and as detached fragments and blocks scattered on the surface. In 1888, R.E. Chalmers mined the limonite deposit on the Leander Nelson property and shipped 907 t of ore to the Londonderry blast furnace. New Glasgow Iron Coal and Railway Company subsequently mined the deposit and shipped the ore to the Ferrona smelter. Development consisted of a 37 m shaft. Total iron ore production amounted to 39 908 t. The adjoining Pearson mine was worked in 1906; the workings consisted of two adits driven north into the valley of a brook, and a south-facing open pit along the valley slope west of the adits. The ore was shipped to Londonderry.

The mines are about 4 km northeast of Brookfield, and 400 m northeast of the Brookfield mine. Lat. 45°16′16″N, Long. 63°14′30″W. *See* Map 30.

Road log from Highway 2 at **km 12.9** (*see* the Truro to Waverley road log on page 166):



1. Brookfield mine 2. Chambers and Pearson mines 3. Middle Stewiacke mine 4. Smithfield (Leadvale) mine 5. Glenbervie (Pembroke) mine

Map 30. Brookfield

km 0 Brookfield, junction of highways 2 and 289; proceed east along Highway 289.

1.4 Upper Brookfield, junction; turn left (northeast).

4.3 Junction; turn left onto a road leading northwest.

4.5 Junction; turn right onto the mine road.

5.0 Chambers and Pearson mines.

Refs.: 138 p. 177P; 165; 193 p. 93-97; 218 p. 167-168; 336 p. 90-91; 372 p. 141-145; 374 p. 14-17.

Maps (T): 11 E/6 Truro
(G): 39A Nova Scotia Sheet (GSC, 1:506 880)
636 Truro Sheet No. 57, Colchester County, Nova Scotia (GSC, 1:63 360)
1058A Truro, Colchester, Hants and Pictou counties, Nova Scotia (GSC, 1:63 360)
Metallogenic map of the province of Nova Scotia, 1983 (NSDNR, 1:500 000)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

Middle Stewiacke mine

BARITE, CALCITE

In limestone and limestone breccia

Barite is white, pink to red, grey to greenish and brownish-white massive with inclusions of graphite, hematite, and pyrite. It occurs as pods and lenses in fractured host rocks. Specimens of barite from this mine were displayed in the Geological Survey of Canada economic minerals exhibit at the Colonial and Indian Exhibition held in London in 1886 and at the Paris Exhibition held in 1900.

The deposit was originally worked in the 1860s. About 1100 t of barite ore were mined from a 12 m shaft. In the 1890s, Brandran and Henderson mined a small amount of ore from an open cut 24 by 15 m, and 9 m deep. Recent exploration was done by Maritime Exploration Limited from 1945 to 1948, and by Magnet Cove Barium Corporation in 1957.

The mine is about 8 km southeast of Brookfield. Lat. 45°13′59″N, Long. 63°10′38″W. *See* Map 30.

Road log from Highway 2 at **km 12.9** (*see* the Truro to Waverley road log on page 166):

km 0 Brookfield, junction of highways 2 and 289; proceed east along Highway 289.

9.7 Junction; turn left (north) onto the mine road.

10.7 Middle Stewiacke mine, on the east bank of Mine Brook.

Refs.: 132 p. 153-162; 138 p. 192P; 297 p. 247-250; 336 p. 61; 395 p. 105; 397 p. 163.

Maps (T): 11 E/3 Shubenacadie
(G): 39A Nova Scotia Sheet (GSC, 1:506 880)
85-1 Industrial mineral commodities map of the Province of Nova Scotia (NSDNR, 1:500 000)

91-002 Sheet 11, Clover Dale, Colchester County (NSDNR, 1:15 840)
636 Truro Sheet No. 57, Colchester County, Nova Scotia (GSC, 1:63 360)
1076A Shubenacadie, Colchester, Halifax, and Hants counties, Nova Scotia (GSC, 1:63 360)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

Smithfield (Leadvale) mine

GALENA, SPHALERITE, PYRITE, ARSENOPYRITE, CHALCOPYRITE, BARITE, MALACHITE, AZURITE

In limestone

Galena and sphalerite, the ore minerals, are associated with pyrite, arsenopyrite, and chalcopyrite. Barite occurs as white, and pink to red coarse crystalline masses. Malachite and azurite occur as coatings on the ore minerals found on the mine dumps. Specimens of argentiferous galena were displayed in the Geological Survey of Canada economic minerals exhibit at the Paris International Exhibition held in 1900.

Boulders containing argentiferous galena were first reported in 1862. In 1878, some development work was done in the area. Between 1881 and 1884, Howard Clark sank two shafts to 9 m and 17 m, respectively and put into operation an on-site smelter which treated about 272 t of ore. In 1894 and 1895, some work was done including deepening the old shafts. In 1925, Leadville Mining Company dewatered the workings and did some development work. In the following year, British Metals Corporation (Canada) Limited deepened one of the shafts to 30 m. In 1951 and 1952, Minda Scotia Mines Limited sank a new shaft to 76 m and did extensive underground development.

The mine is about 16 km east of Brookfield. 45°16′08″N, Long. 63°04′33″W. *See* Map 30.

Road log from Highway 2 at **km 12.9** (*see* the Truro to Waverley road log on page 166):

km		
	0	Brookfield, junction of highways 2 and 289; proceed east along Highway 289.
	17.9	Halfway Brook, junction; turn left (north).
	21.5	Smithfield (Leadvale) mine, on the east side of the road.

Refs.: 6 p. 56-60; 132 p. 163-170; 138 p. 186P-187P; 166; 196 p. 84S-85S; 207 p. 45-46; 245 p. 413-428; 297 p. 247, 249; 336 p. 93-98; 370 p. 79C-83C; 397 p. 105.

Maps (T): 11 E/6 Truro
(G): 39A Nova Scotia Sheet (GSC, 1:506 880)
91-002 Sheet 5 Smithfield, Colchester County (NSDNR, 1:15 840)
636 Truro Sheet No. 57, Colchester County, Nova Scotia (GSC, 1:63 360)
1058A Truro, Colchester, Hants and Pictou counties, Nova Scotia (GSC, 1:63 360)
Metallogenic map of the province of Nova Scotia, 1983 (NSDNR, 1:500 000)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

Glenbervie (Pembroke) mine

GALENA, FOSSILS

In limestone

Galena occurs as disseminated grains and crystals; large masses of galena were found during mining operations. Brachiopod fossils of Mississippian age occur in the limestone.

The discovery of galena in limestone boulders in the Glenbervie area led to exploration beginning in about 1870. The results were disappointing and work was abandoned shortly after. In 1877, renewed exploration consisted of driving a 21 m adit and sinking a shallow shaft. In 1929 and 1930, Mr. Williams excavated test pits and trenches on a new showing which he had discovered. In 1930 and 1931, R.E.G. Burroughs mined several tonnes of galena-bearing limestone, shipped some of it to the Nova Scotia Technical College in Halifax for testing, leaving the remainder on the dumps. Two samples averaged 13.7% and 8.9% lead, respectively. The mine consisted of several pits and trenches, a 41 m adit, and two shallow shafts 30 m apart. Exploration in 1949 and in 1960 consisted of trenching and drilling.

The mine is about 26 km east of Brookfield. Lat. 45°17′03″N, Long. 62°56′23″W. *See* Map 30.

Road log from Highway 2 at **km 12.9** (*see* the Truro to Waverley road log on page 166):

km		
	0	Brookfield, junction of highways 2 and 289; proceed east along Highway 289.
	31.0	Stewiacke Cross Roads, junction; turn left (north) onto the road to Pembroke.
	34.3	Glenbervie (Pembroke), junction; turn right (east).
	34.5	Glenbervie (Pembroke), junction; proceed north.
	36.9	Junction; turn left (west).
	37.5	Junction; the road turns north. Continue straight ahead (west) along a trail.
	38.1	Glenbervie (Pembroke) mine, on the north side of the road.

Refs.: 6 p. 56; 27 p. 50; 138 p. 186P-187P; 245 p. 403, 405-406; 247 p. 122; 250 p. 128-130.

Maps (T): 11 E/7 Hopewell
(G): 39A Nova Scotia Sheet (GSC, 1:506 880)
91-002 Sheet 6 Glenbervie, Colchester County (NSDNR, 1:15 840)
633 Eastville Sheet No. 48, Colchester and Halifax counties, Nova Scotia (GSC, 1:63 360)
1215A Hopewell, Nova Scotia (GSC, 1:63 360)
Metallogenic map of the province of Nova Scotia, 1983 (NSDNR, 1:500 000)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

Gays River (Coldstream) mine

NATIVE GOLD

In conglomerate and slate

Native gold occurs as flattened scales up to 6 mm across in the matrix cementing pebbles in conglomerate, in thin coatings on the pebbles, and in slate. Most of the native gold was recovered from pockets in clay-filled crevices in slate. The coarsest and most plentiful native gold was found at the contact of conglomerate and the underlying slate. Gold was also found in the drift.

In 1862, Berry Corbett and George Gay discovered gold on their adjoining farms along McLean (Corbett) Brook. The Gay discovery was just northwest of the village of Coldstream. The Corbett discovery was to the north of the village in the vicinity of Corbett's mill, where conglomerate exposures along the brook contained abundant flattened scales of native gold up to 6 mm across. Adits were driven into the channel of the brook to mine the auriferous conglomerate which was then crushed and washed in pans or rockers yielding rich returns. In 1866, exploration began on the north side of McLean (Corbett) Brook and a small crusher was installed. Development in 1869 consisted of several adits and surface-to-adit shafts. Involved in these operations were Messrs. Werner and Company; Messrs. Hopp, Salter and others; George Gay; Dr. McLean and Company; and Messrs. Moore and D. Annand. In 1870, Dr. McLean continued small-scale operations and recovered 3825.7 g of gold. A new eight-stamp mill was installed in 1871. From 1872 to 1874, Mr. McDonald was the principal operator; he drove an adit 82 m into a hillside and produced 14 494 g of gold. In 1876, development shifted to the south side of the brook. Operations from 1876 to 1884 involved the following: Messrs. Corbett, Dunlop, Wilson, Daniel McDonald, Parker, Pulsiver, and Holdsworth. In 1890 and 1891, Coldstream Gold Mining Company sank a new shaft and installed a fifty-stamp mill. The venture was unsuccessful. In 1900, Nova Scotia Gold Mining Company reopened some of the old workings, and installed a fifty-stamp mill. Production from 1873 to 1881 amounted to 58 411 g of gold from 10 772 t of ore.

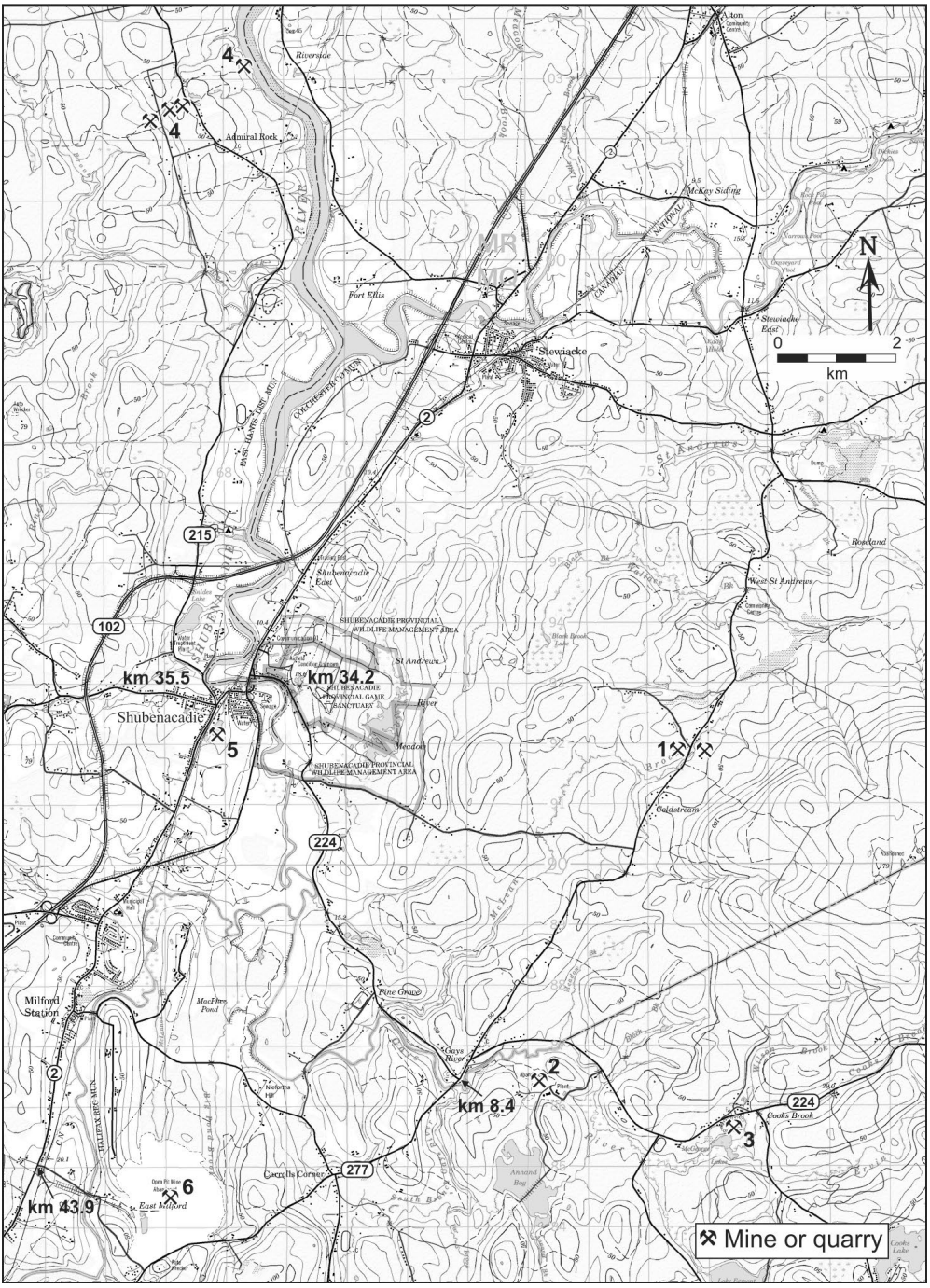
The mine is about 8 km east of Shubenacadie. 45°04′47″N, Long. 63°18′38″W (north side of brook); 45°04′50″N, Long. 63°18′28″W (south side of brook). *See* Map 31.

Road log from Highway 2 at **km 34.2** (*see* the Truro to Waverley road log on page 166):

km		
	0	Shubenacadie, junction of highways 2 and 224; proceed east along Highway 224.
	2.4	Junction; turn left (east).
	8.0	Junction; turn left (north).
	10.0	Junction, road leading northwest. Just west of this junction, a trail leads 70 m southwest to the Gays River (Coldstream) adits on the north side of McLean Brook. Just north of the junction, a trail leads east 120 m to the adits on the south side of McLean Brook.

Refs.: 69 p. 112-118; 193 p. 37; 194 p. 42; 228 p. 223-225; 337 p. 51-53.

Maps (T): 11 E/3 Shubenacadie
(G): 39A Nova Scotia Sheet (GSC, 1:506 880)
53A Southeast Nova Scotia (GSC, 1:250 000)
91-002 Sheet 17 Coldstream, Halifax and Colchester counties (NSDNR, 1:15 840)
635 Shubenacadie Sheet No. 56, Colchester and Halifax counties, Nova Scotia (GSC, 1:63 360)
1076A Shubenacadie, Colchester, Halifax, and Hants counties, Nova Scotia (GSC, 1:63 360)
Metallogenic map of the province of Nova Scotia, 1983 (NSDNR, 1:500 000)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)



1. Gays River (Coldstream) mine 2. Gays River Lead mine 3. Cooks Brook quarry 4. Admiral Rock quarries 5. Shubenacadie (L.E. Shaw) pit 6. East Milford mine

Map 31. Shubenacadie

Gays River Lead mine

GALENA, SPHALERITE, MARCASITE, PYRITE, FLUORITE, CHALCOPYRITE, BARITE, CALCITE CRYSTALS, ULEXITE, HOWLITE, FOSSILS

In dolomitic limestone

The lead ore consists of stratiform ore and vein ore. Stratiform ore is composed of open spaces and fractures filled with galena and sphalerite with minor marcasite, pyrite, violet to black fluorite, and calcite. Vein ore consists of massive galena and sphalerite. Yellow to brown sphalerite occurs in cavities in porous limestone and in shell fossils. Chalcopyrite and barite occur in trace amounts. Massive white calcite contains cavities lined with small colourless calcite scalenohedra; the calcite fluoresces bright pink in ultraviolet light. Ulexite and howlite have been found in drill cores. Shell fossils of Mississippian age occur in the limestone.

In about 1824, early settlers discovered galena while engaged in burning limestone for agricultural use. Prospect pits and trenches were dug in 1873 and 1874 and in 1928. In 1951, Maritime Barytes Limited carried out surface exploration and sampling. In 1952, Gays River Lead Mines Limited did some drilling and outlined a low-grade lead-zinc orebody. In 1972, Cuvier Mines Limited discovered large boulders of sphalerite-bearing dolomitic limestone in the mine area. This company and Imperial Oil Limited jointly conducted a drilling program. In 1976, Preuvier Mines Limited drove a 762 m decline and removed some ore for a bulk mill test. In 1980 and 1981, Canada Wide Mines Limited operated the mine and mill, and produced 8845 t of lead concentrates and 15 564 t of zinc concentrates from 629 952 t of ore. In 1990 and 1991, Westminer Canada Limited produced 5987 t of lead and 12 467 t of zinc.

The mine is about 8 km southeast of Shubenacadie. Lat. 45°01′49″N, Long. 63°20′28″W. *See* Map 31.

Road log from Highway 2 at **km 34.2** (*see* the Truro to Waverley road log on page 166):

km		
	0	Shubenacadie, junction of highways 2 and 224; proceed east along Highway 224.
	8.4	Gays River, junction with Highway 277; turn left (north).
	8.8	Junction; turn right (east) continuing on Highway 224.
	11.2	Junction; turn right (southwest).
	12.5	Gays River Lead mine.

Refs.: 4 p. 25-28; 36 p. 68-73; 167 p. A2-1-A2-5; 207 p. 43-48; 245 p. 402-403; 271 p. 18; 272 p. 64; 286 p. A2-17-A2-19; 297 p. 247, 249; 322 p. 35-44; 337 p. 54-57; 345 p. 196, 386; 370 p. 83C; 413 p. 398; 414 p. 370.

Maps (T): 11 E/3 Shubenacadie
(G): 39A Nova Scotia Sheet (GSC, 1:506 880)
53A Southeast Nova Scotia (GSC, 1:250 000)
91-002 Sheet 17 Coldstream, Halifax and Colchester counties (NSDNR, 1:15 840)
908 Gays River Sheet No. 55, Colchester and Hants counties, Nova Scotia (GSC, 1:63 360)
1076A Shubenacadie, Colchester, Halifax, and Hants counties, Nova Scotia (GSC, 1:63 360)
Metallogenic map of the province of Nova Scotia, 1983 (NSDNR, 1:500 000)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

Middle Musquodoboit (Murphy Brook) pit

FIRE-CLAY

The fire-clay is white to grey mottled in shades of red and dark grey and is suitable for pottery-making. It is composed of quartz, kaolinite, and mica with minor hematite, anatase, and rutile. It is of Cretaceous age.

In 1900, Mr. F.H. Mason of Halifax investigated the Murphy Brook clay deposit in search of high-refractory clay for the manufacture of fire brick. In 1924, Foley Pottery Company Limited of Saint John, New Brunswick opened the deposit on the James A. Sedgewick property and mined the clay from an open pit and from underground until 1960. The output was used in the manufacture of fire brick and high-grade stove linings.

The pit is in Middle Musquodoboit, about 23 km southeast of Shubenacadie. Lat. 45°02′47″N, Long. 63°08′36″W. *See* Map 32.

Road log from Highway 2 at **km 34.2** (*see* the Truro to Waverley road log on page 166):

km		
	0	Shubenacadie, junction of highways 2 and 224; proceed east along Highway 224.
	14.0	Cooks Brook quarry, on the south side of the highway. Lat. 45°01′30″N, Long. 63°17′59″W. Mosher Limestone Company Limited operated this quarry for agricultural limestone from 1987 to 1991. The location is shown on Map 31.
	27.7	Middle Musquodoboit, junction of the road to Glenmore. The Middle Musquodoboit (Murphy Brook) pit is on the east side of the Glenmore road opposite this junction.

Refs.: 72 p. 62; 242 p. 146; 301 p. 74-83; 337 p. 69-70; 373 p. 70-71.

Maps (T): 11 E/3 Shubenacadie

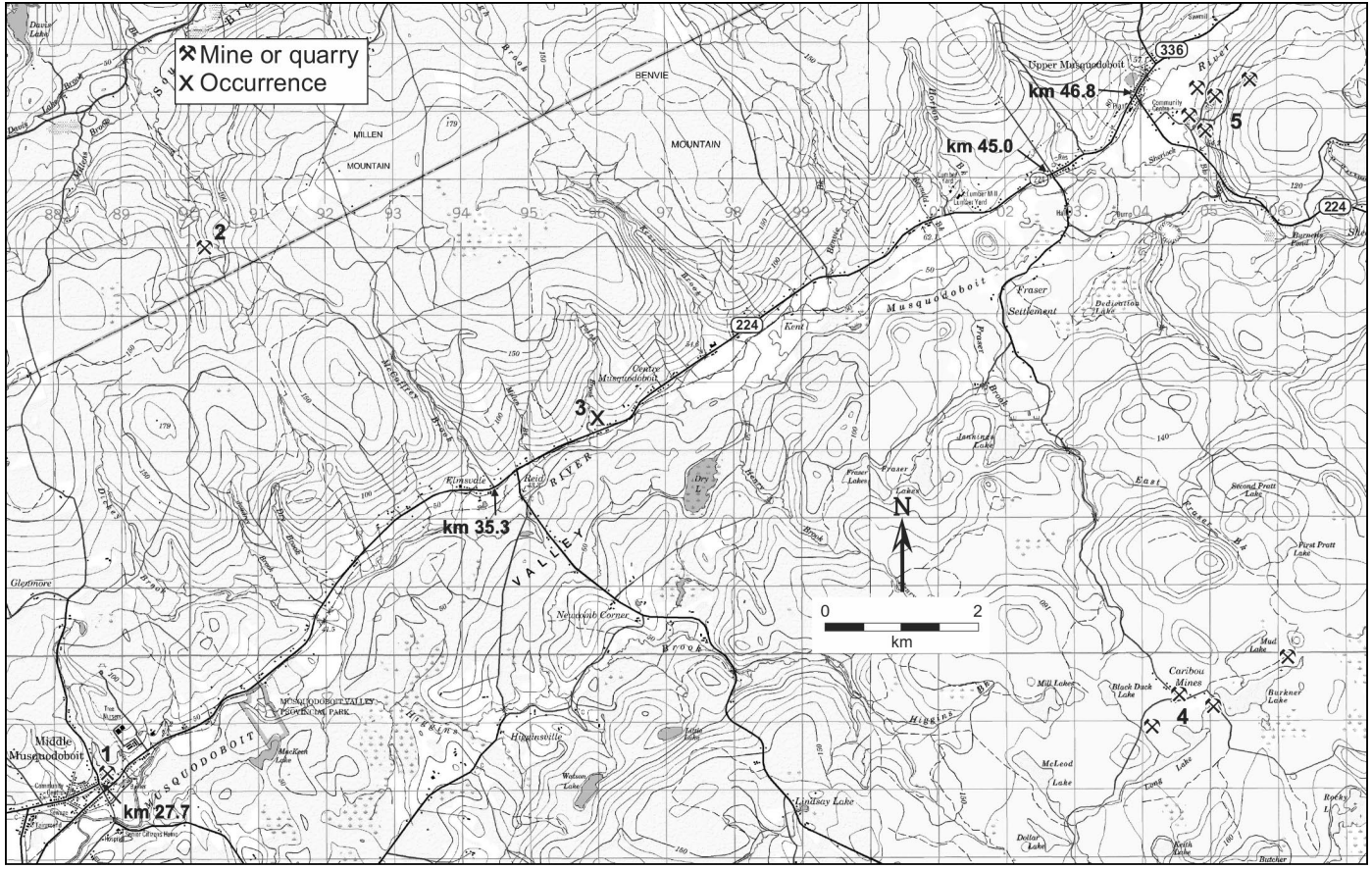
(G): 6-1956 Surficial geology, Shubenacadie, Colchester, Halifax, and Hants counties, Nova Scotia (GSC, 1:63 360)
39A Nova Scotia Sheet (GSC, 1:506 880)
85-1 Industrial mineral commodities map of the Province of Nova Scotia (NSDNR, 1:500 000)
91-002 Sheet 18 Middle Musquodoboit, Halifax and Colchester counties (NSDNR, 1:15 840)
908 Gays River Sheet No. 55, Colchester and Hants counties, Nova Scotia (GSC, 1:63 360)
1076A Shubenacadie, Colchester, Halifax, and Hants counties, Nova Scotia (GSC, 1:63 360)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

South Branch (Upper Stewiacke) mine

NATIVE GOLD

In slate and quartzite

Native gold occurs in quartz veins and in drift.



1. Middle Musquodoboit (Murphy Brook) pit 2. South Branch (Upper Stewiacke) mine 3. Paint Brook occurrence 4. Caribou mines 5. Upper Musquodoboit quarries

Map 32. Musquodoboit

Gold-bearing veins were discovered in the area in 1865. A crusher was installed in 1884 and a few tonnes of ore were milled. Some very rich streaks of native gold recovered from a vein extending 550 m yielded an average of 343 to 411 g/t gold. In 1906 and 1907, E.P. Crowe recovered about 746 g of gold. The total gold production amounted to 1365 g.

The mine is on the South Branch of the Stewiacke River, about 5 km northwest of Elmsvale and 23 km east of Shubenacadie. Lat. 45°07′00″N, Long. 63°07′25″W. *See* Map 32.

Road log from Highway 2 at **km 34.2** (*see* the Truro to Waverley road log on page 166):

km		
	0	Shubenacadie, junction of highways 2 and 224; proceed east along Highway 224.
	27.7	Middle Musquodoboit, junction of the road to Glenmore; continue along Highway 224.
	35.3	Elmsvale, junction; turn left (north).
	38.2	Junction; turn left (west).
	41.1	South Branch (Upper Stewiacke) mine.

Refs.: 115 p. 179A-180A; 228 p. 184-185; 243 p. 223; 337 p. 50-51.

Maps (T): 11 E/3 Shubenacadie
(G): 39A Nova Scotia Sheet (GSC, 1:506 880)
53A Southeast Nova Scotia (GSC, 1:250 000)
91-002 Sheet 19 Newcomb Corner, Halifax and Colchester counties (NSDNR, 1:15 840)
635 Shubenacadie Sheet No. 56, Colchester and Halifax counties, Nova Scotia (GSC, 1:63 360)
1076A Shubenacadie, Colchester, Halifax, and Hants counties, Nova Scotia (GSC, 1:63 360)
Metallogenic map of the province of Nova Scotia, 1983 (NSDNR, 1:500 000)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

Paint Brook occurrence

FIRE-CLAY

The fire-clay varies from red to mottled grey-and-pink. It is composed of quartz, kaolinite, and mica, with minor hematite, anatase, and rutile. The red colour is due to a high iron (hematite) content. The fire-clay is suitable for pottery making, and has been used locally as a paint for barns. It is of Cretaceous age.

The deposit has been known since the 1890s. In 1967, the Nova Scotia Department of Mines carried out a drilling program to outline the deposit. More recently, a pit was opened at Paint Brook just above the Highway 224 bridge to supply pottery clay.

The Paint Brook occurrence is on the east side of Paint Brook, about 27 km east of Shubenacadie. Lat. 45°05′34″N, Long. 63°03′06″W. *See* Map 32.

Road log from Highway 2 at **km 34.2** (*see* the Truro to Waverley road log on page 166):

km		
	0	Shubenacadie, junction of highways 2 and 224; proceed east along Highway 224.

27.7 Middle Musquodoboit, junction of the road to Glenmore; continue along Highway 224.

37.0 Paint Brook. The pit is just north of this point.

Refs.: 301 p. 73-77; 337 p. 70; 373 p. 69-70.

Maps (T): 11 E/3 Shubenacadie
(G): 6-1956 Surficial geology, Shubenacadie, Colchester, Halifax, and Hants counties, Nova Scotia (GSC, 1:63 360)
39A Nova Scotia Sheet (GSC, 1:506 880)
85-1 Industrial mineral commodities map of the Province of Nova Scotia (NSDNR, 1:500 000)
91-002 Sheet 19 Newcomb Corner, Halifax and Colchester counties (NSDNR, 1:15 840)
634 Upper Musquodoboit Sheet No. 49, Colchester and Halifax counties, Nova Scotia (GSC, 1:63 360)
1076A Shubenacadie, Colchester, Halifax, and Hants counties, Nova Scotia (GSC, 1:63 360)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

Caribou mines

NATIVE GOLD, ARSENOPYRITE

In slate and quartzite

Native gold occurs in quartz veins in the host rocks and in quartz boulders. Arsenopyrite is associated with the gold. Specimens of quartz containing native gold were displayed in the Geological Survey of Canada economic minerals exhibit at the Paris International Exhibition held in 1900.

The Caribou gold district consists of several mines in the vicinity of Caribou Mines village. Operations began in 1867. In the 1870s, numerous shafts were sunk and several stamp mills were installed by numerous companies. Some of the veins worked at that time were very rich with yields of 69 g/t gold. Various operators worked in the district almost continuously from 1869 until 1908 when a large part of the district was consolidated under the name Caribou Gold Mines Limited which continued operations until 1934. Consolidated Mining and Smelting Company of Canada then took over operations continuing until ore was exhausted in 1947. Development consisted of numerous shafts; the deepest underground workings extended to a vertical depth of 305 m at the Guffey-Jennings mine, the largest operation in the district. The Caribou district gold producers included the Truro mine, the Dixon mine, and the Guffey-Jennings (Lake, Holman) mine. The district yielded a total of 2 840 817 g of gold, ranking this production second in the province to that of the Goldenville district.

The mines are in Caribou Mines, about 37 km east of Shubenacadie. Lat. 45°03′25″N, Long. 62°56′31″W (old mines); Lat. 45°03′10″N, Long. 62°56′55″W (Dixon mine); Lat. 45°03′23″N, Long. 62°56′07″W (Truro mine); Lat. 45°03′44″N, Long. 62°55′17″W (Guffey-Jennings mine). *See* Map 32.

Road log from Highway 2 at **km 34.2** (*see* the Truro to Waverley road log on page 166):

km 0 Shubenacadie, junction of highways 2 and 224; proceed east along Highway 224.



Plate 18.

Guffey-Jennings Gold Mining Company, Caribou mines, 1897. (GSC 5293)



Plate 19.

Elk Gold Mining Company, Caribou mines, 1897. (GSC 5279)

45.0 Junction; turn right (south) onto the road to Caribou Mines.

54.0 Caribou Mines, junction. There are some old mine shafts are on both sides of this junction. To reach the Dixon mine from the junction at km 54.0, turn right (west) and proceed 0.75 km to the mine on the south side of the road, just east of the crossing over a brook. To reach the Truro mine from the junction at km 54.0, proceed straight ahead (east) for 0.5 km; turn right (south) and proceed 200 m to the Truro mine. To reach the Guffey-Jennings (Lake, Holman) mine from the junction at km 54.0, proceed straight ahead (east) for 1.4 km to the mine at the eastern end of Burkner Lake.

Refs.: 21 p. 33; 22 p. 927-936; 39 p. 354-364; 228 p. 62-68; 397 p. 41-42.

Maps (T): 11 E/2 Upper Musquodoboit
(G): 39A Nova Scotia Sheet (GSC, 1:506 880)
53A Southeast Nova Scotia (GSC, 1:250 000)
634 Upper Musquodoboit Sheet No. 49, Colchester and Halifax counties, Nova Scotia (GSC, 1:63 360)
643 Caribou gold district, Halifax Co, N.S., Plan and sections (GSC, 1:500)
Nova Scotia geology map (Atlantic Geoscience Society, 1:640 000)
Metallogenic map of the province of Nova Scotia, 1983 (NSDNR, 1:500 000)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

Upper Musquodoboit quarries

FOSSILS, CALCITE CRYSTALS

In dolomitic limestone

Shell fossils of Mississippian age occur in dark grey, dense dolomitic limestone. Calcite crystals occur in calcite veins in the limestone.

O.P. Mosher and Sons began quarry operations in 1940 on the Joseph Parker property. An on-site crushing and grinding plant produced lime for agricultural purposes; the output was used by farmers in Nova Scotia and in Prince Edward Island. In 1945, Mosher Limestone Company upgraded the processing plant and installed a new mill. In 1951, the company began shipments to the Dominion Steel and Coal Corporation Limited steel plant in Sydney, replacing shipments from the Scotch Lake quarry which had closed operations. Five quarries have been opened on the west side of a hill.

The quarries are in Upper Musquodoboit, about 40 km east of Shubenacadie. Lat. 45°07′58″N, Long. 62°56′25″W; Lat. 45°08′00″N, Long. 62°56′13″W; Lat. 45°08′09″N, Long. 62°56′11″W; Lat. 45°08′15″N, Long. 62°56′12″W; Lat. 45°08′22″N, Long. 62°55′48″W. *See* Map 32.

Road log from Highway 2 at **km 34.2** (*see* the Truro to Waverley road log on page 166):

km 0 Shubenacadie, junction of highways 2 and 224; proceed east along Highway 224.

46.8 Upper Musquodoboit, junction of Highway 336; turn right (south) continuing along Highway 224 toward Sheet Harbour Road.

48.1 Junction; turn left (north).

48.4 Junction; turn right (northeast) onto the Upper Musquodoboit quarries road. The first two quarries are on the north and south sides, respectively of the quarry road just north of the junction. The road log continues to the other quarries.

48.9 Quarry, on the south side of the road.

49.0 Quarry, on the north side of the road.

49.4 Quarry, at the end of the road.

Refs.: 74 p. 58; 161 p. 65; 162 p. 86; 255 p. 62-70; 357 p. 62-70.

Maps (T): 11 E/2 Upper Musquodoboit
(G): 39A Nova Scotia Sheet (GSC, 1:506 880)
53A Southeast Nova Scotia (GSC, 1:250 000)
85-1 Industrial mineral commodities map of the Province of Nova Scotia (NSDNR, 1:500 000)
91-002 Sheet 13 Upper Musquodoboit, Halifax and Colchester Counties (NSDNR, 1:15 840)
634 Upper Musquodoboit Sheet No. 49, Colchester and Halifax counties, Nova Scotia (GSC, 1:63 360)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

Admiral Rock quarries

FOSSILS, CALCITE CRYSTALS

In limestone

Fossils of Mississippian age including corals and marine shells occur abundantly in fine-grained porous buff to grey limestone. Calcite crystals occur in small cavities in the rock.

Limestone was originally quarried in the 1880s from a deposit on the west bank of the Shubenacadie River about 1300 m northeast of Admiral Rock village; on-site kilns operated to produce lime. In about 1940, Thomas Dillman opened a quarry on the east side of a ridge on the William Webb property, about 1 km northwest of Admiral Rock. A pulverizer and storage shed were installed on the site. In 1944, George Grant of Milford Station opened two quarries on the north side of a ridge on the Robert Kennedy property and produced crushed limestone for use locally for fertilizer. Operations ended in the early 1960s.

The quarries are about 10 km north of Shubenacadie. Lat. 45°10′52″N, Long. 63°24′11″W (original quarry); Lat. 45°10′27″N, Long. 63°25′17″W (Webb property); Lat. 45°10′30″N, Long. 63°24′15″W and Lat. 45°10′30″N, Long. 63°25′07″W (Kennedy property). *See* Map 31.

Road log from Highway 2 at **km 35.5** (*see* the Truro to Waverley road log on page 166):

km 0 Shubenacadie, junction of highways 2 and 215; proceed northwest onto Highway 215.

10.7 Admiral Rock, junction. To reach the original quarry on the west side of Shubenacadie River, continue north 1.2 km from this junction to the junction of a road leading east 1 km to an inactive quarry. To reach the other quarries, turn left (west) at the junction at km 10.7.

11.5 Junction; turn right (north).

12.2 Quarry, on the Webb property on the west side of the road.

12.35 Trail on the east side of the road leading 50 m to the western quarry on the Robert Kennedy property; the eastern quarry is 150 m further east.

Refs.: 161 p. 76-77; 256 p. 97-105; 337 p. 71-72.

Maps (T): 11 E/3 Shubenacadie
(G): 85-1 Industrial mineral commodities map of the Province of Nova Scotia (NSDNR, 1:500 000)
91-002 Sheet 9 Urbania, Hants and Colchester counties (NSDNR, 1:15 840)
635 Shubenacadie Sheet No. 56, Colchester and Halifax counties, Nova Scotia (GSC, 1:63 360)
1076A Shubenacadie, Colchester, Halifax, and Hants counties, Nova Scotia (GSC, 1:63 360)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

Shubenacadie (L.E. Shaw) pit

FIRE-CLAY, PYRITE, QUARTZ CRYSTALS, FOSSILS

The fire-clay is white, grey to reddish grey; it is suitable for pottery-making. Pyrite concretions, commonly studded with quartz crystals, occur in the clay. Well-preserved plant remains of Cretaceous age are found in a lignite bed at the south end of the pit.

Small quantities of clay from this deposit were recovered several years before 1910 and shipped to the Enfield pottery works which produced coarse stoneware. In about 1910, E. Thompson sank a 9 m shaft on his property adjoining the railway track near the original pit. Between 1927 and 1936, Dominion Steel and Coal Corporation sank a shaft to 15 m and mined clay for use in the company's steel mill. L.E. Shaw Limited took over operations in 1956 and began open pit mining. The clay is used for the manufacture of bricks and structural clay products and for medium duty refractories.

The pit is in the village of Shubenacadie. Lat. 45°04′56″N, Long. 63°24′38″W. *See* Map 31.

The Shubenacadie (L.E. Shaw) clay pit is on the east side of Highway 2 at **km 36.0** (*see* the Truro to Waverley road log on page 166), 0.5 km south of its junction with Highway 215.

Refs.: 146 p. 22-24; 163 p. 204-205; 242 p. 147; 301 p. 83-84; 337 p. 70.

Maps (T): 11 E/3 Shubenacadie
(G): 39A Nova Scotia Sheet (GSC, 1:506 880)
6-1956 Surficial geology, Shubenacadie, Colchester, Halifax, and Hants counties, Nova Scotia (GSC, 1:63 360)
85-1 Industrial mineral commodities map of the Province of Nova Scotia (NSDNR, 1:500 000)
91-002 Sheet 16 Shubenacadie, Halifax, Hants, and Colchester counties (NSDNR, 1:15 840)
635 Shubenacadie Sheet No. 56, Colchester and Halifax counties, Nova Scotia (GSC, 1:63 360)

1076A Shubenacadie, Colchester, Halifax, and Hants counties, Nova Scotia (GSC, 1:63 360)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

East Milford mine

GYPSUM, ANHYDRITE, ULEXITE, THENARDITE

In limestone

White to grey, finely granular massive gypsum occurs with white massive anhydrite. Colourless platy selenite, white to pink fibrous gypsum (satin spar), and white ulexite nodules occur in massive gypsum. Thenardite occurs as white powdery coatings on massive gypsum.

National Gypsum (Canada) Limited, the current operator, began mining the deposit in 1955. Crushed gypsum is shipped by rail to Bedford Basin for loading onto ocean-going ships for transport to Montreal and to wallboard and cement manufacturing plants along the eastern seaboard from Boston to Louisiana and in the Great Lakes region. Annual production is slightly more than three million tonnes making this one of the largest open pit gypsum operations in the western world.

The mine is about 8 km south of Shubenacadie. Lat. 45°00′43″N, Long. 63°25′10″W. *See* Map 31.

Access to the East Milford mine is by a road 1.2 km long leading east from Highway 2 at **km 43.9** (*see* the Truro to Waverley road log on page 166).

Refs.: 2 p. 71-72; 5 p. 20-24; 44 p. 115-119; 258 p. 107; 337 p. 68; 345 p. 386.

Maps (T): 11 E/3 Shubenacadie
(G): 39A Nova Scotia Sheet (GSC, 1:506 880)
6-1956 Surficial geology, Shubenacadie, Colchester, Halifax, and Hants counties, Nova Scotia (GSC, 1:63 360)
85-1 Industrial mineral commodities map of the Province of Nova Scotia (NSDNR, 1:500 000)
91-002 Sheet 16 Shubenacadie, Halifax, Hants, and Colchester counties (NSDNR, 1:15 840)
908 Gays River Sheet No. 55, Colchester and Hants counties, Nova Scotia (GSC, 1:63 360)
1076A Shubenacadie, Colchester, Halifax, and Hants counties, Nova Scotia (GSC, 1:63 360)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

Lantz (L.E. Shaw) pit

CLAY

The clay is compact reddish brown. It is composed of quartz, kaolinite, and mica. It is of Cretaceous age.

L.E. Shaw Limited has been operating the pit and plant since 1931 when it took over operations from Nova Scotia Clay Works Limited. The clay is used for the manufacture of various types of bricks, and structural tile, drain tile, sewer pipe, and flue linings.

The pit is in Lantz, about 12 km south of Shubenacadie. Lat. 44°58′41″N, Long. 63°29′07″W. *See* Map 33.

Road log from Highway 2 at **km 48.6** (*see* the Truro to Waverley road log on page 166):

km		
	0	Lantz, junction of highways 2 and 277; proceed south along Highway 277.
	0.5	Junction; turn right (west).
	1.0	Lantz pit, on the south side of the road; the brick plant is on the north side of the road.

Refs.: 146 p. 22-24; 162 p. 79; 163 p. 226-227.

Maps (T): 11 D/14 Musquodoboit Harbour
(G): 39A Nova Scotia Sheet (GSC, 1:506 880)
85-1 Industrial mineral commodities map of the Province of Nova Scotia (NSDNR, 1:500 000)
91-002 Sheet 22 Dutch Settlement, Hants and Halifax counties (NSDNR, 1:15 840)
1005 Elmsdale Sheet No. 66, Hants and Halifax counties, Nova Scotia (GSC, 1:63 360)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

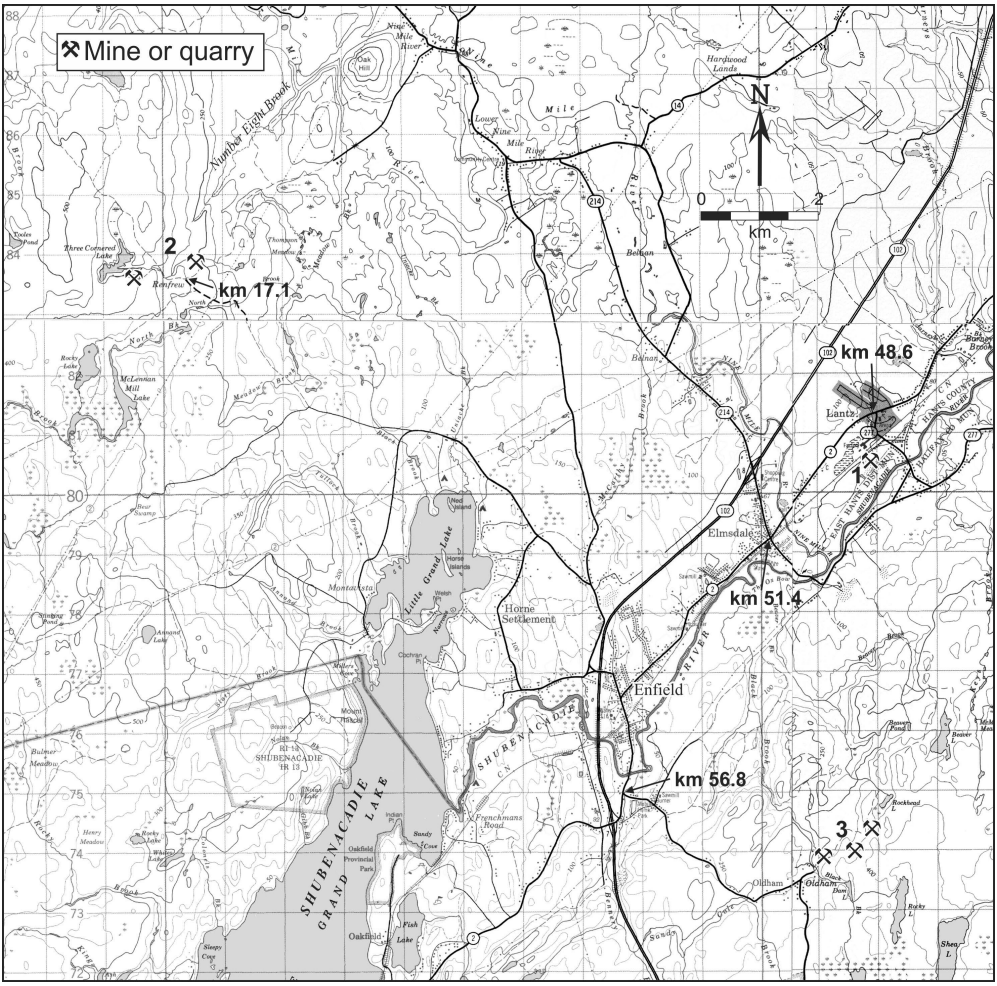
Renfrew mines

NATIVE GOLD, ARSENOPYRITE, GALENA, CHALCOPYRITE, PYRITE

In quartzite and slate

Native gold occurs as grains, nuggets, strings, and thin plates in quartz veins and in slate. Arsenopyrite, galena, chalcopyrite, and pyrite occur in quartz. Very rich gold specimens were recovered during mining operations; some of them were displayed in the Geological Survey of Canada economic minerals exhibit at the Paris International Exhibition held in 1900.

The Renfrew gold district extends northeast from Renfrew to Number Eight Brook and south from Renfrew to North (Renfrew) Brook. The most important operations were between Parker (Spring) Brook and North (Renfrew) Brook, and between Renfrew and Three Cornered (Stinking) Lake; gold-bearing quartz boulders and rich auriferous drift were found in these sections. The discovery of gold in the district was made in 1861 when William Thompson found a gold-bearing quartz boulder on the banks of a brook near his mill. In the same year, John McPhee discovered gold-bearing quartz veins near the Thompson mill, but it was Andrew Parker's 1862 discovery of an unusually rich quartz vein near that mill that led to a prospecting rush to the area. Small-scale mining began immediately and some very rich veins were mined in the first few months of operations. Production increased annually and the district became the leading gold producer in the province in 1867; the most productive period was from 1866 to 1871, when the district produced 732 320 g of gold, representing nearly half



1. Lantz (L.E. Shaw) pit 2. Renfrew mines 3. Oldham mines

Map 33. Enfield

its total production. Mining was continuous until 1913 with peak periods in 1900 to 1904 and in 1910 to 1912 due mainly to the recovery of very rich ore from the mines in the western end of the district. Since that time, production has been spasmodic.

The principal mining companies operating during the most productive years included Ophir Mining Company, Hartford Gold Mining Company, Colonial Gold Mining Company, and Renfrew Gold Mining Company in the 1860s and 1870s; Empress Gold Mining Company in the 1880s; Pictou Development and Mining Company Limited in the 1890s; Big Five Mining Company, E. and C. Thompson, Pictou Development Company, and Eagle Mining Company Limited in 1900 and 1910; and M.J. O'Brien Company from 1910 to 1919. More recent producers were: Renfrew Gold Mines Limited (1927–1932); Horne Gold Mines Limited (1938–1940, 1952–1955); and East Hants Gold Mines Limited (1955–1958). Anglo Canadian Mining Corporation did some trenching and geochemical and geophysical surveys in 1984.

The Renfrew mines consist of numerous shafts up to 152 m deep. The total production for the district from 1862 to 1958 amounted to 1 604 775 g of gold, the seventh largest production in the province.

The mines occur in the town of Renfrew, about 10 km northwest of Elmsdale. Lat. 45°00′28″N, Long. 63°37′49″W (eastern section); Lat. 45°00′21″N, Long. 63°38′20″W (western section). *See* Map 33.

Road log from Highway 2 at **km 51.4** (*see* the Truro to Waverley road log on page 166):

km		
	0	Elmsdale, junction of highways 2 and 214; proceed northwest along Highway 214 toward Nine Mile River.
	7.5	Nine Mile River, junction; turn left (west).
	17.1	Renfrew, junction; from this junction an old mine road leads north toward Parker Brook and the eastern section mines. The oldest Renfrew mines are between this junction and the brook; the 145 m Chummy shaft on the McLeod (Nuggety) vein, from which most of the gold recovered was in the form of nuggets, is about 270 m northeast of this junction. To reach the mines in the western section, continue along the road leading west from the junction at km 17.1.
	17.6	Junction, at the eastern end of Three Cornered Lake (shown as Stinking Lake in old geological maps); follow the road on left leading west.



Plate 20.

Empress Gold Mining Company stamp mill and tailings, Renfrew mines, 1896.
(GSC 5263A)

18.0 Renfrew mines, western section. Production from this area represented the last period (1910–1919) of extensive mining in the district; the returns included some exceedingly rich ore recovered from the Jubilee and Thompson veins.

Refs.: 21 p. 33; 39 p. 652-677; 115 p. 162A-175A; 194 p. 30-33; 228 p. 159-166; 337 p. 49-50; 397 p. 44.

Maps (T): 11 E/4 Kennetcook
(G): 39A Nova Scotia Sheet (GSC, 1:506 880)
701 Plan and sections, Renfrew gold district, Hants Co., Nova Scotia (GSC, 1:3600)
1005 Elmsdale Sheet No. 66, Hants and Halifax counties, Nova Scotia (GSC, 1:63 360)
1075A Kennetcook, Hants County, Nova Scotia (GSC, 1:63 360)
Metallogenic map of the province of Nova Scotia, 1983 (NSDNR, 1:500 000)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

Oldham mines

NATIVE GOLD, ARSENOPYRITE, GALENA, SPHALERITE, PYRITE, PYRRHOTITE, MAGNESITE, SCHEELITE

In slate and quartzite

Native gold occurs with arsenopyrite, galena, sphalerite, and traces of pyrite and pyrrhotite in quartz veins. Native gold also occurs in greenish dolomite and in magnesite. During mining operations, nuggets composed of native gold and arsenopyrite, and rich pockets of native gold, including one that contained 1866 g of gold, were found; one vein carried an unusually high value of 3531 g/t gold. Reddish scheelite was found in some of the quartz veins.

The Oldham gold district consists of numerous gold-bearing quartz veins in an area 3200 by 800 m. It extends northeast from just west of Oldham village to Rockhead Lake. Edward Horne of Elmsdale and Samuel Isner of Gays River discovered a white quartz boulder containing native gold in the Oldham district during a hunting excursion in the spring of 1861. Amos Gough, Edward McDonald, and Donald McKenzie made additional discoveries in the same year. Mining from open cuts and shallow shafts began in 1862. By 1863, eight stamp mills were in operation. During succeeding years a number of individuals and companies worked the veins. Among the individuals were Messrs. Lockhart, Schaffer, Bunker, Robert G. Fraser, McBean, Donaldson, Oakes, Pearson, Bayne, Doyle, Horne, McAllister, Baker, A. McDonald, E.C. McDonell, J.E. Hardman, M.R. O'Shaughnessy, Edward Whidden, and John and Alex. Greenough. The principal companies were: Boston and Oldham Company (1866 and 1867); Sterling Company (1869–1871); St. Andrew's Company (1870 and 1871); Oldham Gold Company (1885–1894); Standard Gold Company, and Napier Company (1890–1893); Caledonia Mining Company, and Rhode Island Mining Company (1893); New England Gold Mining Company (1903); Sterling Gold Mining Company (1903–1910); Oldham Stirling Gold Company (1906–1916); Oldham Mining Company (1910–1916); M.J. O'Brien Company (1914); John S. Short and Company (1924); Acadia Gold Mining Company (1926–1928); and Avon Gold Mines Limited (1939). The workings consist of open cuts and trenches, and several shafts. The mines produced gold almost continuously from 1862 to 1929, and intermittently until 1946. The most productive

part of the district was between Black Brook and Rockhead Lake. The district's most productive period, 1885 to 1893, recorded an average annual recovery of 81 863 g of gold. The total production from 1862 to 1946 amounted to 2 649 276 g of gold, the third largest in the province.

The mines are about 4 km southeast of Enfield. Lat. 44°55′06″N, Long. 63°29′35″W (Boston and Oldham mine); Lat. 44°55′10″N, Long. 63°29′15″W (Dunbrack shaft); Lat. 44°55′26″N, Long. 63°28′57″W (Baker shafts). *See* Map 33.

Road log from Highway 2 at **km 56.8** (*see* the Truro to Waverley road log on page 166):

km		
	0	Enfield, junction of Highway 2 and the road to Oldham; proceed east onto the road to Oldham.
	4.3	Oldham, junction of the road leading south to Goffs; continue straight ahead (east).
	4.6	Road crosses Black Brook. The mine workings extend 1200 m northeastward from here toward Rockhead Lake.
	4.7	Boston and Oldham mine, one of the earliest operations in the district.
	4.9	Junction, road on right leading east 550 m to the Dunbrack vein shaft (137 m deep).
	5.9	Junction; continue straight ahead 75 m to the Baker vein shafts (115 m and 125 m, respectively).

Refs.: 21 p. 33; 39 p. 607-651; 118 p. 181A-182A; 124 p. 379-382; 194 p. 29-30; 228 p. 150-156; 370 p. 88C-90C.

Maps (T): 11 D/14 Musquodoboit Harbour
(G): 39A Nova Scotia Sheet (GSC, 1:506 880)
53A Southeast Nova Scotia (GSC, 1:250 000)
642 Plan and sections, Oldham gold district, Halifax Co., N.S. (GSC, 1:6000)
1005 Elmsdale Sheet No. 66, Hants and Halifax counties, Nova Scotia (GSC, 1:63 360)
Metallogenic map of the province of Nova Scotia, 1983 (NSDNR, 1:500 000)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

Fletchers Lake occurrence

BARITE, GOETHITE

In shale

White barite occurs as tabular crystals in a vein in dark brown shale. Goethite occurs in fractures, cleavage planes, and in interstices between barite crystals.

The barite vein is up to 45 cm wide and 150 m long. Angus Rafter exposed it by trenching in 1962.

The occurrence is in Fletchers Lake village, about 500 m east of Highway 2. Lat. 44°49′57″N, Long. 63°36′20″W. *See* Map 34.

Road log from Highway 2 at **km 71.0** (*see* the Truro to Waverley road log on page 166):



Plate 21.

Oldham mines, Baker Cross lead, 1891. (National Archives of Canada PA 39860)

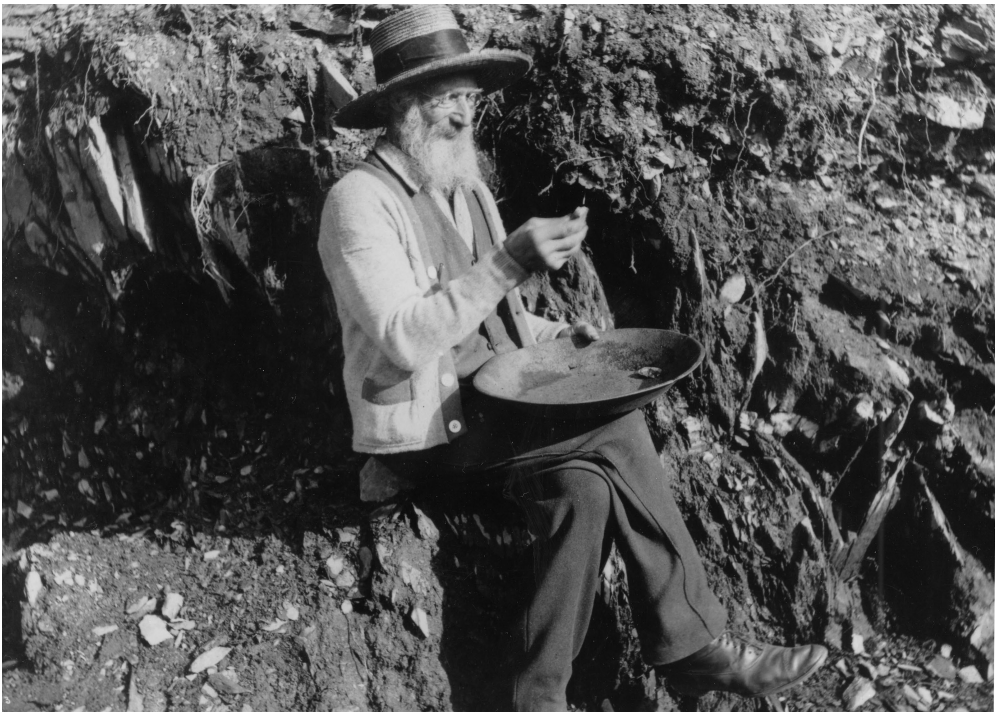


Plate 22

Henry N. Reeves of Black Brook, a typical gold miner, Oldham district, 1912. (GSC 21583)

km		
	0	Fletchers Lake, junction; proceed along the road leading southeast.
	0.5	Junction; turn left onto a road leading northeast.
	0.9	Fletchers Lake occurrence, below the power line and about 35 m north of the road (Robert Street).

Ref.: 132 p. 230-234.

Maps (T): 11 D/13 Mount Uniacke
(G): 39A Nova Scotia Sheet (GSC, 1:506 880)
85-1 Industrial mineral commodities map of the Province of Nova Scotia (NSDNR, 1:500 000)
1025 Waverley Sheet No. 67, Halifax and Hants counties, Nova Scotia (GSC, 1:63 360)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

Waverley mines

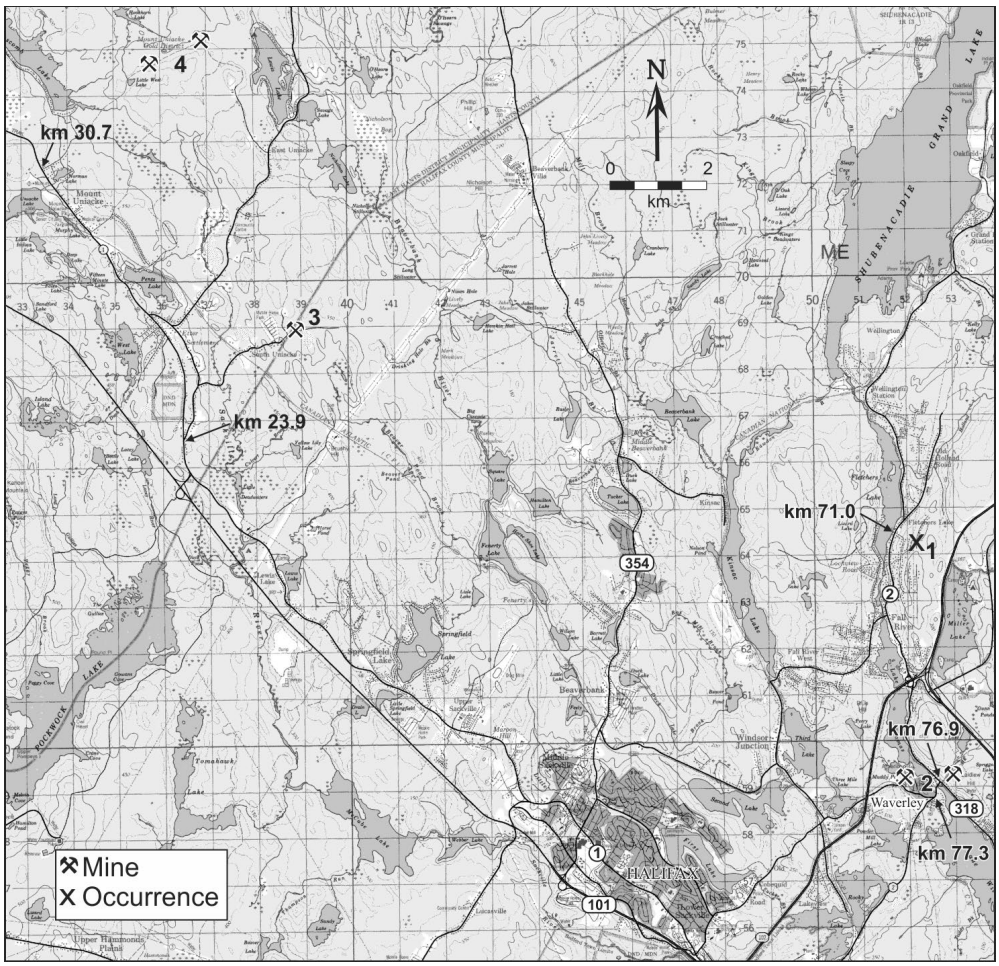
NATIVE GOLD, ARSENOPYRITE, PYRITE

In slate and quartzite

Native gold occurs with arsenopyrite and pyrite in quartz veins. Specimens of quartz containing native gold were displayed in the Geological Survey of Canada economic minerals exhibit at the Paris International Exhibition held in 1900.

Some of the gold-bearing quartz veins at this mine resembled barrels or logs lying side by side, giving the name barrel quartz to veins of this type commonly occurring in Nova Scotia gold deposits. Some portions of the quartz veins were exceptionally rich, including 'a mass of about two cubic feet extracted in 1862 from which gold to the value of $4500 was obtained' (Ref. 194 p. 27). At that time, gold was valued at $18.50 per ounce, and each miner earned $1.25 per day. During early mining operations, small nuggets of native gold were recovered from crushed quartz.

The Waverley district consists of the western section located between Muddy Pond and American Hill in Waverley, and the eastern section on Laidlaw Hill. It is one of the first gold districts discovered in Nova Scotia and was among the principal gold producers in the province. Alexander Taylor discovered gold in quartz boulders on August 23, 1861 on the edge of Muddy Pond on the Waverley farm, also known as the Allen farm. When the discovery became known, the Hon. Joseph Howe visited the area and returned to Halifax with $80 worth of specimens acquired from men who broke them off boulders found on American Hill. The Waverley gold rush began the following day. On September 14, 1861, James Skerry discovered gold-bearing quartz boulders in drift and a gold-bearing quartz vein in bedrock on Laidlaw Hill. On May 1, 1862, Alexander Taylor exposed a gold-bearing vein in bedrock on the Waverley farm. In the same year, other auriferous veins were discovered east of Muddy Pond and active mining began. The most productive periods were in 1862 to 1877, 1893 to 1895, and 1901 to 1903. Between 1864 and 1867, Waverley was the province's leading gold producer; the 1865 production was more than half the province's total. Principal operators in the 1860s and 1870s included Messrs. Muller, Burkner, Franck, and Ellerhausen, The Wolfville Company, Nova Scotia Gold Company, Lake Major Company, Rockland Gold Mining Company, Waverley and Boston Company, Taylor Gold Company, North American Company, Boston and Nova Scotia Company, and Waverley Gold Mining Company. From the



1. Fletchers Lake occurrence 2. Waverley mines 3. South Uniacke mines 4. Mount Uniacke mines

Map 34. Waverley

1890s to 1903, the main producers were: West Waverley Gold Mining Company, Tudor Gold Mining Company, Tunnel Mining Company, and Waverley Gold Mining Company. Sporadic production continued until 1940. Development consisted of numerous shafts (the deepest being 152 m) in the western and eastern sections, and a 204 m adit driven into Laidlaw Hill. Total production from 1862 to 1940 amounted to 2 257 039 g of gold, the fourth-largest production in Nova Scotia.

The mines are in the village of Waverley. Lat. 44°47′13″N, Long. 63°35′36″W (eastern section); Lat. 44°47′11″N, Long. 63°36′24″W (western section). *See* Map 34.

Road log from Highway 2 at **km 77.3** (*see* the Truro to Waverley road log on page 166):

km		
	0	Junction of Highway 2 and Cobequid Road; proceed west along Cobequid Road.
	0.6	Waverley, junction; the road on right leads north 400 m to old workings in the western section.

0.9 Waverley, junction; the road on right leads north 250 m to additional workings in the western section.

Access to the eastern section workings on Laidlaw Hill is by a 350 m long trail leading east (along the south side of Willis Brook) from Highway 318 at a point 100 m south of the junction at km 76.9 (see the Truro to Waverley road log on page 166); the portal to the Laidlaw Hill adit is on the east side of Highway 2, about 150 m north of this junction.

Refs.: 21 p. 33; 39 p. 713-739; 114 p. 150A-152A; 194 p. 25-28; 228 p. 200-208; 397 p. 42.

Maps (T): 11 D/13 Mount Uniacke
(G): 39A Nova Scotia Sheet (GSC, 1:506 880)
53A Southeast Nova Scotia (GSC, 1:250 000)
721 Waverley gold district, Halifax Co., Nova Scotia (GSC, 1:3000)
1025 Waverley Sheet No. 67, Halifax and Hants counties, Nova Scotia (GSC, 1:63 360)
Metallogenic map of the province of Nova Scotia, 1983 (NSDNR, 1:500 000)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

South Uniacke mines

NATIVE GOLD, ARSENOPYRITE

In slate and quartzite

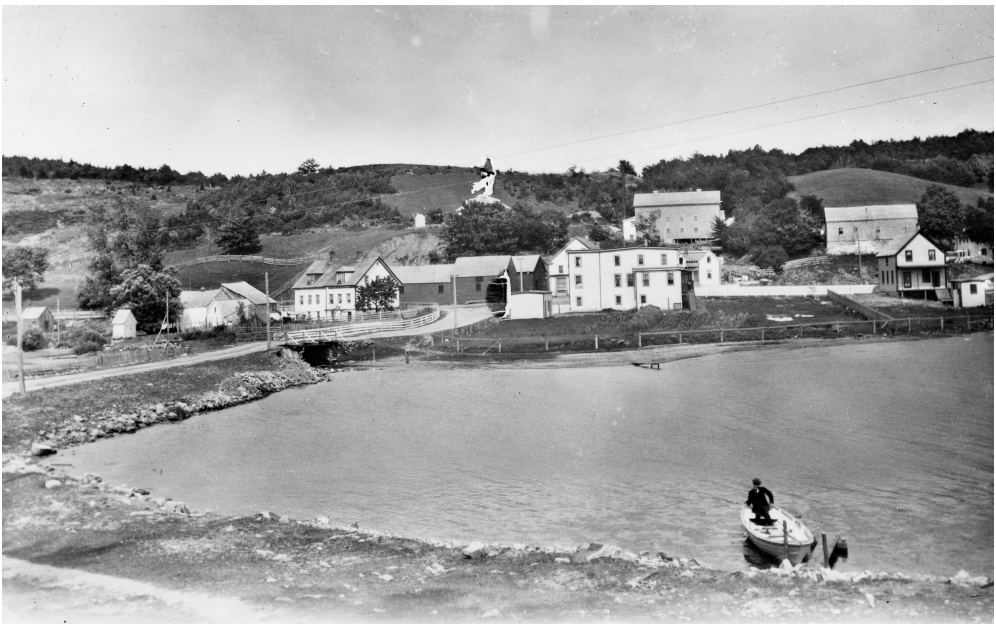


Plate 23.

Waverley gold district (eastern part), 1891. (GSC 5229)



Plate 24.

Lakeview Gold Mining Company shaft on the shore of Lake Thomas, Waverley, 1891. (National Archives of Canada PA 39841)

Native gold occurs with minor arsenopyrite in quartz veins. Specimens of quartz containing native gold were displayed in the Geological Survey of Canada economic minerals exhibit at the Paris International Exhibition held in 1900.

The South Uniacke gold district consists of two parallel zones extending over 550 m. The discovery of gold in the district was made in 1887. J.J. Withrow Mining Company began mining in 1888, followed in 1889 by Mr. Thompson who opened the Thompson and Quirk mine on very rich ore immediately to the east. These mines operated continuously until 1899. In 1894, Golden Lode Mining Company sank a 123 m shaft just east of the Thompson and Quirk mine, and continued mining until 1897; this mine contained some very rich ore including a streak with a remarkable average yield of 311 to 373 g/t gold. In 1902 to 1905, Victoria Mining Company worked the Withrow property from a 122 m shaft. Reginald Withrow started a new shaft on the Withrow property in 1922. Mining continued intermittently until 1948. Development consisted of several shafts and open cuts. Three crushing mills operated on the site. The South Uniacke district produced 645 764 g of gold between 1888 and 1948.

The mines are in the village of South Uniacke. Lat. 44°52′21″N, Long. 63°46′23″W. *See* Map 34.

Road log from Highway 2 at **km 77.3** (*see* the Truro to Waverley road log on page 166):

km		
	0	Junction of Highway 2 and Cobequid Road; proceed west along Cobequid Road.
	6.7	Lower Sackville, junction; turn right (northwest) onto Sackville Drive (Highway 1).
	23.9	Junction; follow the road on right leading northeast to South Uniacke.



Plate 25.

Golden Lode Gold Mining Company, South Uniacke, 1896. (GSC 5257)

25.2 Junction; turn right (east).

26.6 South Uniacke, at a railway crossing; continue straight ahead.

28.0 South Uniacke mines.

Refs.: 21 p. 33; 115 p. 179A-180A; 228 p. 185-187; 397 p. 43.

Maps (T): 11 D/13 Mount Uniacke
(G): 39A Nova Scotia Sheet (GSC, 1:506 880)
53A Southeast Nova Scotia (GSC, 1:250 000)
87-8 Mount Uniacke (N.T.S. sheet 11 D/13 west half), Nova Scotia (NSDNR, 1:50 000)
94-01 South Mountain Batholith, Western Nova Scotia (NSDNR, 1:250 000)
768 (Plan and section) South Uniacke gold district, Hants and Halifax counties, Nova Scotia (GSC, 1:3000)
1025 Waverley Sheet No. 67, Halifax and Hants counties, Nova Scotia (GSC, 1:63 360)
Metallogenic map of the province of Nova Scotia, 1983 (NSDNR, 1:500 000)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

Mount Uniacke mines

NATIVE GOLD, ARSENOPYRITE, PYRITE, GALENA, SPHALERITE

In slate and quartzite

Native gold occurs in quartz veins containing minor amounts of arsenopyrite, pyrite, galena, and sphalerite. During mining operations, some very rich shoots of free gold were encountered in several veins. Native gold specimens reputed to be among the finest ever encountered in Nova Scotia gold mines were recovered from a rich vein in the western workings. Specimens of quartz containing native gold were displayed in the Geological Survey of Canada economic minerals exhibit at the Paris International Exhibition held in 1900.

The Mount Uniacke gold district consists of two zones, a north-south 915 m zone crossed by an east-west 1980 m zone. In 1865, David Mackintosh, John Sims, and Charles Sims discovered gold-bearing quartz veins on the Hon. Richard J. Uniacke farm. The discovery led to a prospecting rush in the district. In 1866, mining began, a small crusher was installed, and a road from the mine to Uniacke Station was constructed. By 1867, activity flourished and the district attracted two hundred residents. Production peaked in 1868 with a recovery of 100 991 g of gold, the highest annual yield recorded for the district. During these early years, yield of gold from 68.6 to 137 g/t were fairly common, and exceptional yields of 445.7 to 617 g/t were recorded. Production decreased sharply in 1869 but recovered in the 1880s and 1890s. From that time to 1941, activity was sporadic. The principal producers were Uniacke Gold Mining Company, West Lake Company, Queen Gold Mining Company, Montreal Mining Company, Prince of Wales Company, and Victoria Mining Company. Development consisted of numerous shafts, up to 80 m deep, and several open cuts, one of them being 45 m deep and 30 m long. Several crushing mills were in operation. Total production for the district from 1867 to 1941 was 862 704 g of gold. Exploration in 1974 consisted of trenching and drilling by First Eastern Gold Development Inc.

The mines are on a ridge about 5 km northeast of Mount Uniacke village. Lat. 44°55′23″N, Long. 63°48′50″W (western workings); Lat. 44°55′41″N, Long. 63°48′00″W (main workings). *See* Map 34.

Road log from Highway 2 at **km 77.3** (*see* the Truro to Waverley road log on page 166):

km		
	0	Junction of Highway 2 and Cobequid Road; proceed west along Cobequid Road.
	6.7	Lower Sackville, junction; turn right (northwest) onto Sackville Drive (Highway 1).
	23.9	Junction, road to South Uniacke; continue straight ahead (north) along Highway 1.
	29.6	Mount Uniacke, at Mount Uniacke Provincial Park; continue straight ahead.
	30.7	Junction; turn right (northeast) onto the road to Cockscomb Lake.
	31.8	Junction, road to Cockscomb Lake; continue straight ahead (northeast).
	34.0	Mount Uniacke mines (western workings).
	35.1	Mount Uniacke mines (main workings).

Refs.: 21 p. 33; 39 p. 571-606; 115 p. 175A-179A; 118 p. 183A-184A; 154 p. 43; 194 p. 33-35; 228 p. 140-149; 397 p. 44.

Maps (T): 11 D/13 Mount Uniacke
(G): 39A Nova Scotia Sheet (GSC, 1:506 880)
53A Southeast Nova Scotia (GSC, 1:250 000)

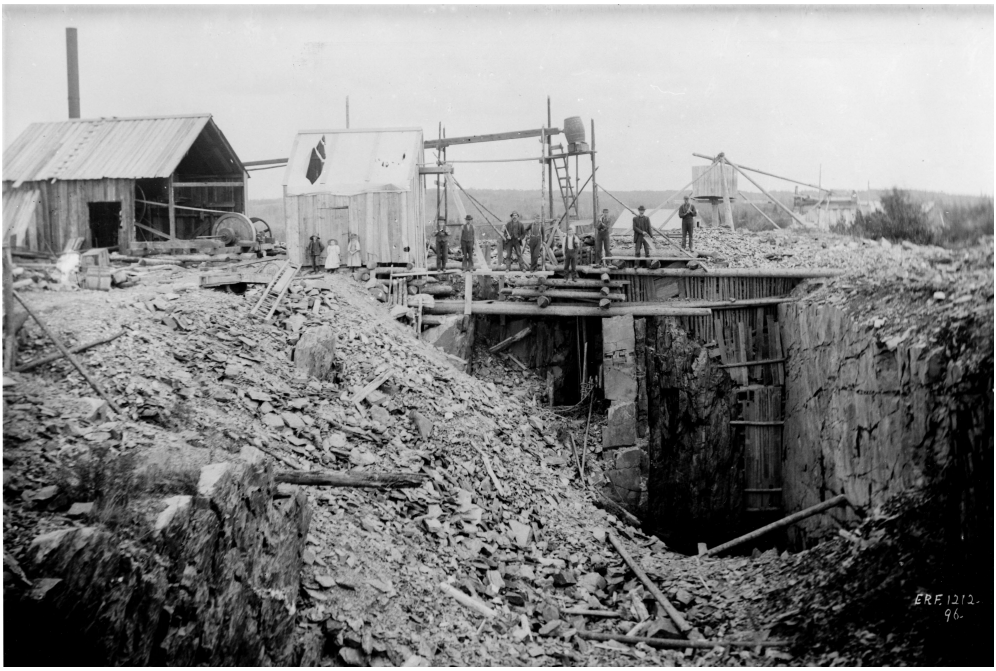


Plate 26.

Montreal Gold Mining Company, Mount Uniacke, 1896. (GSC 5264)

87-8 Mount Uniacke (N.T.S. sheet 11 D/13 west half), Nova Scotia (NSDNR, 1:50 000)
94-01 South Mountain Batholith, Western Nova Scotia (NSDNR, 1:250 000)
709 Plan and section, Mount Uniacke gold district, Hants Co., Nova Scotia (GSC, 1:3000)
1005 Elmsdale Sheet No. 66, Hants and Halifax counties, Nova Scotia (GSC, 1:63 360)
Metallogenic map of the province of Nova Scotia, 1983 (NSDNR, 1:500 000)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

This is the end of the description of collecting localities between Truro and Waverley. The description of collecting localities along the main collecting route along Highway 236 (Glooscap Trail) continues from **km 154.0** (p. 117).

Clifton (Old Barns) mine

LIMONITE, GOETHITE, HEMATITE

In sandstone

Limonite, the iron ore, consists mainly of goethite and hematite. It occurs in botryoidal and massive forms in small veins and as concretions.

A. McDonald opened a 2 m iron-bearing vein in the 1870s and shipped 450 t of iron ore to the Steel Company of Canada Londonderry smelter in 1879. In 1903, Londonderry Iron Mining Company reactivated the mine and shipped 272 t of ore to its smelter in Londonderry. Development consists of two shafts, 20 m apart, each about 21 m deep.

The mine is on the Allison McCurdy farm about 1.5 km southwest of Clifton. Lat. 45°20′11″N, Long. 63°25′07″W. *See* Map 35.

Road log from Highway 236 (Glooscap Trail) at **km 163.4** (*see* the Main Road Log on page 117):

km		
	0	Junction of Highway 236 and the road to Black Rock; proceed west toward Black Rock.
	0.4	McCurdy farm on the north side of the road. The Clifton (Old Barns) mine is about 500 m north of the road.

Refs.: 138 p. 95P; 155 p. 15; 218 p. 168-169; 336 p. 91; 372 p. 139-141; 374 p. 18-19.

Maps (T): 11 E/6 Truro
(G): 39A Nova Scotia Sheet (GSC, 1:506 880)
82-9 Cobequid Highlands, Colchester, Cumberland & Pictou counties, Nova Scotia (NSDNR, 1:50 000)
636 Truro Sheet No. 57, Colchester County, Nova Scotia (GSC, 1:63 360)
1058A Truro, Colchester, Hants and Pictou counties, Nova Scotia (GSC, 1:63 360)
Metallogenic map of the province of Nova Scotia, 1983 (NSDNR, 1:500 000)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

Black Rock mine

MANGANITE, PYROLUSITE, HAUSMANNITE, LIMONITE

In limestone

Manganite, the main ore mineral, is massive with colloform banding. It occurs with minor amounts of pyrolusite, hausmannite, and botryoidal limonite. These minerals occur with calcite in joints and fractures.

The deposit was opened sometime before 1880 by shallow open cuts into the east bank of the Shubenacadie River between low and high tide levels. T.H. Donaldson investigated the deposit during World War II when there was a demand for manganese for war purposes. The investigation consisted of stripping and two shallow openings about 1 m deep. Erosion of the shoreline has removed evidence of the mine openings, but specimens containing manganese ore may be found along the shore.

The mine site is 90 m west of the remnants of the wharf at Black Rock. Lat. 45°18′58″N, Long. 63°28′34″W. *See* Map 35.

Road log from Highway 236 (Glooscap Trail) at **km 163.4** (*see* the Main Road Log on page 117):

km		
	0	Junction of Highway 236 and the road to Black Rock; proceed west along the road to Black Rock.

5.7 Black Rock, junction; continue straight ahead (southwest).

6.2 End of the road. The mine site is about 90 m west of this point.

Refs.: 29 p. 97; 128 p. 1F-2F; 182 p. 38-39; 186 p. 91; 248 p. 223-224; 329 p. 122-124; 336 p. 110-111.

Maps (T): 11 E/6 Truro
(G): 39A Nova Scotia Sheet (GSC, 1:506 880)
837 Noel Sheet No. 64, Colchester and Hants counties, Nova Scotia (GSC, 1:63 360)
1058A Truro, Colchester, Hants and Pictou counties, Nova Scotia (GSC, 1:63 360)
Metallogenic map of the province of Nova Scotia, 1983 (NSDNR, 1:500 000)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

South Maitland occurrence

RUTILE, ILMENITE, MAGNETITE, GARNET, ZIRCON, MONAZITE

In beach sand

Rutile, ilmenite, magnetite, and minor amounts of garnet, zircon, and monazite occur as grains of various sizes in black beach sand.

The black beach sand is exposed at low tide in the Shubenacadie River in South Maitland. Lat. 45°15′01″N, Long. 63°27′13″W. *See* Map 35.

Access to the South Maitland occurrence is by walking down the river bank from the Highway 236 (Glooscap Trail) bridge over the Shubenacadie River in South Maitland at **km 175.0** (*see* the Main Road Log on page 117).

Refs.: 223 p. 2; 224 p. 63-64.

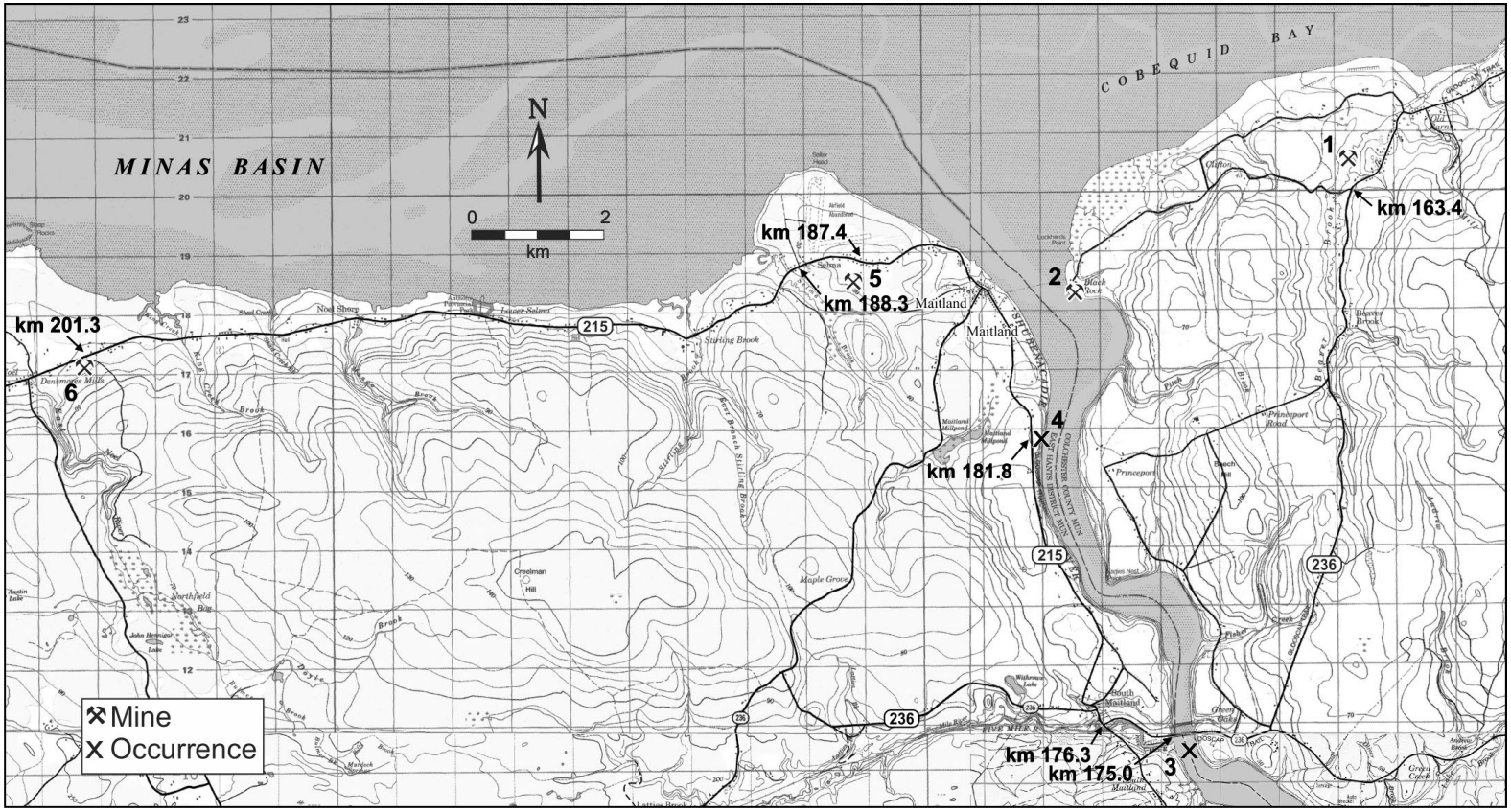
Maps (T): 11 E/3 Shubenacadie
(G): 39A Nova Scotia Sheet (GSC, 1:506 880)
91-002 Sheet 9 Urbania, Hants and Colchester counties (NSDNR, 1:15 840)
1076A Shubenacadie, Colchester, Halifax, and Hants counties, Nova Scotia (GSC, 1:63 360)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

Stephens occurrence

GYPSUM

In shale and limestone

Gypsum occurs as white fibrous (satin spar) veins up to 45 cm wide, and as white compact masses.



1. Clifton (Old Barns) mine 2. Black Rock mine 3. South Maitland occurrence 4. Stephens occurrence 5. Selma mine 6. Densmore Mills mine

Map 35. Clifton-Maitland

This is the site of the largest fibrous gypsum (satin spar) deposit in the province. In 1869, it was mined by an open cut into the west bank of the Shubenacadie River. The gypsum was shipped to a mill in Noel for the production of *terra alba*, a finely powdered gypsum. Operations ended in 1870 after the mill was destroyed by fire.

The occurrence is exposed over about 200 m along the west bank of the Shubenacadie River, about 3 km southeast of Maitland. Lat. 45°17′41″N, Long. 63°29′05″W. *See* Map 35.

Access to the Stephens occurrence is by a 250 m walk down the Shubenacadie River west bank from Highway 215 (Glooscap Trail) at **km 181.8** (*see* the Main Road Log on page 117).

Refs.: 204 p. 65; 336 p. 89.

Maps (T): 11 E/3 Shubenacadie
(G): 39A Nova Scotia Sheet (GSC, 1:506 880)
837 Noel Sheet No. 64, Colchester and Hants counties, Nova Scotia (GSC, 1:63 360)
1058A Truro, Colchester, Hants and Pictou counties, Nova Scotia (GSC, 1:63 360)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

Selma mine

LIMONITE, HEMATITE

In shale

The iron ore, consisting of limonite and hematite, occurs in massive form.

New Glasgow Iron, Coal and Railway Company mined the deposit in about 1890. The original workings consisted of a shaft 3.7 m deep on the Charles Ells farm, and a pit 2.5 m deep on the Sweeney farm, about 180 m to the east. Subsequently, several pits were sunk on the Ells farm.

The mine is just south of Selma, about 5 km west of Maitland. It is exposed at the mouth of a brook south of Highway 215 (Glooscap Trail). Lat. 45°19′03″ Long. 63°31′36″. See Map 35.

Access to the Selma mine is by a 500 m footpath leading south from Highway 215 at **km 187.4** (*see* the Main Road Log on page 117).

Refs.: 218 p. 182-183; 366 p. 62-63; 372 p. 136-139; 374 p. 112.

Maps (T): 11 E/5 Bass River
(G): 39A Nova Scotia Sheet (GSC, 1:506 880)
837 Noel Sheet No. 64, Colchester and Hants counties, Nova Scotia (GSC, 1:63 360)
874A Londonderry, Colchester and Hants counties, Nova Scotia (GSC, 1:63 360)
Metallogenic map of the province of Nova Scotia, 1983 (NSDNR, 1:500 000)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

Densmore Mills mine

PYROLUSITE

In quartzite

Pyrolusite occurs as radiating acicular crystals forming small stringers up to 15 mm wide in the host rock.

In 1880, Miner Brown sank a shaft 7.6 m deep and removed about one tonne of ore.

The mine is in Densmore Mills. Lat. 45°18′19″N, Long. 63°41′34″W. *See* Map 35.

Access to the Densmore Mills mine is by walking about 180 m south from Highway 215 (Glooscap Trail) at **km 201.3** (*see* the Main Road Log on page 117).

Refs.: 29 p. 23, 89-91; 182 p. 67; 329 p. 130; 366 p. 77.

Maps (T): 11 E/5 Bass River
(G): 39A Nova Scotia Sheet (GSC, 1:506 880)
837 Noel Sheet No. 64, Colchester and Hants counties, Nova Scotia (GSC, 1:63 360)
874A Londonderry, Colchester and Hants counties, Nova Scotia (GSC, 1:63 360)
Metallogenic map of the province of Nova Scotia, 1983 (NSDNR, 1:500 000)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

West Gore mine

STIBNITE, NATIVE ANTIMONY, NATIVE GOLD, ARSENOPYRITE, PYRITE, VALENTINITE, KERMESITE

In slate

The principal ore minerals, stibnite and native antimony, occur as stringers and bunches associated with minor amounts of arsenopyrite and pyrite in quartz-calcite fissure veins. Native gold occurs in stibnite. Some free gold in quartz was encountered during mining operations. The secondary minerals, valentinite and kermesite, occur as coatings on the ore minerals. Specimens of stibnite from this mine were displayed in the Geological Survey of Canada economic minerals exhibit at the Colonial and Indian Exhibition held in London in 1886 and at the Paris International Exhibition held in 1900.

In 1880, John MacDougall discovered antimony float ore in drift on his farm. In 1883, trenching uncovered a vein carrying ore of excellent quality. In the same year, Dominion Antimony Company undertook underground development and conducted mining operations from two 53 m shafts until 1888. Rawdon Antimony Mines then took over operations until 1898. About 2500 t of antimony concentrates were shipped to England between 1884 and 1891. Later, two additional antimony-bearing veins were discovered and shafts sunk into them. The subsequent discovery of gold in the ore resulted in the recovery of both antimony and gold. Several operators were involved, including: Dominion Antimony Company in 1904 to 1908, St. Helen's Smelting Company in 1909, West Gore Antimony Company in 1914 to 1917, Wm. Flowers in 1928 to 1936, and C.H. Berggren in 1936 to 1942. Development consisted of several shafts,

including the main 259 m shaft, and two 73 m shafts. A mill operated on the site. Several companies investigated the deposit between 1942 and 1986. Total production amounted to 7250 t of antimony concentrates which yielded 565 888 g of gold.

The mine is in West Gore, about 25 km southwest of Noel. Lat. 45°05′07″N, Long. 63°47′23″W (shaft at km 28.2); Lat. 45°04′57″N, Long. 63°47′28″W (main shafts); Lat. 45°04′51″N, Long. 63°47′40″W (western shaft). *See* Map 36.

Road log from Highway 215 (Glooscap Trail) at **km 205.9** (*see* the Main Road Log on page 117):

km		
	0	Noel, junction of highways 215 and 354; proceed south along Highway 354.
	19.8	Gore, junction of Highway 202; turn right (west) onto Highway 202.
	27.0	West Gore, junction; continue straight ahead along Highway 202.
	27.35	Junction; follow the road on left leading southwest.
	28.2	West Gore mine shaft on the east side of the road.
	28.5	West Gore mine main shafts and dumps on both sides of the road.
	28.9	Trail on right leads west 260 m to the western shaft.

Refs.: 95 p. 37-49; 228 p. 234-237; 251 p. 227-236; 258 p. 74; 337 p. 57-60; 395 p. 66; 397 p. 109.

Maps (T): 11 E/4 Kennetcook
(G): 39A Nova Scotia Sheet (GSC, 1:506 880)
53A Southeast Nova Scotia (GSC, 1:250 000)
878 Kennetcook Sheet No. 65, Hants County, Nova Scotia (GSC, 1:63 360)
1075A Kennetcook, Hants County, Nova Scotia (GSC, 1:63 360)
Metallogenic map of the province of Nova Scotia, 1983 (NSDNR, 1:500 000)
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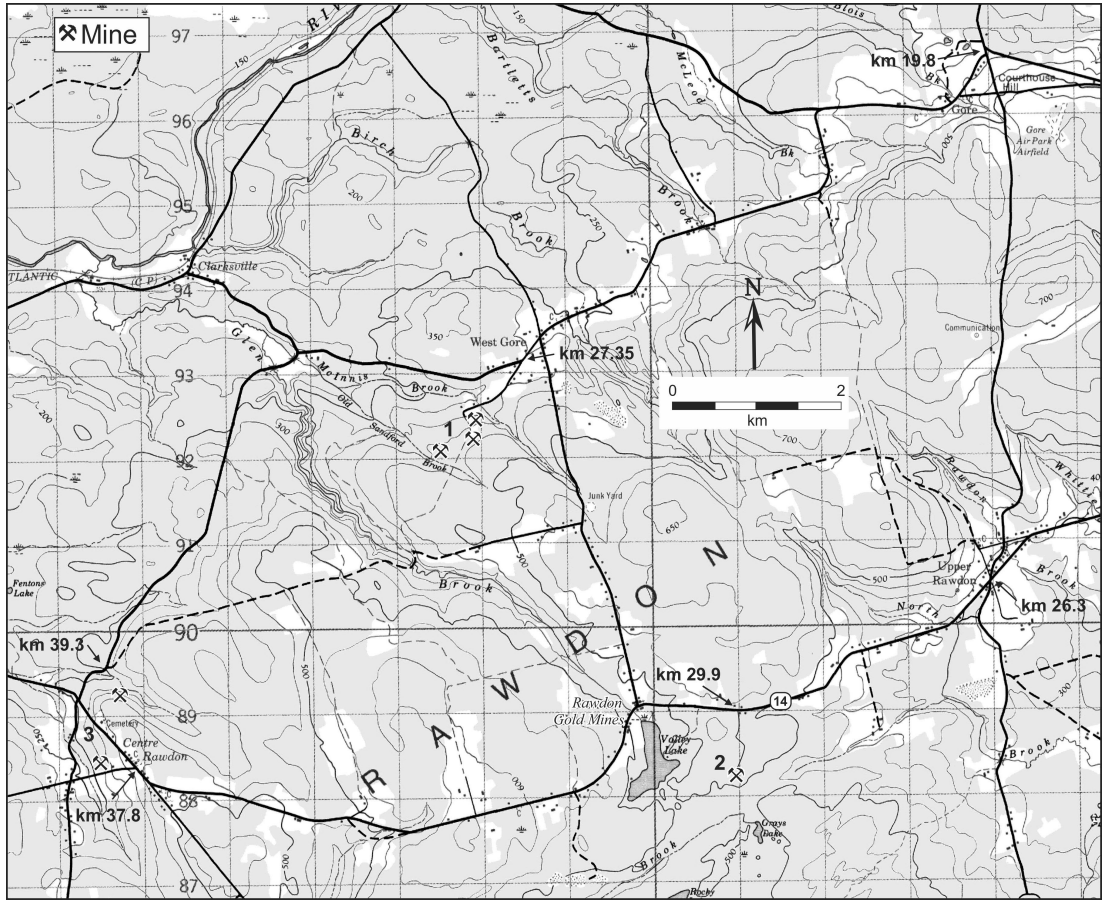
East Rawdon mines

NATIVE GOLD, PYRITE

In quartzite

Native gold occurs with pyrite in quartz veins.

In 1884, Messrs. Sims and White began mining the deposit, erected a ten-stamp mill, and extracted 7496 g of gold from 197 t of ore. In 1885, Robert McNaughton opened an adjoining mine over a length of 275 m and recovered 85 533 g of gold from 1064 t of ore. Production from the two mines to 1887 amounted to 109 078 g of gold from 4811 t of ore, making the district the leading gold producer in the province. In 1887, Rawdon United Mining Company took over operations, but a fire late that year destroyed all buildings and ended mining operations. There was some production in 1890 and 1891, 1901, 1908, and in 1931. Development on the main vein consisted of twelve shafts sunk over a length of 610 m to depths of 7 to 155 m. Additional shafts were sunk on nearby veins. Total production amounted to 419 922 g of gold.



1. West Gore mine 2. East Rawdon mines 3. Rawdon mines

Map 36. Rawdon

The mines are about 28 km south of Noel and 1.5 km southeast of Rawdon Gold Mines village. Lat. 45°02′47″N, Long. 63°44′59″W. *See* Map 36.

Road log from Highway 215 (Glooscap Trail) at **km 205.9** (*see* the Main Road Log on page 117):

km		
	0	Noel, junction of highways 215 and 354; proceed south along Highway 354.
	26.3	Upper Rawdon, junction of Highway 14; proceed southwest along Highway 14.
	29.9	Junction, mine road; turn left (south) onto this road.
	30.9	East Rawdon mines.

Refs.: 21 p. 33; 228 p. 78-79; 243 p. 31-32; 337 p. 48.

Maps (T): 11 E/4 Kennetcook
(G): 39A Nova Scotia Sheet (GSC, 1:506 880)
53A Southeast Nova Scotia (GSC, 1:250 000)
1005 Elmsdale Sheet No. 66, Hants and Halifax counties, Nova Scotia (GSC, 1:63 360)
1075A Kennetcook, Hants County, Nova Scotia (GSC, 1:63 360)
Metallogenic map of the province of Nova Scotia, 1983 (NSDNR, 1:500 000)
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Rawdon mines

NATIVE GOLD, PYRITE, QUARTZ CRYSTALS

In slate

Native gold and pyrite occur in quartz veins. Quartz crystals occur in small cavities in massive quartz.

Two mines, the Northup mine and the Central Rawdon mine, comprise the Rawdon gold district. James Cope discovered gold in the district in 1887. Mining began in the western end of the district in 1887 by Clarence Dimock and Gould Northup and continued to 1889; a ten-stamp mill was in operation. In 1890, Central Rawdon Mining Company Limited undertook mining in the eastern end of the district, and Northup Mining Company Limited continued in the western end. After 1897, operations became intermittent with little production. Development consists of five shafts in the western mine (the deepest at 123 m), a 32 m shaft and a 282 m adit in the eastern mine. Production for the district amounted to 215 248 g of gold.

The mines are in Rawdon, 29 km southwest of Noel. Lat. 45°02′54″N, Long. 63°50′37″W (Northup mine); Lat. 45°03′16″N, Long. 63°50′32″W (Central Rawdon mine). *See* Map 36.

Road log from Highway 215 (Glooscap Trail) at **km 205.9** (*see* the Main Road Log on page 117):

km		
	0	Noel, junction of highways 215 and 354; proceed south along Highway 354.
	26.3	Upper Rawdon, junction of Highway 14; proceed southwest onto Highway 14.

31.0 Rawdon Gold Mines village, at the junction of the road to West Gore; continue straight ahead (west) along Highway 14.

37.8 Rawdon, junction of a road leading west. The Northup mine is about 50 m north of this road at a point 0.35 km west of this junction. To reach the Central Rawdon mine, continue straight ahead along Highway 14.

38.8 Junction; turn right (north) onto the road to Clarksville.

39.3 Junction, mine road (just west of a fork in the main road); turn right and proceed southeast along the mine road for about 450 m to the Central Rawdon mine.

Refs.: 21 p. 33; 39 p. 403-409; 228 p. 69-72; 337 p. 46-47.

Maps (T): 11 E/4 Kennetcook
(G): 39A Nova Scotia Sheet (GSC, 1:506 880)
53A Southeast Nova Scotia (GSC, 1:250 000)
1037 Windsor Sheet No. 73, Hants County, Nova Scotia (GSC, 1:63 360)
1075A Kennetcook, Hants County, Nova Scotia (GSC, 1:63 360)
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Burntcoat Head occurrences

FOSSILS

In sandstone

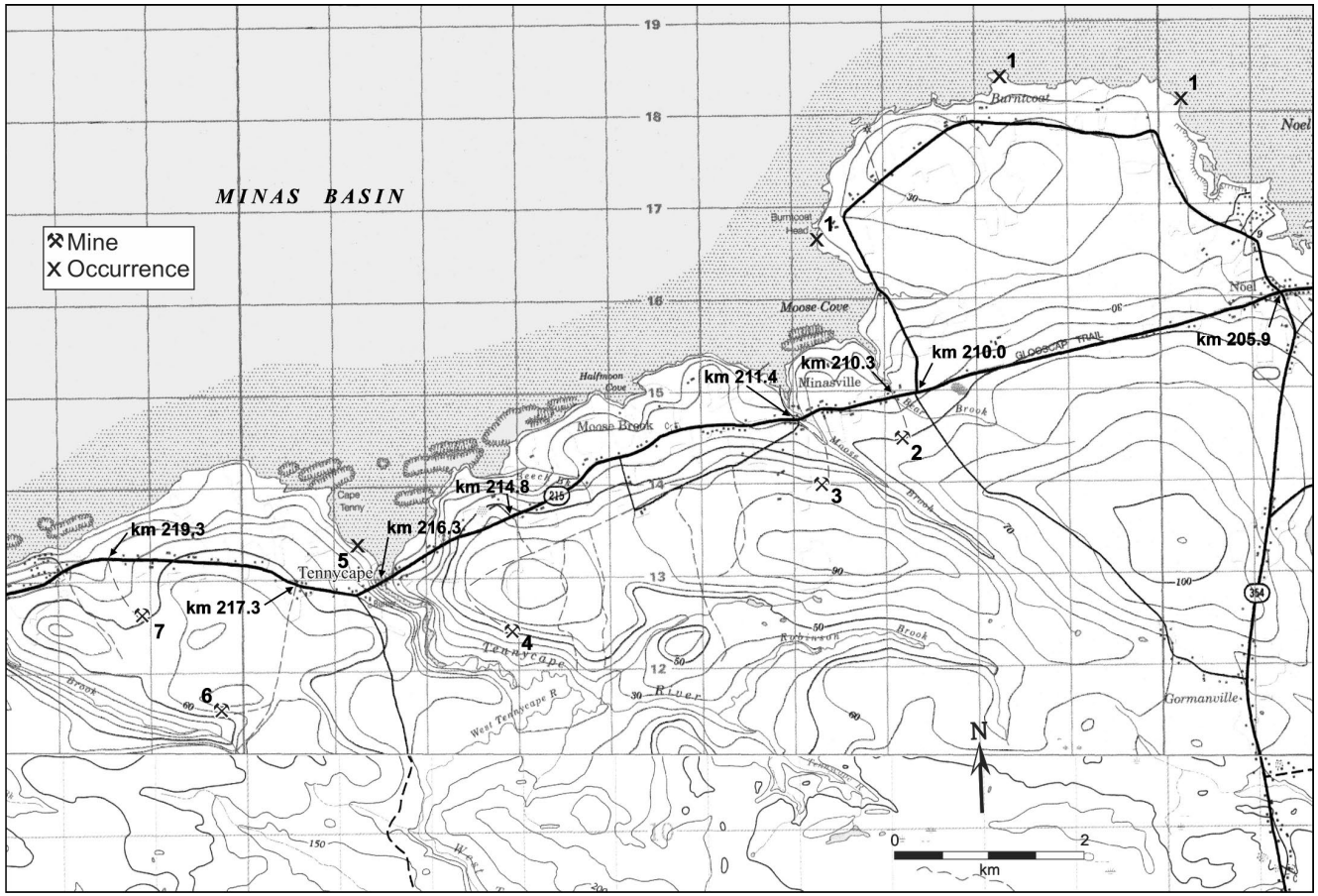
Fossil fragments of Triassic age are sparsely distributed in sandstone associated with conglomerate of the Wolfville Formation. Fossils include pelecypods, amphibians, reptiles, and dinosaur remains.

The occurrences are exposed along the shore of Minas Basin from Burntcoat Head to Noel Bay, about 5 km northwest of Noel. Lat. 45°18′49″N, Long. 63°45′47″W (eastern end) to Lat. 45°18′58″N, Long. 63°47′19″W to Lat. 45°18′02″N, Long. 63°48′47″W (western end). *See* Map 37.

Access to the Burntcoat Head occurrences is by roads leading north from Highway 215 (Glooscap Trail) at **km 205.9** and **km 210.0** (*see* the Main Road Log on page 117). Collect at low tide.

Ref.: 58 p. 22-30.

Maps (T): 11 E/5 Bass River
(G): 39A Nova Scotia Sheet (GSC, 1:506 880)
837 Noel Sheet No. 64, Colchester and Hants counties, Nova Scotia (GSC, 1:63 360)
838 Five Islands and Tennycape Sheet No. 75, Colchester and Hants counties, Nova Scotia (GSC, 1:63 360)
867A Bass River, Colchester and Hants counties, Nova Scotia (GSC, 1:63 360)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)



1. Burntcoat Head occurrences 2. Minasville School mine 3 MacDonald mine 4. Faulkner mine 5. Cape Tenny occurrence 6. Tennycape mine 7. Parker mine

Map 37. Tennycape

Minasville School mine

PYROLUSITE

In sandstone and shale

Pyrolusite occurs as veinlets up to 25 mm wide in cracks and joints in the host rocks.

Mr. McFee did some surface work on the deposit in about 1887. Between 1900 and 1902, Mr. J. Wright sank two shafts and recovered five barrels of ore. The workings consist of two shafts (one of them 8.2 m deep) and some trenches, the largest being 10.7 by 2.4 m.

The mine is south of the schoolhouse in Minasville. Lat. 45°16′55″N, Long. 63°48′06″W. *See* Map 37.

Access to the Minasville School mine is by walking south 400 m along an old wood road leading south from Highway 215 at **km 210.3** (*see* the Main Road Log on page 117).

Refs.: 29 p. 23, 64, 86-87; 329 p. 130; 366 p. 76.

Maps (T): 11 E/5 Bass River
(G): 39A Nova Scotia Sheet (GSC, 1:506 880)
837 Noel Sheet No. 64, Colchester and Hants counties, Nova Scotia (GSC, 1:63 360)
867A Bass River, Colchester and Hants counties, Nova Scotia (GSC, 1:63 360)
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MacDonald mine

PYROLUSITE

In sandstone and shale

Pyrolusite occurs as veinlets and films along cracks in the host rocks. Mining operations uncovered pyrolusite veins up to 12 cm wide.

John Mosher opened the deposit on his farm in 1891 and made a small shipment of ore. The mine consists of a shaft, a trench 12 m long, and some pits. In 1968, Chibtown Copper Corporation did some geochemical, magnetic, and gravity surveys.

The mine is on the former MacDonald farm, just south of Minasville. Lat. 45°16′40″N, Long. 63°48′44″W. *See* Map 37.

Access to the MacDonald mine is by walking along a 650 m trail leading south from Highway 215 at **km 211.4** (*see* the Main Road Log on page 117), just west of the highway bridge over Moose Brook.

Refs.: 29 p. 23, 84-85; 329 p. 130-131; 366 p. 76.

Maps (T): 11 E/5 Bass River
(G): 39A Nova Scotia Sheet (GSC, 1:506 880)
838 Five Islands and Tennycape Sheet No. 75, Colchester and Hants counties, Nova Scotia (GSC, 1:63 360)
867A Bass River, Colchester and Hants counties, Nova Scotia (GSC, 1:63 360)

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Faulkner mine

PYROLUSITE, MANGANITE, CALCITE CRYSTALS

In conglomerate

Pyrolusite occurs as crystals up to 25 mm long and as earthy stringers. Crystals of manganite and calcite occur in cavities in the host rock.

In 1887, William Stephens recovered about 545 kg of manganese ore from shallow pits on the Joseph Faulkner farm. In 1907, Leonard Reynolds mined about a tonne of good ore from a 12 m shaft.

The mine is about 2 km southeast of Tennycape. Lat. 45°15′41″N, Long. 63°51′12″W. *See* Map 37.

Road log from Highway 215 (Glooscap Trail) at **km 214.8** (*see* the main Road Log on page 117):

km		
	0	Junction, Highway 215 (Glooscap Trail) and a road leading south; proceed south along this road.
	0.5	Junction; turn right (west).
	1.3	Junction of a trail at the end of the road. The trail leads southeast 800 m to the Faulkner mine shaft; the original pits are about 37 m southwest of the shaft.

Refs.: 19 p. 29; 29 p. 23, 78-80; 144 p. 103; 182 p. 40; 329 p. 132-133; 366 p. 68-69.

Maps (T): 11 E/5 Bass River
(G): 39A Nova Scotia Sheet (GSC, 1:506 880)
838 Five Islands and Tennycape Sheet No. 75, Colchester and Hants counties, Nova Scotia (GSC, 1:63 360)
867A Bass River, Colchester and Hants counties, Nova Scotia (GSC, 1:63 360)
Metallogenic map of the province of Nova Scotia, 1983 (NSDNR, 1:500 000)
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Cape Tenny occurrence

PYROLUSITE, PSILOMELANE, MANGANITE, CALCITE CRYSTALS; FOSSILS

In conglomerate; in shale

The manganese minerals occur as small pebbles and as small masses and crystalline aggregates in the calcareous matrix cementing pebbles in conglomerate, and as coatings on the host rocks. White calcite crystals (dogtooth spar), coated with hair-like manganite crystals, occur in cavities in massive calcite. Plant fossils of Mississippian age occur in shale.

The manganese mineralization is exposed for 125 m along vertical seacliffs on the western shore of the estuary of Tennycape River, about 500 m south of Cape Tenny, Minas Basin. The fossil-bearing shale is exposed along seacliffs between the manganese occurrence and the Highway 215 bridge.

The occurrence is about 600 m northeast of Tennycape. Lat. 45°16′14″N, Long. 63°52′42″W. *See* Map 37.

Access to the Cape Tenny occurrence is by walking along the western shore of the Tennycape River for 700 m northwest of the Highway 215 bridge at **km 216.3** (*see* the Main Road Log on page 117). Collect at low tide.

Refs.: 29 p. 23, 76-77; 144 p. 106; 329 p. 133-138; 366 p. 77-78.

Maps (T): 11 E/5 Bass River
(G): 39A Nova Scotia Sheet (GSC, 1:506 880)
838 Five Islands and Tennycape Sheet No. 75, Colchester and Hants counties, Nova Scotia (GSC, 1:63 360)
867A Bass River, Colchester and Hants counties, Nova Scotia (GSC, 1:63 360)
Metallogenic map of the province of Nova Scotia, 1983 (NSDNR, 1:500 000)
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Plate 27.

Pyrolusite, Tennycape mine. The specimen measures 9 cm across.
(GSC 112324-YY)

Tennycape mine

PYROLUSITE, MANGANITE, PSILOMELANE, BARITE, HEMATITE, GYPSUM

In limestone conglomerate and shaly limestone

The ore consists of pyrolusite with minor amounts of manganite and psilomelane; calcite, barite, hematite, and gypsum (selenite) are associated with the ore. The manganese minerals occur as nests, nodules, and lenses in limestone conglomerate and as fracture fillings in shaly limestone. The ore was reputed to be of exceptional purity, the best ore occurring in the conglomerate as stringers up to 25 cm thick, and as nodules and pockets varying from a few centimetres across to huge masses weighing several hundred kilograms. Pyrolusite, the most abundant manganese mineral, commonly occurred as acicular crystal aggregates; specimens regarded as the most beautifully crystallized pyrolusite in America were recovered during mining operations. Pyrolusite specimens from this mine were displayed in the Geological Survey of Canada economic minerals exhibit at the Philadelphia International Exhibition held in 1876, at the Colonial and Indian Exhibition held in London in 1886, and at the Paris International Exposition held in 1900.

In 1861, Nicholas Mosher discovered manganese ore in a near-surface 30 cm thick layer of clay soil overlying manganese-bearing limestone conglomerate. The ore consisted of pyrolusite nodules varying from bean-size to 45 kg lumps; nodules and lumps of this ore were sent by Mr. Mosher to London for exhibit at the International Exhibition of 1862. In that year, the Mosher Company began mining manganese ore from open cuts in limestone conglomerate and from the overlying soil. The first shipment, consisting of 33 barrels (about 7 t) of dressed ore, was shipped from Windsor to England in 1863. In the mid-1860s, mining was conducted by several operators including Messrs. Mosher, Nash and Company, Messrs. Weeks, Ouseley and Company, and Messrs. Duvar and Company. Mr. J. D. Nash received an Honorable Mention for his exhibit of a large 150 kg mass of manganese ore at the Dublin International Exhibition of 1865. Between 1870 and 1875, a large pocket in one of the open cuts yielded 900 t of ore. From 1877 to about 1892, J.W. Stephens mined the deposit, followed by Messrs. McVicar and Shaw in 1895. From 1880 to 1895, this mine was the province's largest manganese producer with a production of about 3625 t of high-grade ore of remarkable purity. The ore was hand cobbed and sorted, then crushed and concentrated for shipment in barrels. The almost iron-free, high-purity ore was highly prized because it produced flint glass free of the greenish tinge caused by iron. The ore was also used to produce glass pastes, black enamel for pottery, tiles, and for calico printing. In 1917 and 1918, Mr. Hassan pumped out and sampled the old workings. The main workings consist of two open cuts at the foot of a 15 m cliff (one of them 152 by 15 m with a shaft at one end), the main shaft (50 m deep), and several other openings 50 to 195 m to the west. There are large dumps on the site.

The mine is on the north side of Rennie Brook, about 2 km southwest of Tennycape. Lat. 45°15′14″N, Long. 63°53″47″W. *See* Map 37.

Road log from Highway 215 (Glooscap Trail) at **km 217.3** (*see* the Main Road Log on page 117):

km		
	0	Junction, Highway 215 (Glooscap Trail) and a road leading south; proceed south along this road.
	1.3	Junction; follow the road on right leading west.
	1.9	Tennycape mine.

Refs.: 19 p. 25-29; 29 p. 23, 69-75; 89 p. 58-59; 132 p. 430; 144 p. 102; 154 p. 90-91; 182 p. 41-44; 193 p. 111-116; 198 p. 154S-155S; 248 p. 212-213; 329 p. 138-144; 366 p. 64-68; 393 p. 68; 394 p. 3; 395 p. 96-97; 397 p. 135.

Maps (T): 11 E/5 Bass River
(G): 39A Nova Scotia Sheet (GSC, 1:506 880)
838 Five Islands and Tennycape Sheet No. 75, Colchester and Hants counties, Nova Scotia (GSC, 1:63 360)
867A Bass River, Colchester and Hants counties, Nova Scotia (GSC, 1:63 360)
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Parker mine

PYROLUSITE

In limestone and conglomerate

Pyrolusite occurs as coatings and as small masses in the host rocks. During mining operations, very pure pyrolusite was recovered from a large pocket.

In 1881, William Stephens recovered very high grade ore from the deposit on the Parker farm. He shipped about 90 t of ore to the United States. In 1893, Gould Northup recovered about half a tonne of ore from prospect trenches. The mine consists of a pit about 30 m across and two trenches 180 m and 240 m respectively, northeast of the pit.

The mine is about 2 km west of Tennycape. Lat. 45°15′45″N, Long. 63°54′18″W. *See* Map 37.

Road log from Highway 215 (Glooscap Trail) at **km 219.3** (*see* the Main Road Log on page 117):

km		
	0	Junction, Highway 215 (Glooscap Trail) and a road leading south; proceed south along this road.
	0.8	Parker mine.

Refs.: 29 p. 23, 66-68; 89 p. 59; 139 p. 64A; 182 p. 44-45; 329 p. 145; 366 p. 69-70.

Maps (T): 11 E/5 Bass River
(G): 39A Nova Scotia Sheet (GSC, 1:506 880)
838 Five Islands and Tennycape Sheet No. 75, Colchester and Hants counties, Nova Scotia (GSC, 1:63 360)
867A Bass River, Colchester and Hants counties, Nova Scotia (GSC, 1:63 360)
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Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

Whale Creek mine

PYROLUSITE

In limestone

Pyrolusite occurs in veinlets.

The mine consisted of an adit driven 24 m into a hillside. Two to three tonnes of ore were removed from the deposit. The mine is now caved.

The mine site is on the east side of Whale Creek, 1.5 km northeast of Walton. Lat. 45°14′28″N, Long. 63°59′50″W. *See* Map 38.

Access to the Whale Creek mine site is by walking north 100 m from just east of the Highway 215 bridge over Whale Creek at **km 227.0** (*see* the Main Road Log on page 117). A similar pyrolusite occurrence is exposed along the west bank of Whale Creek just north of the highway bridge.

Refs.: 29 p. 23, 49, 60-62; 33 p. 29; 34 p. 29; 182 p. 68; 329 p. 148; 337 p. 62-63.

Maps (T): 11 E/4 Kennetcook
(G): 38-1962 Walton–Cheverie area, Nova Scotia (GSC, 1:24 000)
39A Nova Scotia Sheet (GSC, 1:506 880)
879 Walton Sheet No. 74, Hants County, Nova Scotia (GSC, 1:63 360)
1075A Kennetcook, Hants County, Nova Scotia (GSC, 1:63 360)
Metallogenic map of the province of Nova Scotia, 1983 (NSDNR, 1:500 000)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

Whale Cove occurrence

RAMSDELLITE, PSILOMELANE, CALCITE

In red sandstone

Ramsdellite occurs as lustrous black platy aggregates associated with dark brown to black, fine-grained psilomelane in massive white-and-brown banded calcite. The white calcite fluoresces bright pink in ultraviolet light.

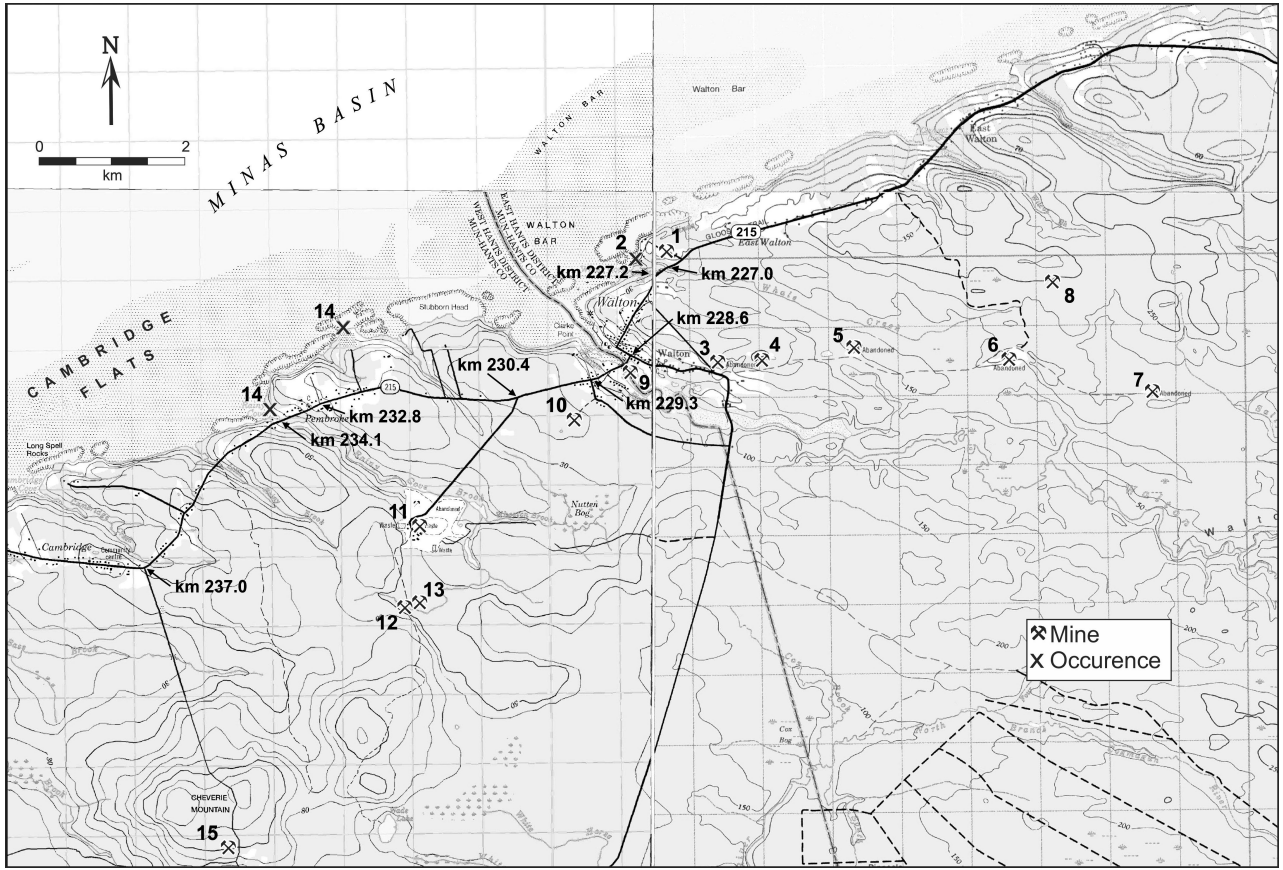
The occurrence is exposed at low tide along the Minas Basin seacliffs at Whale Cove north of the mouth of Whale Creek, about 1.5 km north of Walton. Lat. 45°14′26″N, Long. 64°00′14″W. *See* Map 38.

Road log from Highway 215 (Glooscap Trail) at **km 227.2** (*see* the Main Road Log on page 117):

km		
	0	Walton, junction of Highway 215 and an old road to Whale Cove; proceed west along this road.
	0.4	End of the road at the shore. Walk to the right (north) along the shore for about 150 m to the Whale Cove occurrence. Collect at low tide.

Refs.: 29 p. 23, 49, 59; 33 p. 29-30.

Maps (T): 21 H/1 Wolfville
(G): 38-1962 Walton–Cheverie area, Nova Scotia (GSC, 1:24 000)
39A Nova Scotia Sheet (GSC, 1:506 880)
879 Walton Sheet No. 74, Hants County, Nova Scotia (GSC, 1:63 360)
1128A Wolfville, Nova Scotia (GSC, 1:63 360)
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1. Whale Creek mine 2. Whale Cove occurrence Walton gypsum mines: 3. South Mountain mine 4. North Mountain mine 5. New mine 6. Fry's Mountain mine 7. Stevens mine 8. Hibernia mine 9. Shaw and Churchill mine 10. Stephens mine 11. Walton (Magnet Cove) mine 12. Sturgis mine 13. Feuchtwanger mine 14. Pembroke shoreline occurrences 15. Goshen mine

Map 38. Walton

Walton gypsum mines

GYPSUM, ANHYDRITE

In limestone

White to grey, massive and fibrous gypsum (satin spar) is associated with minor amounts of white to grey anhydrite. Selenite occurs as colourless to grey transparent platy crystals forming daisy-like rosettes, and as individual tabular crystals in massive gypsum.

The Walton gypsum deposits occur along a 7 km east-west band beginning about 1 km east of Walton. Five mines were in operation at various times. Intermittent mining began in 1810 continuing to 1906 when continuous operations began in an old mine on the G.W. Churchill estate under the direction of Albert E. Parsons for the Maritime Gypsum Company. This mine became known as the North Mountain mine. In 1913, the company opened another mine, the South Mountain mine. During this time, the annual production was between 20 000 t and 30 000 t, all of it purchased by J.B. King & Company of New York and shipped in company barges from the pier at Walton to the eastern United States. Rock Plaster Corporation took over operations in 1920 followed by Atlantic Gypsum Products Limited in 1926, and National Gypsum Company in 1936. A 1.5 km narrow gauge railway connected the South Mountain mine to the shipping dock and crushing plant in Walton. More recent operations moved eastward with the opening of the New mine in 1948, Fry's Mountain mine in 1950, and the Stevens mine in 1957. Anhydrite was produced from the North Mountain and Fry's Mountain mines. All operations ended in 1971.

The mines are 1.5 km to 8.5 km east of Walton. Lat. 45°13′37″N, Long. 63°59′16″W (South Mountain mine); Lat. 45°13′40″N, Long. 63°58′48″W (North Mountain mine); Lat. 45°13′43″N, Long. 63°57′47″W (New mine); Lat. 45°13′39″N, Long. 63°56′09″W (Fry's Mountain mine); Lat. 45°13′26″N, Long. 63°54′29″W (Stevens mine). *See* Map 38.

Road log from Highway 215 (Glooscap Trail) at **km 228.6** (*see* the Main Road Log on page 117):

km		
	0	Walton, junction of Highway 215 (Glooscap Trail) and the Walton Woods road leading east from a sharp bend just east of the bridge over the Walton River; proceed east along this road.
	1.4	Junction; follow the road on left leading east to the gypsum mines.
	1.6	Turnoff to the South Mountain mine on left.
	2.0	Trail on left leading north 200 m to the North Mountain mine. This mine joins the South Mountain mine.
	3.4	New mine, on the left (north) side of the road.
	5.2	Junction; continue straight ahead (east).
	5.8	Fry's Mountain mine on the south side of the road. The road log continues straight ahead (east) from the junction.
	8.0	Stevens mine.

Refs.: 2 p. 106-107; 33 p. 28-29; 76 p. 36-37; 77 p. 20; 158 p. 45-46; 204 p. 72-73; 337 p. 68-69.

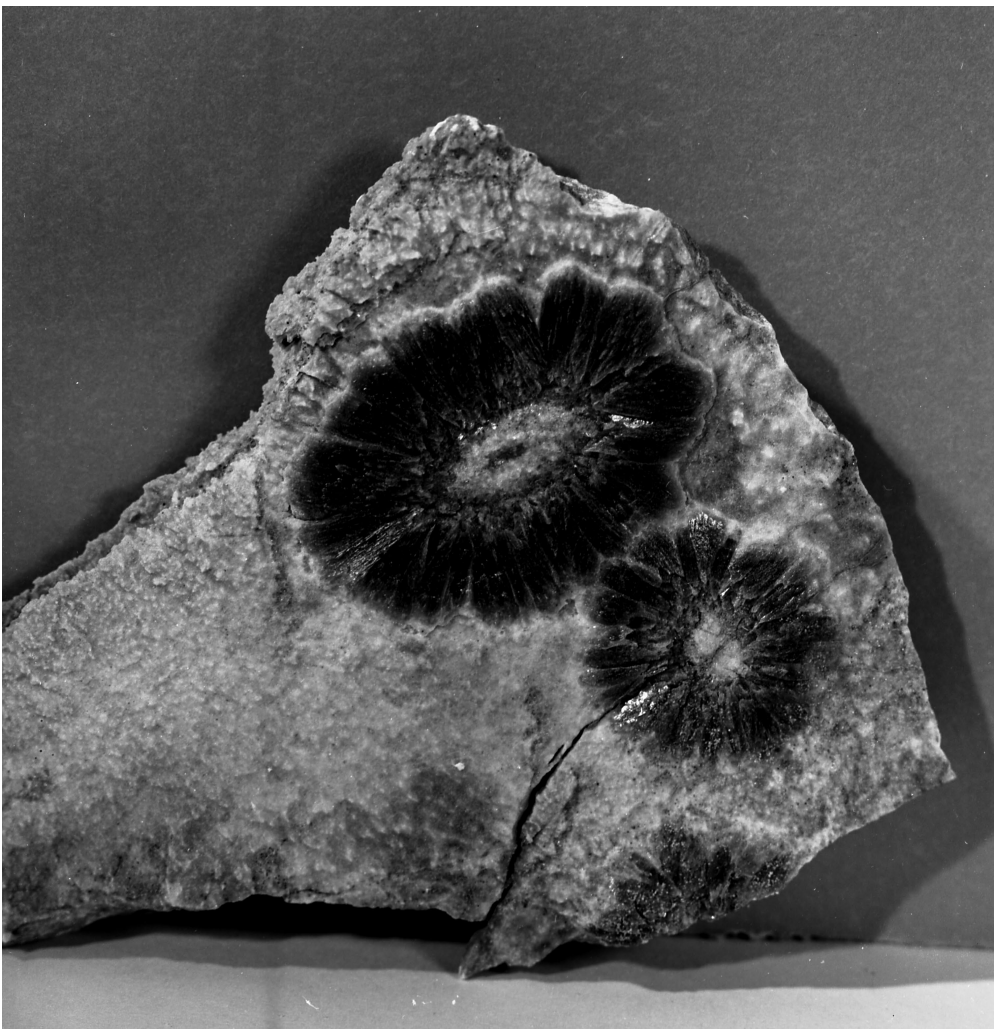


Plate 28.

Selenite ‘daisies’ in massive gypsum, North Mountain mine, Walton. Large ‘daisy’ measures 47 mm by 35 mm. (GSC 203092-J)

Maps (T): 11 E/4 Kennetcook

(G): 38-1962 Walton–Cheverie area, Nova Scotia (GSC, 1:24 000)
39A Nova Scotia Sheet (GSC, 1:506 880)
85-1 Industrial mineral commodities map of the Province of Nova Scotia (NSDNR, 1:500 000)
879 Walton Sheet No. 74, Hants County, Nova Scotia (GSC, 1:63 360)
1075A Kennetcook, Hants County, Nova Scotia (GSC, 1:63 360)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

Hibernia mine

PYROLUSITE, PSILOMELANE

In shale and conglomerate

Pyrolusite and minor psilomelane occur as fillings in fractures and in joints in the host rocks, and as coatings on pebbles in conglomerate.

J. Stephens worked the deposit in about 1885 and recovered about 2 t of ore from several open cuts.

The mine is about 6 km east of Walton. Lat. 45°14′20″N, Long. 63°55′39″W. *See* Map 38.

Road log from Highway 215 (Glooscap Trail) at **km 228.6** (*see* the Main Road Log on page 117):

km		
	0	Walton, junction of Highway 215 (Glooscap Trail) and the Walton Woods road leading east from a sharp bend just east of the bridge over the Walton River; proceed east along this road.
	1.4	Junction; proceed east along the road on left.
	5.2	Junction; proceed along the road on left leading northeast.
	6.1	Junction; turn left (north) onto a wood road.
	7.4	Junction, trail on right; follow this trail east for about 500 m to the Hibernia mine.

Refs.: 29 p. 23, 91-93; 182 p. 45; 329 p. 146-147; 337 p. 62.

Maps (T): 11 E/4 Kennetcook
(G): 39A Nova Scotia Sheet (GSC, 1:506 880)
879 Walton Sheet No. 74, Hants County, Nova Scotia (GSC, 1:63 360)
1075A Kennetcook, Hants County, Nova Scotia (GSC, 1:63 360)
Metallogenic map of the province of Nova Scotia, 1983 (NSDNR, 1:500 000)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

Shaw and Churchill mine

MANGANITE, PYROLUSITE, BARITE, HEMATITE

In limestone

Manganite occurs as fine crystal aggregates and as porous masses associated with minor pyrolusite in pods and stringers. Associated minerals include white coarsely crystalline barite, hematite, and calcite. Specimens of manganese ore were displayed in the Geological Survey of Canada economic minerals exhibit at the Colonial and Indian Exhibition held in London in 1886.

The deposit contained large masses of very high grade manganese ore. Much of the ore occurred as lumps weighing up to three tonnes; disintegration of the host rock liberated these lumps which were then readily removed by pick and shovel. In 1881 to 1883, about 225 t of chemical grade manganese oxides were produced from a large open pit about 60 m long on the Churchill estate. The pit bottomed below the high tide level.

The mine is on the west bank of the Walton River just south of Walton. Lat. 45°13′36″N, Long. 64°00′21″W. *See* Map 38.

Access to the Shaw and Churchill mine is by a 70 m path leading south from the west end of the Highway 215 bridge over the Walton River in Walton, at **km 228.7** (*see* the Main Road Log on page 117).

Refs.: 29 p. 23, 49, 53-55; 34 p. 28; 89 p. 59-60; 132 p. 272-274; 182 p. 46; 198 p. 155S; 329 p. 149; 367 p. 21L; 395 p. 96.

Maps (T): 21 H/1 Wolfville
(G): 38-1962 Walton–Cheverie area, Nova Scotia (GSC, 1:24 000)
39A Nova Scotia Sheet (GSC, 1:506 880)
879 Walton Sheet No. 74, Hants County, Nova Scotia (GSC, 1:63 360)
1128A Wolfville, Nova Scotia (GSC, 1:63 360)
Metallogenic map of the province of Nova Scotia, 1983 (NSDNR, 1:500 000)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

Stephens mine

MANGANITE, PYROLUSITE, HAUSMANNITE, CALCITE CRYSTALS

In limestone and conglomerate

The manganese ore minerals, manganite, pyrolusite, and hausmannite, occur in pockets and in joint planes in the host rocks. Calcite crystals occur in joint planes.

From 1870 to 1875, J. Brown mined a few tonnes of very good manganese ore from this deposit on the William Stephens property. In about 1885, R.J. Stephens recovered 10 to 18 t of ore, and in 1902 to 1907, William Stephens recovered about 18 t. The workings consist of several open cuts (up to 70 m long) and six shafts.

The mine is about 1 km southwest of Walton. Lat. 45°13′11″N, Long. 64°00′58″W. *See* Map 38.

Road log from Highway 215 (Glooscap Trail) at **km 229.3** (*see* the Main Road Log on page 117):

km		
	0	Walton, junction of Highway 215 (Glooscap Trail) and a road leading south; proceed south along this road.
	0.3	Junction of two trails on right opposite a house on the east side of the road; follow the left (south) trail.
	0.5	Fork; proceed west along the right fork.
	0.9	Stephens mine. Additional workings extend over about 400 m east of this point.

Refs.: 29 p. 23, 49, 50-53; 34 p. 27-28; 81 p. 63-64; 89 p. 59; 144 p. 103; 181 p. 46-47; 186 p. 91; 329 p. 149-151; 366 p. 71-74.

Maps (T): 21 H/1 Wolfville
(G): 38-1962 Walton–Cheverie area, Nova Scotia (GSC, 1:24 000)
39A Nova Scotia Sheet (GSC, 1:506 880)
879 Walton Sheet No. 74, Hants County, Nova Scotia (GSC, 1:63 360)

1128A Wolfville, Nova Scotia (GSC, 1:63 360)
Metallogenic map of the province of Nova Scotia, 1983 (NSDNR, 1:500 000)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

Walton (Magnet Cove) mine

BARITE, SIDERITE, HEMATITE, PYRITE, MARCASITE, GALENA, SPHALERITE, CHALCOPYRITE, ACANTHITE, TENNANTITE, ARGENTITE, PROUSTITE, PEARCEITE, GERSDORFFITE, STROMEYERITE, BORNITE, PYROLUSITE, PSILOMELANE, MANGANITE, CHALCOCITE, MALACHITE, AZURITE, ERYTHRITE, LAVENDULAN, CHALCANTHITE, SZOMOLNOKITE, METAVOLTINE, MOORHOUSEITE, APLOWITE

In sandstone, limestone, and shale

Barite occurs as white, pink, and orange-red microcrystalline and sugary masses. Some of it is mottled or banded dark grey and black. The red colour is caused by hematite and the grey/black colour is due to amorphous carbon or bitumen. Barite also occurs as long prismatic crystals, often forming spheres, in cavities in massive barite. Dolomite, siderite, and hematite are associated with barite. The deposit includes a sulphide zone consisting of pyrite, marcasite, galena, sphalerite, chalcopyrite, acanthite, siderite, tennantite, argentite, proustite, pearceite, gersdorffite, stromeyerite, bornite, and barite. Other minerals occurring in this zone include pyrolusite, psilomelane, manganite, chalcocite, malachite, azurite, erythrite, lavendulan, chalcanthite, szomolnokite, and metavoltine. Two new mineral species, moorhouseite and aplowite, were originally described from this mine. Moorhouseite and aplowite occur as pink vitreous patchy coatings or crusts associated with sulphide minerals in a barite-siderite matrix; aplowite is brighter pink than moorhouseite and occurs on the rock surface beneath moorhousite.

A barite-bearing breccia outcrop on the top of a hill near Walton was discovered in 1893 during a geological survey of the area by Hugh Fletcher of the Geological Survey of Canada. That outcrop turned out to be the top of a massive barite deposit which local residents referred to as *heavy marble*. In 1940, local prospector Roscoe Hiltz brought the occurrence to the attention of C.W. McFee of Springer Sturgeon Gold Mines Limited who recommended exploration. A drilling program in 1940 and 1941 outlined the largest barite deposit ever found in Canada. Canadian Industrial Minerals Limited mined the deposit from an open pit from 1941 to 1955 when Barium Corporation took over operations and undertook underground development. Drilling in 1956 and 1957 revealed a lead-zinc-copper-silver deposit beneath the barite deposit at 76 m below the surface. Underground development extended to a depth of 523 m. The head frame for the shaft was transported 2413 km from a northern Ontario gold mine. A fine-grinding barite mill operated at the mine site. Sulphide concentrate production began in 1961. Dresser Minerals operated the mine from 1967 to 1978 when underground flooding ended operations. The ground barite was shipped from Walton to the United States, the Caribbean, and the Middle East for use as a weighting agent in drilling fluids in the oil industry. Chemical- and filler-grade barite was produced for domestic use. The mine produced 4.3 million tonnes of barite, and 51 916 t of concentrates containing 1 682 706 kg of copper, 13 935 704 kg of lead, 4 360 999 kg of zinc, and 108 828.5 kg of silver.

The mine is about 4 km southwest of Walton. Lat. 45°12′20″N, Long. 64°02′39″W. *See* Map 38.



Plate 29.

Walton: loading barite for shipment to Trinidad, 1941. Paper bags filled with barite are stacked on the dock. The barite grinding mill is directly behind the pier. (GSC 89042)

Road log from Highway 215 (Glooscap Trail) at **km 230.4** (*see* the Main Road Log on page 117):

km		
	0	Junction, Highway 215 (Glooscap Trail) and a road leading southwest; proceed southwest along this road.
	2.4	Walton (Magnet Cove) mine.

Refs.: 29 p. 23, 46-47; 33 p. 20-27; 34 p. 23-27; 35 p. 394-410; 72 p. 60; 81 p. 59-62; 88 p. 31-32; 145 p. 2-4; 167 p. A1-1-A1-4; 203 p. 166-171; 205 p. 54-58; 321 p. 53-56; 322 p. 23-32; 344 p. 128-137; 405 p. 107.

Maps (T): 21 H/1 Wolfville
(G): 38-1962 Walton–Cheverie area, Nova Scotia (GSC, 1:24 000)
39A Nova Scotia Sheet (GSC, 1:506 880)
85-1 Industrial mineral commodities map of the Province of Nova Scotia (NSDNR, 1:500 000)
879 Walton Sheet No. 74, Hants County, Nova Scotia (GSC, 1:63 360)
1128A Wolfville, Nova Scotia (GSC, 1:63 360)
Metallogenic map of the province of Nova Scotia, 1983 (NSDNR, 1:500 000)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

Sturgis and Feuchtwanger mines

PYROLUSITE, LIMONITE, BARITE, GYPSUM

In limestone and sandstone

Pyrolusite occurs as pulverulent masses in stringers and as needle-like and platy aggregates in pockets associated with colloform masses of limonite. White barite, as bladed aggregates, and gypsum occur with the manganese ore.

The two adjacent mines, the Sturgis and Feuchtwanger mines, were worked for manganese. Dr. Sturgis worked the Sturgis mine on his property intermittently from 1877 to 1882 and obtained a small amount of ore. Provincial Manganese Mining Company worked the property in about 1892, and E. Chisholm recovered about 15 t of ore from the mine in 1918. The Sturgis mine workings consist of two shafts (one of them 12 m deep) and a large pit 9 m deep. Most of the ore came from the pit. Dr. L. Feuchtwanger of New York operated the Feuchtwanger mine in the 1860s and produced about 14 t of good pyrolusite ore and a few tonnes of manganite ore. Between 1885 and 1894, F. Ward of Windsor mined a considerable tonnage of good ore. The Feuchtwanger mine workings consist of three shallow shafts (up to 9 m deep) and several pits in an area about 45 m across. In 1955, Magnet Cove Barium Limited did some trenching, surveying, and drilling.

The mines are about 5 km southwest of Walton. Lat. 45°11′45″N, Long. 64°02′43″W (Sturgis mine); Lat. 45°11′44″N, Long. 64°02′36″W (Feuchtwanger mine). *See* Map 38.

Road log from Highway 215 (Glooscap Trail) at **km 230.4** (*see* the Main Road Log on page 117):

km		
	0	Junction, Highway 215 (Glooscap Trail) and a road leading southwest; proceed southwest along this road.
	2.4	Walton (Magnet Cove) mine; an old road leads south from this mine; proceed south along this road.
	3.7	Junction, trail on left leading east 200 m to the Feuchtwanger mine; most of the workings are on the north side of a stream known locally as Sturgis Brook. The Sturgis mine is about 100 m west of the Feuchtwanger mine.
	3.8	Road crosses a stream known locally as Sturgis Brook.

Refs.: 19 p. 30; 29 p. 23, 39-45; 34 p. 23; 132 p. 245-252; 139 p. 64A; 167 p. A1-5-A1-6; 182 p. 48-49; 193 p. 114; 329 p. 152-156.

Maps (T): 21 H/1 Wolfville
(G): 38-1962 Walton–Cheverie area, Nova Scotia (GSC, 1:24 000)
39A Nova Scotia Sheet (GSC, 1:506 880)
879 Walton Sheet No. 74, Hants County, Nova Scotia (GSC, 1:63 360)
1128A Wolfville, Nova Scotia (GSC, 1:63 360)
Metallogenic map of the province of Nova Scotia, 1983 (NSDNR, 1:500 000)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

Pembroke shoreline occurrences

CALCITE CRYSTALS

In sandstone and conglomerate

Calcite occurs as white crystals and irregular masses in red sandstone. The calcite fluoresces bright pink in ultraviolet light.

The occurrence is exposed along the Minas Basin shoreline north of Pembroke. Lat. 45°13′55″N, Long. 64°03′20″W (Minas Basin shore); Lat. 45°13′17″N, Long. 64°04′13″W (Rainy Cove). *See* Map 38.

Access to the Pembroke shoreline occurrences is by roads branching from Highway 215 (*see* the Main Road Log on page 117): from **km 232.8** by a 1.2 km road leading north to gravel pits at the shore; from **km 234.1** by a 200 m road leading northwest from the east side of the Rainy Cove Brook bridge to Rainy Cove. Sedimentary rocks containing fluorescent calcite are exposed along the Minas Basin shoreline between Walton and Cheverie.

Maps (T): 21 H/1 Wolfville
(G): 38-1962 Walton–Cheverie area, Nova Scotia (GSC, 1:24 000)
39A Nova Scotia Sheet (GSC, 1:506 880)
879 Walton Sheet No. 74, Hants County, Nova Scotia (GSC, 1:63 360)
1128A Wolfville, Nova Scotia (GSC, 1:63 360)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

Goshen mine

SIDERITE, HEMATITE, GOETHITE, BARITE

In limestone and sandstone

Siderite occurs with hematite, barite, calcite, and manganese oxide minerals in a brecciated zone at the contact of sandstone and limestone. Some of the siderite is altered to goethite. Barite is white and coarsely crystalline.

The mine was worked for iron in about 1885 by miners from Windsor. The workings consist of a number of open cuts and an old shaft. In 1961, Consolidated Mining and Smelting Company Limited bulldozed a mineralized zone consisting of siderite, barite, and pyrite.

The mine is about 9 km southwest of Walton. Lat. 45°09′47″N, Long. 64°04′36″W. *See* Map 38.

Road log from Highway 215 (Glooscap Trail) at **km 237.0** (*see* the Main Road Log on page 117):

km		
	0	Cambridge, junction of Highway 215 (Glooscap Trail) and a road leading south; proceed south along this road toward Cheverie Mountain.
	4.5	Junction; turn right (west).
	4.6	The Goshen mine, on a slope on the north side of the road.

Refs.: 29 p. 31-32; 34 p. 22; 132 p. 253-257; 139 p. 65A; 167 p. A1-6; 372 p. 135-136; 374 p. 110.

Maps (T): 21 H/1 Wolfville
(G): 38-1962 Walton–Cheverie area, Nova Scotia (GSC, 1:24 000)
39A Nova Scotia Sheet (GSC, 1:506 880)
879 Walton Sheet No. 74, Hants County, Nova Scotia (GSC, 1:63 360)
1128A Wolfville, Nova Scotia (GSC, 1:63 360)
Metallogenic map of the province of Nova Scotia, 1983 (NSDNR, 1:500 000)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

Johnson Cove occurrence

BARITE, CALCITE CRYSTALS; FOSSILS

In limestone; in shale, limestone, and sandstone

Barite occurs as white crystalline aggregates associated with calcite crystals (dogtooth spar) in fractures in a fault zone. The host limestone is stained due to hematite and manganese oxides. Fossil plants (*Lepidodendropsis* and *Aneimites*) and fossil fish remains *(Palaeoniscidae*) occur in shale-limestone-sandstone of the Horton Bluff Formation of Mississippian age.

The occurrence is on the southeast side of Minas Basin, about 1 km west of Bramber. The barite-bearing rock is exposed along the shore of Johnson Cove north of the mouth of a brook flowing into the cove. Lat. 45°10′29″N, Long. 64°09′50″W. The fossil-bearing rocks are exposed at points along the Minas Basin shore at Johnson Cove extending northeast to Rainy Cove (at Pembroke). *See* Map 39.

Access to the Johnson Cove barite occurrence is by a road, 0.8 km long, leading northwest from Highway 215 (Glooscap Trail) at **km 243.7** in Bramber (*see* the Main Road Log on page 117). Collect at low tide.

Refs.: 34 p. 30; 132 p. 258-60; 167 p. A1-6; 320 p. 48-51.

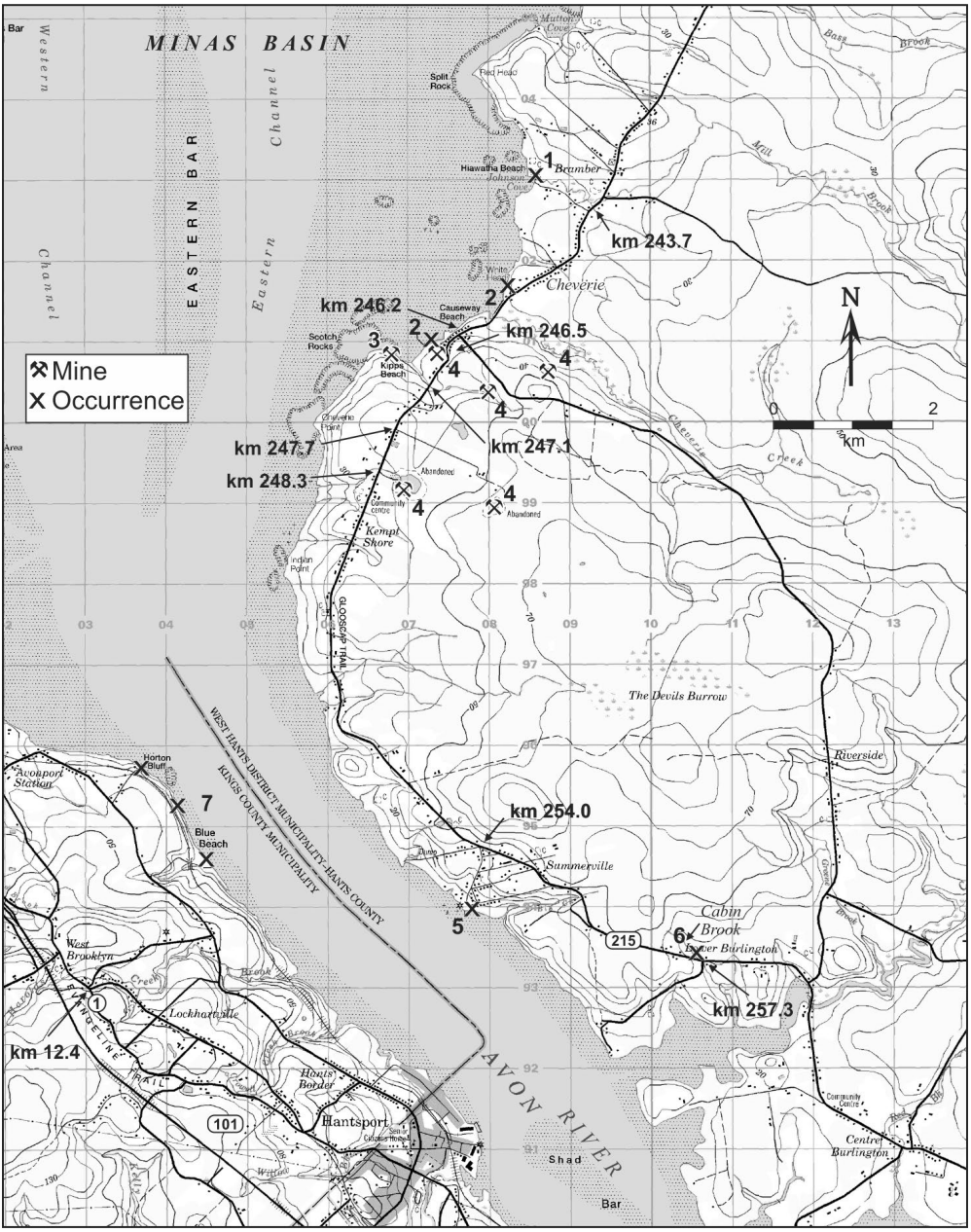
Maps (T): 21 H/1 Wolfville
(G): 38-1962 Walton–Cheverie area, Nova Scotia (GSC, 1:24 000)
39A Nova Scotia Sheet (GSC, 1:506 880)
85-1 Industrial mineral commodities map of the Province of Nova Scotia (NSDNR, 1:500 000)
879 Walton Sheet No. 74, Hants County, Nova Scotia (GSC, 1:63 360)
1128A Wolfville, Nova Scotia (GSC, 1:63 360)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

Cheverie Cliffs occurrence

GYPSUM, ANHYDRITE, CELESTINE, FLUORITE, CALCITE CRYSTALS, PYRITE, QUARTZ CRYSTALS, DANBURITE, HOWLITE, ULEXITE, PROBERTITE

In limestone

Gypsum occurs as white to grey and light yellow fine-grained masses, as white to orange fibrous aggregates (satin spar), and as colourless to grey transparent platy crystals (selenite). Anhydrite occurs as white to grey and pink granular masses, and as colourless blocky prismatic and radiating platy and fibrous aggregates. Celestine occurs as bluish grey transparent



1. Johnson Cove occurrence 2. Cheverie cliffs occurrence 3. Lake (Macumber) mine 4. Cheverie gypsum mines 5. Summerville occurrence 6. Lower Burlington occurrence 7. Horton Bluff occurrences

Map 39. Cheverie

fibrous bundles in fibrous gypsum; the bundles protrude from the weathered surfaces. Fluorite occurs as violet crystals up to 3 mm across on colourless calcite crystals and in massive calcite. Small cubes and crystal aggregates of pyrite and tiny colourless quartz crystals occur in massive gypsum. Borate minerals occurring in gypsum are danburite, as white chalk-like nodules and discs; howlite, as white chalk-like to porcellaneous nodules; ulexite, as white rods and nodules composed of silky matted fibres; and probertite, as white nodules composed of radiating blocky prisms.

The occurrence is exposed along the shore of Minas Basin in Cheverie: Lat. 45°09′20″N, Long. 64°10′50″W (Cheverie wharf); Lat. 45°09′49″N, Long. 64°10′04″W (White Head). *See* Map 39.

Access to the Cheverie Cliffs occurrence is by a road 0.6 km long leading northwest from Highway 215 (Glooscap Trail) at **km 246.5** (*see* the Main Road Log on page 117) to the Cheverie wharf; this junction is just south of a church on the west side of the highway. The gypsum-bearing limestone is exposed along the Minas Basin seacliffs extending northeast from the Cheverie wharf to White Head, a distance of about 1300 m. Water-worn specimens of gypsum occur along the beach. Collect at low tide.

Refs.: 2 p.82; 34 p. 102, 103; 132 p. 278-280; 158 p. 44-45; 159 p. 113.

Maps (T): 21 H/1 Wolfville
(G): 38-1962 Walton–Cheverie area, Nova Scotia (GSC, 1:24 000)
39A Nova Scotia Sheet (GSC, 1:506 880)
83-1 Hantsport area, Nova Scotia (NSDNR, 1:25 000)
85-1 Industrial mineral commodities map of the Province of Nova Scotia (NSDNR, 1:500 000)
879 Walton Sheet No. 74, Hants County, Nova Scotia (GSC, 1:63 360)
1128A Wolfville, Nova Scotia (GSC, 1:63 360)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

Lake (Macumber) mine

PYROLUSITE, MANGANITE, PSILOMELANE, HAUSMANNITE, CALCITE

CRYSTALS, BARITE

In limestone conglomerate

Pyrolusite and manganite are the main manganese ore minerals; psilomelane and hausmannite are minor. The manganese minerals occur as nodular masses and crystal aggregates associated with white to brown calcite crystals (dogtooth spar). Barite occurs as colourless crystals and as white pulverulent masses associated with minor siderite and hematite.

J.W. Stephens opened the mine on the Lester Lake property in 1880, and sent a trial shipment to Boston. Work continued sporadically over the next eight years. About 90 t of high grade manganese ore were mined from an open cut about 24 by 9 m and 8 m deep opened into a seacliff. In 1936 and 1937, Leander Macumber sank a 6 m shaft just west of the open cut and removed about 60 t of rock containing 1.4 t of manganese ore. During mining operations, masses of ore up to 15 cm across were encountered. Nodular masses of pyrolusite and manganite up to 30 cm across occur in rock exposures along the Minas Basin shore in the vicinity of the mine.



Plate 30.

Water-worn gypsum, Cheverie Beach. (GSC 203030-K)

The mine is on the Minas Basin shore, about 350 m southwest of the Cheverie wharf. Lat. 45°09′14″N, Long. 64°11′04″W. *See* Map 39.

Access to the Lake (Macumber) mine is by a road 0.7 km long leading northwest from Highway 215 Glooscap Trail at **km 247.1** (*se*e the Main Road Log on page 117). It may also be reached by walking along the shore at low tide from the Cheverie wharf; see access to the Cheverie cliffs occurrence.

Refs.: 29 p. 23-26; 34 p. 20-21; 81 p. 64; 132 p. 237; 144 p. 103-105; 167 p. A1-5; 182 p. 50-51; 186 p. 91; 198 p. 156S; 248 p. 214; 329 p. 158-159; 366 p. 74-75; 367 p. 22L-23L.

Maps (T): 21 H/1 Wolfville
(G): 13A Kingsport Sheet No. 84, Hants and Kings counties, Nova Scotia (GSC, 1:63 360)
38-1962 Walton–Cheverie area, Nova Scotia (GSC, 1:24 000)
39A Nova Scotia Sheet (GSC, 1:506 880)

83-1 Hantsport area, Nova Scotia (NSDNR, 1:25 000)
1128A Wolfville, Nova Scotia (GSC, 1:63 360)
Metallogenic map of the province of Nova Scotia, 1983 (NSDNR, 1:500 000)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

Cheverie gypsum mines

GYPSUM, ANHYDRITE, DANBURITE

In limestone

Gypsum occurs as white to grey granular masses and as colourless to grey transparent crystals (selenite) in massive gypsum associated with white massive anhydrite. Danburite occurs as snow white compact masses in small pockets in massive gypsum.

Several formerly operated gypsum mines occur in the Cheverie evaporite basin, which occupies an area of about 13 square kilometres. The gypsum shoreline exposures at Cheverie are in the central part of the basin. Mining began in about 1870 in the vicinity of the Cheverie wharf. In 1912, Albert Parsons of Walton operated two mines: the Cove mine extending south from the Cheverie wharf to the highway and continuing along a tunnel beneath the highway to the opposite side of the road, and the Upper Head mine which consisted of a series of cuts into the seacliffs extending from a point about 100 m northeast of the wharf. In 1926, Connecticut Adamant Plaster Company of New Haven opened mines about 2.5 km south of the wharf. The company mined gypsum from these mines and anhydrite from the old mines near the wharf until 1947. The production was transported by the company's narrow gauge railway to its pier on the Minas Basin shore near Cheverie for shipment by boat to its mill in New Haven, Connecticut; the gypsum was used as fertilizer by the peanut growers in the southern United States. National Gypsum (Canada) Limited was the most recent operator, from 1957 continuing to 1962.

The mines are within Cheverie village and a few kilometres to the south. These mines, inactive for many years, are now overgrown; only the sides remain in some of them. Lat. 45°09′08″N, Long. 64°09′49″W (1); Lat. 45°09′02″N, Long. 64°10′11″W (2); Lat. 45°09′16″N, Long. 64°10′40″W (3); Lat. 45°08′26″N, Long. 64°11′05″W (4); Lat. 45°08′16″N, Long. 64°10′10″W (5). *See* Map 39.

Access to the former Cheverie gypsum mines from the kilometre points on the Main Road Log (*see* page 117) along Highway 215 (Glooscap Trail) is as follows: 1) **km 246.2**, proceed 1.3 km along the road leading southeast to Riverside, then onto a road leading northeast 0.5 km to a former gypsum mine; 2) **km 246.5**, a former gypsum mine on the west side of Highway 215; 3) **km 247.1**, proceed 0.8 km along a road leading east to a former gypsum mine; 4) **km 247.7**, proceed 1.7 km along a road leading southeast to a former gypsum mine; 5) **km 248.3,** proceed east 0.4 km to the former National Gypsum (Canada) Limited mine.

Refs.: 2 p. 82; 34 p. 21-22; 76 p. 37; 77 p. 19-20; 81 p. 58; 158 p. 44-45; 204 p. 73-76.

Maps (T): 21 H/1 Wolfville
(G): 13A Kingsport Sheet 84, Hants and Kings counties, Nova Scotia (GSC, 1:63 360)
38-1962 Walton–Cheverie area, Nova Scotia (GSC, 1:24 000)
39A Nova Scotia Sheet (GSC, 1:506 880)
83-1 Hantsport area, Nova Scotia (NSDNR, 1:25 000)

85-1 Industrial mineral commodities map of the Province of Nova Scotia (NSDNR, 1:500 000)
879 Walton Sheet No. 74, Hants County, Nova Scotia (GSC, 1:63 360)
1128A Wolfville, Nova Scotia (GSC, 1:63 360)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

Summerville occurrence

BARITE

In sandstone

Colourless to white massive barite occurs in interstices and fracture fillings up to 2 cm wide.

The barite-bearing sandstone is exposed along the shore of the Avon River immediately west of a small quarry that supplied sandstone for building the nearby Summerville wharf.

The occurrence is in Summerville. Lat. 45°05′34″N, Long. 64°10′21″W. *See* Map 39.

Access to the Summerville occurrence is by a road, 0.8 km long, leading southwest from Highway 215 (Glooscap Trail) at **km 254.0** (*see* the Main Road Log on page 117) in Summerville.

Ref.: 132 p. 281-286.

Maps (T): 21 H/1 Wolfville
(G): 39A Nova Scotia Sheet (GSC, 1:506 880)
83-1 Hantsport area, Nova Scotia (NSDNR, 1:25 000)
85-1 Industrial mineral commodities map of the Province of Nova Scotia (NSDNR, 1:500 000)
879 Walton Sheet No. 74, Hants County, Nova Scotia (GSC, 1:63 360)
1128A Wolfville, Nova Scotia (GSC, 1:63 360)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

Lower Burlington occurrence

BARITE

In limestone

White, bladed and coarsely crystalline massive barite occurs in shaly limestone.

The barite-bearing limestone occurs as float in Cabin Brook. In 1945, Maritime Exploration Limited explored the area by trenching and drilling along both sides of the brook. The trenches are now filled in.

The occurrence is in Lower Burlington. Lat. 45°05′16″N, Long. 64°08′12″W. *See* Map 39.

Access to the Lower Burlington occurrence is from the Highway 215 (Glooscap Trail) crossing over Cabin Brook at **km 257.3** (*see* the Main Road Log on page 117), just west of the junction of a road leading southwest. The occurrence is about 30 m north of the highway.

Refs.: 132 p. 266-269; 162 p. 79.

Maps (T): 21 H/1 Wolfville
(G): 39A Nova Scotia Sheet (GSC, 1:506 880)
85-1 Industrial mineral commodities map of the Province of Nova Scotia (NSDNR, 1:500 000)
879 Walton Sheet No. 74, Hants County, Nova Scotia (GSC, 1:63 360)
1128A Wolfville, Nova Scotia (GSC, 1:63 360)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

Miller Creek, Bailey mines

GYPSUM, CELESTINE, DANBURITE, FOSSILS

In limestone

Gypsum occurs as white granular, foliated, and fibrous masses (satin spar) and as colourless platy crystals (selenite) commonly forming rosettes and daisy-like aggregates. Pink gypsum is present, but it is uncommon. The massive gypsum contains crystals of grey celestine and pockets filled with white, compact, fine, granular danburite. Mississippian fossils, including brachiopods, pelecypods, bryozoa, cephalopods, and gastropods, occur in the host limestone.

The Miller Creek gypsum deposits were known as far back as the 1890s. In about 1900, Newport Plaster Mining and Development Company Limited began mining in the area. In 1957, Canadian Gypsum Company undertook production followed in 1962 by the Fundy Gypsum Company Limited, the current operator. In 1978, the Bailey mine was opened adjacent to the Miller Creek mine. The gypsum is transported by rail to the company's shipping facilities in Hantsport, then by ship to wallboard plants along the United States eastern coast from Boston to Houston. In 1989, the mine excavator, Allan Wilcox, discovered a 915 cm fossil mastodon tusk in the overburden filling a sinkhole between gypsum beds in the Bailey mine.

The mines are about 7 km east of Windsor. Lat. 45°00′37″N, Long. 64°02′51″W (Miller Creek mine); 45°01′01″N, Long. 64°03′27″W (Bailey mine). *See* Map 40.

Road log from Highway 215 (Glooscap Trail) at **km 271.1** (*see* the Main Road Log on page 117):

km		
	0	Junction of highways 215 (Glooscap Trail) and 236; proceed southwest along Highway 236.
	2.6	Junction; turn right (north) onto the mine road.
	3.5	Miller Creek mine. The Bailey mine is immediately northwest of the Miller Creek mine; a roadcut along the road connecting these mines exposes limestone and siltstone containing Mississippian fossils including crinoids, ostracods, brachiopods, conularids, and fossil fish.

Refs.: 2 p. 91-92; 23 p. 146-149; 81 p. 57; 191 p. 61-66; 204 p. 81; 259 p.56.

Maps (T): 21 H/1 Wolfville
(G): 39A Nova Scotia Sheet (GSC, 1:506 880)
85-1 Industrial mineral commodities map of the Province of Nova Scotia (NSDNR, 1:500 000)
86-2 Windsor area, Nova Scotia (NSDNR, 1:25 000)
1037 Windsor Sheet No. 73, Hants County, Nova Scotia (GSC, 1:63 360)

1128A Wolfville, Nova Scotia (GSC, 1:63 360)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

McKay Section (Maynard) mine

GYPSUM

In limestone

The gypsum is white, fine grained, and massive. It is reputed to be of high purity.

Windsor Plaster Company Limited began operations on the deposit on the Harry Maynard farm in 1945, continuing until 1956 when Gypsum Lime and Alabastine Company took over. The gypsum was trucked to the company's plant in Windsor for the manufacture of hard wall, bond wall, dental plaster, plaster of Paris, and bug killer. Domtar Construction Materials Limited took over operations in 1962. The company, now known as Domtar Gypsum Limited, produces plaster products at its calcining plant in Windsor.

The mine is in McKay Section (formerly McKay Settlement), about 14 km east of Windsor. Lat. 45°00′02″N, Long. 63°57′42″W. *See* Map 40.

Road log from Highway 215 (Glooscap Trail) at **km 272.9** (*see* the Main Road Log on page 117):

km		
	0	Brooklyn, junction of highways 215 and 14; proceed southeast along Highway 215.
	2.0	Junction; turn left (east).
	5.8	Junction; turn right (south) onto the mine road.
	6.8	McKay Section (Maynard) mine.

Refs.: 2 p. 90-91; 162 p. 85; 337 p. 69.

Maps (T): 11 E/4 Kennetcook
(G): 39A Nova Scotia Sheet (GSC, 1:506 880)
85-1 Industrial mineral commodities map of the Province of Nova Scotia (NSDNR, 1:500 000)
1037 Windsor Sheet No. 73, Hants County, Nova Scotia (GSC, 1:63 360)
1075A Kennetcook, Hants County, Nova Scotia (GSC, 1:63 360)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

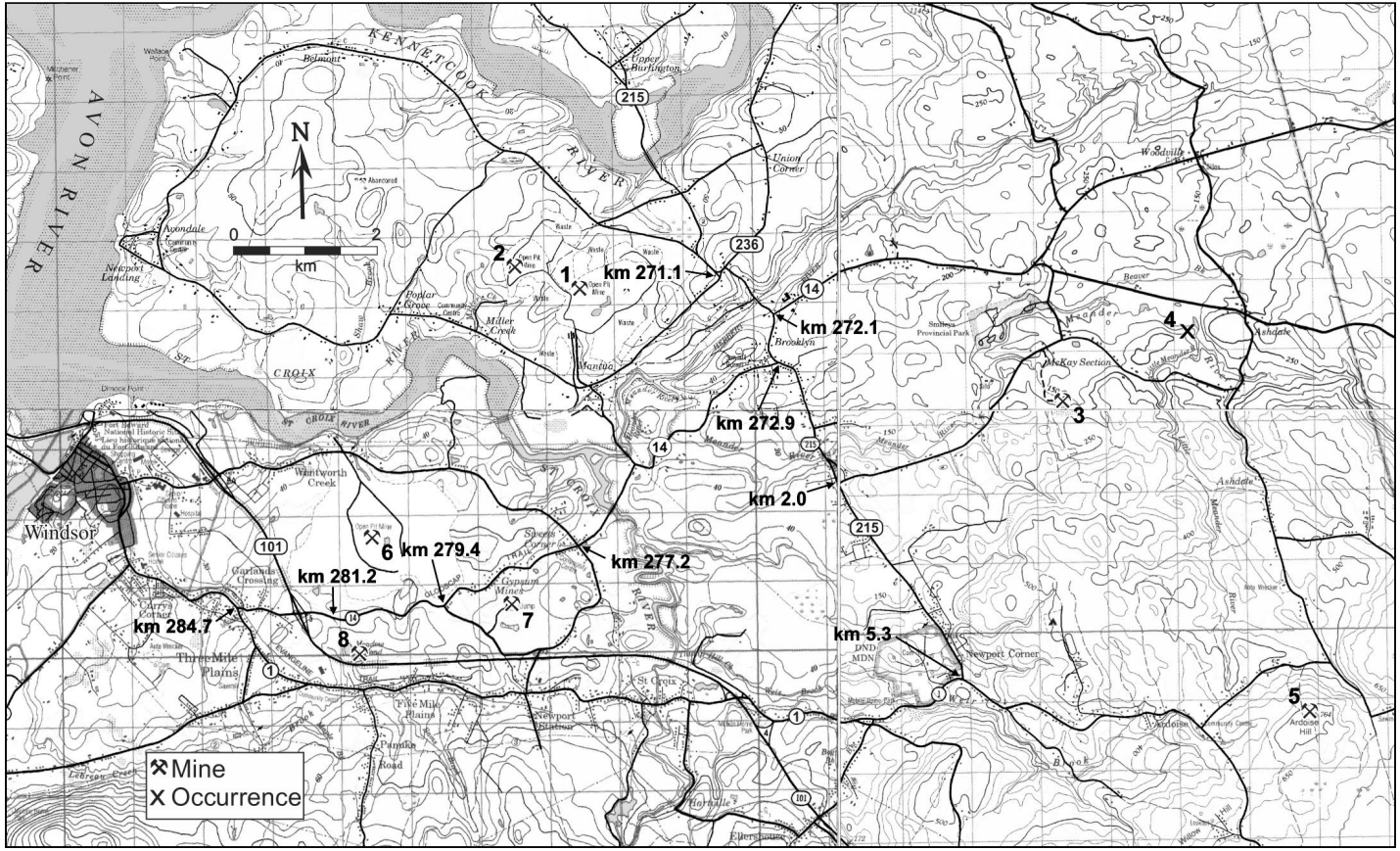
Meander River occurrence

NATIVE GOLD

In alluvium

Native gold occurs as coarse grains in alluvial sand and gravel.

In the 1890s, coarse gold was recovered from sand and gravel in the Meander and Little Meander rivers in the vicinity of their forks. Mr. Van Meter built a dam on the Meander River below the forks and did some sluicing in the summers of 1897 and 1898. In 1898, prospectors



1. Miller Creek mine 2. Bailey mine 3. McKay Section (Maynard) mine 4. Meander River occurrence 5. Ardoise mine 6. Wentworth Creek mine 7. Mosher mine 8. Meadow mine

Map 40. Windsor

trenched the Meander River 2400 m downstream from the forks. In 1899, the Rood brothers did some washing on the Little Meander River gold-bearing rocks to the south between the bridge and the forks. The source of the alluvial gold is the gold-bearing rock to the south near Ardoise; the gold was released by erosion from the rock, washed down by the Little Meander River from its headwaters toward the forks, a distance of about 6 km.

The occurrence is about 16 km northeast of Windsor. Lat. 45°00′31″N, Long. 63°56′04″W (at the forks). *See* Map 40.

Road log from Highway 215 (Glooscap Trail) at **km 272.9** (*see* the Main Road Log on page 117):

km		
	0	Brooklyn, junction of highways 215 and 14; proceed southeast along Highway 215.
	2.0	Junction; turn left (east).
	7.6	Bridge over Little Meander River. The forks of the Meander and Little Meander rivers is about 900 m northeast of the bridge; the main gold washings were downstream from the forks.

Refs.: 115 p. 181A-182A; 228 p. 222.

Maps (T): 11 E/4 Kennetcook
(G): 39A Nova Scotia Sheet (GSC, 1:506 880)
1037 Windsor Sheet No. 73, Hants County, Nova Scotia (GSC, 1:63 360)
1075A Kennetcook, Hants County, Nova Scotia (GSC, 1:63 360)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

Ardoise mine

NATIVE GOLD, PYRITE

In slate

Native gold occurs with pyrite in quartz veins and in slate.

Gold was discovered in 1868. In the 1890s, several veins were explored by shallow shafts and pits, and a ten-stamp mill was installed.

The mine is about 17 km southeast of Windsor. Lat. 44°57′36″N, Long. 63°54′51″W. *See* Map 40.

Road log from Highway 215 (Glooscap Trail) at **km 272.9** (*see* the Main Road Log on page 117):

km		
	0	Brooklyn, junction of highways 215 and 14; proceed southeast along Highway 215.
	5.3	Newport Corner, junction; turn left (east) onto Highway 1.
	9.1	Ardoise, junction; turn left (northeast).
	10.8	Junction; turn right (south) onto the mine road.
	11.6	Ardoise mine.

Refs.: 115 p. 182A; 227 p. 56-57; 243 p. 11.

Maps (T): 11 D/13 Mount Uniacke
(G): 39A Nova Scotia Sheet (GSC, 1:506 880)
1037 Windsor Sheet No. 73, Hants County, Nova Scotia (GSC, 1:63 360)
Metallogenic map of the province of Nova Scotia, 1983 (NSDNR, 1:500 000)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

Wentworth Creek mine

GYPSUM, ANHYDRITE, HOWLITE, ULEXITE, INYOITE, GINORITE

In limestone

The gypsum formation consists of a dark selenite-bearing interbedded type, and a white microcrystalline high-purity type underlain by great thicknesses of anhydrite. Gypsum is mottled white with grey, and is fine grained, compact and massive. Colourless selenite, white to pink fibrous gypsum (satin spar), and bluish-grey massive anhydrite occur in massive gypsum. Rare minerals reported from the deposit include howlite, as white nodules up to 5 cm across; ulexite, as white felt-like lenticles; inyoite, as colourless crystals; and ginorite, as white dense fine platy masses. Specimens of anhydrite, blue gypsum, white gypsum, and gypsum containing nodules of ulexite, howlite, and cryptomorphite (ginorite) were displayed in the Geological Survey of Canada economic minerals exhibit at the Philadelphia International Exhibition held in 1876; these specimens were provided by mine owner, Mr. S.H. Sweet. Specimens of gypsum, selenite, and anhydrite were displayed in the Geological Survey of Canada economic minerals exhibits at the Colonial and Indian Exhibition held in London in 1886 and at the Paris International Exhibition held in 1900.

Gypsum mining in the Windsor area began in about 1800. The Wentworth Creek mines date back to the 1860s. At that time, gypsum (soft plaster, white and blue varieties) and anhydrite (hard plaster) were produced for the export trade. Blue plaster was used for agricultural purposes (fertilizer) and exported mainly to the United States eastern seaboard from Boston to Richmond, Virginia for use in tobacco, Indian corn, and cotton growing. The white plaster was heated (boiled or burned) to expel the water content, then powdered and mixed with water to produce a hard plaster used for finishing walls and ceilings, and for making casts, models, and copies of statues and fossils; selenite produced the finest and purest white plaster and commanded a premium price. Anhydrite (hard plaster), commonly admixed with gypsum, was used as a building stone for residential foundations and as a substitute indoors for marble; a tabletop and pedestal polished by Mr. Woods of Windsor was exhibited at the 1867 Paris International Exhibition. Most of the production in the 1870s was obtained from quarries owned by Mr. S.H. Sweet. From 1881 to 1891, E.W. Dimock and J.B. King were the principal mine operators. Wentworth Gypsum Company began operations in 1875 continuing until 1926 when Canadian Gypsum Company took over, followed in 1962 by Fundy Gypsum Company. Nine mines were in operation at various times in the area between Wentworth Creek and Five Mile Plains, most of them between Wentworth Creek and Highway 15. In the early days, the gypsum production was used mainly for fertilizer; after 1900, the principal use was for the manufacture of plaster of Paris and gyprock wallboard. The current producing mine, Wentworth Creek mine, produces high-purity gypsum for specialty plaster and anhydrite for the agriculture and cement industries. The production is transported 16 km from Wentworth Creek to Hantsport where it is loaded onto company ships for transport to wallboard and cement plants in the eastern United States, from Boston to Houston. Production in 1987 amounted to 1 600 000 t.

The mine is about 3 km east of Windsor. 44°59′00″N, Long. 64°05′07″W. *See* Map 40.

Road log from Highway 14 (Glooscap Trail) at **km 277.2** (*see* the Main Road Log on page 117):

km		
	0	Sweets Corner, junction of Highway 14 (Glooscap Trail) and the road to Wentworth Creek; proceed northwest toward Wentworth Creek.
	3.9	Wentworth Creek mine office; junction of the road to the open pits.

Refs.: 2 p. 108-109; 76 p. 38-39; 77 p. 18-19; 158 p. 42-43; 159 p. 110-114; 188 p. 63T-64T; 191 p. 61-66; 193 p. 132-139; 201 p. 64-66; 204 p. 80-81; 222 p. 59; 258 p. 71-73; 345 p. 158, 196, 386; 351 p. 54-57; 392 p. 119-120; 393 p. 70-71; 395 p. 215; 397 p. 215.

Maps (T): 21 A/16 Windsor
(G): 39A Nova Scotia Sheet (GSC, 1:506 880)
85-1 Industrial mineral commodities map of the Province of Nova Scotia (NSDNR, 1:500 000)
86-2 Windsor area, Nova Scotia (NSDNR, 1:25 000)
1037 Windsor Sheet No. 73, Hants County, Nova Scotia (GSC, 1:63 360)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

Mosher mine

GYPSUM, ANHYDRITE

In limestone

Gypsum is white, fine-grained, compact, and massive. Light grey anhydrite occurs as irregular patches in massive gypsum.

Windsor Gypsum Company began operations in 1892. Operations continued intermittently until 1946. The floor of the open pit mine is overgrown and only the walls remain.

The mine is about 6 km southeast of Windsor. Lat. 44°58′27″N, Long. 64°03′37″W. *See* Map 40.

Road log from Highway 14 (Glooscap Trail) at **km 279.4** (*see* the Main Road Log on page 117):

km		
	0	Junction, Highway 14 (Glooscap Trail) and the road leading southeast; proceed southeast along this road.
	0.8	Junction; turn left (east).
	1.4	Mosher mine.

Refs.: 2 p. 84; 77 p. 17; 204 p. 79.

Maps (T): 21 A/16 Windsor
(G): 39A Nova Scotia Sheet (GSC, 1:506 880)
85-1 Industrial mineral commodities map of the Province of Nova Scotia (NSDNR, 1:500 000)
86-2 Windsor area, Nova Scotia (NSDNR, 1:25 000)
1037 Windsor Sheet No. 73, Hants County, Nova Scotia (GSC, 1:63 360)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

Meadow mine

GYPSUM, ANHYDRITE

In limestone

Gypsum is white, fine grained, compact, and massive. Light grey anhydrite occurs as irregular masses in massive gypsum.

Wentworth Gypsum Company Limited operated the mine from 1920 to 1926. Canadian Gypsum Company then took over operations continuing to 1934. The mine consisted of an opening 12 m high and 120 m long cut into the side of a hill. The company shipped the crushed gypsum to its loading dock in Hantsport. From there, four steamers, the *Gypsum King*, *Gypsum Queen*, *Gypsum Prince*, and *Gypsum Empress* transported the total production from all the company operations to their mills along the eastern coast of the United States. These steamers had passenger accommodation and carried tourists travelling between Windsor, Nova Scotia and New York City.

The mine is about 5 km southeast of Windsor. Lat. 44°58′08″N, Long. 64°05′17″W. *See* Map 40.

Road log from Highway 14 (Glooscap Trail) at **km 281.2** (*see* the Main Road Log on page 117):

km		
	0	Junction, Highway 14 and the road leading south; proceed south along this road toward Meadow Pond.
	0.5	Junction of a trail on the north side of Meadow Pond; proceed east along this trail.
	0.85	Meadow mine.

Refs.: 2 p. 102-103; 77 p. 18-19.

Maps (T): 21 A/16 Windsor
(G): 39A Nova Scotia Sheet (GSC, 1:506 880)
85-1 Industrial mineral commodities map of the Province of Nova Scotia (NSDNR, 1:500 000)
86-2 Windsor area, Nova Scotia (NSDNR, 1:25 000)
1037 Windsor Sheet No. 73, Hants County, Nova Scotia (GSC, 1:63 360)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

BAY OF FUNDY, NOVA SCOTIA: WINDSOR TO YARMOUTH

The Main Road Log — Windsor to Yarmouth

The main road log proceeds along the Evangeline Trail: Highways 1 and 101 from Windsor to Yarmouth. The starting point is the junction of highways 1 and 101 just north of Windsor. Kilometre distances along these highways is shown in bold type. The collecting localities are described in the text following the road log. A page reference is indicated in parenthesis following the name of each mine, occurrence, or quarry.

km	**0**	Windsor, junction of highways 1 and 101; the main road log proceeds north along Highway 1 (Evangeline Trail).

km	**12.4**	West Brooklyn, junction of the road to the Horton Bluff occurrences (p. 237).
km	**24.0**	Wolfville, Acadia University.
km	**26.8**	Greenwich, junction of Highway 358 to Port Williams and the Bennett (Woodworth) Bay, Ross Creek occurrences (p. 240), the Cape Blomidon occurrence (p. 242), the Scots Bay occurrence (p. 243), and the Cape Split, Big Cove, and Little Split Rock Cove occurrences (p. 244).
km	**33.0**	New Minas, junction of the road to Canaan and the Bishop Brook occurrence (p. 245).
km	**35.2**	Kentville, junction of Highway 12, the starting point for the Kentville to New Ross side trip (p. 245).
km	**35.4**	Kentville, junction of Highway 359 to the Baxters Harbour, Long Beach occurrences (p. 259), the Halls Harbour occurrence (p. 259), and the Chipman Brook occurrence (p. 261).
km	**50.5**	Waterville, junction of the road to the Canada Creek, Black Rock occurrences (p. 262).
km	**55.5**	Berwick, junction of Highway 360 to the Harbourville, Ogilvie occurrences (p. 263).
km	**66.7**	Auburn, junction of the road to the Nichols (Aylesford) mine (p. 263).
km	**67.2**	Auburn, junction of the road to the Morden occurrence (p. 266) and the Bishop Brook mine (p. 268).
km	**86.6**	Middleton, junction of Highway 362 to the Margaretsville, Port George, Stronach Brook occurrences (p. 269).
km	**86.8**	Middleton, junction of Highway 10 to the Nictaux quarries (p. 270), the Wheelock mines (p. 272), and the Leckie mine (p. 274).
km	**108.4**	Bridgetown, junction of the road to Valleyview Provincial Park and the Hampton, Port Lorne, and Starratt Brook occurrences (p. 276).
km	**120.6**	Junction, road to Youngs Cove.
km	**129.0**	Junction, road to Parkers Cove and the Parkers Cove, Youngs Cove, and Delaps Cove occurrences (p. 277).
km	**130.4**	Granville Ferry, junction of the road to Victoria Beach and the Digby Gut occurrence (p. 279).
km	**132.4**	Annapolis Royal, junction of Highway 8. Highway 8 leads 41 km to Kejimkujik National Park at Maitland Bridge.
km	**138.4**	Clementsport, junction of the road to Clementsvale and the Potter mine (p. 281), and the Milner mine (p. 282).
km	**151.9**	Highway 1 joins Highway 101; the main road log continues along Highway 1/101 (Evangeline Trail).
km	**154.5**	Junction, Highway 303 to Digby, the starting point for the Digby to Westport side trip (p. 284).

km	**178.3**	Junction; Highway 1 leaves Highway 101. The main road log proceeds southwest along Highway 1 (Evangeline Trail).
km	**223.6**	St. Alphonse, junction of the road to the St. Alphonse quarry (p. 299).
km	**252.2**	Hebron, junction of Highway 340 to the Brazil Lake occurrence (p. 299), the Carleton mine (p. 300), the Kemptville mines (p. 302), and the East Kemptville mine (p. 305).
km	**254.4**	Dayton, junction of Dayton Road to the Cream Pot (Cranberry Head) mine (p. 306) and the Foote Cove occurrence (p. 307).
km	**257.1**	Yarmouth, junction of Vancouver Street to the Chegoggin Point quarry (p. 309) and the Chegoggin Point occurrences (p. 310).
km	**257.6**	Yarmouth, junction of Highway 3 (Starrs Road); Highway 1(Evangeline Trail) ends at this junction.

This is the end of the road log from Windsor to Yarmouth. The description of the occurrences follows.

Horton Bluff occurrences

FOSSILS, PYRITE

In shale, dolomitic limestone, and sandstone

Fossils of Mississippian age occur in the Bluff Formation, which consists of shale interbedded with dolomitic limestone and sandstone. The fossils include ostracods, plant remains (*Lepidodendropsis*, *Aneimites*), fish remains, microspores, worm burrows, and arthropod and amphibian tracks. Plant stems up to 30 cm long and 20 cm in diameter have been reported. Fossil footprints about 30 cm long are believed to be those left by a large prehistoric amphibian (*Baropozia*) that existed about 350 million years ago. Flat nodular masses of pyrite and septarian calcareous concretions occur in shale. The fossil footprints were discovered in 1841 by William E. Logan, first director of the Geological Survey of Canada.

The occurrences are exposed in low cliffs along the west side of the mouth of the Avon River extending from Blue Beach to Horton Bluff, about 15 km east of Wolfville. Lat. 45°05′57″N, Long. 64°12′56″W (Blue Beach); Lat. 45°06′31″N, Long. 64°13′28″W (Horton Bluff). *See* Map 39.

Road log from Highway 1 (Evangeline Trail) at **km 12.4** (*see* the Main Road Log on page 235):

km	0	West Brooklyn, junction of Highway 1 and a road leading toward Horton Bluff; proceed northeast toward Horton Bluff.
	1.7	Junction; turn left (north) onto the Horton Bluff Road.
	2.8	Junction; turn right (east) onto the road to Blue Beach.
	3.6	End of the road at Blue Beach. The fossil-bearing rocks are exposed along the shore for about 1500 m from Blue Beach to the Horton Bluff lighthouse. The fossil footprints are exposed at low tide over a 20 m section of the beach about 1 km west of the lighthouse. Collect at low tide.

Refs.: 23 p. 136-143; 26 p. 3-11; 58 p. 17-22; 81 p. 31-35; 150 p. 80-81; 164 p. 5; 261 p. 50-53; 333 p. 951; 357 p. 84-86.

Maps (T): 21 H/1 Wolfville

(G): 13A Kingsport Sheet 84, Hants and Kings counties, Nova Scotia (GSC, 1:63 360)
39A Nova Scotia Sheet (GSC, 1:506 880)
83-1 Hantsport area, Nova Scotia (NSDNR, 1:25 000)
1128A Wolfville, Nova Scotia (GSC, 1:63 360)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

The North Mountain Coastline

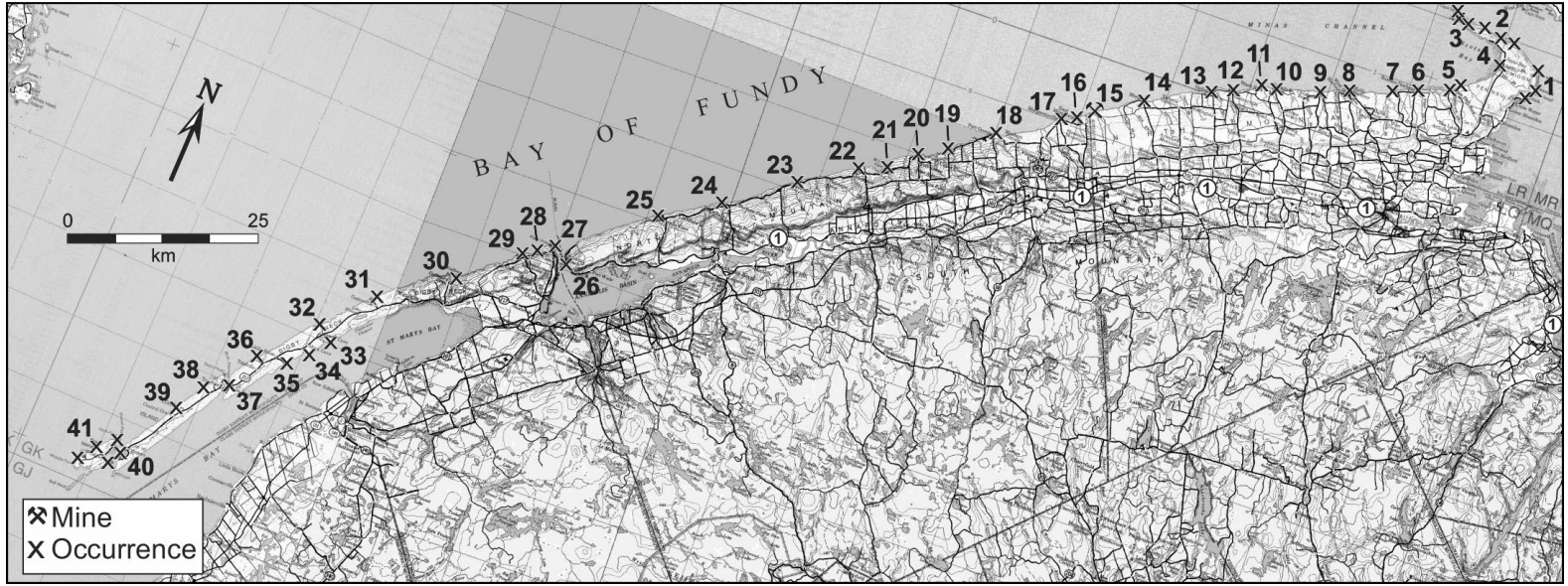
JASPER, CHALCEDONY (AGATE), AMETHYST, STILBITE, HEULANDITE, ANALCIME, APOPHYLLITE, LAUMONTITE, NATROLITE, CHABAZITE, THOMSONITE, MORDENITE, SCOLECITE, OKENITE, LEVYNE, MESOLITE, EPISTILBITE, GYROLITE, NATIVE COPPER

In basalt

The North Mountain basalt formation of Jurassic age extends from Cape Blomidon to Brier Island, a distance of about 250 km. The basalt is characterized by amygdaloidal pipes and columnar jointing; the pipes contain cavities and fractures filled with varieties of quartz and with zeolite minerals. The quartz varieties — jasper and chalcedony (agate) — are found throughout this coastline, and amethyst occurs mainly at Cape Blomidon. The zeolite minerals are widespread from Cape Blomidon to Digby Neck but are most plentiful between Halls Harbour and Margaretsville. Stilbite and heulandite are the most abundant zeolites, followed by analcime, apophyllite, laumontite, natrolite, chabazite, and thomsonite; less common are mordenite, scolecite, okenite, levyne, mesolite, epistilbite, and gyrolite. Green clay minerals (celadonite, montmorillonite) line cavities containing zeolite and quartz minerals in the host rock. Native copper occurs in fissures and in fault zones.

The zeolite minerals include stilbite, as colourless to white radiating plates and sheaf-like aggregates; heulandite, as colourless to white, pink or pinkish-orange tabular and radiating prismatic aggregates; analcime, as colourless to white or pink glassy nodules and crystals; apophyllite, as greenish-tinged colourless to white radiating plates; laumontite, as white, pink to reddish crystal aggregates which become opaque and friable due to dehydration; natrolite, as colourless needle-like crystals; chabazite, as orange-pink to orange-red square crystals; thomsonite, as white transparent radiating fibres; mordenite, as white to pink nodules with fibrous structure; scolecite, as white radiating fibres; okenite, as colourless to white fibrous to acicular aggregates; levyne, as colourless tabular crystals; mesolite, as colourless slender radiating prisms; epistilbite, as colourless prismatic crystals forming spherical aggregates; and gyrolite, as colourless to white concretions.

The basalt containing these minerals is exposed in seacliffs along the Bay of Fundy coast from Cape Split to Brier Island, and along the western shore of St. Marys Bay. Weathering of the seacliffs releases the minerals which are then accumulated in beach gravels. Localities readily accessible from Highway 1 (Evangeline Trail) are described in the text that follows. Collecting is at low tide. *See* Map 41.



x North Mountain coastal occurrences 1. Cape Blomidon occurrence 2. Cape Blomidon-Cape Split occurrences 3. Cape Split, Big Cove, Little Split Rock Cove occurrences 4. Scots Bay occurrence 5. Bennett (Woodworth) Bay, Ross Creek occurrences 6. Baxters Harbour occurrence 7. Long Beach occurrence 8. Halls Harbour occurrence 9. Chipman Brook occurrence 10. Canada Creek occurrence 11. Black Rock occurrence 12. Harbourville occurrence 13. Ogilvie occurrence 14. Morden occurrence 15. Bishop Brook mine 16. Stronach Brook occurrence 17. Margaretsville occurrence 18. Port George occurrence 19. Starratt Brook (Martial's Cove) occurrence 20. Port Lorne occurrence 21. St. Croix Cove occurrence 22. Hampton (Chute Cove) occurrence 23. Youngs Cove occurrence 24. Parkers Cove occurrence 25. Delaps Cove occurrence 26. Digby Gut occurrence 27. Prim Point occurrence 28. House Cliff (Broad) Cove occurrence 29. Broad (Deep) Cove occurrence 30. Gullivers Cove occurrence 31. Trout Cove occurrence 32. Sandy Cove occurrence 33. East Sandy Cove occurrence 34. Mink Cove occurrence 35. Little River Cove occurrence 36. Whale Cove occurrence 37. Petit Passage occurrence 38. Bear Cove occurrence 39. Flour Cove occurrence 40. Grand Passage occurrences 41 Brier Island occurrences

Map 41. North Mountain

Bennett (Woodworth) Bay, Ross Creek occurrences

JASPER, CHERT, FOSSIL TREES; CHALCEDONY (AGATE), HEULANDITE, THOMSONITE, ANALCIME, STILBITE, MORDENITE, RUTILATED QUARTZ, QUARTZ CRYSTALS

In limestone; in basalt

Jasper occurs as dark red and orange-red to brownish red concretions up to 30 cm across in limestone, and as layers along the limestone-basalt contact. Chert nodules occur in limestone. Fossil tree logs of Jurassic age occur in limestone. The logs, commonly 30 cm across, are replaced by silica (jasper, chert, amethystine quartz). Red jasper and reddish-orange and bluish grey chalcedony (agate) occur in veins and fractures up to 7 cm wide in basalt. Zeolite minerals including heulandite, thomsonite, analcime, stilbite, and mordenite occur in small cavities (up to 5 cm across) in basalt. Rutilated quartz and black quartz crystals have been reported. Jasper, agate, and zeolite minerals are found as pebbles of various sizes in beach gravels.

The occurrences are exposed in seacliffs along the Minas Channel shore from Bennett (Woodworth) Bay to and beyond Ross Creek, about 19 km north of Wolfville. Lat. 45°14′34″N, Long. 64°27′50″W (Bennett (Woodworth) Bay occurrence); Lat. 45°14′55″N, Long. 64°27′11″W to Lat. 45°14′57″N, Long. 64°26′50″W (Ross Creek occurrence). *See* Map 41, Map 42.

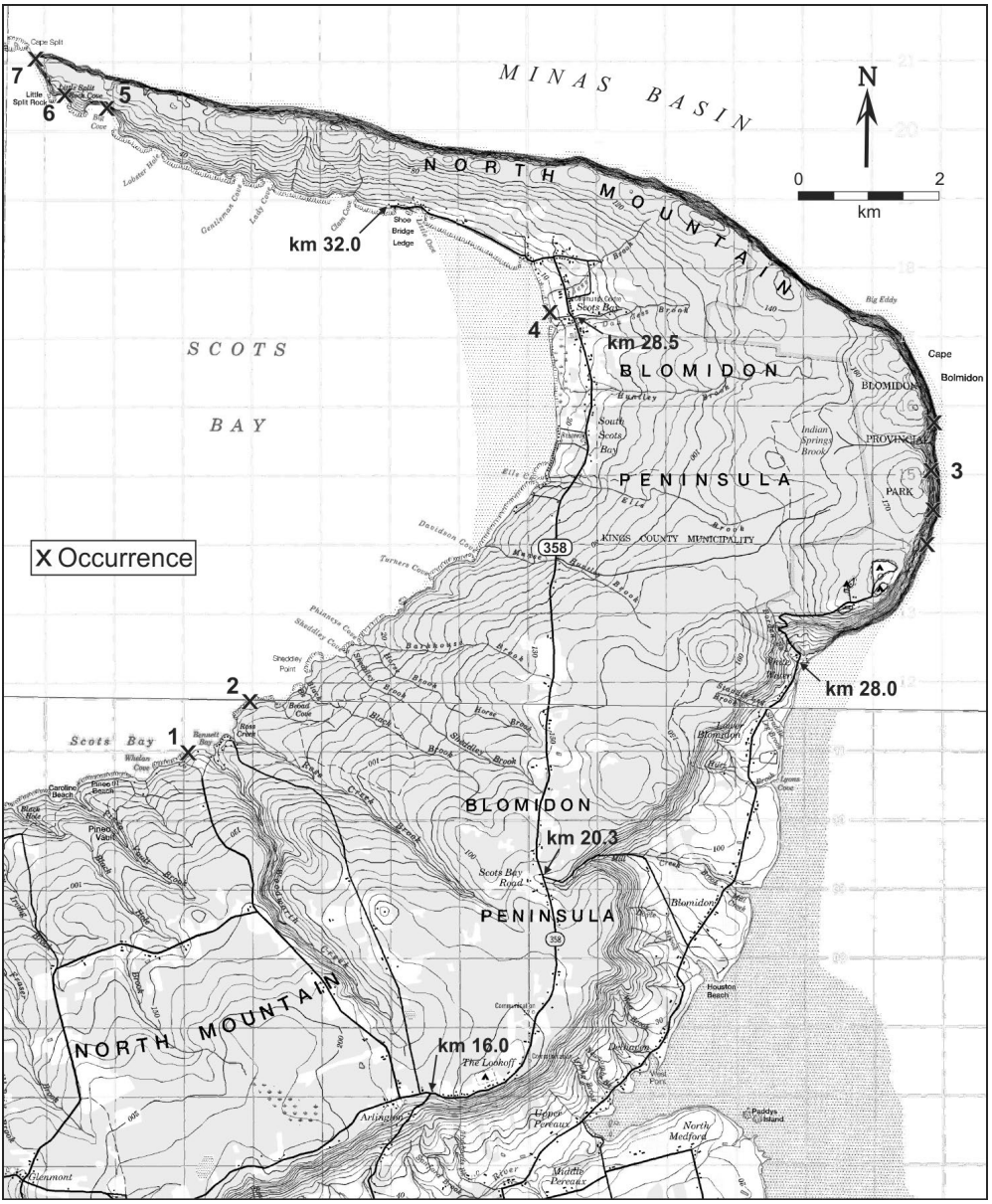
Road log from Highway 1 (Evangeline Trail) at **km 26.8** (*see* the Main Road Log on page 235):

km		
	0	Greenwich, junction of highways 1 and 358; proceed north along Highway 358 toward Port Williams.
	10.5	Canning, junction of Highway 221; continue along Highway 358.
	16.0	Junction, at a sharp bend; turn left (west) onto the road to Glenmont.
	16.2	Junction of the road leading north 6.1 km to the Minas Channel shore at Ross Creek. The fossil trees and jasper concretions occur in limestone exposed in small coves along the shore 800 to 1000 m northeast of the mouth of Ross Creek. Chert nodules occur in limestone overlying zeolite-bearing basalt seacliffs just southwest of Ross Creek. The road log continues along the road to Glenmont.
	16.5	Junction of the road leading north 6.0 km to the Bennett (Woodworth) Bay basalt seacliffs containing jasper, agate, and zeolite minerals. Collect at low tide.

Refs.: 79 p. 12-13; 81 p. 46-49; 90 p. 857-873; 143 p. 294A; 213 p. 72S; 270 p. 132; 335 p. 415-418; 357 p. 87-89.

Maps (T): 21 H/1 Wolfville

(G): 13A Kingsport Sheet No. 84, Hants and Kings counties, Nova Scotia (GSC, 1:63 360)
39A Nova Scotia Sheet (GSC, 1:506 880)
85-1 Industrial mineral commodities map of the Province of Nova Scotia (NSDNR, 1:500 000)
1128A Wolfville, Nova Scotia (GSC, 1:63 360)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)



1. Bennett (Woodworth) Bay occurrence 2. Ross Creek occurrence 3. Cape Blomidon occurrence 4. Scots Bay occurrence 5. Big Cove occurrence. 6. Little Split Rock Cove occurrence 7. Cape Split occurrence

Map 42. Scots Bay

Cape Blomidon occurrence

GYPSUM; CHALCEDONY (AGATE), JASPER, AMETHYST, ZEOLITES

In sandstone; in basalt

Gypsum occurs in veins up to 22 cm wide in brick-red sandstone; the varieties include colourless transparent selenite and white, pink and red fibrous gypsum (satin spar). Chalcedony (agate), jasper, amethyst, and zeolites occur in basalt. Specimens of selenite and fibrous gypsum were exhibited in the Geological Survey of Canada economic minerals display at the Colonial and Indian Exhibition held in London in 1886.

These minerals occur in the beach gravels along the shore of Blomidon Provincial Park at Cape Blomidon, Minas Basin, northeast of Lower Blomidon village, about 20 km north of Wolfville. Lat. 45°16′14″N, Long. 64°19′45″W to Lat. 45°17′06″N, Long. 64°19′40″W. *See* Map 41, Map 42.

Road log from Highway 1 (Evangeline Trail) at **km 26.8** (*see* the Main Road Log on page 235):

km		
	0	Greenwich, junction of highways 1 and 358; proceed north along Highway 358 toward Port Williams.
	10.5	Canning, junction of Highway 221; continue along Highway 358.
	16.0	Junction, road to Glenmont; turn right (east) continuing along Highway 358.
	16.9	The Lookoff, on the left (north) side of the road. The Lookoff viewing stand, 200 m above ground, presents a panoramic view of Minas Basin, the Cornwallis-Annapolis Valley, and the South Mountain Uplands.
	20.3	Junction; turn right (east) onto the road to Blomidon.
	23.3	Blomidon, junction; turn left (north).
	28.0	Bridge over Borden Brook, just south of the Blomidon Provincial Park boundary. After crossing the brook, turn right and proceed to the Minas Basin shore. Walk north toward Cape Blomidon. The main collecting area begins at about 3 km from km 28.0 and continues north about 1 km to Indian Springs Brook. Collect at low tide.

Refs.: 31 p. 56-61; 141 p. 211A-214A; 150 p. 222-223; 201 p. 39; 395 p. 101.

Maps (T): 21 H/1 Wolfville, 21 H/8 Parrsboro
(G): 39A Nova Scotia Sheet (GSC, 1:506 880)
85-1 Industrial mineral commodities map of the Province of Nova Scotia (NSDNR, 1:500 000)
841 Parrsboro Sheet No. 83, Cumberland and Kings counties, Nova Scotia (GSC, 1:63 360)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

Scots Bay occurrence

JASPER, CHALCEDONY (AGATE), STILBITE, HEULANDITE, NATROLITE, RUTILATED QUARTZ

In basalt

Dark red to orange-red jasper and brown, grey, and dark bluish-grey chalcedony (agate) occur in fractures and joint planes up to 5 cm wide in basalt, and as pebbles in beach gravel. Stilbite, heulandite, and natrolite occur in small cavities in the rock. Rutilated quartz has been reported.

The occurrence is exposed along the shore of Scots Bay, Minas Channel at Scots Bay village, about 23 km north of Wolfville. Lat. 45°18′00″N, Long. 64°23′59″W. *See* Map 41, Map 42.

Road log from Highway 1 (Evangeline Trail) at **km 26.8** (*see* the Main Road Log on page 235):

km		
	0	Greenwich, junction of highways 1 and 358; proceed north along Highway 358.
	28.5	Scots Bay village, junction; turn left (west) onto the road to the shore of Scots Bay.
	29.0	Scots Bay occurrence. Collect at low tide.

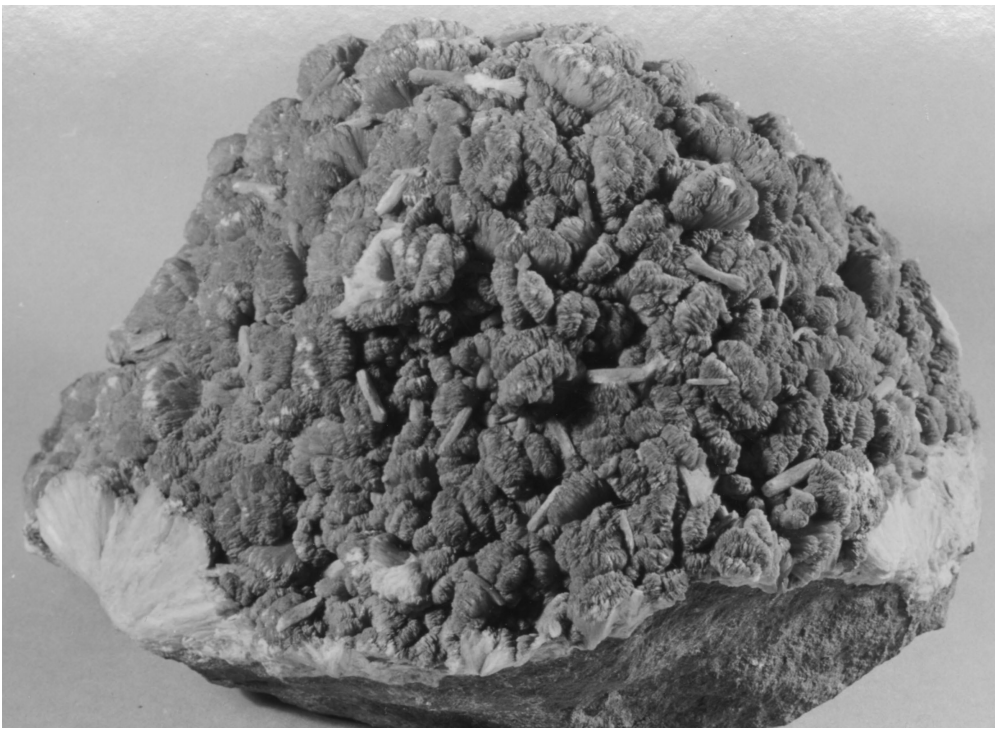


Plate 31.

Stilbite, Scots Bay. The specimen measures 9 cm across. Stilbite is the mineral emblem of Nova Scotia, as enacted by an Act of the Nova Scotia Legislative Assembly in 1999. (GSC 112324-V)

Refs.: 141 p. 211A, 215A-216A; 213 p. 70S-72S; 270 p. 132; 353 p. 63.

Maps (T): 21 H/8 Parrsboro
(G): 39A Nova Scotia Sheet (GSC, 1:506 880)
85-1 Industrial mineral commodities map of the Province of Nova Scotia (NSDNR, 1:500 000)
841 Parrsboro Sheet No. 83, Cumberland and Kings counties, Nova Scotia (GSC, 1:63 360)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

Cape Split, Big Cove, Little Split Rock Cove occurrences

STILBITE, HEULANDITE, ANALCIME, CHABAZITE, APOPHYLLITE, NATROLITE, JASPER, CHALCEDONY (AGATE, CARNELIAN), NATIVE COPPER

In basalt

Stilbite, heulandite, analcime, chabazite, apophyllite, and natrolite occur in cavities. Red to brownish-red jasper, white to bluish-grey chalcedony (agate), and reddish-orange chalcedony (carnelian) occur in fractures and as pebbles along the beaches. Jasper and zeolites also occur in large inverted cone-shaped cavities up to 2 m across. Native copper occurs in a fault zone at the tip of Cape Split.

The occurrences are exposed in seacliffs along the northern shore of Scots Bay, Minas Channel from Cape Split to Scots Bay village, about 28 km northwest of Wolfville. Lat. 45°19′34″N, Long. 64°28′50″W (Big Cove); Lat. 45°19′39″N, Long. 64°29′21″W (Little Split Rock Cove); Lat. 45°19′56″N, Long. 64°29′42″W (Cape Split). *See* Map 41, Map 42.

Road log from Highway 1 (Evangeline Trail) at **km 26.8** (*see* the Main Road Log on page 235):

km		
	0	Greenwich, junction of highways 1 and 358; proceed north along Highway 358.
	28.5	Scots Bay village. Continue north along Highway 358.
	32.0	End of the road. Basalt containing the cone-shaped cavities is exposed along the Scots Bay shore in the vicinity of the wharf at the end of the road. The Big Cove and Little Split Rock Cove occurrences are 4500 m and 5000 m, respectively west of this point. The native copper occurrence at the tip of Cape Split is about 900 m west of Little Split Rock Cove. Access to these occurrences is by boat. Collect at low tide.

Alternate access to the Cape Blomidon-Cape Split occurrences on the Minas Basin shore (*see* page 145): a partly overgrown trail, 1200 m long, leads north from the end of the road at km 32.0 to the top of the Minas Basin seacliffs. The descent down the 100 m high cliffs at the end of the trail is hazardous and the use of ropes is advisable.

Refs.: 334 p. 12-15; 335 p. 415-419; 348 p. 13, 14, 59; 353 p. 28, 33, 63.

Maps (T): 21 H/8 Parrsboro
(G): 39A Nova Scotia Sheet (GSC, 1:506 880)
85-1 Industrial mineral commodities map of the Province of Nova Scotia (NSDNR, 1:500 000)

841 Parrsboro Sheet No. 83, Cumberland and Kings counties, Nova Scotia (GSC, 1:63 360)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

Bishop Brook occurrence

PYROLUSITE, MANGANITE, PSILOMELANE, HEMATITE

In phyllite

The manganese ore minerals, pyrolusite, manganite and psilomelane, are intergrown with hematite forming platy masses (up to 25 mm wide), lenses, nodules, concretions (up to 4.5 kg), and prismatic masses (up to 22 cm across) in bands of grey phyllite.

Manganese ore was found on the William Bishop farm in the 1890s. The discovery was made along the banks of Bishop Brook; diggings in the clay and gravel yielded barrels of pyrolusite nodules. In 1917, A.R. Eisenhauer of New Canaan excavated a cut 6 m long and 1.7 m deep along the southwest bank of the western branch of the brook. Other mineralized belts were located on the middle and east branches of Bishop Brook, over a distance of about 165 m. Several prospect pits were excavated in the area.

The occurrence is about 3 km south of Kentville. Lat. 45°03′00″N, Long. 64° 30′00″W.

Road log from Highway 1 (Evangeline Trail) at **km 33.0** (*see* the Main Road Log on page 235):

km		
	0	New Minas, junction of Highway 1 and a road leading south to Highway 101 and Canaan; proceed south along this road.
	1.5	Junction; turn right (west) onto Highway 101.
	3.7	Highway 101 crossing over Bishop Brook. The old workings are just south of this point. A roadcut on the southeast side of Highway 101 at the crossing exposes manganese mineralization; this is an extension of the Bishop farm manganese ore zone.

Refs.: 20 p. l01-107; 29 p. 218-221; 141 p. 213A; 206 p. 46; 345 p. 293.

Maps (T): 21 H/1 Wolfville
(G): 39A Nova Scotia Sheet (GSC, 1:506 880)
1128A Wolfville, Nova Scotia (GSC, 1:63 360)
Metallogenic map of the province of Nova Scotia, 1983 (NSDNR, 1:500 000)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

Kentville to New Ross

Collecting localities between Kentville and New Ross are described in the text that follows. The localities described are: Reeves Farm occurrence (p. 246), Dalhousie East occurrence (p. 247), Lavers mine (p. 247), Walker (New Russell) mine (p. 250), Millet Brook occurrence (p. 251), Turner mine (p. 253), Cain (Lower) mine (p. 254), Riddle mine (p. 254), Marpic mine (p. 254), Dean and Chapter (Upper) mine (p. 255), and Seffernsville occurrence (p. 257). A page reference is indicated in parenthesis following the name of each mine or occurrence.

The side trip proceeds along Highway 12; the starting point is at **km 35.2** (*see* the Main Road Log on page 235) on Highway 1, the Evangeline Trail. The description of collecting localities along the main collecting route, Highway 1 (Evangeline Trail) is resumed on page 259.

Reeves Farm occurrence

CASSITERITE, FLUORITE, BERYL, APATITE, QUARTZ CRYSTALS, IXIOLITE, AMBLYGONITE, LEPIDOLITE, ZINNWALDITE, MONAZITE, WOLFRAMITE, SCHEELITE, HUEBNERITE, TAPIOLITE, DURANGITE, TOPAZ, TOURMALINE, COLUMBITE, MORINITE, METATORBERNITE, TUNGSTITE, PYROLUSITE, MANGANITE, BISMUTHINITE, MOLYBDENITE, SPHALERITE, HEMATITE, MAGNETITE, SIDERITE, GALENA, CHALCOPYRITE, ARSENOPYRITE

In granite pegmatite

Cassiterite occurs as nuggets in pegmatite composed of albite, smoky to black quartz, and mica. Small cavities in the host rock contain crystals of dark purple fluorite, light blue beryl, and light blue and green apatite. Large colourless, smoky, and milky quartz crystals up to 10 cm across were found in the pegmatite. Ixiolite occurs as black metallic flat prisms. Other minerals reported from the deposit are amblygonite, lepidolite, zinnwaldite, monazite, wolframite, scheelite, huebnerite, tapiolite, durangite, topaz, tourmaline, columbite, morinite, metatorbernite, tungstite, pyrolusite, manganite, bismuthinite, molybdenite, sphalerite, hematite, magnetite, siderite, galena, chalcopyrite, and arsenopyrite.

In 1906, John Reeves discovered quartz crystals in outcrops on his property. Together with Benjamin Meister he excavated a shallow pit 3.6 by 3 m and 3 m deep. The pit yielded large smoky to black quartz crystals; the largest crystal found was 68 cm long and 25 cm across. Later, Charles Keddy, who had discovered tin mineralization at Lake Ramsay the previous year, examined the Reeves occurrence and found cassiterite. In 1907, M.J. O′Brien and Neil A. King deepened the original pit to 6 m and recovered some material.

The mine is about 5 km west of New Ross. Lat. 44°43′47″N, Long. 64°31′01″W. *See* Map 43.

Road log from Highway 1 (Evangeline Trail) at **km 35.2** (*see* the Main Road Log on page 235):

km		
	0	Kentville, junction of highways 1 and 12; proceed onto Highway 12.
	41.0	New Ross, junction; proceed west along the road to Forties.
	46.0	Junction; turn left (south).
	46.5	End of the road at a barn. To reach the Reeves Farm occurrence from this point, proceed south along a trail for 100 m, then west for 120 m to the old pit (now water-filled).

Refs.: 67 p. 46-47; 68 p. 13; 99 p. 111; 112 p. 255-256; 121 p. 80-83; 132 p. 349-351; 157 p. 91-93; 253 p. 221-227; 263 p. 106-107; 265 p. 130; 356 p. 46-50; 376 p. 388-389.

Maps (T): 21 A/10 New Germany
(G): 39A Nova Scotia Sheet (GSC, 1:506 880)
85-1 Industrial mineral commodities map of the Province of Nova Scotia (NSDNR, 1:500 000)

94-01 South Mountain Batholith, Western Nova Scotia (NSDNR, 1:250 000)
1225A Annapolis-St. Marys Bay area (east half), Nova Scotia (GSC, 1:126 720)
1981 Chester Basin Sheet No. 87, Lunenburg County, Nova Scotia (GSC, 1:63 360)
Metallogenic map of the province of Nova Scotia, 1983 (NSDNR, 1:500 000)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

Dalhousie East occurrence

CHALCOPYRITE, CHALCOCITE, MALACHITE, AZURITE, QUARTZ CRYSTALS

In granite

Chalcopyrite, chalcocite, and the secondary minerals, malachite and azurite, occur in a quartz vein. Large crystals of quartz were found during exploration.

In 1876, Ainslie Wilson discovered a 30 cm copper-bearing vein in a granite outcrop on the Irving Smith farm. The vein was explored using a 29 m shaft. In 1890, a company from Bridgewater sank a 50 m shaft and did some underground exploration. A small amount of copper ore mineralization was raised and left on the dump.

The occurrence is about 25 km west of New Ross. Lat. 44°43′08″N, Long. 64°48′00″W.

Road log from Highway 1 (Evangeline Trail) at **km 35.2** (*see* the Main Road Log on page 235):

km		
	0	Kentville, junction of highways 1 and 12; proceed onto Highway 12.
	41.0	New Ross, junction; proceed west along the road leading to Forties.
	68.4	East Dalhousie, junction; turn right (north) onto the road to Crossburn.
	69.6	Dalhousie East occurrence, on the west side of the road.

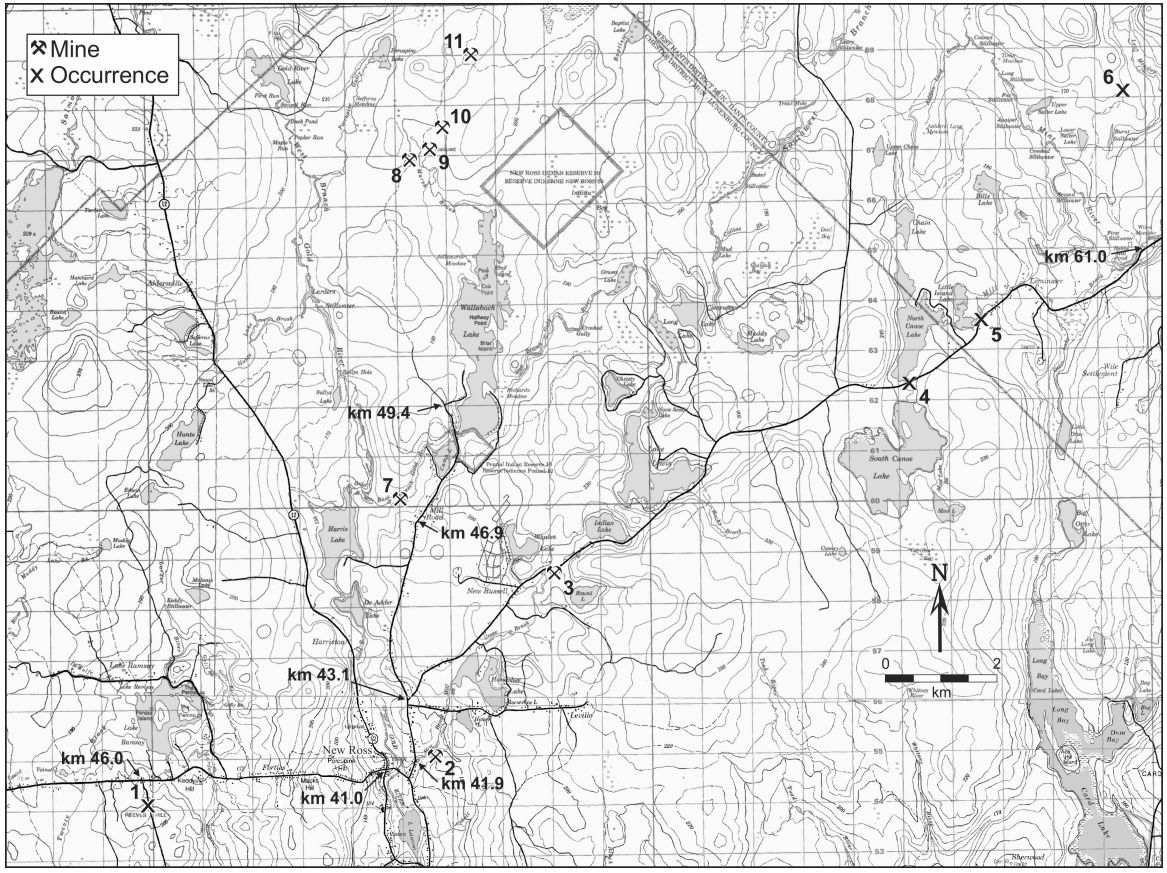
Refs.: 107 p. 15; 130 p. 13E-14E; 154 p. 77.

Maps (T): 21 A/10 New Germany
(G): 39A Nova Scotia Sheet (GSC, 1:506 880)
94-01 South Mountain Batholith, Western Nova Scotia (NSDNR, 1:250 000)
532A Springfield, Annapolis, Lunenburg, Kings, and Queens counties, Nova Scotia (GSC, 1:63 360)
1225A Annapolis-St. Marys Bay area (east half), Nova Scotia (GSC, 1:126 720)
Metallogenic map of the province of Nova Scotia, 1983 (NSDNR, 1:500 000)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

Lavers mine

SCHEELITE, CASSITERITE, COLUMBITE, LEPIDOLITE, JASPER

In granite pegmatite



1. Reeves Farm occurrence 2. Lavers mine 3. Walker (New Russell) mine 4. Roadcut 5. Roadcut 6. Millet Brook occurrence 7. Turner mine 8. Riddle mine 9. Cain (Lower) mine 10. Marpic mine 11. Dean and Chapter (Upper) mine

Map 43. New Ross

Scheelite, cassiterite, columbite, and lepidolite occur in pegmatite composed of orthoclase, quartz, muscovite, and graphic granite. Black columbite crystals weighing several grams have been found. Jasper occurs as a constituent of a jasper breccia dyke in granitic rock.

In 1907, tungsten-tin-rare earth mineralization was discovered in a pegmatite on claims owned by Dr. Lavers and Frank Boylen on the east side of Mill Brook. The pegmatite outcrop was opened by a pit and a trench. This locality is also known as Morley's pegmatite occurrence. About 320 m to the southwest, a jasper breccia dyke composed of brecciated white quartz and red jasper was opened by pits on the J.J. Morley property sometime before 1903; at that time, the jasper was cut and polished, and used locally for decorative purposes.

The mine is about 1 km northeast of New Ross. Lat. 44°44′23″N, Long. 64°26′42″W. *See* Map 43.

Road log from Highway 1 (Evangeline Trail) at **km 35.2** (*see* the Main Road Log on page 235):

km		
	0	Kentville, junction of highways 1 and 12; proceed onto Highway 12.
	41.0	New Ross, junction; proceed along the road leading east.
	41.5	Junction; turn left (north).
	41.9	Junction, just south of the bridge over Mill Brook; from this junction a road leads northeast along the south side of Mill Brook, and a farm lane leads southeast. To reach the jasper breccia pits, proceed along the farm lane for 50 m to a barn, then continue east another 50 m to the pits. To reach the Lavers mine, proceed along the road leading northeast from the junction; the road log continues along this road.
	42.2	Junction; the Lavers mine trench is at this junction. To reach the Lavers mine, follow the road on left leading northeast for about 80 m to the mine.

Refs.: 99 p. 110; 112 p. 257; 121 p. 82-83; 278 p. 11-14; 279 p. 62,69,72; 355 p. 34, 35.

Maps (T): 21 A/9 Chester
(G): 39A Nova Scotia Sheet (GSC, 1:506 880)
85-1 Industrial mineral commodities map of the Province of Nova Scotia (NSDNR, 1:500 000)
90-9 Chester (N.T.S. sheet 21 A/09), Nova Scotia (NSDNR, 1:50 000)
94-01 South Mountain Batholith, Western Nova Scotia (NSDNR, 1:250 000)
1225A Annapolis-St. Marys Bay area (east half), Nova Scotia (GSC, 1:126 720)
2259 New Ross Sheet No. 86, Lunenburg, Hants, and Kings counties, Nova Scotia (GSC, 1:63 360)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

Walker (New Russell) mine

MOLYBDENITE, TOURMALINE, FLUORITE, GAHNITE, CHALCOPYRITE, BORNITE, ROXBYITE, YARROWITE, SPIONKOPITE, COVELLITE, MALACHITE, BROCHANTITE, LANGITE, TOPAZ, SIDEROPHYLLITE, WOLFRAMITE, TENNANTITE, MAWSONITE, WITTICHENITE, CASSITERITE, PYRITE, ARSENOPYRITE, CHALCOCITE, RUTILE, URANINITE, NATIVE BISMUTH

In granite pegmatite

Molybdenite occurs as small flakes and as plates up to 1 cm across in pegmatite composed of pink feldspar, quartz, and mica. Associated minerals include: tourmaline, as black crystals and crystal aggregates; fluorite, as violet crystal aggregates; gahnite, as dark green octahedral crystals; chalcopyrite and bornite, as disseminated grains and granular masses; roxbyite, as bronze flaky aggregates; yarrowite, as black iridescent and velvety flaky aggregates; spionkopite, as black iridescent fine granular crusts; covellite and malachite, as films and thin crusts; and green brochantite and blue langite, as flaky to granular crusts. Topaz, tourmaline, siderophyllite, fluorite, wolframite, gahnite, bornite, chalcopyrite, tennantite, mawsonite, wittichenite, cassiterite, molybdenite, pyrite, arsenopyrite, chalcocite, rutile, uraninite, and native bismuth occur in greisen associated with the pegmatite. Specimens of molybdenite were displayed in the Geological Survey of Canada economic minerals exhibit at the Paris International Exposition held in 1900.

Mr. Bennett Walker discovered molybdenite-bearing quartz boulders on his property in the 1860s. In 1916, Mr. Russell discovered rich molybdenite float on the property then owned by Bernard Walker. In 1917, Nova Scotia Molybdenite Company sank a 15 m shaft and shipped about 19 t of ore to the Mines Branch, Ottawa for testing. In 1949, the Nova Scotia Department of Mines deepened the shaft to 19 m and investigated the underground workings.

The mine is about 5 km northeast of New Ross. Lat. 44°46′19″N, Long. 64°24′51″W. *See* Map 43.

Road log from Highway 1 (Evangeline Trail) at **km 35.2** (*see* the Main Road Log on page 235):

km		
	0	Kentville, junction of highways 1 and 12; proceed onto Highway 12.
	41.0	New Ross, junction; proceed along the road leading east.
	41.5	Junction; turn left (north).
	43.1	Junction; turn right (northeast) onto the road to New Russell.
	47.1	Junction; turn right (south).
	47.2	Junction of a partly overgrown road on right leading west. Follow this road for about 100 m to the Walker (New Russell) mine (this road crosses two streams).

Refs.: 42 p. 124-125; 43 p. 101-106; 67 p. 44-45; 68 p. 13; 99 p. 109-110; 131 p. 22-24, 48-63; 132 p. 349-358; 253 p. 205; 278 p. 45-48; 326 p. 107-112; 349 p. 221-222; 350 p. 18-19; 397 p. 138

Maps (T): 21 A/16 Windsor
(G): 39A Nova Scotia Sheet (GSC, 1:506 880)



Plate 32.

Mining officials at the Bennett Walker prospect, New Ross, 1917. Bennett Walker, discoverer of the deposit that became the Walker (New Russell) mine, is at the extreme left, and E.R. Faribault, Geological Survey of Canada geologist, is at the extreme right. (GSC 40192)

90-10 Windsor (N.T.S. sheet 21 A/16 west half and part of 21 H/01), Nova Scotia (NSDNR, 1:50 000)
94-01 South Mountain Batholith, Western Nova Scotia (NSDNR, 1:250 000)
1225A Annapolis-St. Marys Bay area (east half), Nova Scotia (GSC, 1:126 720)
2259 New Ross Sheet No. 86, Lunenburg, Hants, and Kings counties, Nova Scotia (GSC, 1:63 360)
Metallogenic map of the province of Nova Scotia, 1983 (NSDNR, 1:500 000)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

Millet Brook occurrence

PITCHBLENDE, TORBERNITE, AUTUNITE, META-AUTUNITE, CHALCOPYRITE, BORNITE, COVELLITE, CHALCOCITE, PROUSTITE, GALENA, SPHALERITE, PYRITE, WOLFRAMITE, HEMATITE, TOURMALINE, KAOLINITE, ILLITE, CHLORITE, CALCITE, ANKERITE, ANATASE

In biotite granodiorite

The uranium mineralization consisting of sooty pitchblende, torbernite, autunite, and meta-autunite occurs as fracture fillings in sheared biotite granodiorite. Chalcopyrite, bornite, covellite, chalcocite, proustite, galena, sphalerite, pyrite, and wolframite occur in minor amounts. Gangue minerals include quartz, feldspar, mica, hematite, tourmaline, kaolinite, illite, chlorite, calcite, ankerite, and anatase.

Aquitaine Company of Canada discovered the uranium mineralization by geophysical surveying and drilling conducted between 1976 and 1981. Surface exploration by the company consisted of several trenches.

The occurrence is about 20 km northeast of New Ross. Lat. 44°51′30″N, Long. 64°16′19″W. *See* Map 43.

Road log from Highway 1 (Evangeline Trail) at **km 35.2** (*see* the Main Road Log on page 235):

km		
	0	Kentville, junction of highways 1 and 12; proceed onto Highway 12.
	41.0	New Ross, junction; proceed along the road leading east.
	41.5	Junction; turn left (north).
	43.1	Junction; turn right (northeast) onto the road to New Russell.
	54.8	Roadcuts expose monzogranite containing colourless quartz and colourless, violet, and green fluorite in fracture fillings up to 5 cm across. Lat. 44°48′24″N, Long. 64°19′32″W.
	56.8	Roadcuts expose monzogranite containing colourless, violet and green fluorite and colourless quartz in veins and fracture fillings. Chalcedony occurs with fluorite in brecciated rock at the southern end of the outcrop area. Lat. 44°49′01″N, Long. 64°18′29″W.
	61.0	Junction; turn left (north).
	65.0	Millet Brook occurrence.

Refs.: 65 p. 65-66; 68 p. 12; 132 p. 270-271, 352-353; 175; 278 p. 53-57.

Maps (T): 21 A/16 Windsor
(G): 39A Nova Scotia Sheet (GSC, 1:506 880)
85-1 Industrial mineral commodities map of the Province of Nova Scotia (NSDNR, 1:500 000)
90-10 Windsor (N.T.S. sheet 21 A/16 west half and part of 21 H/01), Nova Scotia (NSDNR, 1:50 000)
94-01 South Mountain Batholith, Western Nova Scotia (NSDNR, 1:250 000)
1225A Annapolis-St. Marys Bay area (east half), Nova Scotia (GSC, 1:126 720)
2259 New Ross Sheet No. 86, Lunenburg, Hants, and Kings counties, Nova Scotia (GSC, 1:63 360)
Metallogenic map of the province of Nova Scotia, 1983 (NSDNR, 1:500 000)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

Turner mine

FLUORITE, MUSCOVITE, CASSITERITE, TOPAZ, SCHEELITE, STANNITE, WOLFRAMITE, TUNGSTITE, MOLYBDENITE, ARSENOPYRITE, PYRITE, CHALCOPYRITE, SPHALERITE, BORNITE, COVELLITE, WITTICHENITE, DIGENITE, APATITE, QUARTZ CRYSTALS

In muscovite granite

Violet fluorite occurs with muscovite in quartz veins in granite and in greisen bordering the veins. Cassiterite and topaz occur as microscopic grains. Associated minerals include scheelite, stannite, wolframite, tungstite, molybdenite, arsenopyrite, pyrite, chalcopyrite, sphalerite, bornite, covellite, and wittichenite. Digenite occurs as an alteration of chalcopyrite and sphalerite. Crystals of blue apatite and colourless quartz occur in small cavities in massive quartz.

In 1907, Ernst Turner discovered and opened cassiterite-scheelite veins at Mill Road. In 1910 to 1912, A.L. McCallum explored the veins. The work consisted of sinking one shaft to 16.5 m and another to 10 m on the Discovery vein 24 m and 40 m, respectively, north of the East branch of Gold River, and a 7.5 m shaft on the Elephant vein near the southern edge of the river. Another vein, the Turner vein, was exposed by two trenches 20 m and 24 m long, respectively, on the south side of the river.

The mine is on the Robert Rafuse property about 5.5 km north of New Ross. Lat. 44°47′08″N, Long. 64°27′13″W. *See* Map 43.

Road log from Highway 1 (Evangeline Trail) at **km 35.2** (*see* the Main Road Log on page 235):

km		
	0	Kentville, junction of highways 1 and 12; proceed onto Highway 12.
	41.0	New Ross, junction; proceed along the road leading east.
	41.5	Junction; turn left (north).
	43.1	Junction; continue straight ahead (north) toward Mill Road.
	46.9	Mill Road, junction of a trail on left; proceed northwest along this trail to the bridge (old dam) over the East Branch of Gold River.
	47.5	Bridge (old dam) on the East Branch of Gold River. To reach the Discovery vein shafts, cross the river, then follow trails leading northeast; the trails lead 80 m and 130 m northeast from the old dam to the two Discovery vein shafts north of the river. The Elephant vein shaft is near the south edge of the river about 30 m east of the bridge. The Turner vein trenches are south of the river; a trail 120 m long leads west from the main trail at a point about 50 m east of the bridge.

Refs.: 42 p. 124; 99 p. 102-107; 122 p. 154; 131 p. 12-21, 25-48; 254 p. 221-225; 265 p. 124-125; 278 p. 37-43; 376 p. 389.

Maps (T): 21 A/16 Windsor
(G): 39A Nova Scotia Sheet (GSC, 1:506 880)
90-10 Windsor (N.T.S. sheet 21 A/16 west half and part of 21 H/01) Nova Scotia (NSDNR, 1:50 000)
94-01 South Mountain Batholith, Western Nova Scotia (NSDNR, 1:250 000)

1225A Annapolis-St. Marys Bay area (east half), Nova Scotia (GSC, 1:126 720)
2259 New Ross Sheet No. 86, Lunenburg, Hants, and Kings counties, Nova Scotia (GSC, 1:63 360)
Metallogenic map of the province of Nova Scotia, 1983 (NSDNR, 1:500 000)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

Cain (Lower) mine, Riddle mine, Marpic mine

MANGANITE, PYROLUSITE, HAUSMANNITE, BRAUNITE, RHODOCHROSITE, KNEBELITE, PINAKIOLITE, BARITE

In porphyritic biotite granite

The manganese ore consists of dark grey massive manganite with minor pyrolusite. Hausmannite, braunite, rhodochrosite, knebelite, pinakiolite, and barite are associated with the ore minerals. Pyrolusite and manganite specimens were displayed in the Geological Survey of Canada economic minerals exhibit at the Paris International Exposition held in 1900.

W. Rafuse discovered the first manganese mineralization in the New Ross district in about 1891, and did some development during the next two years; the deposit became the Cain (Lower) mine. In 1893, M.T. Foster of Halifax worked the mine for some years and made shipments of ore. From 1894 to 1903, New Ross Manganese Company continued operations; the company recovered 20 t of ore from the dumps in 1916 and 1917. Consolidated Manganese Company operated the mine from 1919 to 1921 and shipped about 340 t of ore. In 1930, Dominion Mining and Power Company treated some of the old dump material in its on-site concentrating mill. Development consisted of 610 m of surface openings and a 60 m shaft.

In 1916, International Manganese and Chemical Company sank a 30.5 m shaft on a new discovery 365 m west of the Cain (Lower) mine; this became the Riddle mine. In 1919 to 1921, Consolidated Manganese Company did some development work. In 1958, Marpic Explorations Limited sank a 54 m shaft reaching two massive pyrolusite veins about 400 m northeast of the Cain (Lower) mine; this is known as the Marpic mine.

The mines are about 12 km north of New Ross. Lat. 44°50′47″N, Long. 64°27′01″W (Riddle mine); Lat. 44°50′55″N, Long. 64°26′56″W (Cain (Lower) mine); Lat. 44°51′07″N, Long. 64°26′43″W (Marpic mine). *See* Map 43.

Road log from Highway 1 (Evangeline Trail) at **km 35.2** (*see* the Main Road Log on page 235):

km		
	0	Kentville, junction of highways 1 and 12; proceed onto Highway 12.
	41.0	New Ross, junction; proceed along the road leading east.
	41.5	Junction; turn left (north).
	43.1	Junction; continue straight ahead (north) toward Mill Road.
	49.4	Junction; continue straight ahead (north).
	54.7	Riddle mine, about 70 m west of the road. The road log continues along the main road.



Plate 33.

Riddle mine, International Manganese and Chemical Company, 1917.
(GSC 40194)

55.2 Cain (Lower) mine, on the north side of the road just beyond a bridge crossing a brook.

55.6 Marpic mine, about 50 m east of the road.

Refs.: 98 p. 95-100; 118 p. 186A; 182 p. 53-63; 185 p. 25F-27F; 186 p. 83-102; 277 p. 1275-1291; 278 p. 67-71; 329 p. 163-174; 365 p. 135-139; 376 p. 387-388; 397 p. 136.

Maps (T): 21 A/16 Windsor
(G): 39A Nova Scotia Sheet (GSC, 1:506 880)
90-10 Windsor (N.T.S. sheet 21 A/16 west half and part of 21 H/01), Nova Scotia (NSDNR, 1:50 000)
94-01 South Mountain Batholith, Western Nova Scotia (NSDNR, 1:250 000)
1225A Annapolis-St. Marys Bay area (east half), Nova Scotia (GSC, 1:126 720)
2259 New Ross Sheet No. 86, Lunenburg, Hants, and Kings counties, Nova Scotia (GSC, 1:63 360)
Metallogenic map of the province of Nova Scotia, 1983 (NSDNR, 1:500 000)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

Dean and Chapter (Upper) mine

PYROLUSITE, MANGANITE, HAUSMANNITE, BRAUNITE, KNEBELITE,

PINAKIOLITE, RHODOCHROSITE, BARITE, HEMATITE

In porphyritic biotite granite

The manganese ore occurs as crystallized masses and as compact dense masses in lenticular veins in a fault zone. The best ore consisted of high-purity pyrolusite; during mining operations fine crystal specimens of pyrolusite were found in cavities in the massive ore. Less valuable ore consisted of manganite and psilomelane in a gangue of calcite, barite, iron oxides (goethite, hematite, and limonite). Hausmannite, braunite, knebelite, pinakiolite, and rhodochrosite are associated with the ore minerals. A gossan consisting of botryoidal goethite, hematite, and limonite occurred above the mineralized zone.

In 1907, Ernst Turner discovered the manganese ore. In the following year he sank two shafts to 9 m and 4.5 m, respectively. In 1910, Nova Scotia Manganese Company sank a 47 m shaft, and built a surface plant, boiler house, saw-mill, concentrating mill, shaft house, mine office, mess-house, and a road from the mine to Benjamin Mills. In 1912, a fire destroyed the mill, ending further development. Subsequent operations resulted in the production of high-grade ore by the following companies: Metals Development Company in 1916 (500 t); Rossville Manganese Company Limited in 1917 (165 t); and Consolidated Manganese Company in 1919 to 1921 (104 t). In 1931, E.S. Romilly Smith of Halifax did some surface and underground investigations, and operated a small jigging and tabling plant which produced concentrates from the mine tailings. In 1940, New Ross Manganese Inc. produced 453 t of ore. The mine consists of four shafts 70 m, 51 m, 7.6 m, and 26.5 m deep, respectively.

The mine is about 14 km north of New Ross. Lat. 44°51′52″N, Long. 64°26′16″W. *See* Map 43.

Road log from Highway 1 (Evangeline Trail) at **km 35.2** (*see* the Main Road Log on page 235:

km	0	Kentville, junction of highways 1 and 12; proceed onto Highway 12.



Plate 34.

Dean and Chapter mine, Nova Scotia Manganese Company mill, 1917.
(GSC 40195)

41.0 New Ross, junction of Highway 12 and a road leading east; proceed east along this road.

41.5 Junction; turn left onto the road leading north toward Mill Road.

55.2 Cain (Lower) mine; continue straight ahead.

57.3 Dean and Chapter (Upper) mine, about 50 m north of the junction of the old Windsor road. Three shafts are on the east side of the road, another is on the west side of the road.

Refs.: 98 p. 95-100; 122 p. 154; 160 p. 40D; 182 p. 53-63; 185 p. 26F-27F; 186 p. 83-102; 206 p. 47-48; 277 p. 1275-1291; 278 p. 79-80; 329 p. 163-174; 365 p. 135-139; 376 p. 387-388.

Maps (T): 21 A/16 Windsor
(G): 39A Nova Scotia Sheet (GSC, 1:506 880)
90-10 Windsor (N.T.S. sheet 21 A/16 west half and part of 21 H/01), Nova Scotia (NSDNR, 1:50 000)
94-01 South Mountain Batholith, Western Nova Scotia (NSDNR, 1:250 000)
1225A Annapolis-St. Marys Bay area (east half), Nova Scotia (GSC, 1:126 720)
2259 New Ross Sheet No. 86, Lunenburg, Hants, and Kings counties, Nova Scotia (GSC, 1:63 360)
Metallogenic map of the province of Nova Scotia, 1983 (NSDNR, 1:500 000)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

Seffernsville occurrence

QUARTZ CRYSTALS, TOURMALINE, LEPIDOLITE

In pegmatite

Jet black quartz crystals commonly 3 cm across and several centimetres long occur as individual crystals and as groups of crystals in a quartz-feldspar pegmatite dyke cutting biotite-granite country rock. Black tourmaline and feathery masses of lepidolite also occur in the dyke.

The dyke outcrops in two places near the top of the north side of a high hill between Steeves Lake and Joe Bill Brook. Two pits, 15 m apart in an east-west direction, were sunk in the outcrops. The westerly pit is 1.2 by 2.4 m and 1.2 m deep; it was excavated into a quartz-feldspar outcrop containing lepidolite. The easterly pit is 1.5 m square and 2.4 m deep; it was excavated into a white quartz outcrop containing black tourmaline and black quartz crystals.

The occurrence is 2 km southwest of Seffernsville (9.5 km south of New Ross). Lat. 44°39′23″N, Long. 64°25′18″W.

Road log from Highway 1 (Evangeline Trail) at **km 35.2** (*see* the Main Road Log on page 235):

km 0 Kentville, junction of highways 1 and 12; proceed onto Highway 12.

41.0 New Ross, junction of Highway 12 and a road leading east; continue south along Highway 12.



Plate 35.

Black quartz crystals, Seffernsville. The specimen measures 75 mm from top to bottom. (GSC 2008-126)

50.4 Seffernsville, junction of a road leading 2.2 km west toward Steeves Lake ending 500 m north of this lake. The Seffernsville occurrence is about 700 m southeast of the eastern end of Steeves Lake and 2 km southwest of the junction at km 50.4. There are no roads leading to the pits.

Ref.: 112 p. 256-257.

Maps (T): 21 A/9 Chester
(G): 39A Nova Scotia Sheet (GSC, 1:506 880)
90-9 Chester (N.T.S. sheet 21 A/09), Nova Scotia (NSDNR, 1:50 000)
94-01 South Mountain Batholith, Western Nova Scotia (NSDNR, 1:250 000)
1225A Annapolis-St. Marys Bay area (east half), Nova Scotia (GSC, 1:126 720)
1981 Chester Basin Sheet No. 87, Lunenburg County, Nova Scotia (GSC, 1:63 360)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

This is the end of the description of collecting localities between Kentville and New Ross. The description of collecting localities along the main collecting route along Highway 1 (Evangeline Trail) continues from **km 35.2** (p. 235).

Baxters Harbour, Long Beach occurrences

CHALCEDONY (AGATE), JASPER, HEULANDITE, ANALCIME, STILBITE, LAUMONTITE

In basalt

Bluish- and pinkish-grey chalcedony (agate) and red jasper occur in veins up to 5 cm across. Cavities in the host rock contain colourless to pink heulandite crystals, colourless to white analcime crystals, white fibrous and tabular radiating aggregates of stilbite, and pink granular massive laumontite.

The occurrences are exposed along the Baxters Harbour and Long Beach seacliffs, on the shore of Minas Channel, about 17 km north of Kentville. Lat. 45°13′47″N, Long. 64°30′48″W (Baxters Harbour); Lat. 45°13′11″N, Long. 64°33′53″W (Long Beach). *See* Map 41, Map 44.

Road log from Highway 1 (Evangeline Trail) at **km 35.4** (*see* the Main Road Log on page 235):

km		
	0	Kentville, junction of highways 1 and 359; proceed north along Highway 359.
	11.0	Junction; turn right (east).
	17.3	Glenmont, junction; continue straight ahead (north).
	22.4	Baxters Harbour, junction. To reach the Baxter Harbour occurrence, continue straight ahead (north) 0.15 km to the shore. To reach the Long Beach occurrence, turn left (west) at this junction and proceed 2.9 km to the Long Beach shore. Collect at low tide.

Maps (T): 21 H/2 Berwick

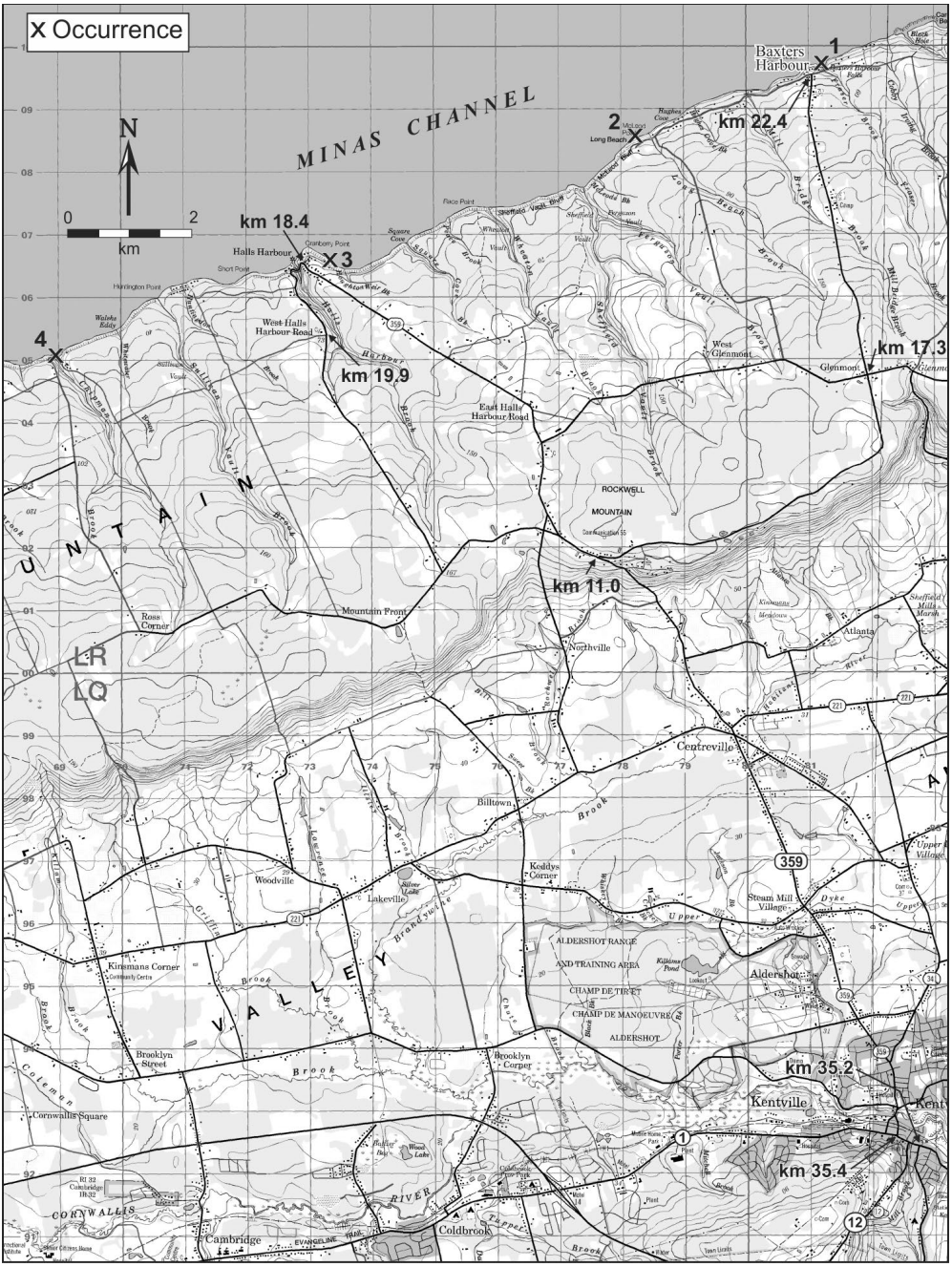
(G): 13A Kingsport Sheet No. 84, Hants and Kings counties, Nova Scotia (GSC, 1:63 360)
14A Hall Harbour Sheet No. 99, Kings County, Nova Scotia (GSC, 1:63 360)
39A Nova Scotia Sheet (GSC, 1:506 880)
85-1 Industrial mineral commodities map of the Province of Nova Scotia (NSDNR, 1:500 000)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

Halls Harbour occurrence

HEULANDITE, STILBITE, LAUMONTITE, APOPHYLLITE, THOMSONITE, ANALCIME, CHABAZITE, LEVYNE, MORDENITE, PLAGIOCLASE, QUARTZ CRYSTALS, CALCITE CRYSTALS, CHALCEDONY (AGATE), JASPER, AMETHYST

In basalt

Zeolite minerals occurring in cavities up to 90 cm across include heulandite, as colourless, white and pink crystals; stilbite, as colourless to white radiating fibrous aggregates; laumontite, as white striated crystals; apophyllite, as colourless radiating fibrous aggregates; thomsonite, as colourless to pink blade-like aggregates; analcime, as colourless to white glassy crystals; chabazite, as white platy aggregates; levyne, as white columnar radiating aggregates;



1. Baxters Harbour occurrence 2. Long Beach occurrence 3. Halls Harbour occurrence 4. Chipman Brook occurrence

Map 44. Baxters Harbour-Chipman Brook

and mordenite, as white nodules. White platy plagioclase, quartz crystals, calcite crystals, and chlorite occur in cavities. Chalcedony (agate), jasper, and amethyst occur in veins and fractures.

The occurrence is exposed along the seacliffs at Halls Harbour, Minas Channel, about 17 km northwest of Kentville. Lat. 45°12′04″N, Long. 64°36′47″W. *See* Map 41, Map 44.

Road log from Highway 1 (Evangeline Trail) at **km 35.4** (*see* the Main Road Log on page 235):

km		
	0	Kentville, junction of highways 1 and 359; proceed north along Highway 359.
	18.4	Halls Harbour, junction; turn right (east) onto Cove Road.
	18.9	Halls Harbour occurrence. Collect at low tide.

Refs.: 150 p. 203-204; 213 p. 70S; 354 p. 10.

Maps (T): 21 H/2 Berwick
(G): 14A Hall Harbour Sheet No. 99, Kings County, Nova Scotia (GSC, 1:63 360)
39A Nova Scotia Sheet (GSC, 1:506 880)
85-1 Industrial mineral commodities map of the Province of Nova Scotia (NSDNR, 1:500 000)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

Chipman Brook occurrence

HEULANDITE, STILBITE, LAUMONTITE, MORDENITE, CHALCEDONY (AGATE)

In basalt

Colourless to pink heulandite and white stilbite are the most common zeolite minerals; they occur in cavities and in tubular spike amygdules 5 to 8 cm across and up to a metre long. Light pink laumonite and white mordenite (nodules) occur less abundantly. Chalcedony (agate) is relatively uncommon.

The occurrence is exposed in seacliffs along the Minas Channel shore at Chipman Brook, about 18 km northwest of Kentville. Lat. 45°11′11″N, Long. 64°40′04″W. *See* Map 41, Map 44.

Road log from Highway 1 (Evangeline Trail) at **km 35.4** (*see* the Main Road Log on page 235):

km		
	0	Kentville, junction of highways 1 and 359; proceed north along Highway 359 to Halls Harbour.
	18.4	Halls Harbour, junction; turn left (west).
	18.9	Junction; road to Huntington Point. Proceed straight ahead (south) toward West Halls Harbour Road.
	19.9	West Halls Harbour Road, junction; turn right west.
	23.7	Junction; turn right (north).

25.3 Bridge over Chipman Brook, opposite the wharf. The Chipman Brook occurrence extends east about 1 km from Chipman Brook to Whitewater Brook. Collect at low tide.

Ref.: 354 p. 10.

Maps (T): 21 H/2 Berwick
(G): 14A Hall Harbour Sheet No. 99, Kings County, Nova Scotia (GSC, 1:63 360)
39A Nova Scotia Sheet (GSC, 1:506 880)
85-1 Industrial mineral commodities map of the Province of Nova Scotia (NSDNR, 1:500 000)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

Canada Creek, Black Rock occurrences

HEULANDITE, STILBITE, MORDENITE, MESOLITE, LAUMONTITE,

APOPHYLLITE, GYROLITE, PREHNITE, JASPER

In basalt

The zeolite minerals occur in cavities and in tubular spike amygdules up to 5 cm across. The most common zeolites are heulandite and stilbite. Mordenite occurs as white nodules up to 4 cm across. Mesolite, laumontite, apophyllite, and gyrolite have been reported from Black Rock, and prehnite from the shoreline between Canada Creek and Black Rock. Jasper and quartz occur in veins in basalt at Black Rock.

The occurrences are exposed along seacliffs on the Minas Channel shore between Canada Creek and Black Rock, about 15 km northwest of Waterville. Lat. 45°10′15″N, Long. 64°44′36″W (Canada Creek); Lat. 45°10′13″N, Long. 64°45′37″W (Black Rock). *See* Map 41, Map 45.

Road log from Highway 1 (Evangeline Trail) at **km 50.5** (*see* the Main Road Log on page 235):

km 0 Waterville, junction of Highway 1 and the road to Canada Creek; proceed north to Canada Creek.

6.4 Buckleys Corner, junction of Highway 221; continue straight ahead.

15.4 Canada Creek, at the bridge over Canada Creek. The wharf is just north of the bridge. The Canada Creek occurrence is on both sides of the wharf. To reach the Black Rock occurrence, continue along the road leading west from the bridge.

16.8 Black Rock, at the lighthouse. The Black Rock occurrence is exposed along the shore. Collect at low tide.

Refs.: 150 p. 198-203; 188 p. 27T, 38T; 213 p. 77S; 270 p. 131; 345 p. 183; 353 p. 28; 367 p. 26L.

Maps (T): 21 H/2 Berwick
(G): 14A Hall Harbour Sheet No. 99, Kings County, Nova Scotia (GSC, 1:63 360)
39A Nova Scotia Sheet (GSC, 1:506 880)

85-1 Industrial mineral commodities map of the Province of Nova Scotia (NSDNR, 1:500 000)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

Harbourville, Ogilvie occurrences

STILBITE, HEULANDITE, MESOLITE, LAUMONTITE, CHALCEDONY (AGATE)

In basalt

White stilbite and pink heulandite are the most common zeolite minerals. Some of the heulandite occurs as dense chalk-white nodules up to 5 cm across. Mesolite and laumontite occur less commonly. Red, white, and grey mottled chalcedony (agate) occurs in veins.

The occurrences are exposed along seacliffs on the Minas Channel shore at Harbourville and Ogilvie, about 14 km northwest of Berwick. Lat. 45°09′05″N, Long. 64°48′43″W (Harbourville); Lat 45°08′22″N, Long. 64°50′55″W (Ogilvie). *See* Map 41, Map 45.

Road log from Highway 1 (Evangeline Trail) at **km 55.5** (*see* the Main Road Log on page 235):

km		
	0	Berwick, junction of highways 1 and 360; proceed north along Highway 360.
	15.4	Harbourville, at the wharf on the north side of the road. The Harbourville occurrence is on both sides of the wharf. To reach the Ogilvie occurrence, continue straight ahead along the road leading west toward Ogilvie.
	18.1	Junction; proceed west along the road on right.
	19.7	Ogilvie, at the wharf. The Ogilvie occurrence is on both sides of the wharf. Collect at low tide.

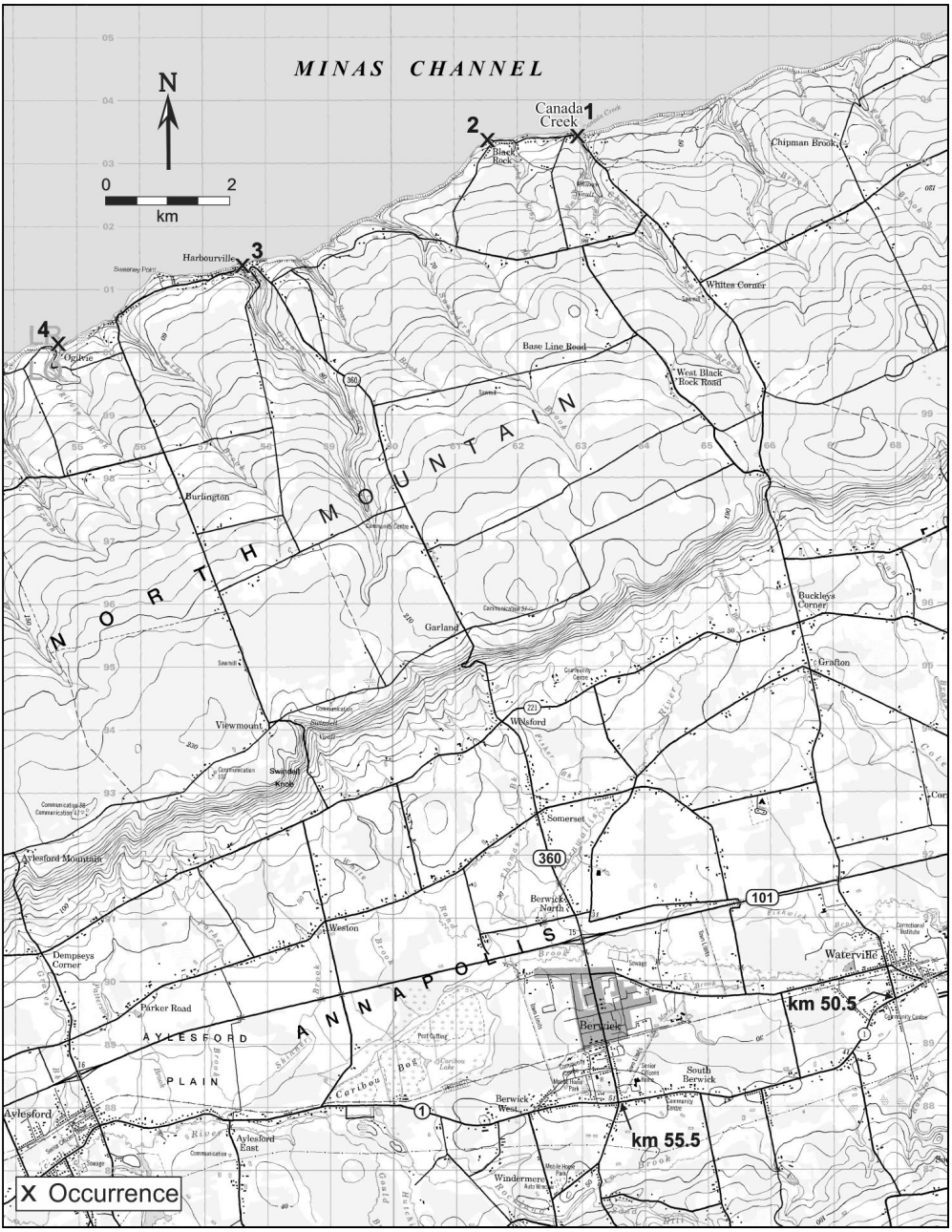
Ref.: 353 p. 28, 53, 59.

Maps (T): 21 H/2 Berwick
(G): 14A Hall Harbour Sheet No. 99, Kings County, Nova Scotia (GSC, 1:63 360)
39A Nova Scotia Sheet (GSC, 1:506 880)
85-1 Industrial mineral commodities map of the Province of Nova Scotia (NSDNR, 1:500 000)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

Nichols (Aylesford) mine

MANGANITE, PYROLUSITE, PSILOMELANE, BARITE, SIDERITE, GOETHITE, LIMONITE, HEMATITE

In argillite



1. Canada Creek occurrence 2. Black Rock occurrence 3. Harbourville occurrence 4. Ogilvie occurrence

Map 45. Canada Creek-Ogilvie

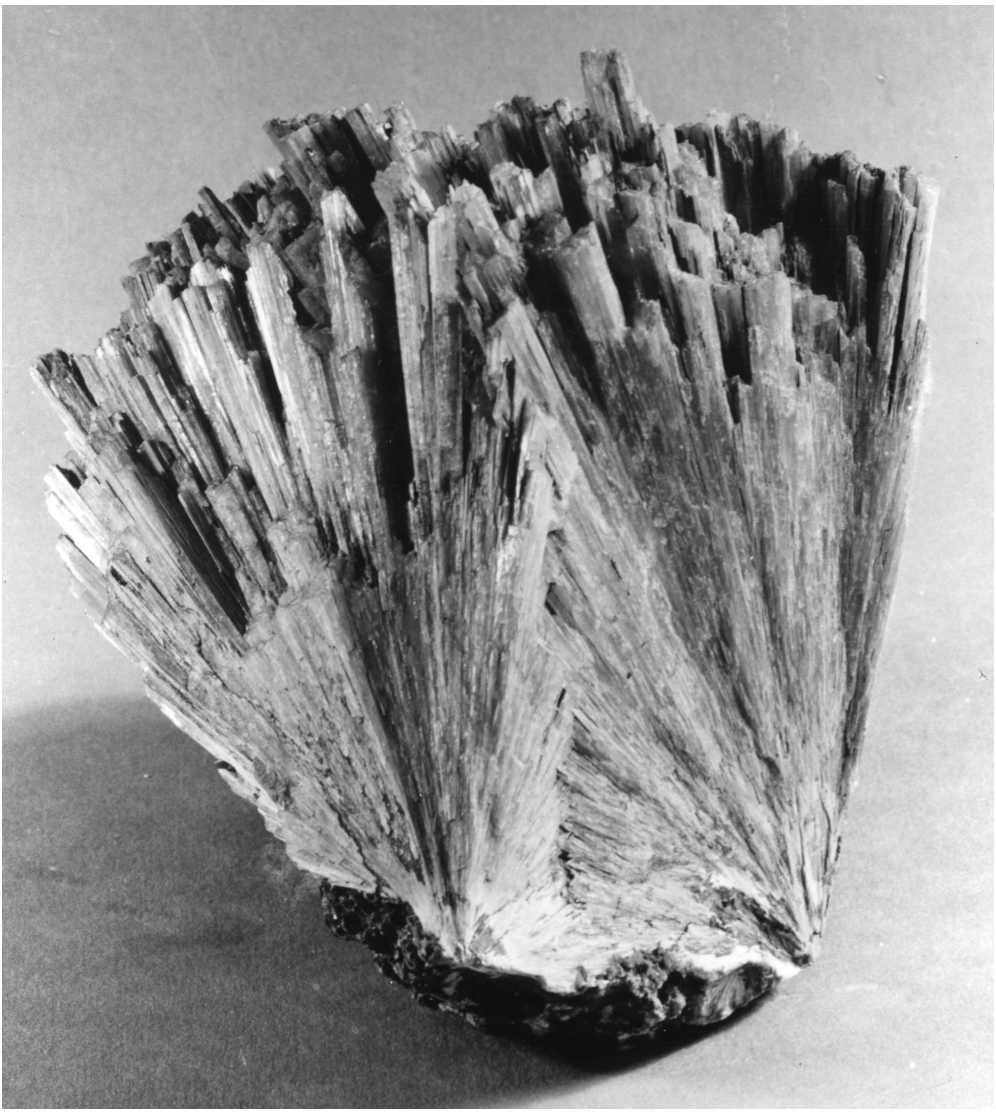


Plate 36.

Mesolite, Bay of Fundy. (GSC 112324-Q)

The manganese ore minerals, manganite, pyrolusite, and psilomelane occur as streaks and lenses in veins. Barite occurs as white crystals and irregular masses. Crystal aggregates of siderite and spheroidal masses of goethite surrounded by limonite and hematite occur in white massive calcite.

Manganese mineralization was discovered in a vein crossing Zebe Brook on the Burton Nichols farm. In 1885, Alex McPhail excavated a 122 m trench on the vein on the north side of the brook and recovered three barrels of manganese ore. In 1908, Abraham Banks of Morristown did some exploration and sank a 2.5 m test pit. In 1917 and 1918, W.E. Bishop

of Aylesford sank a 7.6 m pit at the western end of the original trench, and a shaft 18 m to the east. In 1920, Mr. Bishop formed the Aylesford Manganese Mining Company Limited to develop the deposit. In 1953, Orin Bowlby did some drilling, blasting, and trenching.

The mine is on the Roy Ward farm about 6 km south of Aylesford. Lat. 44°58′29″N, Long. 64°50′15″W. *See* Map 48.

Road log from Highway 1 (Evangeline Trail) at **km 66.7** (*see* the Main Road Log on page 235):

km		
	0	Auburn, junction of Highway 1 and a road leading south; proceed south along this road.
	5.3	Roy Ward farm on the east side of the road. The Nichols (Aylesford) mine is about 200 m east of the road.

Refs.: 29 p. 198-217; 128 p. 2F-3F; 130 p. 12E-13E; 182 p. 52; 206 p. 47; 328 p. 71; 329 p. 176-178.

Maps (T): 21 A/15 Gaspereau Lake
(G): 39A Nova Scotia Sheet (GSC, 1:506 880)
92-1 Gaspereaux Lake (N.T.S. sheets 21 A/15 and part of 21 H/02), Nova Scotia (NSDNR, 1:50 000)
94-01 South Mountain Batholith, Western Nova Scotia (NSDNR, 1:250 000)
1225A Annapolis-St. Mary's Bay area (east half), Nova Scotia (GSC, 1:126 720)
1346A Gaspereau Lake (west half), Nova Scotia (GSC, 1:50 000)
Metallogenic map of the province of Nova Scotia, 1983 (NSDNR, 1:500 000)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

Morden occurrence

MORDENITE, STILBITE, HEULANDITE, ANALCIME, LEVYNE, LAUMONTITE, APOPHYLLITE, MESOLITE, OKENITE, CHALCEDONY (AGATE), JASPER, QUARTZ CRYSTALS

In basalt

Mordenite occurs as white nodules up to 5 cm across in spike amygdules; the nodules are composed of radiating masses of silky white fibres. Mordenite was originally described from this locality for which it was named. Other zeolite minerals found in tubular spike amygdules in basalt are stilbite, as colourless to white radiating aggregates; heulandite, as colourless to pink platy crystals and as white nodules; analcime, as colourless glassy crystals; levyne, as colourless transparent masses and as white radiating aggregates; laumontite, as white striated prisms; apophyllite, as white tabular crystals; mesolite, as white radiating masses; and okenite, as white compact fibrous concretions. Chalcedony (agate) occurs as white, grey to light violet nodules up to 12 cm across. Red jasper and white quartz occur in veins. Microscopic quartz crystals occur in small cavities in massive quartz.

The occurrence is exposed along seacliffs on the Bay of Fundy shore at Morden, about 11 km northwest of Auburn. Lat. 45°06′14″N, Long. 64°56′32″W. *See* Map 41, Map 46.

Road log from Highway 1 (Evangeline Trail) at **km 67.2** (*see* the Main Road Log on page 235):

km		
	0	Auburn, junction of Highway 1 and the road to Morden; proceed north to Morden.
	11.6	Morden, junction; turn right (north) onto the road to the wharf.
	11.9	Morden occurrence, on both sides of the wharf. Collect at low tide.

Refs.: 188 p. 48T, 60T; 287 p. 1215-1232; 345 p. 248; 353 p. 22-73; 367 p. 26L.

Maps (T): 21 H/2 Berwick
(G) 39A Nova Scotia Sheet (GSC, 1:506 880)



Plate 37.

Zeolite-filled irregular amygdules and tubular spike amygdules in basalt seacliffs, Morden, 1976. (GSC 158177)

85-1 Industrial mineral commodities map of the Province of Nova Scotia (NSDNR, 1:500 000)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

Bishop Brook mine

NATIVE COPPER, MALACHITE

In basalt

Native copper occurs as grains and irregular masses in veins and fissures. Malachite occurs in veins and as films on the host rock.

In 1864, Annapolis Copper Company drove a short adit into the mouth of Bishop Brook near the water level; the plan was to sink a shaft from the adit to reach rich copper ore believed to occur at a lower level. In 1881, additional native copper discoveries were made. Some work was done in the vicinity of the adit in 1883, 1884, and in 1888. In 1966, Sladen (Quebec) Limited and O'Brien Gold Mines Limited did some sampling and drilling.

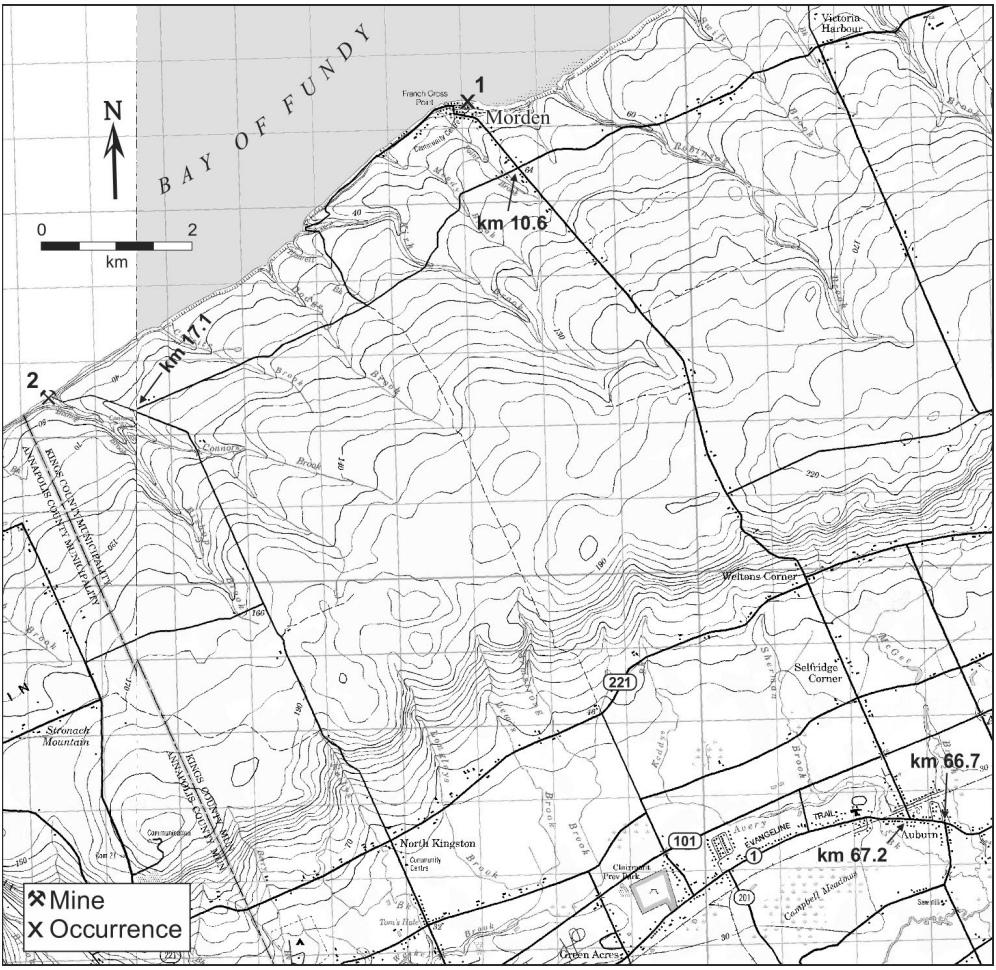
The occurrence is exposed at the mouth of Bishop Brook on the Bay of Fundy shore about 6.5 km southwest of Morden, and about 11 km northwest of Auburn. Lat. 45°04′05″N, Long. 65°00′56″W. *See* Map 41, Map 46.

Road log from Highway 1 (Evangeline Trail) at **km 67.2** (*see* the Main Road Log on page 235):

km		
	0	Auburn, junction of Highway 1 and the road to Morden; proceed north toward Morden.
	10.6	Junction; turn left onto the road leading west toward East Margaretsville.
	17.1	Junction; turn right onto the road leading northwest.
	18.3	End of the road at Bishop Brook. The Bishop Brook mine is at the mouth of the brook. Scattered showings of native copper and malachite occur in basalt exposures along the shore. Collect at low tide.

Refs.: 107 p. 15; 188 p. 30T, 60T; 244 p. 361,369-372; 367 p. 20L-21L.

Maps (T): 21 H/3 Margaretsville
(G) 39A Nova Scotia Sheet (GSC, 1:506 880)
85-1 Industrial mineral commodities map of the Province of Nova Scotia (NSDNR, 1:500 000)
641 Western portion of Nova Scotia (GSC, 1:506 880)
Metallogenic map of the province of Nova Scotia, 1983 (NSDNR, 1:500 000)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)



1. Morden occurrence 2. Bishop Brook mine

Map 46. Morden

Margaretsville, Port George, Stronach Brook occurrences

LAUMONTITE, HEULANDITE, ANALCIME, APOPHYLLITE, GYROLITE, MESOLITE, STILBITE, EPISTILBITE, SCOLECITE, NATROLITE, THOMSONITE, CHALCEDONY (AGATE), JASPER

In basalt

Laumontite, the most abundant zeolite mineral, occurs as pink friable masses in cavities up to 30 cm across. Other zeolites occur in smaller cavities and in tubular amygdules; these include heulandite, analcime, apophyllite, gyrolite, mesolite, stilbite, epistilbite, scolecite, natrolite, and thomsonite. Grey chalcedony (agate) and red jasper occur in veins up to 5 cm wide.

The occurrences are exposed along seacliffs on the Bay of Fundy shore extending from Margaretsville westward to Port George and from Margaretsville eastward to Stronach Brook, about 12 km northeast of Middleton. Lat. 45°00′19″N, Long. 65°09′11″W (Port George); Lat. 45°02′55″N, Long. 65°03′48″W (Margaretsville); Lat. 45°03′24″N, Long. 65°02′13″W (Stronach Brook). *See* Map 41, Map 47.

Road log from Highway 1 (Evangeline Trail) at **km 86.6** (*see* the Main Road Log on page 235):

km	0	Middleton, junction of highways 1 and 362; proceed north along Highway 362.
	3.2	Junction; the road straight ahead leads 8.5 km to Port George and the Port George occurrence. Proceed east continuing along Highway 362 to Margaretsville.
	9.7	Junction; the road on left leads 6.3 km to Port George and the Port George occurrence. The road log continues along Highway 362 to Margaretsville.
	14.4	Margaretsville, at the wharf. The collecting area extends west 9 km from the wharf to Port George, and east 2400 m to Stronach Brook; the basalt headland on the west side of the mouth of Stronach Brook is referred to as Peter's Point in old geological reports. Collect at low tide.

Refs.: 11 p. 147M; 150 p. 195-196; 201 p. 29-32; 270 p. 127; 345 p. 183; 352 p. 6-7; 353 p. 28, 58-59, 63, 72; 367 p. 25L-26L.

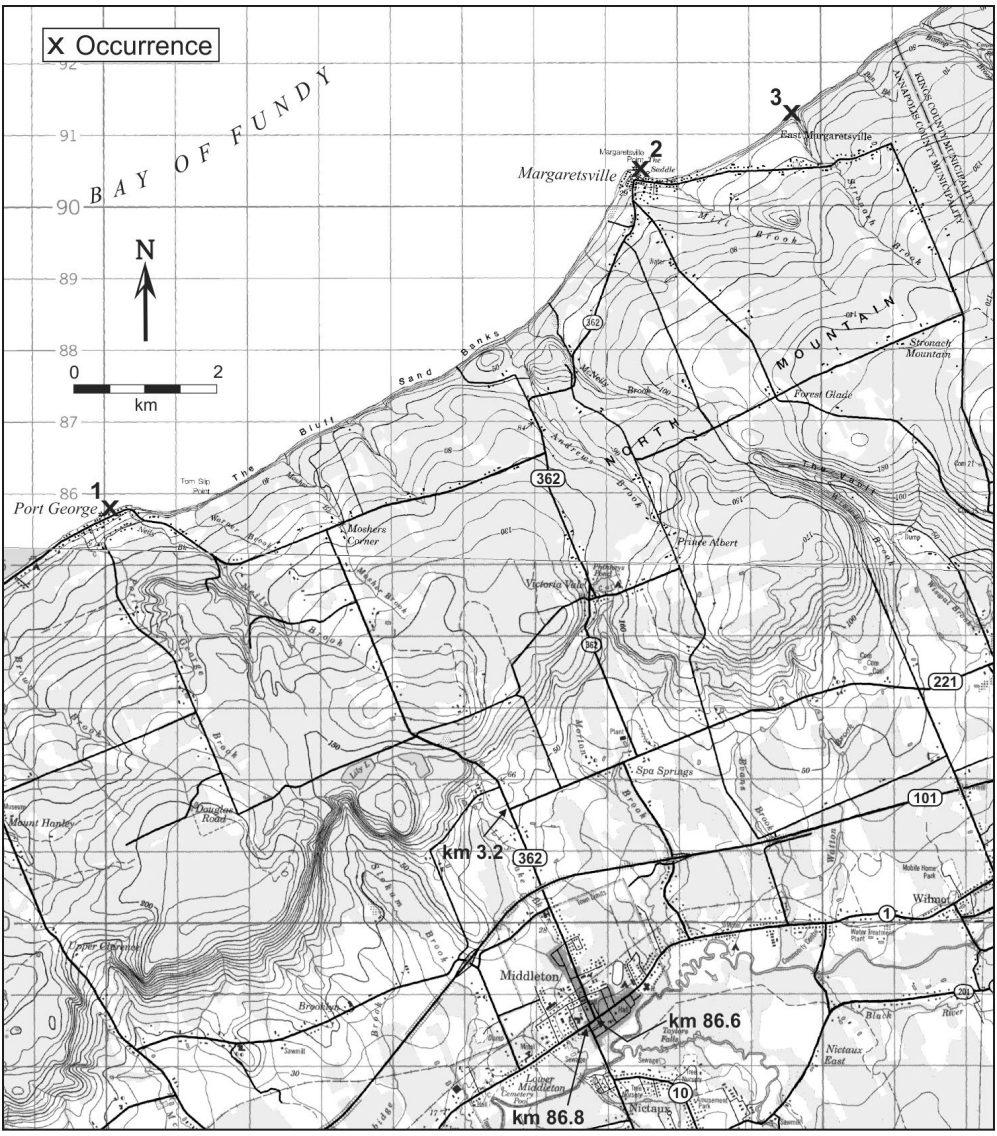
Maps (T): 21 H/3 Margaretsville
21 A/14 Bridgetown
(G) 39A Nova Scotia Sheet (GSC, 1:506 880)
85-1 Industrial mineral commodities map of the Province of Nova Scotia (NSDNR, 1:500 000)
641 Western portion of Nova Scotia (GSC, 1:506 880)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

Nictaux quarries

GRANITE

The granite is grey, fine to medium grained and uniformly textured. It is composed of orthoclase and plagioclase feldspars, quartz, and biotite. The rock takes a good polish and is commercially referred to as *Atlantic Mist Gray.*

Quarrying for granite in the Nictaux area began in about 1889. The granite was originally used locally for building culverts for the Nova Scotia Central Railway, and later for paving blocks, and for monuments. In 1906, John Kline of Halifax opened a small quarry for monument stone. By 1910, there were three operators in the area. Middleton Granite and Marble Company of Middleton produced stone for the construction of the Methodist church in Annapolis, the Sir John Thompson monument in Halifax, the Bentley Buildings in Middleton, and monuments throughout the Maritime provinces; the company operated a dressing plant in Middleton. Thelbert Rice of South Williamston operated a quarry and a monument stone dressing plant. These operators continued into the 1920s. Subsequent operators included: C.M. Hoyt (1922–1935), W.D. Rice (1923–1945), Elmer A. Rice and Otis A. Rice (1924–1945),



1. Port George occurrence 2. Margaretsville occurrence 3. Stronach Brook occurrence

Map 47. Margaretsville-Port George

Arthur Nixon and Robert Nixon of Nixon Granite Works (1942–1972), William Shaw and H. Gehue (1943), Nictaux Granite (Canada) Limited (1946–1950), T.W. Scott and Company (1949–1954), Gehue's Granite Works (1953–1969), and Cyril Rice (1958–1961). Heritage Memorials Limited took over operations in 1967 and became the sole operator in 1973. Most of the production is used for the monument industry, with minor amounts for the building industry. The quarries are the side-hill type, 15 to 45 m long with faces up to 9 m high.

The quarries are 5 to 7 km southwest of Middleton. Lat. 44°54′05″N, Long. 65°05′25″W and Lat. 44°54′00″N, Long. 65°05′15″W (Heritage Memorials Limited quarries); Lat. 44°53′29″N, Long. 65°06′35″W (inactive quarry). *See* Map 48.

Road log from Highway 1 (Evangeline Trail) at **km 86.8** (*see* the Main Road Log on page 235):

km		
	0	Middleton, junction of highways 1 and 10; proceed south along Highway 10.
	2.7	Junction; turn right (southwest) onto Highway 201.
	6.9	Junction; the road on left leads southeast 125 m to the Heritage Memorials Limited quarries.
	9.3	Junction; turn right (north).
	9.9	Junction; the road on right leads east 200 m to an inactive quarry.

Refs.: 45 p. 34-37; 91 p. 15-18; 285 p. 129-133; 328 p. 72; 342 p. 57.

Maps (T): 21 A/14 Bridgetown
(G) 39A Nova Scotia Sheet (GSC, 1:506 880)
85-1 Industrial mineral commodities map of the Province of Nova Scotia (NSDNR, 1:500 000)
94-08 Bridgetown, Nova Scotia, South Mountain Batholith Project (NSDNR, 1:50 000)
641 Western portion of Nova Scotia (GSC, 1:506 880)
1225A Annapolis-St. Marys Bay area (east half), Nova Scotia (GSC, 1:126 720)
1345A Bridgetown (east half), Nova Scotia (GSC, 1:50 000)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

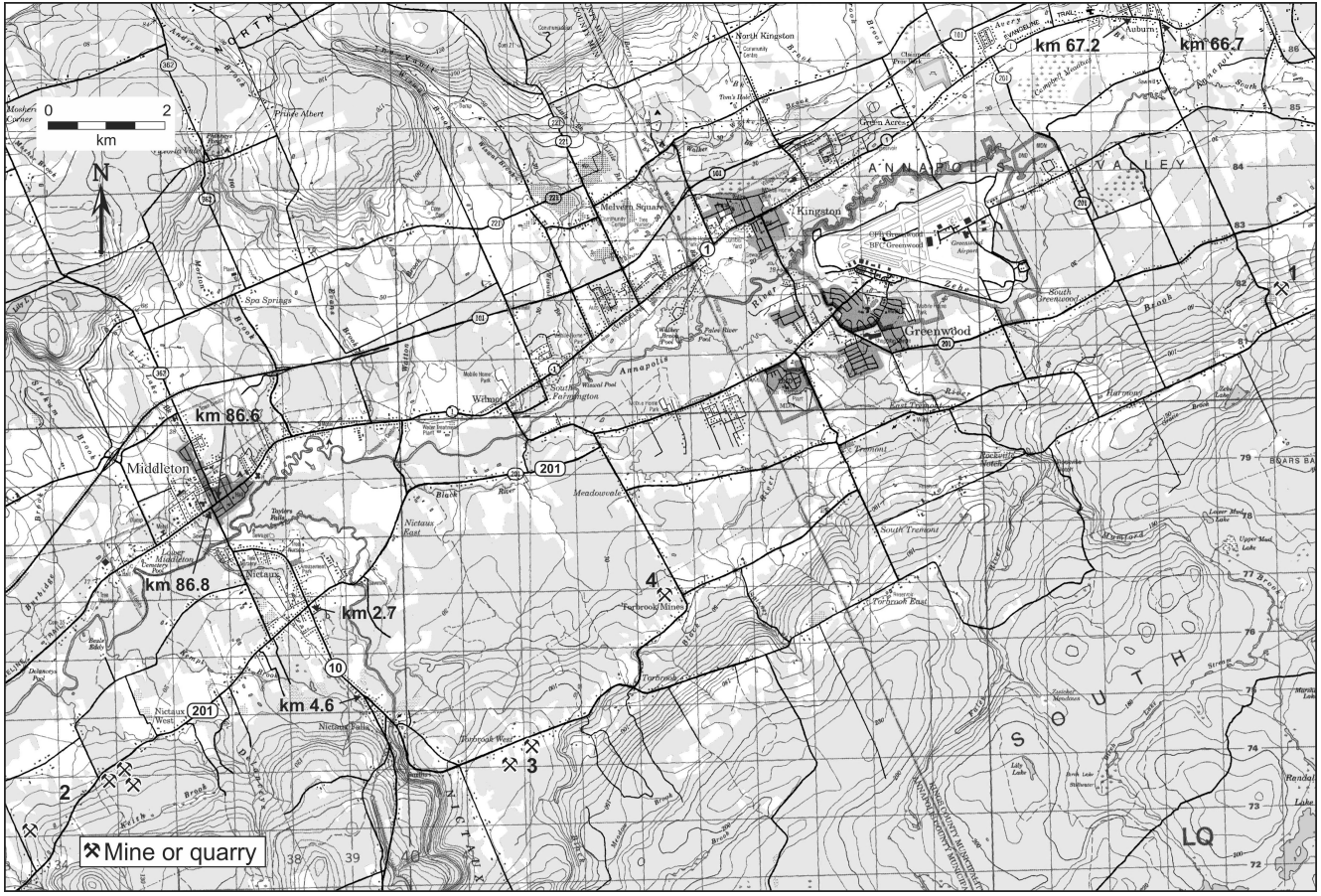
Wheelock mines

MAGNETITE, HEMATITE, FOSSILS

In slate

The iron ore consists of massive magnetite with fissures filled with red hematite. It contains shell fossils of Devonian age, including brachiopods, bryozoans, gastropods, and corals. Specimens of hematite were displayed in the Geological Survey of Canada economic minerals exhibit at the Paris International Exhibition held in 1900.

Iron production in the Nictaux-Torbrook area dates back to the early 1800s when a Catalan forge at Nictaux Falls produced a few tonnes of bar iron. The Torbrook discovery vein occurred in slate beneath clayey ferruginous soil on a hill then known as Nictaux Mountain;



1. Nichols (Aylesford) mine 2. Nictaux quarries 3. Wheelock mines 4. Leckie mine

Map 48. Middleton

this discovery became the Wheelock No. 1 mine. In 1825, Annapolis Iron Mining Company removed about 100 t of ore from a pit about 3 m deep and processed it at its furnace in Clementsport. Intermittent mining continued until 1863. In 1906, Annapolis Iron Company undertook mining the Wheelock No. 1 mine and another mine, the Wheelock No. 2 mine on the Edward Martin property. In 1908, the company was merged into Canada Iron Corporation which continued operations until 1913. Wheelock No. 1 mine operated from a 55 m shaft, and Wheelock No. 2 (Martin) mine, from a 152 m shaft. Total production amounted to 92 605 t of ore. In 1956 and 1957, Torbrook Iron Ore Mines Limited surveyed, drilled, and trenched the area.

The mines are on the C. Veinot farm, about 7 km southeast of Middleton. Lat. 44°54′21″N, Long. 65°00′00″W (Wheelock No. 1 mine); Lat. 44°54′08″N, Long. 65°00′16″W (Wheelock No. 2 mine). *See* Map 48.

Road log from Highway 1 (Evangeline Trail) at **km 86.8** (*see* the Main Road Log on page 235):

km		
	0	Middleton, junction of highways 1 and 10; proceed south along Highway 10.
	4.6	Nictaux Falls, junction; leave Highway 10 and proceed east onto the road to Torbrook.
	8.2	C. Veinot farm on the south side of the road. Wheelock No. 1 mine is on this property just south of the road; Wheelock No. 2 (Martin) mine is 600 m to the southwest.

Refs.: 8 p. 229; 11 p. 140M-143M; 143 p. 302A-307A, 314A; 147 p. 9-11; 150 p.36-39; 217 p. 57-59; 218 p. 185-190; 328 p. 69-71; 343 p. 54; 372 p. 112-118; 374 p. 76-80; 397 p. 127-128.

Maps (T): 21 A/14 Bridgetown, 21 A/15 Gaspereau lake
(G) 39A Nova Scotia Sheet (GSC, 1:506 880)
92-1 Gaspereaux Lake (N.T.S. sheets 21 A/15 and part of 21 H/02), Nova Scotia (NSDNR, 1:50 000)
94-01 South Mountain Batholith, Western Nova Scotia (NSDNR, 1:250 000)
641 Western portion of Nova Scotia (GSC, 1:506 880)
897 Nictaux and Torbrook iron district, Annapolis Co., N.S. (GSC, 1:19 800)
1225A Annapolis-St. Marys Bay area (east half), Nova Scotia (GSC, 1:126 720)
1345A Bridgetown (east half), Nova Scotia (GSC, 1:50 000)
Metallogenic map of the province of Nova Scotia, 1983 (NSDNR, 1:500 000)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

Leckie mine

HEMATITE, FOSSILS

In slate

Hematite occurs as red, fine-grained compact masses, and as black specularite. Shell fossils of Devonian age occur sparingly in the ore. Specimens of hematite and specular hematite were displayed in the Geological Survey of Canada economic minerals exhibit at the Paris International Exhibition held in 1900.



Plate 38.

Wheelock No. 1 mine, 1908. (National Archives of Canada PA 123901)

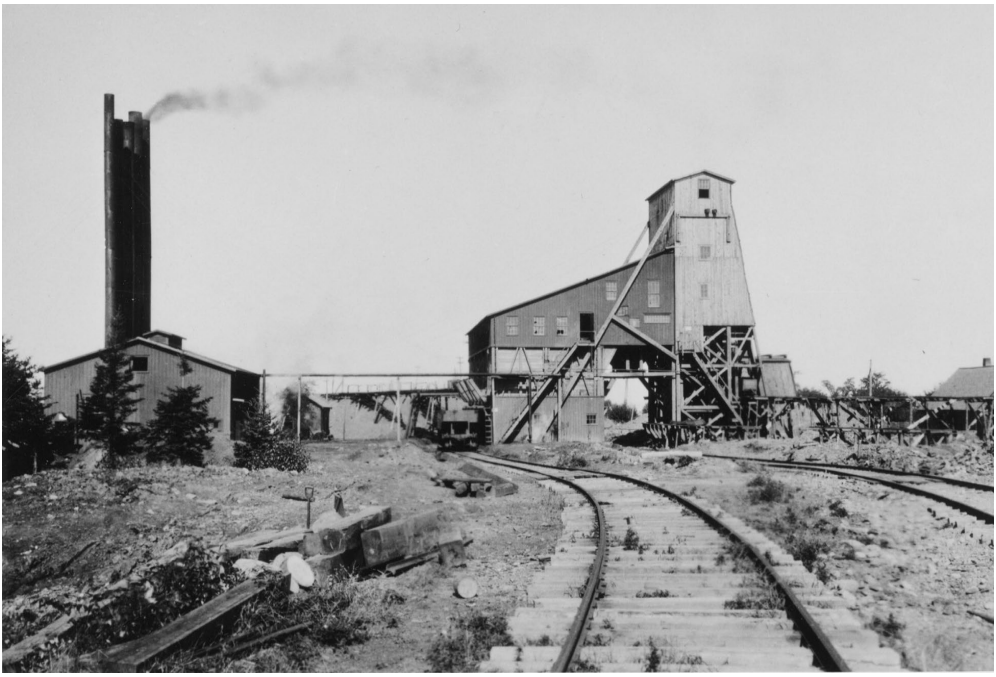


Plate 39.

Wheelock No. 2 mine, 1910. (National Archives of Canada PA 123900)

Londonderry Iron and Mining Company operated the mine from its opening in 1891 until 1896 when the iron works at Londonderry closed. Work was resumed in 1903, continuing until ore was exhausted in 1906. Ore was mined from four shafts, the deepest being 107 m. The mining plant consisted of air-drills, boilers, compressors, steam pumps, a blacksmith, a carpenter, office buildings, and several dwelling houses. A small village including a general store, barber shop, and photographic saloon sprang up at the site. Production amounted to 175 783 t of ore. In 1956 and 1957, Torbrook Iron Mines Limited surveyed, drilled, and trenched the area.

The mine is on the G. Hebb property in Torbrook Mines, about 8 km southeast of Middleton. Lat. 44°55′41″N, Long. 64°58′12″W. *See* Map 48.

Road log from Highway 1 (Evangeline Trail) at **km 86.8** (*see* the Main Road Log on page 235):

km		
	0	Middleton, junction of highways 1 and 10; proceed south along Highway 10.
	4.6	Nictaux Falls, junction; leave Highway 10 and proceed east onto the road to Torbrook.
	8.2	Turn-off (right) to the C. Veinot farm; continue straight ahead.
	10.3	Torbrook, junction; follow the road on left leading north to Torbrook Mines.
	12.5	Torbrook Mines, junction; turn left (west) onto the mine road.
	12.8	Leckie mine.

Refs.: 11 p. 140M-143M; 143 p. 307A-309A; 173 p. 19-20; 218 p. 185-194; 328 p. 69-71; 343 p. 54; 372 p. 104-112; 374 p. 76-80; 397 p. 127-128.

Maps (T): 21 A/15 Gaspereau Lake
(G): 39A Nova Scotia Sheet (GSC, 1:506 880)
92-1 Gaspereaux Lake (N.T.S. sheets 21 A/15 and part of 21 H/02), Nova Scotia (NSDNR, 1:50 000)
94-01 South Mountain Batholith, Western Nova Scotia (NSDNR, 1:250 000)
641 Western portion of Nova Scotia (GSC, 1:506 880)
897 Nictaux and Torbrook iron district, Annapolis Co., N.S. (GSC, 1:19 800)
1225A Annapolis-St. Marys Bay area (east half), Nova Scotia (GSC, 1:126 720)
1346A Gaspereau Lake (west half), Nova Scotia (GSC, 1:50 000)
Metallogenic map of the province of Nova Scotia, 1983 (NSDNR, 1:500 000)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

Hampton, Port Lorne, Starratt Brook occurrences

JASPER, CHALCEDONY (AGATE), EPIDOTE, STILBITE, MESOLITE, THOMSONITE, APOPHYLLITE, LAUMONTITE, NATROLITE, HEULANDITE, NATIVE COPPER, MALACHITE, ANALCIME

In basalt

Dark red jasper, grey chalcedony (agate), epidote, and zeolite minerals occur in veins and cavities in basalt seacliffs and as beach pebbles along the shore. Zeolite minerals include: stilbite, mesolite, thomsonite, apophyllite, laumontite, natrolite, and heulandite. Spectacular specimens of heulandite crystals forming cylinders 30 cm long and 25 mm across have been collected from St. Croix Cove, east of Hampton. These specimens were released by erosion from tubular amygdules in basalt seacliffs along the shore. Native copper occurs as small globules, stalactitic pieces, and fibres associated with malachite and with crystals of analcime and heulandite in amygdaloidal basalt at a cove at the mouth of Starratt Brook; this cove is referred to as Martial's Cove in old reports.

The occurrences are exposed in seacliffs along the Bay of Fundy shore extending from Hampton eastward to St. Croix Cove, Port Lorne, and Starratt Brook, 9 to 12 km north of Bridgetown. Lat. 44°54′22″N, Long. 65°21′03″W (Hampton at Chute Cove); Lat. 44°55′09″N, Long. 65°18′42″W (St. Croix Cove); Lat. 44°56′53″N, Long. 65°15′56″W (Port Lorne); Lat. 44°57′26″N, Long. 65°14′24″W (Starratt Brook). *See* Map 41, Map 49.

Road log from Highway 1 (Evangeline Trail) at **km 108.4** (*see* the Main Road Log on page 235):

km		
	0	Bridgetown, junction of Highway 1 and the road to Hampton; proceed north toward Hampton.
	4.1	Valleyview Provincial Park and Lookout on right.
	9.5	Hampton, junction. To reach the Hampton occurrence at Chute Cove, turn left at this junction and proceed west 0.9 km to a road leading north 0.4 km to the Chute Cove wharf and the Hampton occurrence. Access to the St. Croix Cove occurrence (between Hampton and Port Lorne) is by boat from the wharf at Chute Cove, a distance of about 3 km. To reach the occurrence at Port Lorne, turn right at the junction at km 9.5.
	18.1	Port Lorne, at the junction of the road to the wharf.
	18.3	Port Lorne wharf, and the Port Lorne occurrence. Access to the occurrence at Starratt Brook (Martial's Cove) is by boat from the Port Lorne wharf, a distance of about 2200 m. Collect at low tide.

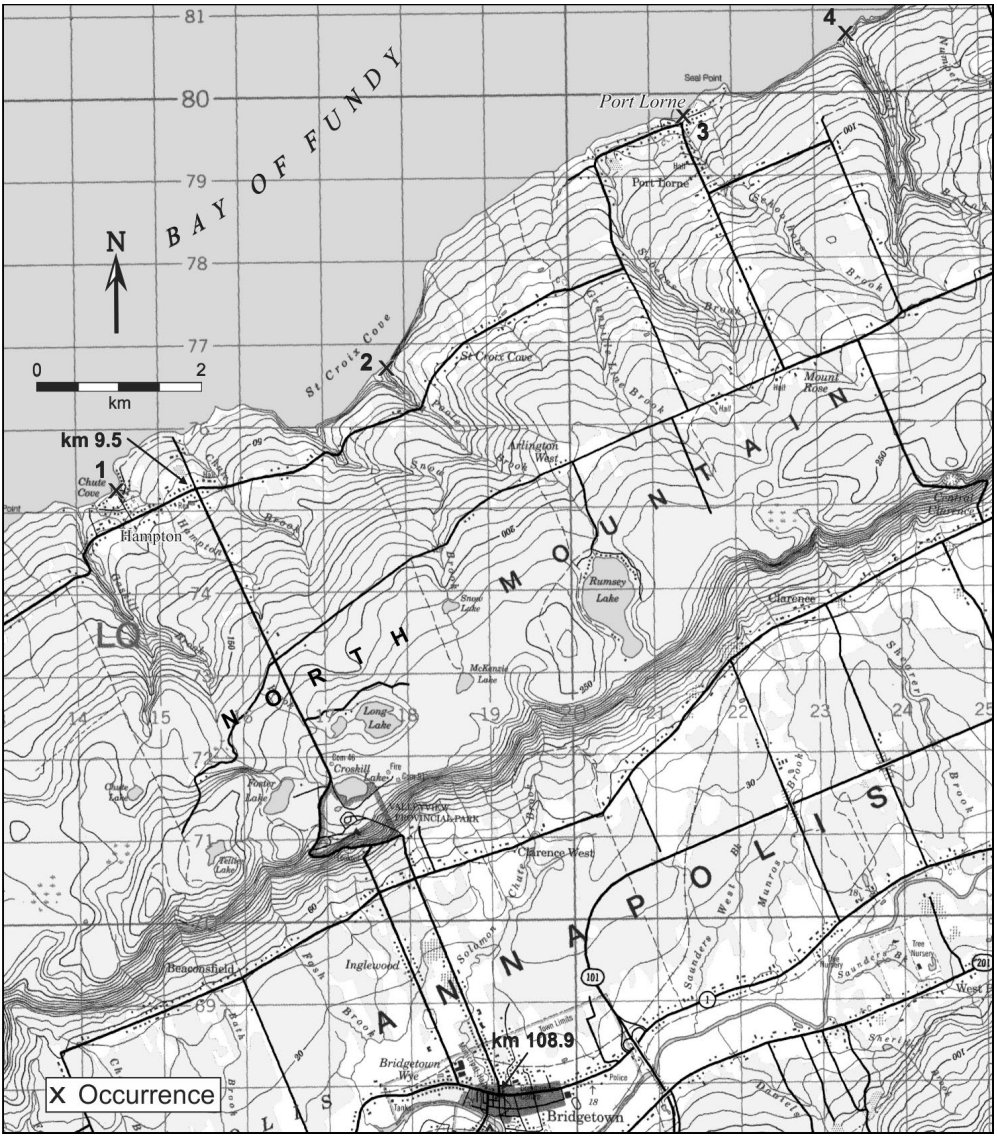
Refs.: 150 p. 189-193; 200 p. 321-325; 201 p. 25-27; 270 p. 127; 352 p. 7-8; 353 p. 28, 54.

Maps (T): 21 A/14 Bridgetown
(G) 39A Nova Scotia Sheet (GSC, 1:506 880)
85-1 Industrial mineral commodities map of the Province of Nova Scotia (NSDNR, 1:500 000)
641 Western portion of Nova Scotia (GSC, 1:506 880)
1225A Annapolis-St. Marys Bay area (west half), Nova Scotia (GSC, 1:126 720)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

Parkers Cove, Youngs Cove, Delaps Cove occurrences

JASPER, CHALCEDONY (AGATE)

In basalt



1. Hampton (Chute Cove) occurrence 2. St. Croix Cove occurrence 3. Port Lorne occurrence 4. Starratt Brook (Martial's Cove) occurrence

Map 49. Hampton-Port Lorne

Dark red to reddish brown jasper and bluish grey chalcedony (agate) occur in veins up to 5 cm wide.

The occurrences are exposed in seacliffs along the Bay of Fundy shore at Parkers Cove eastward to Youngs Cove and westward to Delaps Cove, 8 to 14 km from Annapolis Royal. Lat. 44°48′45″N, Long. 65°32′16″W (Parkers Cove); Lat. 44°52′17″N, Long. 65°25′50″W (Youngs Cove); Lat. 44°46′09″N, Long. 65°38′11″W (Delaps Cove). *See* Map 41, Map 50.

Road log from Highway 1 (Evangeline Trail) at **km 129.0** (*see* the Main Road Log on page 235):

km		
	0	Junction, Highway 1 and the road to Parkers Cove; proceed north toward Parkers Cove.
	6.2	Junction. The road on left leads west 0.6 km to the Parkers Cove occurrence, and continues west for 10 km to the Delaps Cove occurrence; the road on right leads east 11 km to the Youngs Cove occurrence. Access to Youngs Cove is also provided by a 10.3 km road leading north from Highway 1 (Evangeline Trail) at km 120.6 (see the Main Road Log on page 235). Collect at low tide.

Ref.: 143 p. 295A.

Maps (T): 21 A/13 Granville Ferry, 21 A/14 Bridgetown
(G) 39A Nova Scotia Sheet (GSC, 1:506 880)
85-1 Industrial mineral commodities map of the Province of Nova Scotia (NSDNR, 1:500 000)
641 Western portion of Nova Scotia (GSC, 1:506 880)
1225A Annapolis-St. Marys Bay area (west half), Nova Scotia (GSC, 1:126 720)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

Digby Gut occurrence

THOMSONITE, ANALCIME, NATROLITE, STILBITE, HEULANDITE,

APOPHYLLITE, CHABAZITE, MESOLITE, SCOLECITE, LAUMONTITE,

CHALCEDONY (AGATE)

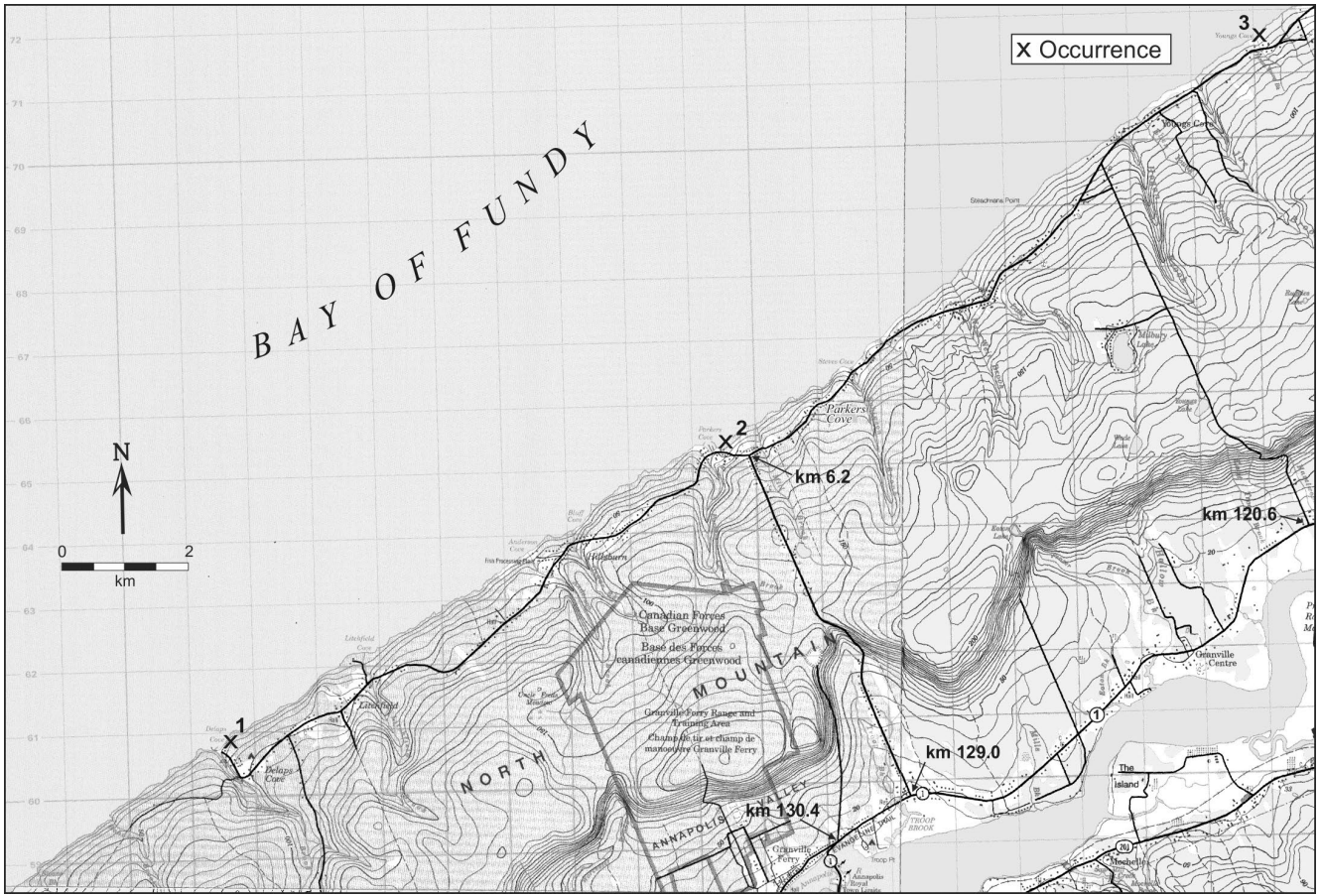
In basalt

Zeolite minerals occur in cavities and in veins; they include thomsonite, analcime, natrolite, stilbite, heulandite, apophyllite, chabazite, mesolite, scolecite, and laumontite. Chalcedony (agate) occurs in veins and fissures.

The occurrence is exposed in seacliffs along the shore of Digby Gut, Bay of Fundy, about 15 km north of Digby, and 20 km southwest of Granville Ferry. Lat. 44°40′32″N, Long. 65°45′16″W. *See* Map 41, Map 52.

Road log from Highway 1 (Evangeline Trail) at **km 130.4** (*see* the Main Road Log on page 235):

km		
	0	Granville Ferry, junction of Highway 1 and the road to Victoria Beach; proceed west to Victoria Beach (Highway 1 turns south).



1. Delaps Cove occurrence 2. Parkers Cove occurrence 3. Youngs Cove occurrence

Map 50. Parkers Cove

	23.5	Victoria Beach, at the lighthouse. The Digby Gut occurrence occurs along the east side of Digby Gut from the lighthouse northward to the Digby Gut entrance on the Bay of Fundy shore. Collect at low tide.

Refs.: 11 p. 147M; 353 p. 28, 54, 40, 67.

Maps (T): 21 A/12 Digby
(G) 39A Nova Scotia Sheet (GSC, 1:506 880)
85-1 Industrial mineral commodities map of the Province of Nova Scotia (NSDNR, 1:500 000)
641 Western portion of Nova Scotia (GSC, 1:506 880)
1225A Annapolis-St. Marys Bay area (west half), Nova Scotia (GSC, 1:126 720)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

Potter mine

HEMATITE, MAGNETITE, FOSSILS

In slate

Massive hematite occurs with minor amounts of magnetite in slate containing shell fossils of Devonian age.

Iron mining in the Clementsport area began in 1825 when Annapolis Iron Company Limited opened several pits in the area between Torbrook West and Torbrook Mines. The Potter mine, on the William Brown property, was worked at that time and again in 1860, 1872 and 1873, and in 1885. In 1826, Mr. Cyrus Alger installed the Annapolis Iron Works at the head of tide-water on the east bank of Moose River near Clementsport. In 1826 and 1827, the furnace was in blast and produced some excellent pig iron for foundry purposes and some refined bar iron. The ore was obtained from local mines including the Potter mine and from the iron mines at Nictaux. The Potter mine consists of an east-west trench 119 m long, 2 m wide and 4.5 to 6 m deep. There is a small dump adjacent to the opening.

The mine is about 6 km southeast of Clementsport. Lat. 44°37′35″N, Long. 65°33′32″W. *See* Map 51.

Road log from Highway 1 (Evangeline Trail) at **km 138.4** (*see* the Main Road Log on page 235):

km		
	0	Clementsport, junction of Highway 1 and the road to Clementsvale; proceed east along the road to Clementsvale.
	0.6	Junction; follow the road on right leading south to Clementsvale.
	6.1	Clementsvale, junction; turn left (northeast).
	7.4	Junction; turn left (northwest).
	8.2	Potter mine, in a field on the left (west) side of the road.

Refs.: 173 p. 19-20; 218 p. 183-184; 292 p. 43-44; 328 p. 71; 372 p. 38-42; 374 p. 75.

Maps (T): 21 A/12 Digby



Plate 40.

Annapolis Iron Works at the head of tide-water on the east bank of Moose River, Clementsport, 1879. (GSC 295)

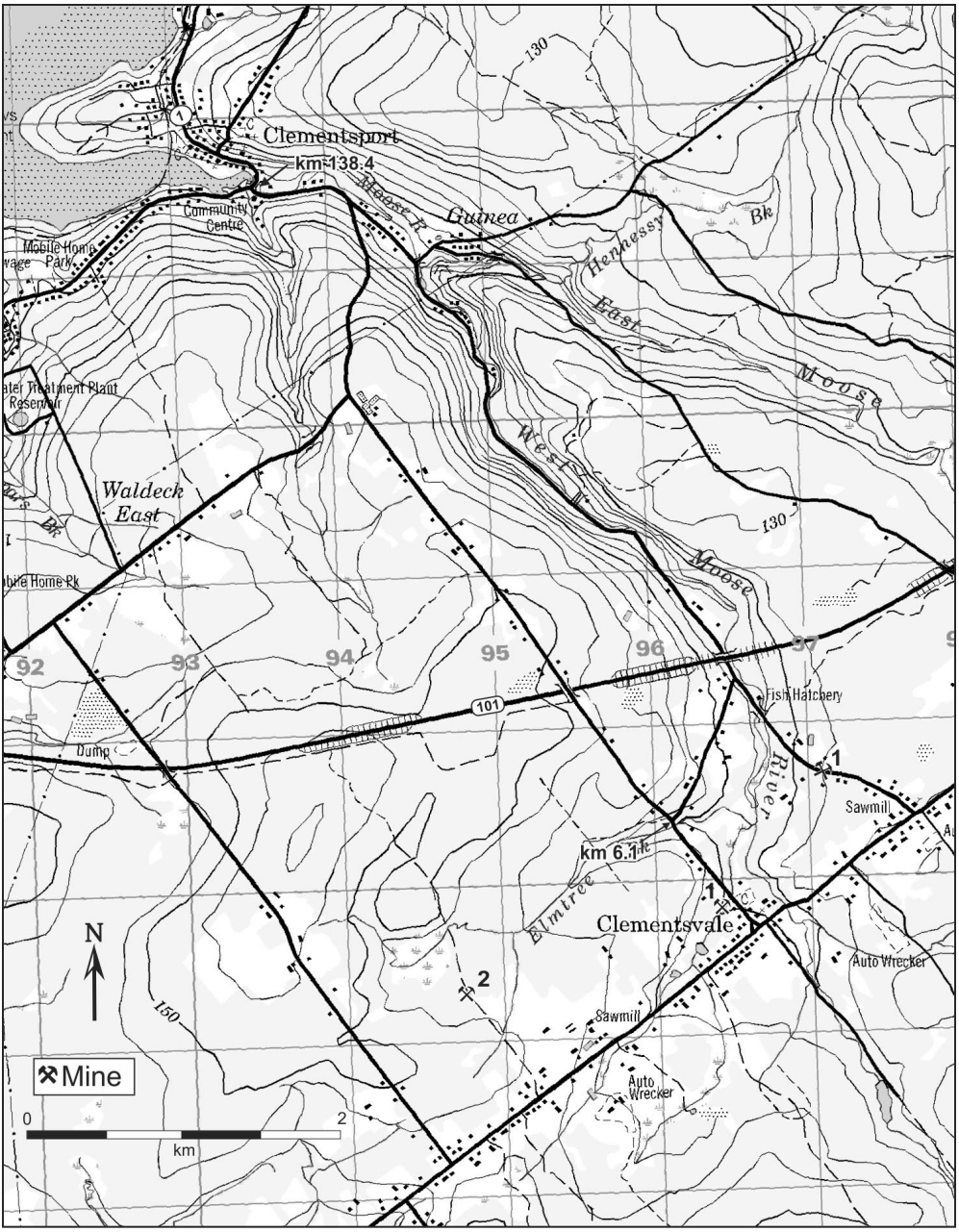
(G) 39A Nova Scotia Sheet (GSC, 1:506 880)
94-07 Digby, Nova Scotia, South Mountain Batholith Project (NSDNR, 1:50 000)
641 Western portion of Nova Scotia (GSC, 1:506 880)
1225A Annapolis-St. Marys Bay area (west half), Nova Scotia (GSC, 1:126 720)
1344A Digby (east half), Nova Scotia (GSC, 1:50 000)
Metallogenic map of the province of Nova Scotia, 1983 (NSDNR, 1:500 000)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

Milner mine

HEMATITE, MAGNETITE, FOSSILS

In slate

Massive hematite and minor amounts of magnetite occur in slate containing shell fossils of Devonian age.



1. Potter mine 2. Milner mine

Map 51. Clementsport

The mine consists of two parallel trenches 10 m apart; the north trench is 137 m long, the south trench 107 m long. They were opened along the property line between the Herbert Milner farm and the Israel Potter farm and were worked in 1826 and 1827. The ore was processed at the Annapolis Iron Works at Clementsport.

The mine is about 6 km south of Clementsport. Lat. 44°36′48″N, Long. 65°35′12″W. *See* Map 51.

Road log from Highway 1 (Evangeline Trail) at **km 138.4** (*see* the Main Road Log on page 235):

km		
	0	Clementsport, junction of Highway 1 and the road to Clementsvale; proceed east along the road to Clementsvale.
	0.6	Junction; follow the road on right leading south to Clementsvale.
	6.1	Clementsvale, junction; turn right (southwest).
	7.9	Junction; turn right (northwest).
	8.7	Milner mine; the trenches straddle the road.

Refs.: 218 p. 183-184; 328 p. 71; 372 p. 38-42; 374 p. 75.

Maps (T): 21 A/12 Digby
(G) 39A Nova Scotia Sheet (GSC, 1:506 880)
94-07 Digby, Nova Scotia, South Mountain Batholith Project (NSDNR, 1:50 000)
641 Western portion of Nova Scotia (GSC, 1:506 880)
1225A Annapolis-St. Marys Bay area (west half), Nova Scotia (GSC, 1:126 720)
1344A Digby (east half), Nova Scotia (GSC, 1:50 000)
Metallogenic map of the province of Nova Scotia, 1983 (NSDNR, 1:500 000)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

Digby to Westport

Collecting localities between Digby and Westport are described in the text that follows. The localities described are: Point Prim occurrence (p. 285), House Cliff (Broad) Cove occurrence (p. 285), Broad (Deep) Cove occurrence (p. 285), St. Marys Bay occurrence (p. 287), Gullivers Cove occurrence (p. 288), Trout Cove occurrence (p. 288), Sandy Cove occurrence (p. 289), East Sandy Cove occurrence (p. 291), Mink Cove occurrence (p. 292), Little River Cove occurrence (p. 293), Whale Cove occurrence (p. 293), Petit Passage occurrence (p. 294), Bear Cove occurrence (p. 295), Flour Cove occurrence (p. 295), Grand Passage occurrences (p. 297), and Brier Island occurrences (p. 298). A page reference is indicated in parentheses following the name of each occurrence.

The side trip proceeds along highways 303 and 217; the starting point is at **km 154.5** on Highway 1, the Evangeline Trail (*see* the Main Road Log on page 235). The description of collecting localities along the main collecting route along Highway 1 (Evangeline Trail) is resumed on page 299.

Point Prim occurrence

NATIVE COPPER, MALACHITE, THOMSONITE, HEULANDITE, MESOLITE, SCOLECITE, LAUMONTITE, JASPER, CHALCEDONY (AGATE)

In basalt

Native copper occurs as sheet copper and as pellets (also referred to as *shot copper*) weighing up to 15 g in columnar basalt. Malachite occurs as coatings on the host rock. The zeolite minerals, thomsonite, heulandite, mesolite, scolecite, and laumontite occur in cavities. Jasper and chalcedony (agate) occur in irregular veins. A suite of four jasper-agate gemstones from this locality were displayed in the Geological Survey of Canada cut and polished stones exhibit at the Paris International Exhibition held in 1900.

The occurrence is exposed at Point Prim, Bay of Fundy, about 7 km north of Digby. Lat. 44°41′31″N, Long. 65°47′10″W. *See* Map 41, Map 52.

Road log from Highway 1/101 (Evangeline Trail) at **km 154.5** (*see* the Main Road Log on page 235):

km		
	0	Junction, highways 1/101 and 303; proceed north along Highway 303 to Digby.
	3.0	Digby, junction of Highway 217; continue north along Highway 303.
	10.9	Point Prim. The native copper mineralization is exposed at Point Prim above the high water mark along the shore of Digby Gut just east of the lighthouse. The zeolite minerals occur in seacliffs along the western shore of Digby Gut south of Point Prim. Jasper and chalcedony (agate) occur in the seacliffs on both sides of Point Prim. Collect at low tide.

Refs.: 85 p. 92A; 200 p. 320; 201 p. 20-21; 244 p. 368; 369 p. 82; 397 p. 183.

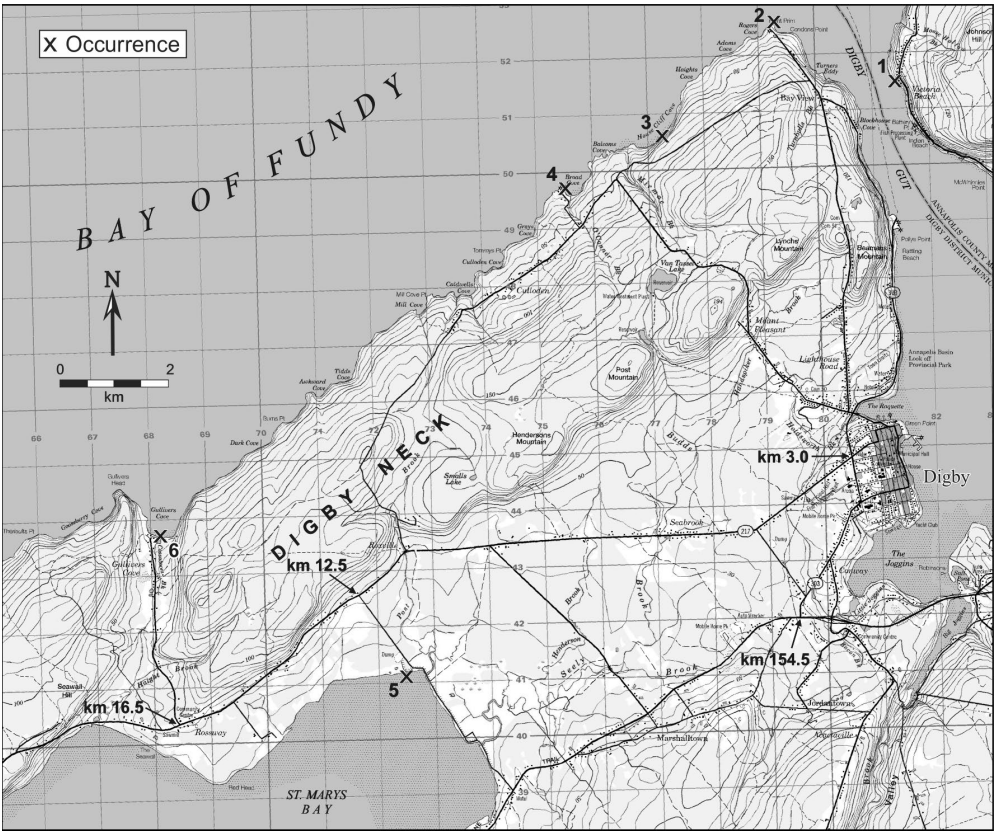
Maps (T): 21 A/12 Digby
(G) 39A Nova Scotia Sheet (GSC, 1:506 880)
94-07 Digby, Nova Scotia, South Mountain Batholith Project (NSDNR, 1:50 000)
641 Western portion of Nova Scotia (GSC, 1:506 880)
1225A Annapolis-St. Marys Bay area (west half) Nova Scotia (GSC, 1:126 720)
Metallogenic map of the province of Nova Scotia, 1983 (NSDNR, 1:500 000)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

House Cliff (Broad) Cove, Broad (Deep) Cove occurrences

JASPER, CHALCEDONY (AGATE), STILBITE, HEULANDITE, EPISTILBITE, THOMSONITE

In basalt

Red jasper and blue-grey chalcedony (agate) occur in veins up to 8 cm wide. Stilbite, heulandite, epistilbite, and thomsonite occur in veins up to 12 cm wide; much of the thomsonite is friable due to weathering.



1. Digby Gut occurrence 2. Point Prim occurrence 3. House Cliff (Broad) Cove occurrence 4. Broad (Deep) Cove occurrence 5. St. Marys Bay occurrence 6. Gullivers Cove occurrence

Map 52. Digby

The occurrences are exposed in seacliffs along the Bay of Fundy shore, from Broad Cove to House Cliff Cove, about 7 km northwest of Digby. Lat. 44°39′53″N, Long. 65°49′44″W (Broad (Deep) Cove); Lat. 44°40′28″N, Long. 65°48′37″W (House Cliff (Broad) Cove). *See* Map 41, Map 52.

Road log from Highway 1/101 (Evangeline Trail) at **km 154.5** (*see* the Main Road Log on page 235):

km		
	0	Junction, highways 1/101 and 303; proceed north along Highway 303 to Digby.
	3.0	Digby, junction of Highway 217; continue north along Highway 303.
	3.8	Junction; turn left (west).
	10.3	Junction; turn left (southwest).
	11.5	Junction; turn right (north).

12.3 Broad Cove wharf. The Broad (Deep) Cove occurrence is on both sides of the wharf. The House Cliff (Broad) Cove occurrence is 2 km to the northeast; access is by boat from the Broad Cove wharf. Collect at low tide.

Ref.: 11 p. 147M.

Maps (T): 21 A/12 Digby
(G) 39A Nova Scotia Sheet (GSC, 1:506 880)
85-1 Industrial mineral commodities map of the Province of Nova Scotia (NSDNR, 1:500 000)
641 Western portion of Nova Scotia (GSC, 1:506 880)
1225A Annapolis-St. Marys Bay area (west half), Nova Scotia (GSC, 1:126 720)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

St. Marys Bay occurrence

MAGNETITE, ILMENITE, JASPER

In beach sand

Magnetite and ilmenite occur as grains forming irregular layers in beach sand; the deposit is referred to as iron sand. A test sample of the iron sand was found to consist of 30% magnetite, 56% ilmenite, and 14% quartz. Red, yellow, and yellowish red jasper including banded red-purple and red-yellow varieties, occur in boulders along the shore.

The occurrence of iron sand was first reported in 1604 by Sieur de Monts. Attempts to work the sands for iron have been unsuccessful.

The occurrence is exposed along the beach at the head of St. Marys Bay, about 9 km southwest of Digby. Lat. 44°35′16″N, Long. 65°51′57″W. *See* Map 52.

Road log from Highway 1/101 (Evangeline Trail) at **km 154.5** (*see* the Main Road Log on page 235):

km 0 Junction, highways 1/101 and 303; proceed north along Highway 303 to Digby.

3.0 Digby, junction of Highway 217; turn left (southwest) onto Highway 217.

11.3 Roxville, junction; continue along Highway 217.

12.5 Junction; turn left (southeast).

14.2 St. Marys Bay shore. Proceed to the St. Marys Bay occurrence on the beach. Collect at low tide.

Refs.: 150 p. 180-181; 154 p. 53; 188 p. 40T, 41T; 197 p. 102S, 111S; 201 p. 17; 213 p. 72S.

Maps (T): 21 A/12 Digby
(G) 39A Nova Scotia Sheet (GSC, 1:506 880)
94-07 Digby, Nova Scotia, South Mountain Batholith Project (NSDNR, 1:50 000)
641 Western portion of Nova Scotia (GSC, 1:506 880)

1225A Annapolis-St. Marys Bay area (west half), Nova Scotia (GSC, 1:126 720)
Metallogenic map of the province of Nova Scotia, 1983 (NSDNR, 1:500 000)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

Gullivers Cove occurrence

STILBITE. HEULANDITE, JASPER, MAGNETITE, CHALCEDONY (AGATE),

QUARTZ CRYSTALS

In basalt

White and pink to red stilbite occurs as crystal aggregates and compact masses in veins commonly 7 cm wide. Heulandite occurs as colourless platy crystals in veins up to 3 cm wide. Red, pinkish-brown to brown jasper occurs abundantly in veins about 5 cm wide. Magnetite is associated with jasper. Bluish-white chalcedony (agate) and colourless quartz crystals up to 15 mm across occur in cavities.

The occurrence is exposed along the shore of Gullivers Cove, Digby Neck, Bay of Fundy, about 13 km west of Digby. Lat. 44°36′33″N, Long. 65°55′25″W. *See* Map 41, Map 52.

Road log from Highway 1/101 (Evangeline Trail) at **km 154.5** (*see* the Main Road Log on page 235):

km		
	0	Junction, highways 1/101 and 303; proceed north along Highway 303 to Digby.
	3.0	Digby, junction of Highway 217; turn left (southwest) onto Highway 217.
	16.5	Rossway, junction; turn right (north).
	20.0	Gullivers Cove. Proceed to the Gullivers Cove occurrence on the beach on the western side of the cove and in seacliffs on the eastern side of the cove. Collect at low tide.

Refs.: 11 p. 147M; 200 p. 316-317; 201 p. 16-17.

Maps (T): 21 A/12 Digby
(G) 39A Nova Scotia Sheet (GSC, 1:506 880)
85-1 Industrial mineral commodities map of the Province of Nova Scotia (NSDNR, 1:500 000)
641 Western portion of Nova Scotia (GSC, 1:506 880)
1225A Annapolis-St. Marys Bay area (west half), Nova Scotia (GSC, 1:126 720)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

Trout Cove occurrence

JASPER, CHALCEDONY (AGATE, CARNELIAN), STILBITE, HEULANDITE

In basalt

Yellow and dark red to brown jasper occurs in veins up to 12 cm wide. Chalcedony, including white and light blue to bluish-grey agate and orange carnelian, occurs in veins about 3 cm wide. Stilbite and heulandite occur sparingly.

The occurrence is exposed in seacliffs along the shore of Trout Cove, Digby Neck, Bay of Fundy, about 22 km southwest of Digby. Lat. 44°33′01″N, Long. 66°01′58″W. *See* Map 41, Map 53.

Road log from Highway 1/101 (Evangeline Trail) at **km 154.5** (*see* the Main Road Log on page 235):

km		
	0	Junction, highways 1/101 and 303; proceed north along Highway 303 to Digby.
	3.0	Digby, junction of Highway 217; turn left (southwest) onto Highway 217.
	28.8	Centreville, junction; turn right (north).
	30.5	Trout Cove, at the wharf. Proceed to The Trout Cove occurrence on the shore. Collect at low tide.

Refs: 150 p. 183-184; 188 p. 26T, 27T; 200 p. 315-316; 201 p. 15; 270 p. 129.

Maps (T): 21 B/9 Centreville
(G) 39A Nova Scotia Sheet (GSC, 1:506 880)
85-1 Industrial mineral commodities map of the Province of Nova Scotia (NSDNR, 1:500 000)
641 Western portion of Nova Scotia (GSC, 1:506 880)
1225A Annapolis-St. Marys Bay area (west half), Nova Scotia (GSC, 1:126 720)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

Sandy Cove occurrence

JASPER, CHALCEDONY (AGATE), QUARTZ CRYSTALS

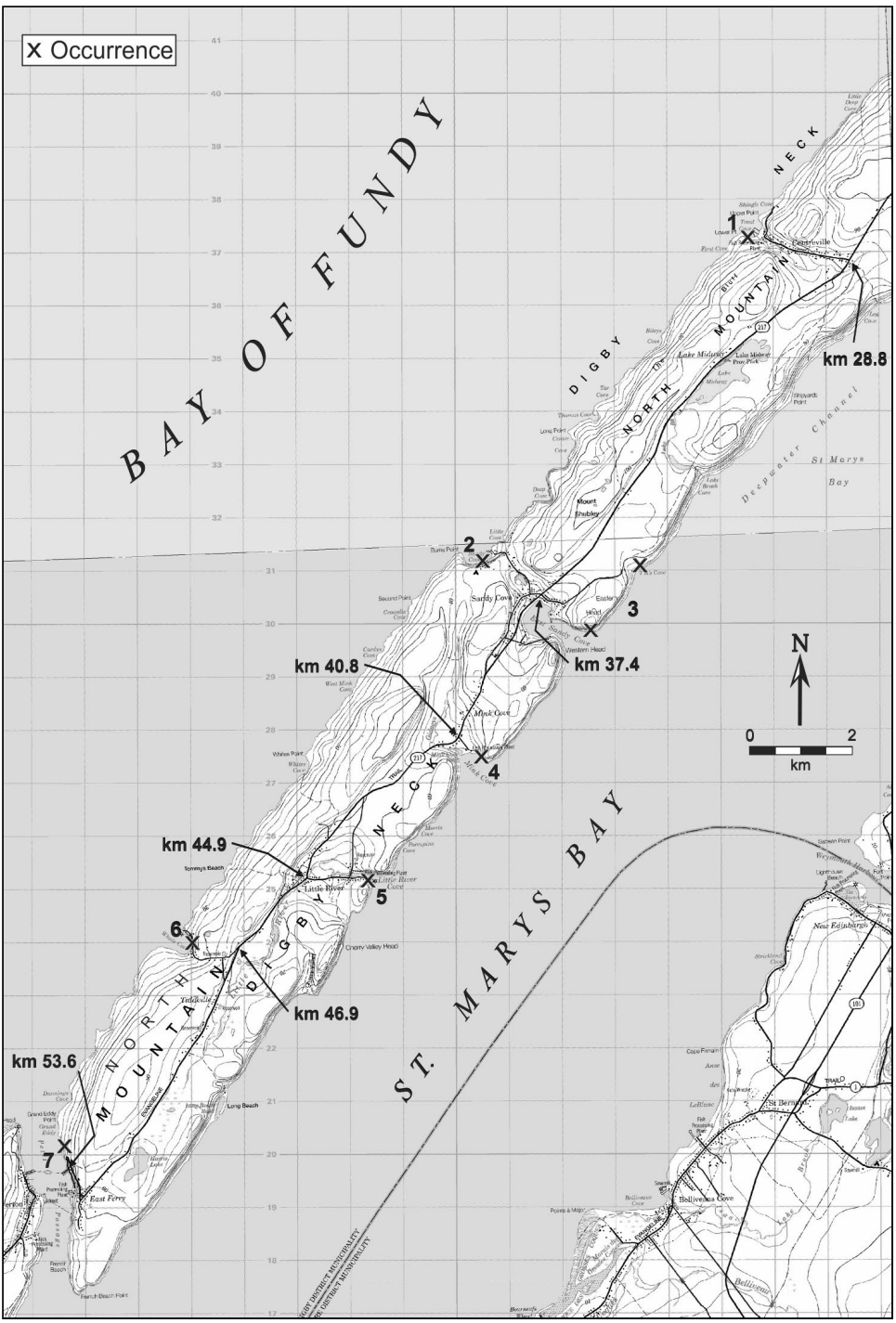
In basalt

Red to brown jasper occurs in veins up to 10 cm wide. Veins of bluish-white to grey chalcedony (agate) contain cavities lined with crystals of amethyst and colourless to white quartz.

The occurrence is exposed in seacliffs along the shore of Sandy Cove, Digby Neck, Bay of Fundy, about 30 km southwest of Digby. Lat. 44°29′49″N, Long. 66°06′00″W. *See* Map 41, Map 53.

Road log from Highway 1/101 (Evangeline Trail) at **km 154.5** (*see* the Main Road Log on page 235):

km		
	0	Junction, highways 1/101 and 303; proceed north along Highway 303 to Digby.
	3.0	Digby, junction of Highway 217; turn left (southwest) onto Highway 217.
	37.4	Junction; turn right (west).
	37.6	Sandy Cove village, junction; turn right (north).



1. Trout Cove occurrence 2. Sandy Cove occurrence 3. East Sandy Cove occurrence 4. Mink Cove occurrence 5. Little River Cove occurrence 6. Whale Cove occurrence 7. Petit Passage occurrence

Map 53. Digby Neck

38.7 Sandy Cove, at the wharf. Proceed to the Sandy Cove occurrence on the shore. Collect at low tide.

Refs: 11 p. 144M-145M; 150 p. 180; 188 p. 27T; 200 p. 309-313; 201 p. 12; 213 p. 70S; 270 p. 129.

Maps (T): 21 B/8 Church Point
(G) 39A Nova Scotia Sheet (GSC, 1:506 880)
85-1 Industrial mineral commodities map of the Province of Nova Scotia (NSDNR, 1:500 000)
641 Western portion of Nova Scotia (GSC, 1:506 880)
1225A Annapolis-St. Marys Bay area (west half), Nova Scotia (GSC, 1:126 720)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

East Sandy Cove occurrence

ANALCIME, SCOLECITE, STILBITE, CHABAZITE, LAUMONTITE, JASPER, CHALCEDONY (AGATE), HEMATITE, MAGNETITE

In basalt

The zeolite minerals occur in small cavities and in veins. The zeolites are: analcime, as colourless glassy and white nodules; scolecite, as white radiating platy aggregates; stilbite, as colourless to white platy and sheaf-like aggregates; chabazite, as colourless to white crystals; and laumontite, as colourless transparent crystals up to 2 cm across. Veins contain: jasper; chalcedony (agate); hematite, in massive form and as tabular crystals (specularite); and magnetite, as octahedral and dodecahedral crystals.

In about 1798, plans to exploit the hematite-magnetite iron ore were considered, and a site for a smelting furnace was selected at Sissiboo River on the opposite side of St. Marys Bay. The venture did not go beyond the planning stage but is believed to be the first attempt to establish iron works in the province.

The occurrence is exposed in seacliffs along the shore of East Sandy Cove, Digby Neck, St. Marys Bay, about 30 km southwest of Digby. Lat. 44°29′03″N, Long. 66°04′31″W. *See* Map 41, Map 53.

Road log from Highway 1/101 (Evangeline Trail) at **km 154.5** (*see* the Main Road Log on page 235):

km 0 Junction, highways 1/101 and 303; proceed north along Highway 303 to Digby.

3.0 Digby, junction of Highway 217; turn left (southwest) onto Highway 217.

37.4 Junction; turn left (east).

37.8 East Sandy Cove, junction. The road on right leads to the wharf and access to the north shore seacliffs exposing basalt containing zeolite and quartz minerals. Hematite and magnetite occur in basalt seacliffs

along St. Marys Bay (just east of T.R.'s Cove, Lat. 44°29′39″N, Long. 66°03′50″W), about 2400 m by boat from the East Sandy Cove wharf. Collect at low tide.

Refs: 11 p. 144M-145M; 150 p. 176-180; 188 p. 27T; 200 p. 309-313; 201 p. 9-10, 12-13; 270 p. 129.

Maps (T): 21 B/8 Church Point
(G) 39A Nova Scotia Sheet (GSC, 1:506 880)
85-1 Industrial mineral commodities map of the Province of Nova Scotia (NSDNR, 1:500 000)
641 Western portion of Nova Scotia (GSC, 1:506 880)
1225A Annapolis-St. Marys Bay area (west half) Nova Scotia (GSC, 1:126 720)
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Mink Cove occurrence

JASPER, QUARTZ CRYSTALS, AMETHYST, CHABAZITE, MESOLITE, MAGNETITE

In basalt

Red and yellow jasper occurs in veins up to 30 cm wide; geodes consisting of colourless and amethystine quartz crystals occur in jasper. Colourless to white chabazite crystals (2 to 3 cm across) and white mesolite occur in veins. Magnetite occurs in veins and in fissures.

The occurrence is exposed in seacliffs along the shore of Mink Cove, Digby Neck, St. Marys Bay, about 33 km southwest of Digby. Lat. 44°27′49″N, Long. 66°06′10″W. *See* Map 41, Map 53.

Road log from Highway 1/101 (Evangeline Trail) at **km 154.5** (*see* the Main Road Log on page 235):

km		
	0	Junction, highways 1/101 and 303; proceed north along Highway 303 to Digby.
	3.0	Digby, junction of Highway 217; turn left (southwest) onto Highway 217.
	40.8	Junction; turn left (east).
	41.2	Mink Cove. Proceed east to the Mink Cove occurrence along the shore. Similar mineralization occurs in seacliffs along the St. Marys Bay shore from Mink Cove to Little River Cove and from Mink Cove to East Sandy Cove. Collect at low tide.

Refs.: 150 p. 176; 188 p. 27T; 200 p. 309; 201 p. 8-9; 232 p. 216; 270 p. 129; 353 p. 28, 57-59.

Maps (T): 21 B/8 Church Point
(G) 39A Nova Scotia Sheet (GSC, 1:506 880)
85-1 Industrial mineral commodities map of the Province of Nova Scotia (NSDNR, 1:500 000)
641 Western portion of Nova Scotia (GSC, 1:506 880)

1225A Annapolis-St. Marys Bay area (west half), Nova Scotia (GSC, 1:126 720)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

Little River Cove occurrence

STILBITE, CHALCEDONY (AGATE), JASPER

In basalt

Stilbite occurs as colourless platy aggregates. Chalcedony (agate) and red jasper occur in narrow veins.

The occurrence is exposed in seacliffs along the shore of Little River Cove, Digby Neck, St. Marys Bay, about 35 km southwest of Digby. Lat. 44°26′36″N, Long. 66°07′48″W. *See* Map 41, Map 53.

Road log from Highway 1/101 (Evangeline Trail) at **km 154.5** (*see* the Main Road Log on page 235):

km		
	0	Junction, highways 1/101 and 303; proceed north along Highway 303 to Digby.
	3.0	Digby, junction of Highway 217; turn left (southwest) onto Highway 217.
	44.9	Little River, junction; turn left (east).
	46.1	Little River Cove, at the wharf. Proceed east to the Little River Cove occurrence along the shore. Collect at low tide.

Ref.: 201 p. 7-8.

Maps (T): 21 B/8 Church Point
(G) 39A Nova Scotia Sheet (GSC, 1:506 880)
85-1 Industrial mineral commodities map of the Province of Nova Scotia (NSDNR, 1:500 000)
641 Western portion of Nova Scotia (GSC, 1:506 880)
1225A Annapolis-St. Marys Bay area (west half), Nova Scotia (GSC, 1:126 720)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

Whale Cove occurrence

JASPER, CHALCEDONY (AGATE), STILBITE

In basalt

Red jasper occurs with white to grey chalcedony (agate) and quartz in veins up to 5 cm wide. Colourless to white platy stilbite occurs in cavities in the host rock.

The occurrence is exposed in seacliffs along the shore of Whale Cove, Digby Neck, Bay of Fundy, about 39 km southwest of Digby. Lat. 44°26′01″N, Long. 66°10′24″W. *See* Map 41, Map 53.

Road log from Highway 1/101 (Evangeline Trail) at **km 154.5** (*see* the Main Road log page 235):

km		
	0	Junction, highways 1/101 and 303; proceed north along Highway 303 to Digby.
	3.0	Digby, junction of Highway 217; turn left (southwest) onto Highway 217.
	46.9	Junction; turn right (west).
	48.3	Whale Cove. Proceed to the Whale Cove occurrence along the shore. Collect at low tide.

Maps (T): 21 B/8 Church Point
(G) 39A Nova Scotia Sheet (GSC, 1:506 880)
85-1 Industrial mineral commodities map of the Province of Nova Scotia (NSDNR, 1:500 000)
641 Western portion of Nova Scotia (GSC, 1:506 880)
1225A Annapolis-St. Marys Bay area (west half), Nova Scotia (GSC, 1:126 720)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

Petit Passage occurrence

JASPER, CHALCEDONY (AGATE), QUARTZ CRYSTALS, STILBITE, HEULANDITE, SCOLECITE, THOMSONITE, LAUMONTITE

In basalt

Jasper, chalcedony (agate), and colourless to amethystine quartz crystals occur in veins about 2 cm wide. Stilbite occurs sparingly as colourless to white radiating platy aggregates. Heulandite occurs as pearly white crystals associated with stilbite, scolecite, thomsonite, and laumontite.

The occurrence is exposed in seacliffs along the shore of Petit Passage at East Ferry, Digby Neck, about 43 km southwest of Digby. Lat. 44°24′00″N, Long. 66°12′20″W. *See* Map 41, Map 53.

Road log from Highway 1/101 (Evangeline Trail) at **km 154.5** (*see* the Main Road Log on page 235):

km		
	0	Junction, highways 1/101 and 303; proceed north along Highway 303 to Digby.
	3.0	Digby, junction of Highway 217; turn left (southwest) onto Highway 217.
	53.6	East Ferry, at the ferry landing. The Petit Passage occurrence is exposed along the shore north of the ferry landing. Collect at low tide.

Refs.: 11 p. 146M, 147M; 353 p. 28, 54.

Maps (T): 21 B/8 Church Point
(G) 39A Nova Scotia Sheet (GSC, 1:506 880)
85-1 Industrial mineral commodities map of the Province of Nova Scotia (NSDNR, 1:500 000)

641 Western portion of Nova Scotia (GSC, 1:506 880)
1225A Annapolis-St. Marys Bay area (west half), Nova Scotia (GSC, 1:126 720)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

Bear Cove occurrence

JASPER, CHALCEDONY (AGATE)

In basalt

Red to brown jasper and variously patterned chalcedony (agate) occur in veins.

The occurrence is exposed in seacliffs along the shore of Bear Cove, Long Island, Bay of Fundy, about 46 km southwest of Digby. Lat. 44°22′56″N, Long. 66°14′12″W. *See* Map 41, Map 54.

Road log from Highway 1/101 (Evangeline Trail) at **km 154.5** (*see* the Main Road Log on page 235):

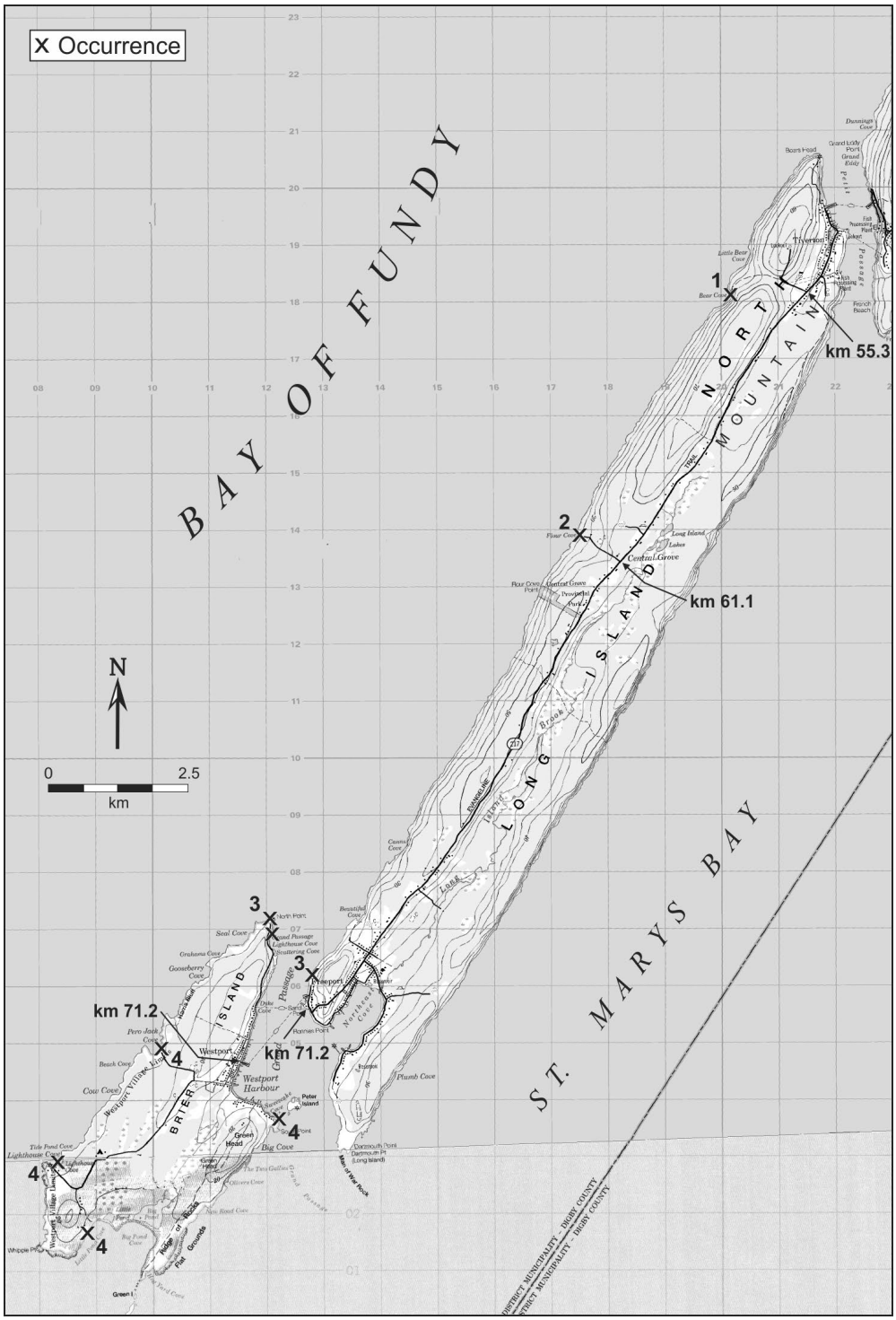
km		
	0	Junction, highways 1/101 and 303; proceed north along Highway 303 to Digby.
	3.0	Digby, junction of Highway 217; turn left (southwest) onto Highway 217.
	53.6	East Ferry, at the ferry landing; proceed onto the ferry to Tiverton.
	53.6	Tiverton, at the ferry landing; proceed south along Highway 217.
	55.3	Junction; turn right (west).
	55.8	Junction; the road turns right leading to a Lookout. To reach Bear Cove, proceed straight ahead (west) along a trail.
	56.9	Bear Cove. Proceed to the Bear Cove occurrence along the shore. Collect at low tide.

Maps (T): 21 B/8 Church Point
(G) 39A Nova Scotia Sheet (GSC, 1:506 880)
85-1 Industrial mineral commodities map of the Province of Nova Scotia (NSDNR, 1:500 000)
641 Western portion of Nova Scotia (GSC, 1:506 880)
1225A Annapolis-St. Marys Bay area (west half), Nova Scotia (GSC, 1:126 720)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

Flour Cove occurrence

NATIVE COPPER, JASPER, CHALCEDONY (AGATE), CHLORITE

In basalt



1. Bear Cove occurrence 2. Flour Cove occurrence 3. Grand Passage occurrences 4. Brier Island occurrences

Map 54. Long Island-Brier Island

Native copper, red jasper, and grey to white chalcedony (agate) occur in veins. Large pieces of native copper have been found at various localities on the Bay of Fundy shore of Long Island. Chlorite occurs as small green nodules in cavities.

The occurrence is exposed in seacliffs along the shore of Flour Cove, Long Island, Bay of Fundy, about 60 km southwest of Digby. Lat. 44°20′43″N, Long. 66°16′19″W. *See* Map 41, Map 54.

Road log from Highway 1/101 (Evangeline Trail) at **km 154.5** (*see* the Main Road Log on page 235):

km		
	0	Junction, highways 1/101 and 303; proceed north along Highway 303 to Digby.
	3.0	Digby, junction of Highway 217; turn left (southwest) onto Highway 217.
	61.1	Central Grove, junction; turn right (west).
	62.0	Flour Cove. Proceed to the Flour Cove occurrence along the shore. Collect at low tide.

Ref.: 150 p. 174.

Maps (T): 21 B/8 Church Point
(G) 39A Nova Scotia Sheet (GSC, 1:506 880)
85-1 Industrial mineral commodities map of the Province of Nova Scotia (NSDNR, 1:500 000)
641 Western portion of Nova Scotia (GSC, 1:506 880)
1225A Annapolis-St. Marys Bay area (west half), Nova Scotia (GSC, 1:126 720)
Metallogenic map of the province of Nova Scotia, 1983 (NSDNR, 1:500 000)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

Grand Passage occurrences

JASPER, CHALCEDONY (AGATE), MAGNETITE, LAUMONTITE, STILBITE

In basalt

Dark red and yellow jasper occurs with white to grey chalcedony (agate) and colourless to white quartz in veins up to 3 cm wide. Laumontite and stilbite occur sparingly in the host rock.

The occurrences are exposed along the shore of Grand Passage at Freeport, Long Island and at Westport (North Point to Lighthouse Cove), Brier Island, about 70 km southwest of Digby. Lat. 44°16′38″N, Long. 66°20′03″W (Freeport); Lat. 44°17′12″N, Long. 66°20′30″W (North Point, Brier Island) to Lat. 44°17′01″N, Long. 66°20′34″W (Lighthouse Cove). *See* Map 41, Map 54.

Road log from Highway 1/101 (Evangeline Trail) at **km 154.5** (*see* the Main Road Log on page 235):

km		
	0	Junction, highways 1/101 and 303; proceed north along Highway 303 to Digby.

3.0 Digby, junction of Highway 217; turn left (southwest) onto Highway 217.

71.2 Freeport, at the Long Island ferry landing and wharf; the eastern Grand Passage occurrence is exposed along the eastern shore of Grand Passage. Collect at low tide.

71.2 Westport, Brier Island at the Brier Island ferry landing. To reach the Grand Passage occurrences on the western shore of Grand Passage, proceed onto the road on right leading north 2.5 km to the occurrence at North Point and Lighthouse Cove. Collect at low tide.

Refs.: 150 p. 172-173; 353 p. 54-55.

Maps (T): 21 B/8 Church Point
(G) 39A Nova Scotia Sheet (GSC, 1:506 880)
85-1 Industrial mineral commodities map of the Province of Nova Scotia (NSDNR, 1:500 000)
641 Western portion of Nova Scotia (GSC, 1:506 880)
1225A Annapolis-St. Marys Bay area (west half), Nova Scotia (GSC, 1:126 720)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

Brier Island occurrences

NATIVE COPPER, MAGNETITE, JASPER, CHALCEDONY (AGATE)

In basalt

Native copper occurs as grains and irregular masses in veins and fissures. Magnetite occurs in thin veins. Red to orange jasper and red to brown banded chalcedony (agate) occur in veins.

The occurrence is exposed at various localities along the shore of Brier Island, Bay of Fundy, about 72 km southwest of Digby. Lat. 44°15′21″N, Long. 66°20′33″W (South Point); Lat. 44°15′59″N, Long. 66°22′04″W (Pero Jack Cove); Lat. 44°14′16″N, Long. 66°23′07″W (Little Pond Cove); Lat. 44°14′56″N, Long. 66°23′26″W (Lighthouse Cove). *See* Map 41, Map 54.

Road log from Westport to shoreline localities along Brier Island:

km 0 Westport, junction of Highway 217 at the ferry landing; turn left (south).

0.5 Junction; the road straight ahead leads 1 km to the Brier Island occurrence at South Point. To reach other shoreline occurrences, turn right (west) at this junction.

1.2 Junction; the road on right leads 0.9 km to the Brier Island occurrence at Pero Jack Cove. The road log continues along the main road.

4.1 Junction; the road on right leads south 0.7 km to the Brier Island occurrence at Little Pond Cove. The road log continues along the main road.

4.7 Brier Island occurrence at Lighthouse Cove. Collect at low tide.

Refs.: 11 p. 140M; 150 p. 172-173; 188 p. 27T, 30T, 41T; 270 p. 129.

Maps (T): 21 B/1 Meteghan
21 B/8 Church Point
(G): 39A Nova Scotia Sheet (GSC, 1:506 880)
85-1 Industrial mineral commodities map of the Province of Nova Scotia (NSDNR, 1:500 000)
641 Western portion of Nova Scotia (GSC, 1:506 880)
1225A Annapolis-St. Marys Bay area (west half), Nova Scotia (GSC, 1:126 720)
Metallogenic map of the province of Nova Scotia, 1983 (NSDNR, 1:500 000)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

This is the end of the description of collecting localities between Digby and Westport. The description of collecting localities along the main collecting route along Highway 1 (Evangeline Trail) continues from **km 154.5** (p. 235).

St. Alphonse quarry

GABBRO

The gabbro is greenish-grey to olive black, fine to coarse grained. It contains grains of magnetite. In places, it is porphyritic with plagioclase phenocrysts up to 2 cm long in a fine-grained matrix. The rock takes a good polish and makes an attractive ornamental stone.

Edmund Jeddry opened the quarry on his property in 1948. The rough stone was shipped to the Nictaux Granite (Canada) Limited plant at Nictaux West for dressing.

The quarry is in St. Alphonse village, about 200 m south of the St. Alphonse church. Lat. 44°07′10″N, Long. 66°10′37″W.

Access to the St. Alphonse quarry is by a 50 m road leading east from Highway 1 at **km 223.6** (*see* the Main Road Log on page 235).

Refs.: 67 p. 95; 72 p. 64; 343 p. 23.

Maps (T): 21 B/1 Meteghan
(G): 39A Nova Scotia Sheet (GSC, 1:506 880)
85-1 Industrial mineral commodities map of the Province of Nova Scotia (NSDNR, 1:500 000)
641 Western portion of Nova Scotia (GSC, 1:506 880)
1225A Annapolis-St. Marys Bay area (west half), Nova Scotia (GSC, 1:126 720)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

Brazil Lake occurrence

SPODUMENE, BERYL, TOURMALINE, APATITE, PLAGIOCLASE, MICROCLINE, MUSCOVITE, ZIRCON, CASSITERITE, COLUMBITE-TANTALITE, EPIDOTE; STAUROLITE, ANDALUSITE, GARNET, ILMENITE

In granite pegmatite; in biotite schist

Spodumene occurs as pinkish-grey crystals up to 120 cm long in granite pegmatite composed of white plagioclase, pink microcline, colourless to smoky quartz, and muscovite. Light greenish-yellow beryl crystals up to 25 mm across and black tourmaline crystals, dark green apatite, zircon, cassiterite, columbite-tantalite, and epidote occur sparingly in the pegmatite. Staurolite, andalusite, garnet, and ilmenite (crystals to 25 mm across) occur in biotite schist associated with granite pegmatite.

The deposit occurs as an outcrop about 24 by 4 m. In 1960 and 1961, L.E. Rodney of Yarmouth explored the deposit as a lithium prospect; the work consisted of stripping and bulldozing the outcrop.

The occurrence is about 19 km northeast of Yarmouth. Lat. 43°59′22″N, Long. 65°59′39″W. *See* Map 55.

Road log from Highway 1 (Evangeline Trail) at **km 252.2** (*see* the Main Road Log on page 235):

km		
	0	Hebron, junction of highways 1 and 340; proceed along Highway 340 toward Deerfield.
	9.2	Junction; turn left (north).
	11.0	Junction; follow the road on right leading northeast.
	14.9	Brazil Lake, junction; turn right (east) onto the Brazil Lake-Pleasant Valley road.
	15.7	Brazil Lake occurrence. The granite pegmatite outcrops on both sides of the road; the strippings are on the north side of the road. The biotite schist containing staurolite, andalusite, garnet, and ilmenite is exposed along the road just east of the strippings.

Refs.: 10 p. 21Q; 11 p. 72M, 148M; 80 p. 1-2; 279 p. 55-57; 342 p. 62,73-75.

Maps (T): 20 P/13 Tusket
(G): 39A Nova Scotia Sheet (GSC, 1:506 880)
85-1 Industrial mineral commodities map of the Province of Nova Scotia (NSDNR, 1:500 000)
641 Western portion of Nova Scotia (GSC, 1:506 880)
1186A Shelburne area, Nova Scotia (GSC, 1:126 720)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

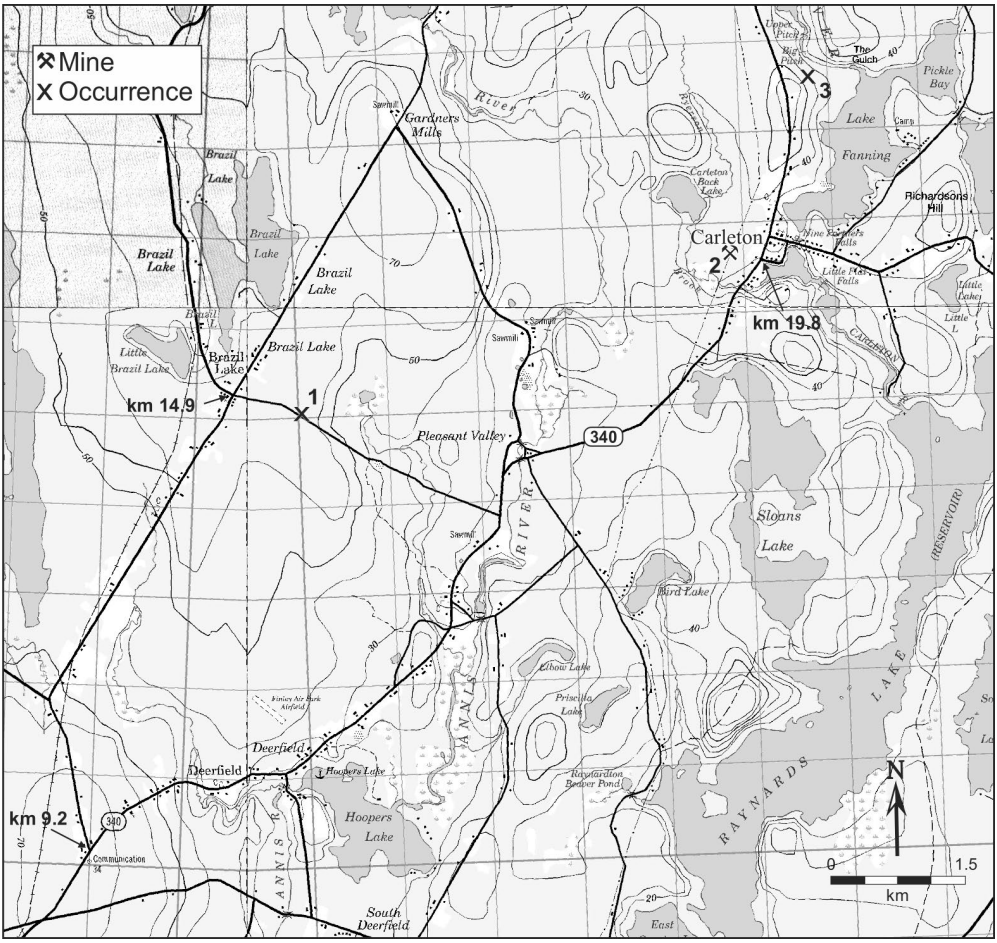
Carleton mine

NATIVE GOLD, ARSENOPYRITE, PYRITE, GALENA, CHALCOPYRITE

In slate and quartzite

Native gold occurs as disseminated grains in quartz veins. Minor amounts of arsenopyrite and pyrite, and traces of galena and chalcopyrite occur in quartz.

Gold was discovered in the district in 1886. In the same year, Messrs. Hale and Ross acquired the property from Messrs. Crosby and Wyman and discovered an outcrop containing a rich streak of native gold; the new owners sank a 30 m shaft, installed a water-power driven crushing mill, and recovered 45 t of rich ore grading 85.7 g/t gold. In 1887, Messrs. Hatfield and



1. Brazil Lake occurrence 2. Carleton mine 3. Hilton workings

Map 55. Carleton

Uhlman deepened the shaft to 61 m and located more good ore. They replaced the crushing mill by a new eight-stamp mill. Subsequently, various operators worked the mine for brief periods until 1915. The workings consist of shafts sunk to 61 m, 30 m, 14 m, and 9 m respectively. About 2 km to the northeast, a gold-bearing quartz vein containing galena, arsenopyrite, and minor pyrite, chalcopyrite, and sphalerite was investigated by a 9 m shaft and an open cut on the farm of Carl F. Hilton; this is known as the Hilton workings.

The mine is in Carleton village, about 23 km northeast of Yarmouth. Lat. 44°00′20″N, Long. 65°55′59″W. *See* Map 55.

Road log from Highway 1 (Evangeline Trail) at **km 252.2** (*see* the Main Road Log on page 235):

km		
	0	Hebron, junction of highways 1 and 340; proceed along Highway 340 toward Deerfield.



Plate 41.

Carleton mine main shaft and rock dump, 1919. (GSC 43616)

19.8 Carleton, junction of a road on right and a trail on left; the trail leads west 300 m to the Carleton mine. To reach the Hilton workings, continue straight ahead along Highway 340 toward Richfield.

22.0 Junction; turn right (east) onto a wood road leading 400 m to the Hilton workings (Lat. 44°01′20″N, Long. 65°55′19″W).

Refs.: 11 p. 139M; 129 p. 7F-10F; 156 p. 19; 228 p. 68-69.

Maps (T): 21 A/4 Wentworth Lake
(G) 39A Nova Scotia Sheet (GSC, 1:506 880)
94-03 Wentworth Lake, Nova Scotia, South Mountain Batholith (NSDNR, 1:50 000)
641 Western portion of Nova Scotia (GSC, 1:506 880)
1225A Annapolis-St. Marys Bay area (west half), Nova Scotia (GSC, 1:126 720)
1814 Carleton-Kemptville gold area, Yarmouth County, Nova Scotia (GSC, 1:47 520)
1817 Carleton gold district, Yarmouth County, Nova Scotia (GSC, 1:3000)
Metallogenic map of the province of Nova Scotia, 1983 (NSDNR, 1:500 000)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

Kemptville mines

NATIVE GOLD

In quartzite

Native gold occurs in quartz veins. Veins containing very rich pockets of gold were found during mining operations.

The Kemptville mines consist of two mines about 650 m apart: the Kempt mine near the shore of Kempt Back Lake (formerly Crawley Lake) at the eastern end of the district, and the Cowan mine at the western end. In 1881, James Reeves and Joseph Reeves discovered gold in the Kemptville district; their discovery became the Kempt mine. Rich float and rich ore were encountered during early mining operations. In 1885 to 1888, Cowan Gold Mining Company mined ore of very high grade from the Cowan mine; the yield of gold from crushed ore was 19 408.3 g from 120.6 t in 1885, 7184.5 g from 50.8 t in 1886, and 7931.3 g from 96.1 t in 1887. The workings consisted of four shafts (10, 50, 23, and 23 m deep, respectively) over a length of about 61 m. The Kempt Gold Mining Company operated the Kempt mine from 1887 to 1906; the workings consisted of the main shaft sunk to 84 m and several shafts 6 to 24 m deep. Subsequent development of the Kemptville mines was done by: Argonaut Mining and Milling Company and International Mining Company in 1901; E.F. Walton in 1910 and 1911; Northup Gold Mining Company in 1915; Byron Bowers in 1916 and 1917; and Bower Mining Company in 1926 and 1927. Total production for the district from 1885 to 1927 amounted to 97 726 g of gold from 4015 t of ore crushed.

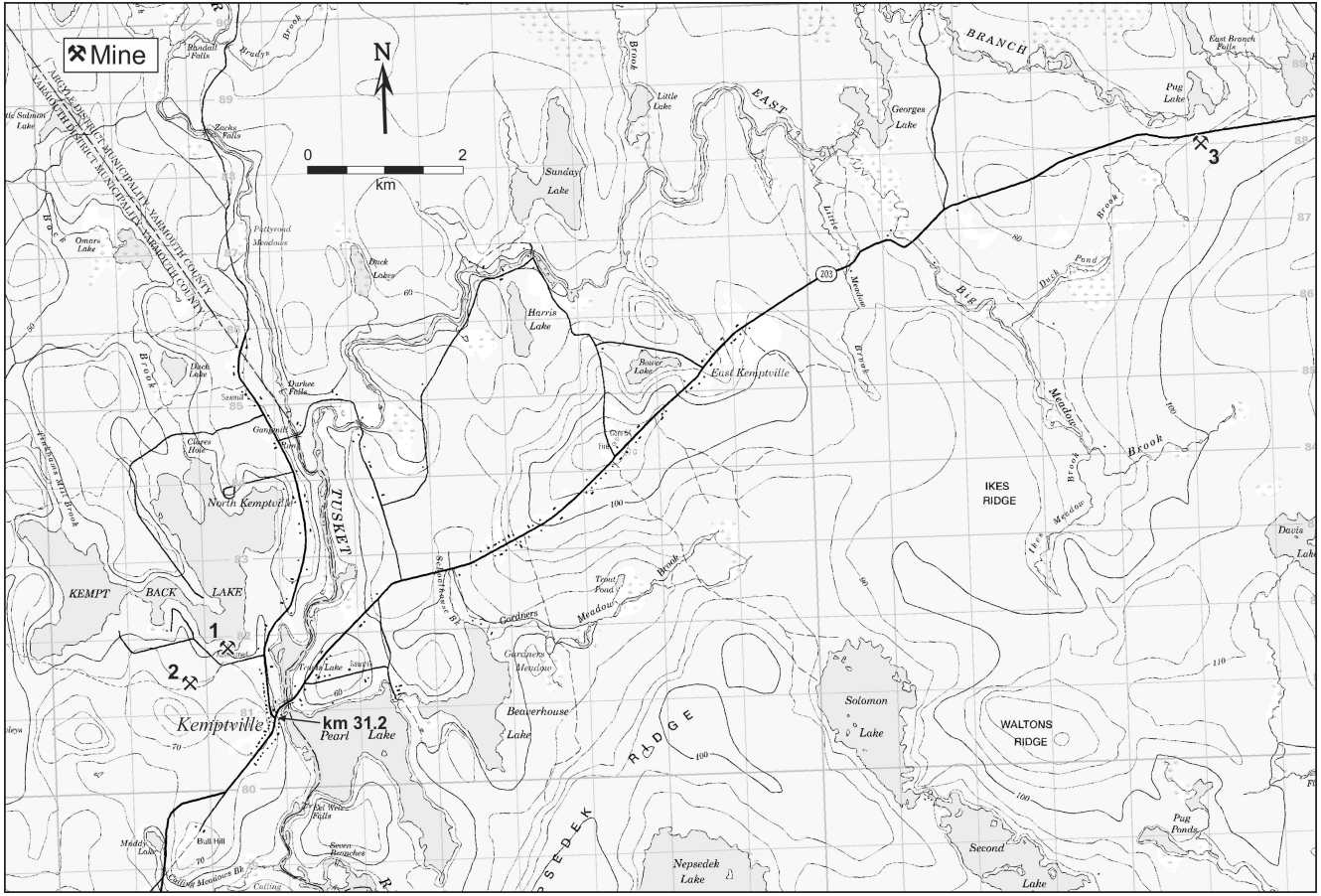
The mines are about 1 km northwest of Kemptville and 31 km northeast of Yarmouth. Lat. 44°03′14″N, Long. 65°50′33″W (Kempt mine); Lat. 44°02′59″N, Long. 65°50′57″W (Cowan mine). *See* Map 56.

Road log from Highway 1 (Evangeline Trail) at **km 252.2** (*see* the Main Road Log on page 235):

km		
	0	Hebron, junction of highways 1 and 340; proceed along Highway 340 toward Deerfield.
	20.1	Carleton, junction; proceed east along Highway 340.
	31.2	Kemptville, junction of Highway 203; continue straight ahead (north) along Highway 340.
	32.1	Junction; turn left (west).
	32.5	Junction; the road on right leads north 150 m to the Kempt mine. To reach the Cowan mine, turn left (southwest).
	33.2	Cowan mine, main workings in a wooded area on the north side of the road.

Refs.: 10 p. 20Q; 11 p. 139M; 129 p. 10F-14F; 228 p. 102-103; 243 p. 71-80; 279 p. 64-66.

Maps (T): 21 A/4 Wentworth Lake
(G) 39A Nova Scotia Sheet (GSC, 1:506 880)
94-03 Wentworth Lake, Nova Scotia, South Mountain Batholith (NSDNR, 1:50 000)
641 Western portion of Nova Scotia (GSC, 1:506 880)
1225A Annapolis-St. Marys Bay area (west half), Nova Scotia (GSC, 1:126 720)
1814 Carleton-Kemptville gold area, Yarmouth County, Nova Scotia (GSC, 1:47 520)
1816 Kemptville gold district, Yarmouth County, Nova Scotia (GSC, 1:3000)
Metallogenic map of the province of Nova Scotia, 1983 (NSDNR, 1:500 000)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)



Kemptville mines: 1. Kempt mine 2. Cowan mine 3. East Kemptville mine

Map 56. Kemptville

East Kemptville mine

CASSITERITE, CHALCOPYRITE, SPHALERITE, PYRITE, PYRRHOTITE, WOLFRAMITE, ARSENOPYRITE, GALENA, MOLYBDENITE, TETRAHEDRITE, STANNITE, NATIVE BISMUTH, TOPAZ, FLUORITE, FLUORAPATITE, TRIPLITE, DOLOMITE, SIDERITE, QUARTZ CRYSTALS, STILBITE, ROZENITE, RHODOCHROSITE, VIVIANITE, KULANITE, MCAUSLANITE, PHOSPHOPHYLLITE, CHILDRENITE

In greisen

Cassiterite, chalcopyrite, sphalerite, pyrite, and minor pyrrhotite, wolframite, arsenopyrite, galena, molybdenite, tetrahedrite, stannite, and native bismuth occur as disseminated grains in quartz-sulphide veins and in the host dark grey, medium-grained, quartz-topaz greisen. The gangue consists of grey topaz, colourless to light green and violet fluorite, and greenish to silvery muscovite. Minerals occurring in thin veins include: green fluorapatite, pink triplite, light blue fluorite, pink to white dolomite, buff siderite, and colourless massive quartz containing microscopic quartz crystals. Small spaces in joint planes and in shear zones contain: stilbite crystals (2 to 5 mm long); colourless, pink, brown, and blue fluorite crystals; radiating botryoidal siderite crusts coated with rozenite; and pink dolomite, pink rhodochrosite, tabular to platy vivianite, and kulanite crystals. Mcauslanite, a new mineral species originally found at this locality, occurs as yellowish-white, transparent, radiating, acicular to tabular crystal aggregates up to 4 mm across associated with other phosphate minerals including fluorapatite, triplite, vivianite, and the rare minerals, phosphophyllite and childrenite; these minerals occur in open spaces in joint planes and in shear zones.

Shell Canada Resources Limited discovered tin-bearing granite and metasedimentary boulders in till in an area just east of East Kemptville village during exploration in 1978, and located an orebody by drilling in 1979. Rio Algom undertook development in 1983 and began open pit mining in 1985. A drop in world tin prices brought operations to a close almost immediately. Mining and milling resumed in 1988. Production from 1988 to 1990 amounted to 16 290 t of tin concentrates and minor quantities of copper and zinc concentrates from 9.1 million tonnes of ore. Operations ended in 1992.

The mine is about 14 km northeast of Kemptville and 45 km northeast of Yarmouth. Lat. 44°06′52″N, Long. 65°41′03″W. *See* Map 56.

Road log from Highway 1 (Evangeline Trail) at **km 252.2** (*see* the Main Road Log on page 235):

km		
	0	Hebron, junction of highways 1 and 340; proceed along Highway 340 toward Deerfield.
	20.1	Carleton, junction; proceed east onto Highway 203.
	31.2	Kemptville, junction; proceed east onto Highway 203.
	46.1	East Kemptville mine, on the south side of the road.

Refs.: 32 p. 102-109; 63 p. 151-196; 209 p. 787-825; 231 p. 142-143; 262 p. 197-200; 276 p. 219; 279 p. 44-48; 298 p.131-149; 299 p. 265-279; 300 p. 917-921; 411 p. 398; 413 p. 338-340.

Maps (T): 21 A/4 Wentworth Lake

(G) 39A Nova Scotia Sheet (GSC, 1:506 880)
94-03 Wentworth Lake, Nova Scotia, South Mountain Batholith (NSDNR, 1:50 000)
641 Western portion of Nova Scotia (GSC, 1:506 880)
1225A Annapolis-St. Marys Bay area (west half), Nova Scotia (GSC, 1:126 720)
Metallogenic map of the province of Nova Scotia, 1983 (NSDNR, 1:500 000)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

Cream Pot (Cranberry Head) mine

NATIVE GOLD, GALENA, ARSENOPYRITE

In slate

Native gold occurs in quartz veins containing minor galena and arsenopyrite. Arsenopyrite crystals occur in the host green slate. Gold concentrates and a specimen of slate containing native gold and arsenopyrite were displayed in the Geological Survey of Canada economic minerals exhibit at the Paris International Exhibition held in 1900.

In 1868, Isaac Foote found rich gold in a quartz vein exposed at low tide at 'Cranberry Head'. Mr. Bingay of Yarmouth sank a pit on the shore. In 1869, additional development consisted of two shafts and an open cut 183 m long and 6 m deep. In 1870, Samuel Ryerson sank some shafts, built a ten-stamp mill on the Chegoggin River, and recovered 4043 g of gold from 167 t of quartz. Captain Cocksetter resumed operations in 1874 and 1875 and produced 902 g of gold from 34.5 t of quartz. In 1880 and 1881, S.A. Haywood moved the mill from the Chegoggin River to the mine site and produced some gold. Between 1897 and 1899, Gold Fissure Mining Company Limited and Cream Pot Gold Mining Company recovered 3266 g of gold from 74.4 t of quartz. The mine workings consist of three shafts (49, 64, and 67 m deep, respectively) extending over 43 m from southwest to northeast, and two shafts to 27m and 9 m, respectively further east.

The mine is about 8 km northwest of Yarmouth. The gold-bearing quartz vein is exposed on the Atlantic shore at low tide about 600 m north of 'Cranberry Head', just west of the mine. Lat. 43°53′58″N, Long. 66°10′09″S. *See* Map 57.

Road log from Highway 1 (Evangeline Trail) at **km 254.4** (*see* the Main Road Log on page 235):

km		
	0	Dayton, junction of Highway 1 and Dayton Road; proceed northwest along Dayton Road.
	3.3	Junction; turn right (north).
	4.0	Junction; turn left (west).
	4.8	Junction; turn right (northwest).
	5.8	Farm house (enquire regarding entry to the property). From here a road leads northwest 1200 m to the Cream Pot (Cranberry Head) mine site and the shoreline exposure.

Refs.: 10 p. 20Q; 11 p. 71M, 140M; 129 p. 18F-20F; 228 p. 77-78; 243 p. 30-31; 342 p. 70-71; 397 p. 44.



Plate 42.

Cream Pot mine west shaft, rock dumps, engine house, and slate exposure along the seashore, 1919. (GSC 43620)

Maps (T): 20 O/16 Yarmouth
(G) 39A Nova Scotia Sheet (GSC, 1:506 880)
641 Western portion of Nova Scotia (GSC, 1:506 880)
1186A Shelburne area, Nova Scotia (GSC, 1:126 720)
1815 Geological plan and section of the gold-bearing series, Cranberry Head to Chegoggin Point, Yarmouth County, Nova Scotia (GSC, 1:31 680)
Metallogenic map of the province of Nova Scotia, 1983 (NSDNR, 1:500 000)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

Foote Cove occurrence

NATIVE GOLD; GARNET, ACTINOLITE, CHLORITOID, STAUROLITE, SILLIMANITE, PYRITE

In beach sand; in chlorite schist

Fine grains of native gold occur in beach sand at 'Foote Cove'. The gold is derived from the weathering of the gold-bearing quartz vein exposed in slate along the shore just west of the Cream Pot mine, 2500 m to the north. Dark red garnet, dark green actinolite, brown to black chloritoid, brown staurolite, colourless to white sillimanite, and pyrite occur in grey chlorite schist exposures along the shore.

The occurrence is exposed along the Atlantic shore at 'Foote Cove', about 5 km northwest of Yarmouth. Lat. 43°52′50″N, Long. 66°09′43″W. *See* Map 57.

Road log from Highway 1 (Evangeline Trail) at **km 254.4** (*see* the Main Road Log on page 235):



1. Cream Pot (Cranberry Head) mine 2. Foote Cove occurrence 3. Chegoggin Point quarry 4. Chegoggin Point occurrences 5. Pinkneys Point occurrences

Map 57. Yarmouth



Plate 43

Gold-bearing sand beach at 'Foote Cove'; local residents harvest seaweed along the beach, 1879. (GSC 301)

km		
	0	Dayton, junction of Highway 1 and Dayton Road; proceed northwest along Dayton Road.
	3.3	Junction; turn left (south).
	4.1	Junction; turn right (west) along the road to 'Pembroke Shore'.
	5.5	Junction; continue straight ahead to the shore.
	5.7	Foote Cove occurrence. Collect at low tide.

Ref.: 129 p. 16F-17F.

Maps (T): 20 O/16 Yarmouth
(G) 39A Nova Scotia Sheet (GSC, 1:506 880)
641 Western portion of Nova Scotia (GSC, 1:506 880)
1186A Shelburne area, Nova Scotia (GSC, 1:126 720)
1815 Geological plan and section of the gold-bearing series, Cranberry Head to Chegoggin Point, Yarmouth County, Nova Scotia (GSC, 1:31 680)
Metallogenic map of the province of Nova Scotia, 1983 (NSDNR, 1:500 000)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

Chegoggin Point quarry

QUARTZ

In quartzite

Colourless to grey, glassy, massive quartz occurs in veins in white to light brown, fine-grained quartzite.

Between 1945 and 1963, Dominion Steel Corporation quarried quartzite as a source of silica. The quartzite was of high quality, containing over 97% silica. A crushing plant operated on the site. An annual output of about 100 000 t of quartzite was trucked to the company's steel plant in Sydney for the manufacture of silica brick for use in their furnaces.

The occurrence is about 5 km northwest of Yarmouth. Lat. 43°51′42″N, Long. 66°09′59″W. *See* Map 57.

Road log from Highway 1 (Evangeline Trail) at **km 257.1** (*see* the Main Road Log on page 235):

km		
	0	Yarmouth, junction of Highway 1 (Evangeline Trail) and Vancouver Street (Highway 304); proceed west along Vancouver Street.
	0.8	Junction; turn right (northwest).
	2.5	Junction; turn left (west).
	3.5	Junction; turn right (northwest).
	5.1	'Pembroke Shore', junction; continue straight ahead (west).
	5.7	The road turns left (south).
	6.3	Junction; turn right (west) onto the quarry road.
	6.55	Chegoggin Point quarry.

Refs.: 72 p. 68; 129 p. 18F; 224 p. 50-51; 342 p. 25, 77-78.

Maps (T): 20 O/16 Yarmouth
(G) 39A Nova Scotia Sheet (GSC, 1:506 880)
85-1 Industrial mineral commodities map of the Province of Nova Scotia (NSDNR, 1:500 000)
641 Western portion of Nova Scotia (GSC, 1:506 880)
1186A Shelburne area, Nova Scotia (GSC, 1:126 720)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

Chegoggin Point occurrences

GARNET, ILMENITE, CHLORITOID, ACTINOLITE

In biotite schist

Garnet (almandine) occurs as crystals up to 15 mm across, in places constituting 30 to 70% of the host rock. Layers of lustrous garnet crystals occur in fractures and joint surfaces. Ilmenite occurs as crystals up to 25 mm across and in massive form. Hornblende, pyrite, and quartz are minor constituents. The garnet-bearing biotite schist belt is 11 m thick and contains 40 to 50% garnet over widths of 3.5 to 4.5 m.

The garnet-bearing schist is exposed along the Atlantic shore at low tide for about 140 m and extends inland northeast for about 4800 m from the shore. Chloritoid, as small black to brownish black prisms up to 15 mm long, dark green actinolite, and dark red garnet occur in light grey schist exposed along the Atlantic shore between Chegoggin Point and 'Foote Cove'.

In 1890, J.D. Huntington trenched a quartzite band parallel to the garnet belt, and built a ten-stamp mill on the site to test for gold. Results proved negative, the mill was abandoned, and the investigation discontinued in 1892. About two years later, Mr. Huntington investigated the garnet belt as a source of abrasive and did some development work; the main pit (6 by 4.5 m and 5.5 m deep) was excavated 150 m inland from the shore. Garnet-bearing rock from this opening was crushed in the stamp mill to produce garnet concentrates which were shipped to the United States for the manufacture of abrasive wheels.

The occurrence is about 5 km northwest of Yarmouth. Lat. 43°52′00″N, Long. 66°10′06″W (chloritoid-actinolite-garnet shoreline exposure); Lat. 43°51′42″N, Long. 66°10′12″W (garnet pit). *See* Map 57.

Road log from Highway 1 (Evangeline Trail) at **km 257.1** (*see* the Main Road Log on page 235):

km		
	0	Yarmouth, junction of Highway 1 (Evangeline Trail) and Vancouver Street (Highway 304); proceed west along Vancouver Street.
	0.8	Junction; turn right (northwest).
	2.5	Junction; turn left (west).
	3.5	Junction; turn right (northwest).
	5.1	'Pembroke Shore', junction; continue straight ahead (west).
	5.7	The road turns left (south). A 300 m trail leads west from this junction to the chloritoid-actinolite-garnet schist exposure along the Atlantic shore. The road log continues along the road leading south from this junction.
	6.3	Junction; turn right (west) onto the Chegoggin Point quarry road. Proceed past the quarry dump, then walk about 400 m along a trail leading west along the north side of a small pond, past the north end of the quarry, continuing toward the shore.
	6.8	Garnet pit and dumps, just north of the trail. The trail continues to the shore.
	6.95	End of the trail at the Atlantic shore. The garnet-bearing schist is exposed along the shore at low tide. Collect at low tide.

Refs.: 10 p. 20Q; 11 p. 70M, 139M-140M, 148M; 101 p. 8, 28; 129 p. 15F-18F; 224 p. 51; 342 p. 30, 62; 345 p. 201.

Maps (T): 20 O/16 Yarmouth
(G) 39A Nova Scotia Sheet (GSC, 1:506 880)
85-1 Industrial mineral commodities map of the Province of Nova Scotia (NSDNR, 1:500 000)
641 Western portion of Nova Scotia (GSC, 1:506 880)
1186A Shelburne area, Nova Scotia (GSC, 1:126 720)
1815 Geological plan and section of the gold-bearing series, Cranberry Head to Chegoggin Point, Yarmouth County, Nova Scotia (GSC, 1: 31 680)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

The Main Road Log — Yarmouth to Halifax

The main road log proceeds along the Lighthouse Route: Highway 3 from Yarmouth to Barrington; Highway 309 from Barrington to Port Clyde; Highway 3 from Port Clyde to Shelburne; the coastal loop from Shelburne to Jordan Falls; Highway 3, joined in places by Highway 103, between Jordan Falls and Mill Village; Highway 331 from Mill Village to Bridgewater; Highway 3 from Bridgewater to Upper LaHave; Highway 332 from Upper LaHave to Lunenburg; Highway 3 from Lunenburg to East River; Highway 329 from East River to Hubbards; Highway 3 from Hubbards to Upper Tantalon; Highway 333 from Upper Tantalon to its junction with Highway 3 (end of the Lighthouse Route); Highway 3 to Halifax. The starting point is at the junction of Highway 1 (Evangeline Trail) and Highway 3 (Lighthouse Route) in Yarmouth. Kilometre distances along these highways are shown in bold type. The collecting localities are described in the text following the road log. A page reference is indicated in parentheses following the name of each mine, occurrence, or quarry.

km	**0**	Yarmouth, junction of Highway 1 (Main Street) and Highway 3 (Starrs Road); the main road log proceeds east along Highway 3 (Lighthouse Route).
km	**5.6**	Arcadia, junction of Highway 334 and the road to the Pinkneys Point occurrences (p. 316).
km	**37.4**	Pubnico, junction of Highway 335 to the Pubnico occurrences (p. 316).
km	**73.4**	Barrington Passage, junction of Highway 330 to the Hawk Point occurrence (p. 317).
km	**80.0**	Barrington Head; Highway 3 (Lighthouse Route) joins Highway 103. The main road log continues along Highway 3/103 (Lighthouse Route).
km	**81.3**	Barrington, junction of highways 103/3 and 309. The main road log continues along Highway 309 (Lighthouse Route) to Port Clyde.
km	**85.7**	Sand Hills Beach Provincial Park, on the west side of the highway.
km	**92.4**	Port La Tour, junction of the road to Smithville and the Baccaro, Johns Island occurrences (p. 319).
km	**101.0**	Cape Negro, junction of the road to Blanche and the Blanche, Cape Negro Island occurrences (p. 320).
km	**107.2**	Port Clyde, junction of Highway 3; turn right (south) onto Highway 3 (Lighthouse Route).
km	**114.8**	North West Harbour village, access to the Negro Harbour occurrence (p. 322).
km	**117.4**	North East Harbour village, access to the Negro Harbour occurrence at John Point (p. 322).
km	**122. 1**	Junction, road to Ingomar and the East Point occurrences (p. 323).
km	**123.0**	Junction, road to Atlantic and the Red Head, Grey Island occurrences (p. 322).
km	**124.6**	Round Bay, junction of the road to the Round Bay shore and the Round Bay occurrence (p. 323).

km 128.5 Roseway, junction of the road to Roseway Beach and the Roseway Beach occurrence (p. 323).

km 129.7 Junction, road to Stoney Point and the Roseway Beach occurrence (p. 323).

km 131.9 Junction, road to the shore and the Shelburne Harbour western occurrence (p. 324).

km 133.1 Carleton Village, junction of the road to the wharf and the Shelburne Harbour western occurrence (p. 324) and access to the McNutts Island occurrence (p. 324).

km 133.9 Carleton Village, junction of the road to the shore and the Shelburne Harbour western occurrence (p. 324).

km 134.8 Gunning Cove, junction of the road to the shore and the Shelburne Harbour western occurrence (p. 324).

km 143.8 Junction, road to Highway 103 and the Birchtown quarries (p. 325).

km 149.0 Junction, road to the Islands Provincial Park. The park occupies the site of a granite quarry formerly operated by Scotia Granite Quarries Limited. The company quarried light grey granite composed of quartz, feldspar and biotite. The granite was in demand as an attractive monument stone because it polished to a high gloss providing a strong contrast to the lettering which was hammered or sandblasted.

km 149.4 Shelburne, junction of Highway 203 to the Roseway River occurrence (p. 327).

km 151.1 Shelburne, at the intersection of Water Street and King Street. Highway 3 (King Street) turns left (east) leading to the Shelburne-Jordan Falls occurrences (p. 327). The main road log continues south along the Shelburne-Sandy Point-Jordan Bay coastal loop (Lighthouse Route) to Jordan Falls where it joins Highway 3/103 at **km 185.7**.

km 155.0 Shelburne Harbour eastern occurrence (p. 324) begins on the shore west of the road.

km 157.5 Sandy Point village, at the church and access to the Shelburne Harbour eastern occurrence (p. 324).

km 162.0 Lower Sandy Point, junction of the road to the Shelburne Harbour shore and the Shelburne Harbour eastern occurrence (p. 324).

km 181.0 Jordan Branch, junction; the Lighthouse Route turns right (east).

km 182.4 Shelburne-Jordan Falls occurrence (p. 327).

km 183.8 Shelburne-Jordan Falls occurrence (p. 327).

km 185.7 Jordan Falls, junction. The Lighthouse Route joins Highway 103 and proceeds east. Highway 103 west of this junction leads to the Shelburne-Jordan Falls occurrences (p. 327).

km 186.1 Jordan Falls, at the bridge over Jordan River and access to a Shelburne-Jordan Falls occurrence (p. 327).

km	**186.2**	Jordan Falls, at the junction of Highway 103 and the Lake John road to the Jordan Falls occurrence (p. 329). Highway 3 (Lighthouse Route) leaves Highway 103 and turns right (south).
km	**219.0**	Sable River Provincial Park on the west side of the highway.
km	**219.5**	Sable River West, Highway 3 joins Highway 103; the main road log proceeds east along Highway 3/103 (Lighthouse Route).
km	**233.8**	Junction of the road to East Side Port L'Hebert and the Sandy Bay occurrence (p. 330).
km	**235.4**	Port Joli, junction of the road to St. Catherines River and the Forbes Cove occurrence (p. 331).
km	**242.7**	Port Mouton, junction of the road to South West Port Mouton and the New Building (Newhouse) Cove occurrence (p. 332) and the Port Mouton Island occurrence (p. 333).
km	**246.2**	Junction. Highway 3 (Lighthouse Route) leaves Highway 103 and proceeds east. The road log continues along Highway 3 (Lighthouse Route).
km	**249.0**	Summerville Beach occurrence (p. 334).
km	**251.3**	Hunts Point occurrence (p. 334).
km	**262.9**	Liverpool, junction. Highway 3 (Lighthouse Route) turns left (northwest) onto Market Street. Main Street leads east to Shore Road leading to Western Head and the Western Head occurrences (p. 334). The main road log continues along Highway 3 (Lighthouse Route).
km	**263.9**	Liverpool, junction of Highway 8 (Kejimkujik Scenic Drive) to the Fifteenmile Brook mine (p. 336), the Whiteburn mines (p. 337), the Malaga (Molega) mines (p. 338), the Brookfield mines (p. 340), and the Pleasant River Barrens mines (p. 342).
km	**289.9**	Mill Village, junction of the road to Charleston and the Mill Village mines (p. 344). The main road log continues east along Highway 331 (Lighthouse Route) to Bridgewater.
km	**301.7**	Voglers Cove, junction of the road to Voglers Lake and the Voglers Cove (East Eagle) mine (p. 345).
km	**317.7**	Rissers Beach Provincial Park.
km	**344.6**	Bridgewater, junction; Highway 3 (Dufferin Street) joins Highway 331 continuing northwest as Highway 3/331 (Lighthouse Route). Highway 3 west leads to the Leipsigate mines (p. 347). The main road log continues along Highway 3/331 (Lighthouse Route).
km	**345.3**	Bridgewater, junction of Highway 325 (alternate route to the Pleasant River Barrens mines p. (342)); the main road log proceeds east along Highway 3/325 (Lighthouse Route).
km	**345.7**	Bridgewater, junction of Highway 3; the main road log proceeds south along Highway 3 (Lighthouse Route).
km	**351.9**	Upper LaHave, junction of Highway 332; the main road log proceeds southeast along Highway 332 (Lighthouse Route).

km	**370.5**	Junction, road to The Ovens mine (p. 350).
km	**374.2**	Junction, road to the Indian Path mine (p. 352).
km	**379.7**	Junction, Highway 3 leading to Lunenburg. The main road log continues east along Highway 3 (Lighthouse Route).
km	**381.8**	Lunenburg, junction; Highway 3 (Lighthouse Route) turns left (north) onto Dufferin Street. Old Town Lunenburg is a UNESCO World Heritage Site.
km	**389.8**	Mahone Bay, junction of the road to Blockhouse and the Blockhouse mine (p. 354).
km	**407.2**	Chester Basin, junction of Highway 12 to New Ross and the Gold River mines (p. 355).
km	**417.8**	Graves Island Provincial Park.
km	**422.6**	East River Provincial Park.
km	**423.1**	East River, junction; Highway 3 continues straight ahead (east). The main road log proceeds south along Highway 329 (Lighthouse Route).
km	**424.4**	East River Point; junction of the road to the East River Point (old) quarry (p. 357).
km	**424.6**	East River Point; junction of the road to the East River Point (new) quarry (p. 357).
km	**432.3**	Upper Blandford occurrence (road-cuts) (p. 358).
km	**434.7**	Upper Blandford, at Gates Cove; junction of the road to the Upper Blandford occurrence (p. 358) on the shore of Gates Cove.
km	**442.3**	Bayswater Beach Provincial Park.
km	**462.1**	Junction of Highway 3; the main road log continues east along Highway 3 (Lighthouse Route).
km	**466.1**	Queensland Beach Provincial Park.
km	**484.6**	Upper Tantallon, junction of Highway 333. The main road log continues along Highway 333 (Lighthouse Route). Highway 3 leads to the Upper Tantallon occurrence (p. 360).
km	**510.2**	Junction, road to Peggys Cove and to the Peggys Cove occurrence (p. 360).
km	**547.8**	Junction, Highway 3 to the Governor Lake mine (p. 361). The Lighthouse Route ends at this junction. The road log continues along Highway 3 to the Armdale Rotary.
km	**551.3**	Halifax, Armdale Rotary; junction of Highway 349 (Herring Cove Road) to the John Kline quarry (p. 363), the King quarries (p. 363), the Queen quarry (p. 364), and the Coughlan quarry (p. 365).

This is the end of the road log from Yarmouth to Halifax. The description of the occurrences follows.

Pinkneys Point occurrences

CHALCOPYRITE, MOLYBDENITE, WOLFRAMITE, CASSITERITE, TOURMALINE, TOPAZ, BERYL, ARSENOPYRITE, FLUORITE, PYRITE, SCHEELITE

In granitic rocks

Chalcopyrite, molybdenite, wolframite, cassiterite, tourmaline, topaz, beryl, arsenopyrite, fluorite, and pyrite occur in 3 m wide greisen zones in granitic rocks. Tourmaline and scheelite occur in quartz veins. Tourmaline prisms are abundant in schist at the contact of granite and greywacke. Small cavities in granite contain quartz, topaz, muscovite, wolframite, and biotite.

The occurrence is exposed along the Atlantic shore from Pinkneys Point village to Pinkneys Point, about 15 km southeast of Yarmouth. Lat. 43°42′49″N, Long. 66°04′04″W (Pinkneys Point village shore); Lat. 43°42′04″N, Long. 66°03′39″W (Pinkneys Point). *See* Map 57.

Road log from Highway 3 (Lighthouse Route) at **km 5.6** (*see* the Main Road Log on page 312):

km		
	0	Arcadia, junction of highways 3 and 334; turn right onto Highway 334.
	1.2	Junction; leave Highway 334 and proceed onto the road leading south.
	5.0	Melbourne, junction; continue straight ahead toward south.
	14.6	Pinkneys Point village, at a bend in the road. To reach the northern end of the Pinkneys Point occurrence, walk west about 100 m to the Atlantic shore; the Pinkneys Point occurrence extends south about 1500 m from this point to Pinkneys Point. The road log continues along the road toward Pinkneys Point, and the southern end of the occurrence.
	16.2	End of the road at the wharf and lighthouse. Pinkneys Point is 500 m southwest of this point. This is the southern end of the Pinkneys Point occurrence.

Refs.: 62 p. 105-106; 64 p. 203-209; 342 p. 64-65.

Maps (T): 20 O/9 Comeaus Hill
(G) 39A Nova Scotia Sheet (GSC, 1:506 880)
85-1 Industrial mineral commodities map of the Province of Nova Scotia (NSDNR, 1:500 000)
641 Western portion of Nova Scotia (GSC, 1:506 880)
1186A Shelburne area, Nova Scotia (GSC, 1:126 720)
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Pubnico occurrences

ANDALUSITE, STAUROLITE, GARNET; CHIASTOLITE

In biotite schist; in slate

Andalusite occurs as pinkish-grey (turbid due to inclusions) prismatic crystals and crystal aggregates (up to 15 cm long), in places comprising up to 30% of the biotite schist. Dark brown prismatic crystals of staurolite and dark red garnet crystals are associated with andalusite. Chiastolite crystals, commonly 1 cm in diameter, occur in slate.

The biotite schist containing andalusite, staurolite, and garnet is exposed at various points along the western shore of Pubnico Harbour from Lower West Pubnico to Pubnico Point (formerly St. Ann Point), and in roadcuts along Highway 335 between Lower West Pubnico and Pubnico Point. Chiastolite-bearing slate is exposed in rock outcrops and boulders along the Atlantic shore west of Lower West Pubnico.

The occurrences are 7 to 12 km south of Pubnico. Lat. 43°38′03″N, Long. 65°47′29″W (Lower West Pubnico village shore); Lat. 43°36′59″N, Long. 65°47′19″W (Pubnico Harbour shore at fish processing plant); Lat. 43°35′56″N, Long. 65°47′33″W (Pubnico Ledge); Lat. 43°35′28″N, Long. 65°48′10″W (Pubnico Point); Lat. 43°37′16″N, Long. 65°48′56″W (chiastolite occurrence, Atlantic shore). *See* Map 58.

Road log from Highway 3 (Lighthouse Route) at **km 37.4** (*see* the Main Road Log on page 312):

km		
	0	Pubnico, junction of highways 3 and 335; proceed southwest along Highway 335.
	8.2	Lower West Pubnico, junction of the road leading east 0.7 km to a Pubnico occurrence on the Pubnico Harbour shore.
	8.9	Lower West Pubnico, junction. Proceed 0.7 km along the road leading east to a junction; turn right (south) and proceed 1.2 km to another Pubnico occurrence on the Pubnico Harbour shore (in the vicinity of a fish processing plant).
	9.0	Lower West Pubnico, junction of the road leading west. Follow this road for 1 km to the end of the road at the Atlantic shore; walk south along the shore for 350 m to the Pubnico (chiastolite) occurrence. The road log continues along the road leading south from the junction at km 9.0.
	12.8	Pubnico Point. Proceed to the southern end of the Pubnico occurrences along the western shore of Pubnico Harbour, from Pubnico Point to Pubnico Ledge.

Refs.: 10 p. 12Q; 11 p. 67M-68M, 148M; 224 p. 10-12; 296 p. 18-19; 342 p. 17-18, 63.

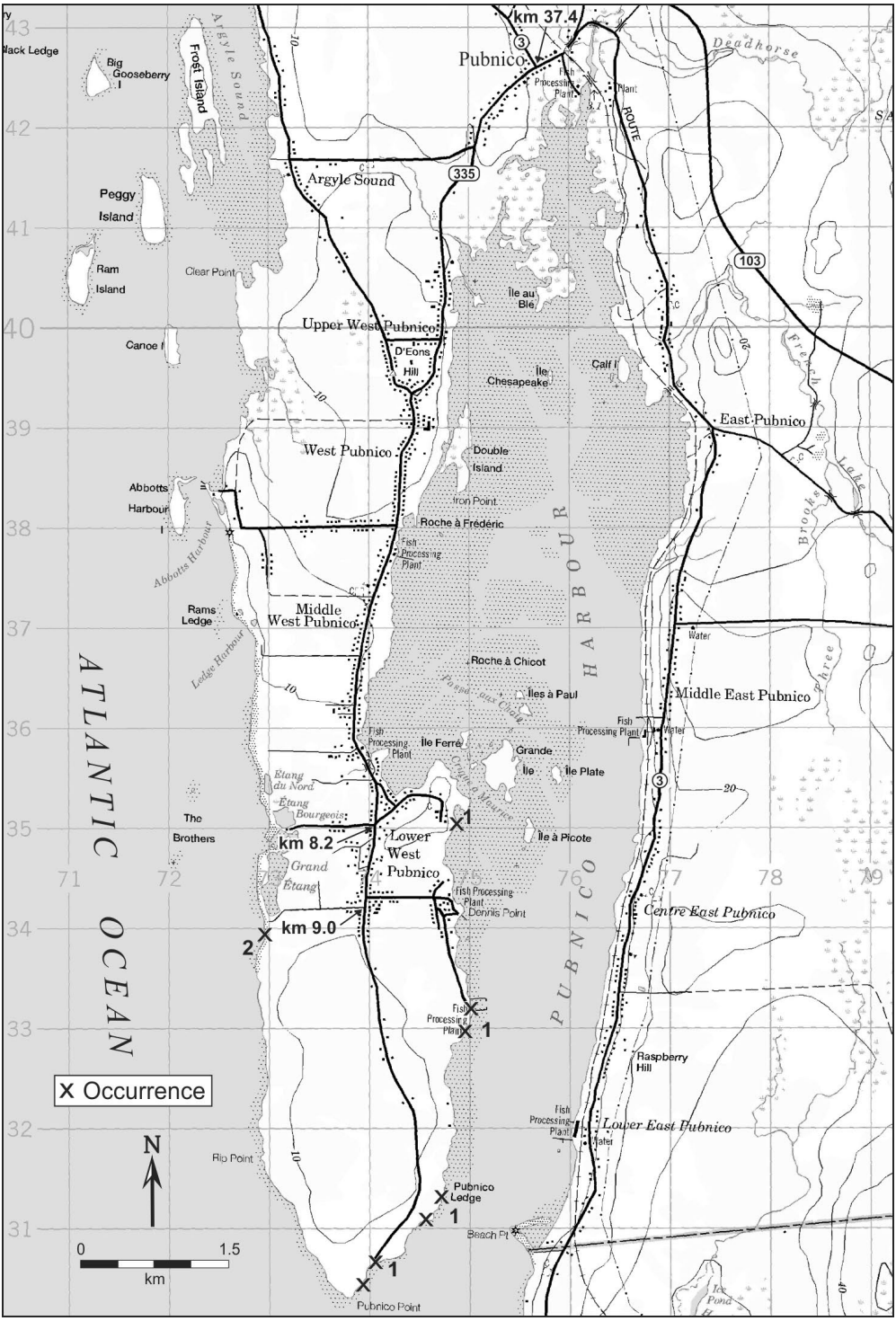
Maps (T): 20 P/12 Pubnico
(G) 39A Nova Scotia Sheet (GSC, 1:506 880)
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641 Western portion of Nova Scotia (GSC, 1:506 880)
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Hawk Point occurrence

SILLIMANITE, GARNET

In migmatite

Sillimanite occurs as fibrous masses in biotite migmatite. Garnet occurs as porphyroblasts in the rock.



1. Staurolite, andalusite occurrences 2. Chiastolite occurrence

Map 58. Pubnico

The occurrence is exposed along the beach at Hawk Point, Cape Sable Island, about 14 km south of Barrington Passage. Lat. 43°24′56″N, Long. 65°36′52″W.

Road log from Highway 3 (Lighthouse Route) at **km 73.4** (*see* the Main Road Log on page 312):

km		
	0	Barrington Passage, junction of highways 3 and 330; proceed south along Highway 330.
	5.9	Junction; turn left (south) onto the road leading to South Side.
	11.9	Junction at a cemetery; turn left (south) onto the road leading to The Hawk.
	13.6	The Hawk, junction; turn left (east) onto the road leading toward Hawk Point.
	14.2	End of road. Turn left and walk north to the sillimanite-garnet migmatite rock outcrops along the beach. Hawk Point is about 200 m northeast of this point.

Ref.: 296 p. 20-21.

Maps (T): 20 P/5 Cape Sable Island\
(G) 39A Nova Scotia Sheet (GSC, 1:506 880)
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Baccaro, Johns Island occurrences

STAUROLITE, CHLORITE, ANDALUSITE, GARNET

In mica schist

Staurolite occurs as dark brown crystals up to 3 cm long; some crystals are dark green due to replacement by chlorite and quartz. Andalusite occurs as nodular and prismatic aggregates, garnet as pink crystals commonly 5 to 7 mm across. These crystals protrude from weathered schist as they are more resistant to erosion than the host rock.

The mica schist containing these minerals is exposed at various points along the southwestern shore of Port La Tour between Port La Tour village and Baccaro Point, and along the shore of Johns Island in Port La Tour.

The Baccaro occurrences are 9 to 17 km south of Port Clyde. Lat. 43°29′01″N, Long. 65°27′52″W (Port La Tour shore opposite Smithsville); Lat. 43°29′01″N, Long. 65°27′31″W (Crow Neck Island); Lat. 43°27′53″N, Long. 65°29′33″W (Cat Point); Lat 43°28′07″N, Long. 65°28′12″W (Port La Tour shore opposite km 4.4); Lat. 43°27′44″N, Long. 65°27′54″W (Gull Point); Lat. 43°26′55″N, Long. 65°28′16″W (Baccaro Point); Lat. 43°31′44″N, Long. 65°26′26″W (Johns Island, northern tip); Lat. 43°31′21″N, Long. 65°26′33″W (Johns Island, northwestern shore); Lat. 43°30′30″N, Long. 65°26′26″W (Johns Island, southern tip). *See* Map 59.

Road log from Highway 3 (Lighthouse Route) at **km 92.4** (*see* the Main Road Log on page 312):

km		
	0	Port La Tour, junction of Highway 3 and the road to Baccaro; proceed south toward Baccaro.
	2.7	Smithsville, junction; the road on left leads east 600 m to the Baccaro occurrence on the Port La Tour shore. The occurrence on the northeastern shore of Crow Neck Island is another 450 m east of this junction.
	3.6	Baccaro, junction; the road on right leads west 2 km to the junction of a 350 m road leading west to the Baccaro occurrence at Cat Point. The road log continues straight ahead (south) from this junction.
	4.4	Baccaro occurrence on the shore opposite this point.
	5.2	Baccaro occurrence on the shore at Gull Point 300 m east of this point.
	6.9	End of the road at Baccaro Point. The Baccaro occurrence is exposed on both sides of the point.

The Johns Island occurrences are accessible from Upper Port La Tour village at **km 92.4** (*see* the Main Road Log on page 312); a 600 m road leads south from this point to the wharf on the Port La Tour shore and boat access to the Johns Island occurrences on the western shore of the island and at the northern tip and the southern tip of the island.

Refs.: 11 p. 59M-60M; 342 p. 17, 61.

Maps (T): 20 P/6 Baccaro
20 P/11 Lockeport
(G): 39A Nova Scotia Sheet (GSC, 1:506 880)
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Blanche, Cape Negro Island occurrences

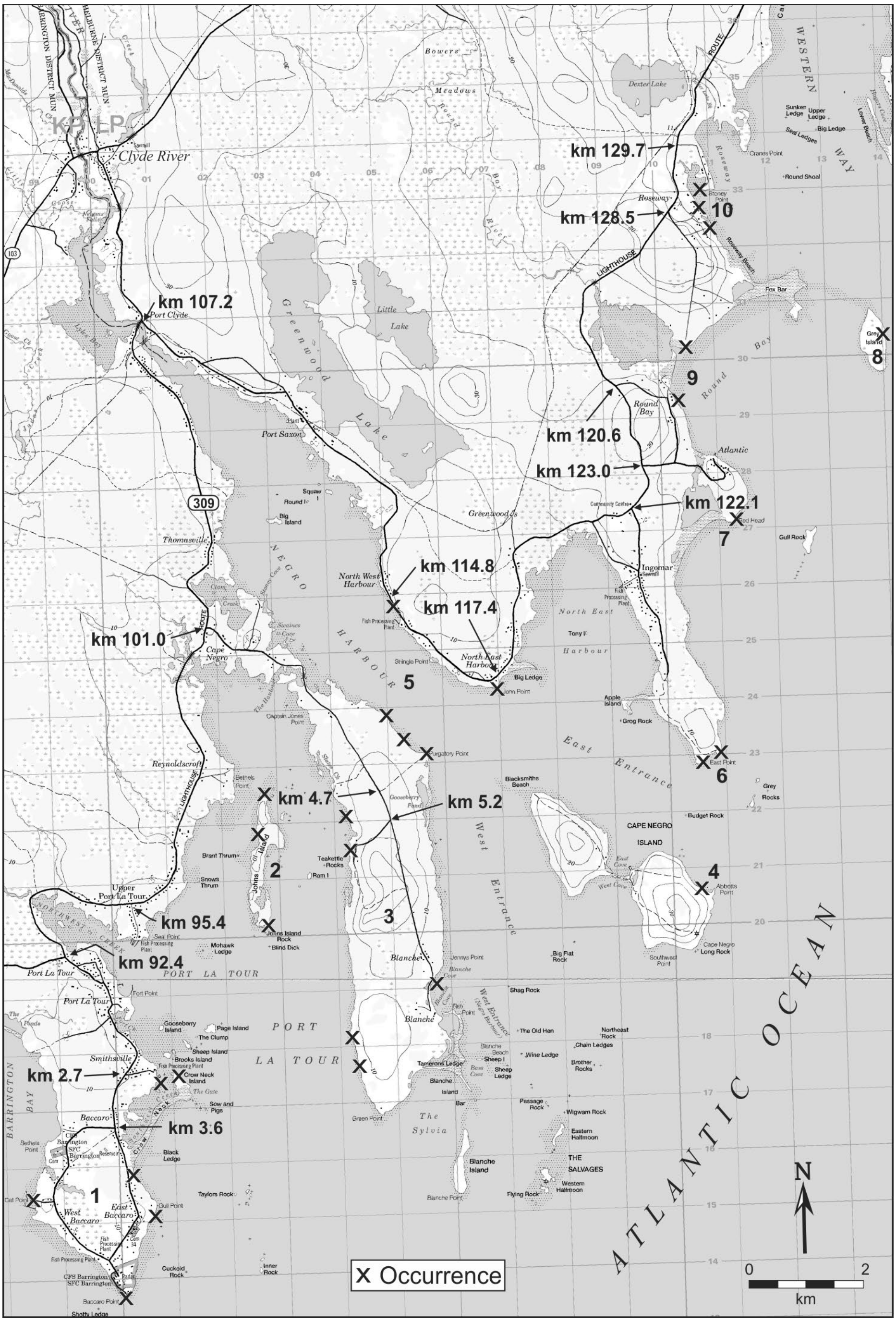
STAUROLITE, ANDALUSITE, GARNET, CHLORITE

In mica schist

Crystals of staurolite, andalusite, and garnet occur in mica schist. Chlorite commonly occurs as a replacement of staurolite.

The mica schist containing these minerals is exposed at various points along the eastern shore of Port La Tour, the western shore of West Entrance, Negro Harbour and the southeastern shore of Cape Negro Island.

The occurrences are 9 to 16 km southeast of Port Clyde, and 3 to 10 km southeast of Cape Negro village. Lat. 43°32′09″N, Long. 65°24′19″W (Purgatory Point) to Lat. 43°32′31″N, Long. 65°24′52″W (shore 1 km northwest of Purgatory Point); Lat. 43°31′33″N, Long. 65°25′23″W and Lat. 43°31′09″N, Long. 65°25′21″W (Port La Tour shore access



1. Baccaro occurrences 2. Johns Island occurrences 3. Blanche occurrences 4. Cape Negro Island occurrence 5. Negro Harbour occurrences 6. East Point occurrences 7. Red Head occurrence 8. Grey Island occurrence 9. Round Bay occurrences 10. Roseway Beach occurrences

Map 59. Port Clyde

from km 5.2); Lat. 43°29′59″N, Long. 65°24′13″W (Blanche Cove); Lat. 43°29′08″N, Long. 65°25′14″W and Lat. 43°29′13″N, Long. 65°25′14″W (shore north of Green Point); Lat. 43°30′52″N, Long. 65°20′43″W (Cape Negro Island). *See* Map 59.

Road log from Highway 3 (Lighthouse Route) at **km 101.0** (*see* the Main Road Log on page 312):

km		
	0	Cape Negro, junction of Highway 3 and the road to Blanche; proceed south toward Blanche.
	4.7	Junction of the road leading east 1 km to Purgatory Point, Negro Harbour. The Blanche occurrence is exposed along the shore at Purgatory Point extending about 1 km northwest of the point. The road log continues straight ahead (south).
	5.2	Junction; the road on left leads west 800 m to the Port La Tour shore. The Blanche occurrence is exposed on the shore 150 m south of this point and 500 m north of this point.
	8.2	Blanche, at the Blanche Cove wharf. The Blanche occurrence is exposed along the shore of Blanche Cove, and on the western shore of the Blanche peninsula at points 900 m and 1200 m north of Green Point. The Cape Negro Island occurrence is exposed along the eastern shore of the southern Cape Negro Island, about 4 km northeast of Blanche; access is by boat from Blanche Cove.

Refs.: 11 p. 58M-59M; 342 p. 61.

Maps (T): 20 P/6 Baccaro, 20 P/11 Lockeport
(G): 39A Nova Scotia Sheet (GSC, 1:506 880)
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Negro Harbour occurrences

CHLORITE, CORDIERITE

In mica schist and slate

Chlorite occurs as dark green nodules up to 5 cm across in mica schist. The chlorite is admixed with quartz, rendering the nodules more erosion-resistant than the enclosing schist and more prominent on exposed surfaces. Cordierite porphyroblasts occur in slate; they are almost completely replaced by chlorite.

The mineral-bearing mica schist and slate are exposed along the southeastern shore of Negro Harbour between North West Harbour village and North East Harbour village (John Point).

The occurrences are about 7 km southeast of Port Clyde. Lat. 43°33′36″N, Long. 65°24′47″W (North West Harbour); Lat. 43°32′46″N, Long. 65°23′24″W (John Point). *See* Map 59.

Access to the Negro Harbour occurrences is from Highway 3 (Lighthouse Route) at **km 114.8** and **km 117.4** (*see* the Main Road Log on page 312). The highway runs parallel to and near the shore at these points.

Refs.: 11 p. 58M; 296 p. 16.

Maps (T): 20 P/11 Lockeport
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East Point occurrences

STAUROLITE, ANDALUSITE

In mica schist

Brown staurolite and pink andalusite occur as prismatic crystals in light grey mica schist.

The occurrences are exposed at points along the shore at East Point, East Entrance, Negro Harbour, about 13 km southeast of Port Clyde. Lat. 43°32′04″N, Long. 65°20′38″W; Lat. 43°32′09′N, Long. 65°20′28″W. *See* Map 59.

Road log from Highway 3 (Lighthouse Route) at **km 122.1** (see the Main Road Log on page 312):

km		
	0	Junction, Highway 3 and the road to Ingomar; proceed south toward Ingomar.
	3.1	The road continues south as a trail.
	4.9	East Point. Proceed to the East Point occurrences along the shore.

Refs.: 11 p. 58M; 342 p. 61.

Maps (T): 20 P/11 Lockeport
(G): 39A Nova Scotia Sheet (GSC, 1:506 880)
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Red Head, Grey Island, Round Bay, Roseway Beach occurrences

STAUROLITE, ANDALUSITE, GARNET, CHLORITE

In mica schist

Staurolite occurs as brown prismatic crystals about 3 cm long, and as twinned crystals. Andalusite occurs as pink to violet-pink crystals up to 10 cm long; the crystals contain inclusions of quartz, garnet, and mica. Crystals of pink garnet and black chlorite are disseminated in the schist.

The mica schist containing these minerals is exposed at various points along the Atlantic shore at Red Head, Round Bay, Roseway Beach, and Grey Island (eastern shore).

The occurrences are about 11 km east of Port Clyde. Lat. 43°34′22″N, Long. 65°20′16″W (Red Head); Lat. 43°36′08″N, Long. 65°18′16″W (Grey Island); Lat. 43°35′33″N, Long. 65°21′03″W (Round Bay, access from **km 124.6**); Lat. 43°36′05″N, Long. 65°20′53″W (Round Bay, access from **km 128.5**); Lat. 43°37′14″N, Long. 65°20′34″W (Roseway Beach, access from **km 128.5**); Lat. 43°37′29″N, Long. 65°20′48″W (Roseway Beach, access from **km 128.5**); Lat. 43°37′33″N, Long. 65°20′39″W (Stoney Point, Roseway Beach). *See* Map 59.

Access to these occurrences is by side roads leading east from Highway 3, the Lighthouse Route (*see* the Main Road Log on page 312). The side roads leave Highway 3 from the following points: from **km 123.0**, a 2 km road to the Atlantic village wharf for access by boat to Red Head, a distance of 1400 m, and to Grey Island, a distance of 4 km; from **km 124.6**, a 1.4 km road to the shore of Round Bay; from **km 128.5**, a 2.4 km road to the shore of Round Bay, and side roads from this road to Roseway Beach; and, from **km 129.7,** a 1.2 km road to the shore of Roseway Beach at Stoney Point.

Refs.: 11 p. 57M, 58M; 342 p. 61.

Maps (T): 20 P/11 Lockeport
(G): 39A Nova Scotia Sheet (GSC, 1:506 880)
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Shelburne Harbour western and eastern occurrences

STAUROLITE, ANDALUSITE, GARNET, CHLORITE

In mica schist

Staurolite occurs as brown prisms about 3 cm long, and as twinned crystals. Andalusite occurs as pink to violet-pink crystals up to 10 cm long; the crystals are turbid due to inclusions of quartz, garnet, and mica. Crystals of pink garnet and black chlorite are disseminated in the schist.

The mica schist containing these minerals is exposed at the following localities: along the western shore of Shelburne Harbour between Carleton Village and the entrance to Gunning Cove; along the eastern shore of Shelburne Harbour extending from about 2 km north of Sandy Point village to Sandy Point and Lower Sandy Point; and along the northern tip of McNutts Island located in Shelburne Harbour 2 km east of Carleton Village.

The occurrences are 4 to 11 km south of Shelburne. Lat. 43°38′39″N, Long. 65°20′00″W (western shore 850 m southeast of **km 131.9**); Lat. 43°39′37″N, Long. 65°19′42″W (western shore 400 m east of **km 133.1**); Lat. 43°40′01″N, Long. 65°19′41″W (western shore 600 m east of **km 133.9**); Lat. 43°40′20″N, Long. 65°19′40″W (western shore 800 m northeast of

km 133.9); Lat. 43°40′45″N, Long. 65°19′50″W (western shore 300 m east of the end of the 0.9 km road leading northeast from **km 134.8**); Lat. 43°39′35″N, Long. 65°18′13″W (McNutts Island); Lat. 43°43′50″N, Long. 65°19′00″W (eastern shore at **km 155.0**); Lat. 43°42′29″N, Long. 65°19′21″W (eastern shore at Sandy Point); Lat. 43°41′19″N, Long. 65°19′16″W (eastern shore 400 m southeast of the lighthouse); Lat. 43°41′14″N, Long. 65°18′51″W (eastern shore 800 m southeast of the lighthouse); Lat. 43°40′39″N, Long. 65°18′01″W (eastern shore at the Lower Sandy Point wharf, at **km 162.0**). *See* Map 60.

Access to the Shelburne Harbour western occurrences is by short side roads leading east from Highway 3, the Lighthouse Route (*see* the Main Road Log on page 312) at **km 131.9**, **km 133.1**, and **km 133.9** in Carleton Village and **km 134.8** at Gunning Cove. Access to the McNutts Island occurrence is by boat from the wharf at the end of the road leading east from **km 133.1** in Carleton Village. Access to the Shelburne Harbour eastern occurrences is from the Shelburne-Jordan Bay coastal loop (Lighthouse Route) which parallels the shore; the occurrences are exposed along the shore between **km 155.0** and **km 162.0.**

Refs.: 10 p. 21Q; 11 p. 57M, 148M; 296 p. 16-18; 342 p. 61.

Maps (T): 20 P/11 Lockeport
(G): 39A Nova Scotia Sheet (GSC, 1:506 880)
85-1 Industrial mineral commodities map of the Province of Nova Scotia (NSDNR, 1:500 000)
641 Western portion of Nova Scotia (GSC, 1:506 880)
1186A Shelburne area, Nova Scotia (GSC, 1:126 720)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

Birchtown quarries

DIORITE

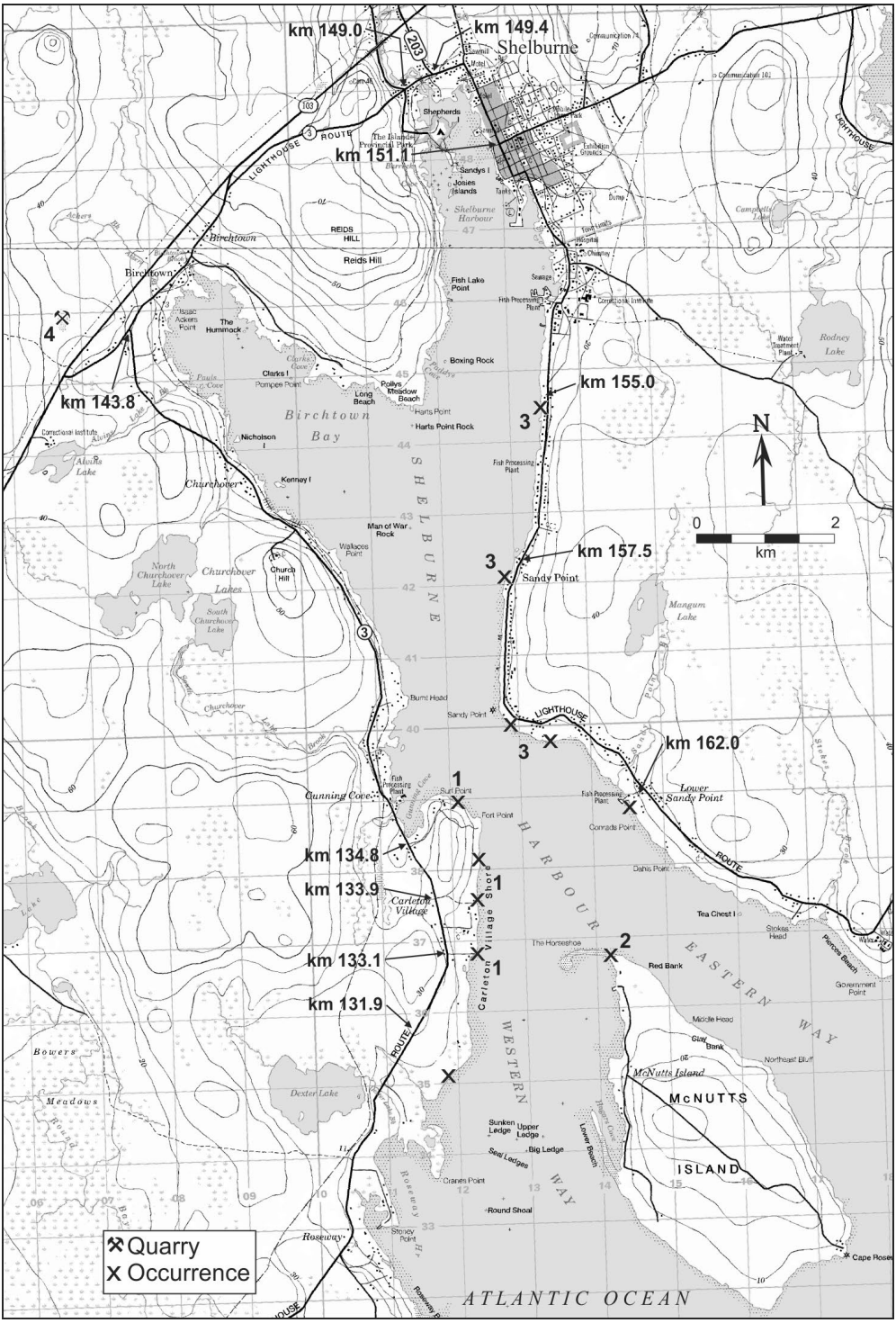
The diorite is medium grained greyish- to greenish-black, and composed of plagioclase feldspar, hornblende, and biotite. It is referred to as ‘black granite’. The rock takes an excellent polish resulting in a jet black colour. It is used for monument stone and to a less extent as a building stone; an example of its use is the exterior of the Maritime Insurance Building in Halifax. The stone is known in the trade as *Scotia Black*.

Operations beginning in 1931 consisted of recovering boulders scattered near the road. W.T. Dauphinee opened the first quarry in 1933 followed by the opening of the adjacent quarries in 1938, 1941, and 1945. The monument processing plant operated on the site until 1948, when it was moved to an old naval base in Shelburne. In 1950, Scotia Granite Quarries Limited took over operations.

The quarries are located in an area of 250 by 250 m, about 7 km southwest of Shelburne. Lat. 43°44′25″N, Long. 65°23′59″W. *See* Map 60.

Road log from Highway 3 (Lighthouse Route) at km **143.8** (*see* the Main Road Log on page 312):

km		
	0	Junction, Highway 3 and the road leading southwest to Highway 103; proceed southwest along this road.
	0.3	Junction; turn right (northwest) onto the quarry road.
	1.0	Birchtown quarries.



Shelburne Harbour occurrences: 1. Western occurrences 2. McNutts Island occurrence 3. Eastern occurrences 4. Birchtown quarries

Map 60. Shelburne Harbour

Refs.: 45 p. 38-40; 72 p. 63; 97 p. 87-89; 221 p. 148-150; 342 p. 76-77.

Maps (T): 20 P/11 Lockeport
(G): 39A Nova Scotia Sheet (GSC, 1:506 880)
85-1 Industrial mineral commodities map of the Province of Nova Scotia (NSDNR, 1:500 000)
641 Western portion of Nova Scotia (GSC, 1:506 880)
1186A Shelburne area, Nova Scotia (GSC, 1:126 720)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

Roseway River occurrence

ANDALUSITE, CORDIERITE, STAUROLITE

In mica schist

Andalusite occurs as large pink porphyroblasts. Cordierite occurs as grey patches in the porphyroblasts. Staurolite occurs as crystal aggregates.

The mica schist containing these minerals is exposed in the Roseway River about 21 km north of Shelburne. Lat. 43°56′42″N, Long. 65°24′48″W.

Road log from Highway 3 (Lighthouse Route) at **km 149.4** (*see* the Main Road Log on page 312):

km		
	0	Shelburne, junction of highways 3 and 203; proceed north along Highway 203.
	19.0	Middle Ohio, junction of a road leading west to Upper Clyde River. The road log continues north along Highway 203.
	21.2	Highway 203 bridge over Roseway River. The Roseway River occurrence is exposed in the bed of Roseway River just south of the bridge.

Ref.: 296 p. 18.

Maps (T): 20 P/14 Shelburne
(G): 39A Nova Scotia Sheet (GSC, 1:506 880)
85-1 Industrial mineral commodities map of the Province of Nova Scotia (NSDNR, 1:500 000)
641 Western portion of Nova Scotia (GSC, 1:506 880)
1186A Shelburne area, Nova Scotia (GSC, 1:126 720)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

Shelburne-Jordan Falls occurrences

STAUROLITE, ANDALUSITE, GARNET, BIOTITE, CORDIERITE

In mica schist

Staurolite occurs as dark brown crystals about 3 cm long, andalusite as masses of pink crystal aggregates up to 40 cm across, garnet as small dark red crystals, biotite as black books, and cordierite as blocky aggregates up to 5 cm across.

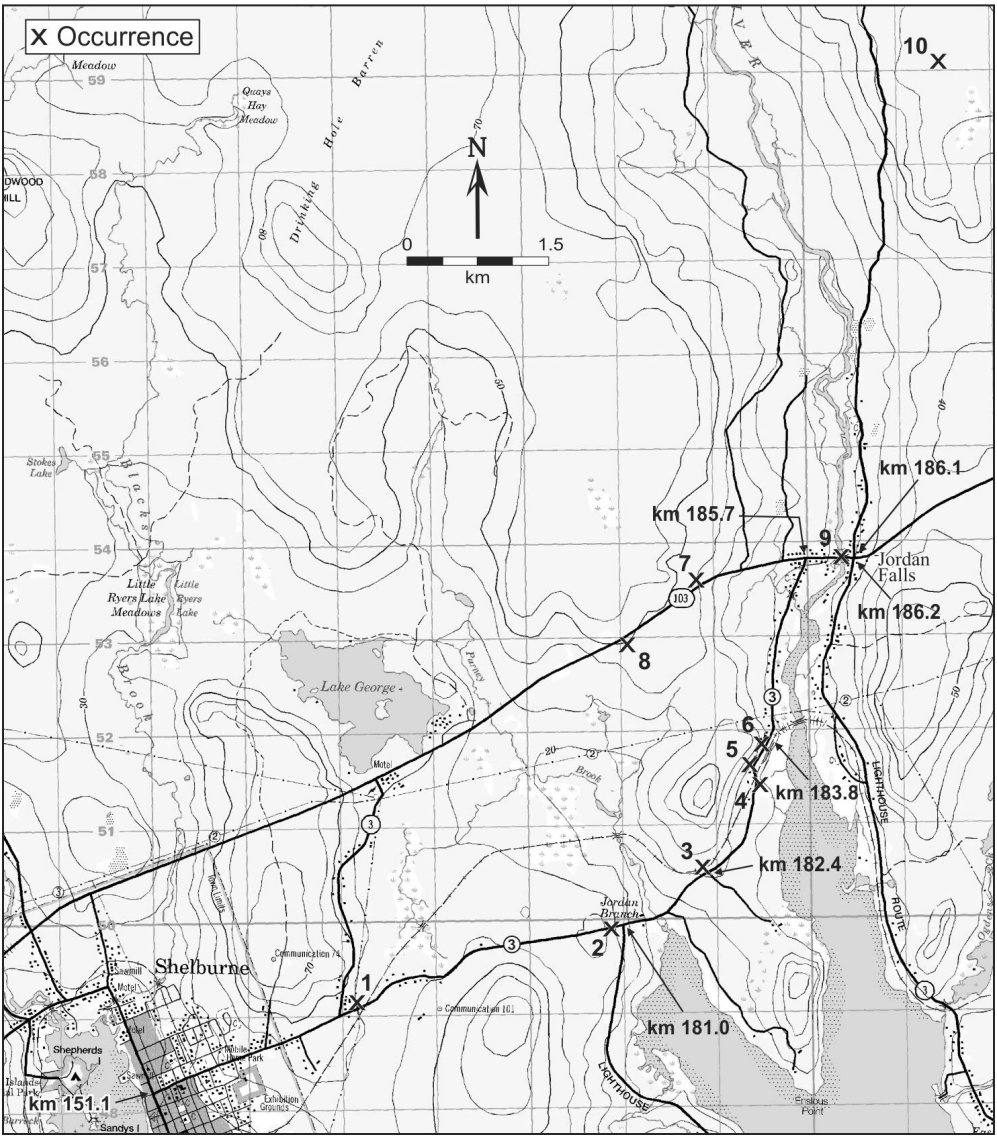
The mica schist bearing these minerals is exposed in numerous roadcuts and outcrops between Shelburne and Jordan Falls, 1 km to 7 km east of Shelburne. Lat. 43°46′17″N, Long. 65°17′49″W (1); Lat. 43°46′47″N, Long. 65°15′49″W (2); Lat. 43°47′12″N, Long. 65°14′55″W (3); Lat. 43°47′34″N, Long. 65°14′43″W (4); Lat. 43°47′42″N, Long. 65°14′42″W (5); Lat. 43°47′53″N, Long. 65°14′35″W (6); Lat. 43°48′42″N, Long. 65°15′14″W (7); Lat. 43°48′25″N, Long. 65°15′49″W (8); Lat. 43°48′56″N, Long. 65°14′01″W (9). *See* Map 61.

Road log from Highway 3 (Lighthouse Route) at **km 151.1** (*see* the Main Road Log on page 312):

km		
	0	Shelburne, at the intersection of Water Street and King Street; proceed east along Highway 3 (King Street).
	2.4	Roadcut, Shelburne-Jordan Falls occurrence (1).
	5.4	Roadcut, Shelburne-Jordan Falls occurrence (2).
	5.5	Jordan Branch, junction (km 181.0, Main Road Log); proceed straight ahead along Highway 3 (Lighthouse Route).
	6.9	Roadcut, Shelburne-Jordan Falls occurrence (3) (**km 182.4**, Main Road Log).
	7.7	Roadcut, Shelburne-Jordan Falls occurrence (4).
	7.9	Roadcut, Shelburne-Jordan Falls occurrence (5).
	8.3	Roadcut, Shelburne-Jordan Falls occurrence (6) (**km 183.8**, Main Road Log).
	10.2	Jordan Falls, junction of Highway 103 (**km 185.7**, Main Road Log). Proceed west along Highway 103 to Shelburne-Jordan Falls occurrences: rock outcrops on the north side of the highway 1.25 km west of this junction (7); rock outcrops in a gravel pit on the south side of the highway 2.25 km west of this junction (8). The road log continues along Highway 103 east of this junction.
	10.6	Jordan Falls, at the bridge over Jordan River (**km 186.1**, Main Road Log). The Shelburne-Jordan Falls occurrence (9) is exposed in rock outcrops along the Jordan River in the vicinity of the bridge.

Refs.: 11 p. 56M-57M; 67 p. 63-64; 221 p. 154; 224 p. 12-13, 34; 258 p. 52-53; 279 p. 54, 67; 296 p. 14-16; 342 p. 61, 63-64; 357 p. 101-102.

Maps (T): 20 P/14 Shelburne
(G): 39A Nova Scotia Sheet (GSC, 1:506 880)
85-1 Industrial mineral commodities map of the Province of Nova Scotia (NSDNR, 1:500 000)
641 Western portion of Nova Scotia (GSC, 1:506 880)
1186A Shelburne area, Nova Scotia (GSC, 1:126 720)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)



1, 2, 3, 4, 5, 6, 7, 8, 9. Shelburne-Jordan Falls occurrences 10. Jordan Falls occurrence

Map 61. Jordan Falls

Jordan Falls occurrence

BERYL, TOURMALINE, APATITE, MOLYBDENITE, ILMENITE

In quartz-rich pegmatite

Light green to white beryl occurs as crystals up to 5 cm across and as crystal aggregates. Tourmaline occurs as black crystals, and apatite as light green crystals. Molybdenite occurs as flaky aggregates. Ilmenite occurs as thin plates. These minerals occur in a vein consisting of colourless to smoky quartz and muscovite.

The occurrence of a molybdenite-bearing vein along a tributary of the Jordan River was noted in about 1896. Shortly thereafter, the vein was opened by some prospect pits. The last investigation for molybdenite was done by Paul Varner between 1949 and 1956; the work consisted of blasting, trenching, and sampling. In 1959, the Nova Scotia Department of Mines began an investigation for beryllium. In 1960, Cadamet Mines Limited did some stripping and trenching on a 80 m section along the length of a vein. In 1961, Talisman Mines Limited carried out some geological mapping and drilling.

The occurrence is about 5 km north of Jordan Falls. Lat. 43°51′33″N, Long. 65°13′06″W. *See* Map 61.

Road log from Highway 3 (Lighthouse Route) at **km 186.2** (*see* the Main Road Log on page 312):

km		
	0	Jordan Falls, junction of Highway 103/3 and the Lake John road; proceed north along the Lake John road.
	5.0	Junction; turn right (east) onto a tractor road.
	5.8	Jordan Falls occurrence in a clearing on top of a hill; there are several trenches in the cleared area.

Refs.: 11 p. 146M; 80 p. 1; 127 p. 19F; 224 p. 13, 22; 264 p. 95; 342 p. 72; 350 p. 17-18.

Maps (T): 20 P/14 Shelburne
(G): 39A Nova Scotia Sheet (GSC, 1:506 880)
85-1 Industrial mineral commodities map of the Province of Nova Scotia (NSDNR, 1:500 000)
641 Western portion of Nova Scotia (GSC, 1:506 880)
1186A Shelburne area, Nova Scotia (GSC, 1:126 720)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

Sandy Bay occurrence

BERYL, TOURMALINE, GARNET, APATITE

In granite pegmatite

Light green beryl crystals up to 3 cm wide and 20 cm long occur with black tourmaline, garnet, and apatite in a quartz-muscovite-perthite pegmatite. The pegmatite dykes occur in biotite granite. This is one of a number of beryl-bearing pegmatites occurring near the contacts with metamorphosed sedimentary rocks along the Atlantic shore from Port L'Hebert to Western Head. In 1959, McIntyre-Porcupine Mines Limited did some drilling and blasting in the pegmatites, and excavated a trench about 4.5 m long and 1.5 m deep at Sandy Cove.

The occurrence is exposed along the Atlantic shore at Sandy Bay, about 12 km southwest of Port Mouton village. Lat. 43°49′23″N, Long. 64°53′16″W. *See* Map 62.

Road log from Highway 103 (Lighthouse Route) at **km 233.8** (*see* the Main Road Log on page 312):

km		
	0	Junction, Highway 103 and the road leading south to East Side Port L'Hebert; proceed toward East Side Port L'Hebert.
	6.3	East Side Port L'Hebert, junction; turn left (south).

8.0 Junction; turn left (east).

9.7 Sandy Bay, junction; turn left (northeast).

10.3 End of the road at Sandy Bay beach. The beryl-bearing pegmatite is exposed at points along the north shore and the west shore of Sandy Bay; pegmatite boulders containing beryl occur along the beach.

Refs.: 80 p. 1-3; 125 p. 254; 224 p. 22; 264 p. 96; 342 p. 73; 371 p. 120; 375 p. 89, 90.

Maps (T): 20 P/15 & 20 P/10 Port Mouton
(G): 39A Nova Scotia Sheet (GSC, 1:506 880)
85-1 Industrial mineral commodities map of the Province of Nova Scotia (NSDNR, 1:500 000)
641 Western portion of Nova Scotia (GSC, 1:506 880)
1186A Shelburne area, Nova Scotia (GSC, 1:126 720)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

Forbes Cove occurrence

BERYL, GARNET

In granite pegmatite

Light green beryl and dark red garnet crystals occur in pegmatite dykes cutting biotite granite.

The beryl-bearing pegmatite is exposed along the shore of Port Joli harbour at Forbes Cove.

The occurrence is about 4 km southeast of Port Joli village. Lat. 43°51′20″N, Long. 64°51′39″W; Lat. 43°51′26″N, Long. 64°51′58″W. *See* Map 62.

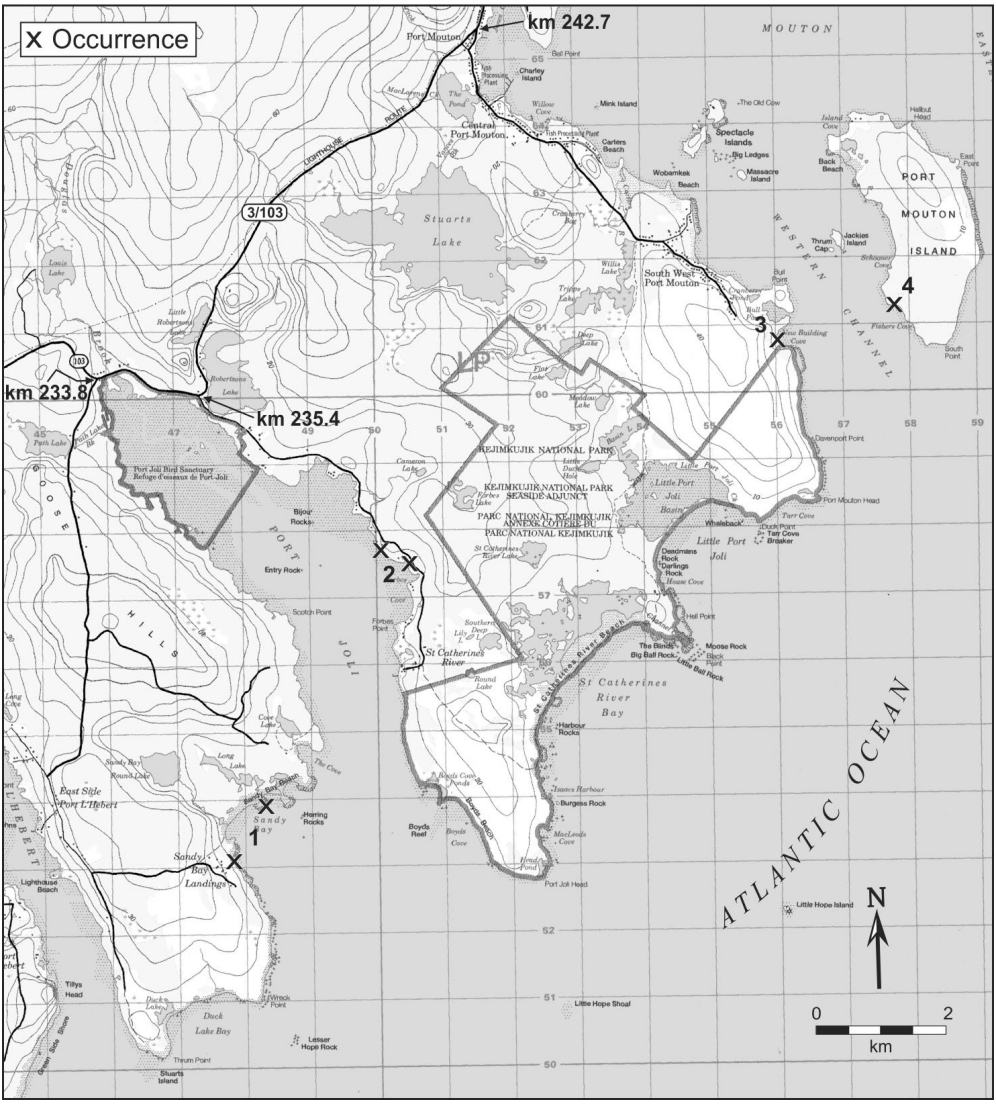
Road log from Highway 103 ((Lighthouse Route) at **km 235.4** (*see* the Main Road Log on page 312):

km 0 Port Joli, junction of Highway 103 and the road leading southeast to St. Catherines River; proceed along the road toward St. Catherines River.

4.5 Forbes Cove. The beryl-bearing pegmatites are exposed along the shore opposite this point, and 600 m to the northwest.

Refs.: 125 p. 254; 224 p. 22; 342 p. 73; 371 p. 120; 375 p. 89, 90.

Maps (T): 20 P/15 & 20 P/10 Port Mouton
(G): 39A Nova Scotia Sheet (GSC, 1:506 880)
85-1 Industrial mineral commodities map of the Province of Nova Scotia (NSDNR, 1:500 000)
641 Western portion of Nova Scotia (GSC, 1:506 880)
1186A Shelburne area, Nova Scotia (GSC, 1:126 720)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)



1. Sandy Bay occurrence 2. Forbes Cove occurrence 3. New Building (Newhouse) Cove occurrence 4. Port Mouton Island occurrence

Map 62. Port Mouton

New Building (Newhouse) Cove occurrence

BERYL, GARNET

In granite pegmatite

Beryl occurs as small light green crystals in pegmatite dykes cutting biotite granite. Garnet and biotite are associated with beryl.

The beryl-bearing pegmatite zone is exposed for about 25 m along the shore of New Building (Newhouse) Cove, Western Channel, Port Mouton harbour.

The occurrence is about 6.5 km southeast of Port Mouton village. Lat. 43°53′09″N, Long. 64°47′34″W. *See* Map 62.

Road log from Highway 103 ((Lighthouse Route) at **km 242.7** (*see* the Main Road Log on page 312):

km		
	0	Port Mouton, junction of Highway 103 and the road leading southeast to South West Port Mouton; proceed to South West Port Mouton.
	6.2	South West Port Mouton, end of the road. From this point a trail continues 800 m southeast to the New Building (Newhouse) Cove occurrence along the shore of the cove.

Refs.: 224 p. 22; 342 p. 73; 371 p. 120; 375 p. 88, 89.

Maps (T): 20 P/15 & 20 P/10 Port Mouton
(G): 39A Nova Scotia Sheet (GSC, 1:506 880)
85-1 Industrial mineral commodities map of the Province of Nova Scotia (NSDNR, 1:500 000)
641 Western portion of Nova Scotia (GSC, 1:506 880)
1186A Shelburne area, Nova Scotia (GSC, 1:126 720)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

Port Mouton Island occurrence

BERYL, GARNET

In granite pegmatite

Beryl occurs as light green to white crystals up to 6 cm across and as crystal aggregates 5 cm across and 7 cm long. Garnet occurs as crystals up to 5 cm across. These minerals occur in pegmatite composed of pink perthitic feldspar, plagioclase feldspar, dark grey quartz, and muscovite.

The occurrence consists of several pegmatite dykes in an area about 90 m long and 20 to 35 m wide along a point on the southwestern shore of Port Mouton Island. In 1959, McIntyre-Porcupine Mines Limited did some drilling and blasting, and sank a pit inland about 150 m east of the shoreline showing. In 1961, Talisman Mines Limited examined the occurrence.

The occurrence is in Port Mouton harbour, about 7 km southeast of Port Mouton village. Lat. 43°53′26″N, Long. 64°46′15″W. *See* Map 62.

Road log from Highway 103 (Lighthouse Route) at **km 242.7** (*see* the Main Road Log on page 312):

km		
	0	Port Mouton, junction of Highway 103 and the road leading southeast to South West Port Mouton; proceed to South West Port Mouton.
	5.2	South West Port Mouton; access to Port Mouton Island is by boat, a distance of 2.5 km from South West Port Mouton. The Port Mouton Island occurrence is about 1300 m northwest of the southern tip of Port Mouton Island.

Refs.: 224 p. 22; 258 p. 51; 264 p. 95-96; 342 p. 73; 371 p. 120; 375 p. 90.

Maps (T): 20 P/15 & 20 P/10 Port Mouton

(G): 39A Nova Scotia Sheet (GSC, 1:506 880)
85-1 Industrial mineral commodities map of the Province of Nova Scotia (NSDNR, 1:500 000)
641 Western portion of Nova Scotia (GSC, 1:506 880)
1186A Shelburne area, Nova Scotia (GSC, 1:126 720)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

Summerville Beach–Hunts Point occurrences

BERYL, GARNET, APATITE

In granite pegmatite

White to light green beryl crystals occur in a muscovite-quartz-feldspar pegmatite. Red garnet crystals up to 10 mm across and light green apatite grains occur in the rock.

The beryl-bearing pegmatites occur near the contacts with metamorphosed sedimentary rocks along the shore of Port Mouton harbour from Summerville Beach to Hunts Point. Beryl-bearing boulders derived from these pegmatites occur along the beaches.

The occurrences are 5 to 7 km northeast of Port Mouton village. Lat. 43°56′57″N, Long. 64°47′59″W (Summerville Beach); Lat. 43°57′04″N, Long. 64°46′05″W (Hunts Point). *See* Map 63.

The occurrences are readily accessible from numerous points along Highway 3 (Lighthouse Route) including **km 249.0** at Summerville Beach and **km 251.3** at Hunts Point (*see* the Main Road Log on page 312).

Refs.: 67 p. 62; 224 p. 22; 264 p. 96; 342 p. 73; 371 p. 119-120; 375 p. 87-90.

Maps (T): 20 P/15 & 20 P/10 Port Mouton
(G): 39A Nova Scotia Sheet (GSC, 1:506 880)
85-1 Industrial mineral commodities map of the Province of Nova Scotia (NSDNR, 1:500 000)
641 Western portion of Nova Scotia (GSC, 1:506 880)
1186A Shelburne area, Nova Scotia (GSC, 1:126 720)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

Western Head occurrences

ANDALUSITE; BERYL

In mica schist; in granite pegmatite

Andalusite occurs as small brownish pink crystals in mica schist. Small white to light green beryl crystals occur in granite pegmatite associated with the schist.

The schist and pegmatite rocks containing these minerals outcrop along the Atlantic shore between Scott Bay and the Western Head lighthouse, and as boulders along the shore. Beryl-bearing pegmatite occurs at the contact of granite and schist toward the north end of Scott Bay; andalusite-bearing schist is exposed in places from Scott Bay to Western Head.



1. Summerville Beach occurrences 2. Hunts Point occurrences 3. Western Head occurrences

Map 63. Summerville Beach-Western Head

The occurrence is about 5 km southeast of Liverpool. Lat. 44°00′17″N, Long. 64°39′57″W (Scott Bay); Lat. 43°59′58″N, Long. 64°39′53″W; Lat. 43°59′39″N, Long. 64°39′49″W; Lat. 43°59′29″N, Long. 64°39′42″W (Western Head). *See* Map 63.

Road log from Highway 3 (Lighthouse Route) at **km 262.9** (*see* the Main Road Log on page 312):

km		
	0	Liverpool, junction. Highway 3 turns north; continue straight ahead (east) along the road to Western Head.
	0.3	Intersection; turn right (southeast) onto the road to Mersey Point.
	1.5	Junction; continue straight ahead (southeast) toward Mersey Point.

6.8 Scott Bay and the Western Head occurrence are on left. The beryl-bearing pegmatite is exposed along the shore about 300 m north of this point. The andalusite-bearing mica schist is exposed at points between Scott Bay and Western Head, a distance of about 1200 m.

Refs.: 125 p. 254, 258; 264 p. 95-96; 342 p. 61, 72-73.

Maps (T): 20 P/15 & 20 P/10 Port Mouton, 21 A/2 Liverpool
(G): 39A Nova Scotia Sheet (GSC, 1:506 880)
85-1 Industrial mineral commodities map of the Province of Nova Scotia (NSDNR, 1:500 000)
439A Liverpool Sheet (east half), Queens, and Lunenburg counties, Nova Scotia (GSC, 1:63 360)
641 Western portion of Nova Scotia (GSC, 1:506 880)
1186A Shelburne area, Nova Scotia (GSC, 1:126 720)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

Fifteenmile Brook mine

NATIVE GOLD

In slate

Native gold occurs in quartz veins, in gold-bearing boulders derived from the veins, and in drift.

The deposit was discovered in 1880 and prospected over the next twenty years. Underground development began in 1901, and a five-stamp mill was installed in the following year. The mine was worked intermittently until 1914. The operators included J. McGrath (1901), C.N. Crowe (1906), and Switzer Mining Company Limited (1912–1914). The workings consisted of a 67 m shaft and a 43 m shaft about 200 m apart. Total production from 1910 to 1914 amounted to 15 178 g of gold from 1730 t of ore crushed. Rich gold-bearing boulders and rich drift were encountered.

The mine is in Pleasantfield, about 27 km northwest of Liverpool. Lat. 44°14′10″N, Long. 64°54′07″W.

Road log from Highway 3 (Lighthouse Route) at **km 263.9** (*see* the Main Road Log on page 312):

km 0 Liverpool, junction of highways 3 and 8 (Kejimkujik Scenic Drive); proceed onto Highway 8.

19.0 Ten Mile Lake Provincial Park on the west side of the highway.

26.8 Pleasantfield. The Fifteenmile Brook mine shafts are on each side of the highway; this point is 600 m southeast of the junction of the road leading southwest to Indian Gardens, and about 200 m northwest of the highway crossing over Fifteen Mile Brook. Gold-bearing boulders were found on the west side of the highway at this point, and rich auriferous drift on the east side.

Refs.: 228 p. 81-82; 243 p. 38-41.

Maps (T): 21 A/2 Liverpool

(G): 39A Nova Scotia Sheet (GSC, 1:506 880)
440A Liverpool Sheet (west half), Queens County, Nova Scotia (GSC, 1:63 360)
641 Western portion of Nova Scotia (GSC, 1:506 880)
1225A Annapolis-St. Marys Bay area (east half), Nova Scotia (GSC, 1:126 720)
Metallogenic map of the province of Nova Scotia, 1983 (NSDNR, 1:500 000)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

Whiteburn mines

NATIVE GOLD

In quartzite

Native gold occurs in quartz veins and in quartz boulders, float, and drift throughout the district. Some veins very rich in visible gold were encountered during early mining operations.

The Whiteburn gold district extends from Whiteburn Mines to Murphy Lake. In 1885, gold was discovered following a year of prospecting. George McGuire and brothers began mining immediately from a 6 m pit and removed auriferous quartz yielding 582.8 g/t gold (17 oz per ton). This successful venture prompted several miners to open ten other veins in the same year. By 1887, three mines and mills were in operation. Various companies, including Whiteburn Mining Company, Rossignol Mining Company, Queens County Mining Company, and Crocker Mining Company carried out mining and milling operations intermittently until 1906. In 1931, Mr. L.H. Douglas of Caledonia revived mining in the district. He sank several new shafts, deepened some of the old shafts, and produced about 41 520 g of gold. Mining ended in 1941. Total production for the district amounted to 369 823 g of gold from 9663 t of ore. Development consisted of several shafts from 7 to 67 m deep. In the 1980s, Coxheath Gold Holdings Limited carried out a major exploration program.

The mines are in Whiteburn Mines, about 40 km northwest of Liverpool. Lat. 44°18′40″N, Long. 65°04′29″W (main workings); Lat. 44°18′20″N, Long. 65°05′10″W (western workings). *See* Map 64.

Road log from Highway 3 (Lighthouse Route) at **km 263.9** (*see* the Main Road Log on page 312):

km		
	0	Liverpool, junction of highways 3 and 8 (Kejimkujik Scenic Drive); proceed onto Highway 8.
	43.6	South Brookfield, junction of Highway 208; continue along Highway 8.
	48.3	Caledonia, junction; turn left (south).
	48.5	Caledonia, junction; turn right (west) onto the road leading toward West Caledonia.
	51.5	Junction; turn left (south).
	56.0	Junction; turn right (west).
	57.5	Junction; turn right onto the mine road leading southwest.

58.4 Whiteburn Mines, at a small pond known locally as Mill Pond. The Whiteburn mine main workings extend south for about 500 m from this point. The road log continues west to the western workings.

59.5 Junction; turn left (south).

60.0 Whiteburn mine western workings.

Refs.: 10 p.19Q; 11 p. 134M-135M; 228 p. 208-210; 243 p. 232-238.

Maps (T): 21 A/6 Kejimkujik Lake
(G): 39A Nova Scotia Sheet (GSC, 1:506 880)
94-05 Kejimkujik Lake, Nova Scotia, South Mountain Batholith Project (NSDNR, 1:50 000)
437A Kejimkujik Lake Sheet (east half), Annapolis and Queens counties, Nova Scotia (GSC, 1:63 360)
641 Western portion of Nova Scotia (GSC, 1:506 880)
1225A Annapolis-St. Marys Bay area (east half), Nova Scotia (GSC, 1:126 720)
1690 Whiteburn gold district, Queens County, Nova Scotia (GSC, 1:4800)
Metallogenic map of the province of Nova Scotia, 1983 (NSDNR, 1:500 000)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

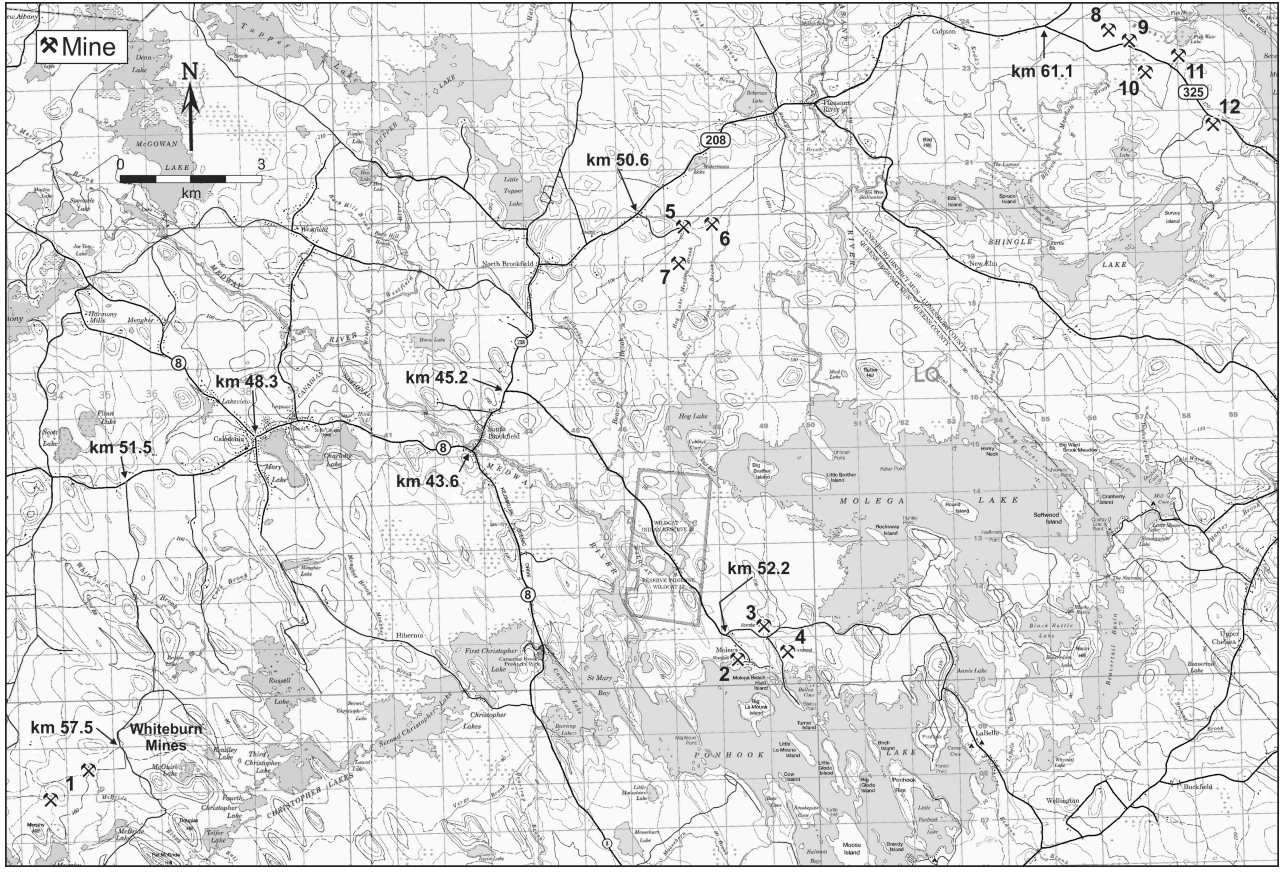
Malaga (Molega) mines

NATIVE GOLD, SCHEELITE, ARSENOPYRITE, PYRITE

In slate and quartzite

Native gold occurs as coarse grains in quartz veins. Light grey to brown scheelite occurs with minor arsenopyrite and pyrite in some veins. Much free gold, including very coarse grains, was encountered during mining operations. Specimens of gold-bearing quartz were displayed in the Geological Survey of Canada economic minerals exhibit at the Paris International Exhibition held in 1900.

Three mines operated in the Malaga (Molega) district: the Malaga mine, the Parker Douglas mine, and the Boston Gold (Ballou) mine. The discovery of gold in the district in 1886 led to a prospecting rush and to the discovery of several rich gold-bearing veins. Mining began immediately on the Wharton and Company and the McGuire and Smith properties. In 1887, a twenty-stamp mill was started and some of the richest near-surface veins were found. Within two years, a mining community of 600 people sprang up and vigorous mining and milling began. The operators at that time were Malaga Mining Company (the major producer), Parker Douglas Company, Minneapolis and Molega Mining Company, Caledonia Mining Company, and Boston Gold Mining Company. Production peaked in 1898, then dropped sharply. Several companies were involved in subsequent operations, including Ponhook Mining Company Limited (1908–1915), Porcupine North Star Gold Mines Limited (1917–1918), Malaga Gold Mines Limited (1922–1927), and Queens Mines Limited (1938–1946). Development consisted of numerous shafts, 24 to 99 m deep, and several stamp mills. The most active mines were the Malaga mine on the north shore of Ponhook Lake; the Parker Douglas mine, 900 m to the northeast; and the Boston Gold (Ballou) mine, 1 km to the east.



1. Whiteburn mines Malaga (Molega) mines: 2. Malaga mine 3. Parker Douglas mine 4. Boston Gold (Ballou) mine Brookfield mines: 5. Brookfield (Libbey) mine 6. Philadelphia mine 7. King (King Fissure) mine Pleasant River Barrens mines: 8. Pine Tree shaft 9. Mill shaft 10. Brignell shaft 11. Wilson shaft 12. Ernst shaft

Map 64. Brookfield

The mines are in Molega, about 35 km northwest of Liverpool. Lat. 44°19′52″N, Long. 64°54′06″W (Malaga mine); Lat. 44°20′17″N, Long. 64°53′46″W (Parker Douglas mine); Lat. 44°20′00″N, Long. 64°53′22″W (Boston Gold (Ballou) mine). *See* Map 64.

Road log from Highway 3 (Lighthouse Route) at **km 263.9** (*see* the Main Road Log on page 312):

km		
	0	Liverpool, junction of highways 3 and 8 (Kejimkujik Scenic Drive); proceed onto Highway 8.
	43.6	South Brookfield, junction of Highway 208; proceed north along Highway 208.
	45.2	Junction; turn right (east) onto the road to Molega.
	52.2	Molega, junction. The road straight ahead leads 800 m southeast to the junction of the mine road leading 200 m west to the Malaga mine. The road log continues along the road leading east from the junction at km 52.2.
	52.8	Junction; the mine road on left leads 300 m northeast to the Parker Douglas mine. The road log continues along the road leading southeast from this junction.
	53.2	Junction; turn right (south).
	53.5	Junction; turn left (east).
	53.7	Boston Gold (Ballou) mine.

Refs.: 10 p. 17Q-18Q; 11 p. 133M-134M; 37 p. 136-137; 39 p. 525-541; 122 p. 157; 219 p. 194; 228 p. 118-122; 397 p. 45.

Maps (T): 21 A/7 Bridgewater
(G): 39A Nova Scotia Sheet (GSC, 1:506 880)
436A Malaga Lake Sheet (west half), Queens and Lunenburg counties, Nova Scotia (GSC, 1:63 360)
641 Western portion of Nova Scotia (GSC, 1:506 880)
995 Malaga gold district, Queens Co., Nova Scotia (GSC, 1:3000)
1225A Annapolis-St. Marys Bay area (east half), Nova Scotia (GSC, 1:126 720)
Metallogenic map of the province of Nova Scotia, 1983 (NSDNR, 1:500 000)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

Brookfield mines

NATIVE GOLD, ARSENOPYRITE

In quartzite

Native gold occurs as free gold in quartz and in association with arsenopyrite and other sulphide minerals. Some gold was found in drift during early exploration. Specimens of gold-bearing quartz were displayed in the Geological Survey of Canada economic minerals exhibit at the Paris International Exhibition held in 1900.

There were three producing mines in the Brookfield district: the Brookfield (Libbey) mine, the Philadelphia (East) mine, and the King (King Fissure) mine. Following the discovery of gold in 1885, W.L. Libbey began development of the most promising vein which proved to be the most productive vein in the district. In 1886 and 1887, Brookfield Mining Company Limited mined the vein, operated a mill, and produced 44 104 g of gold from 1534 t of ore. Mining stopped briefly when ore ran out, but resumed in 1894 when a rich ore shoot was located and the mine became one of the leading gold producers in Nova Scotia. In 1897, the company installed a chlorination plant to treat the concentrates, and in 1904 a cyanide plant to treat concentrates and tailings of former operations. Operations at the Brookfield (Libbey) mine ended in 1906. In 1888, Peter Dunbrack prospected the district and discovered a new vein in the eastern part of the district. Philadelphia Mining Company Limited acquired the new find, built a tramway to the Brookfield mill which it used until it built its own mill, and mined the newly discovered vein and other veins from 1888 to 1892; subsequently, various individuals produced small amounts of gold, and in 1901 to 1906, North Brookfield Mining Company conducted mining operations. In 1905, A.M. King discovered some rich ore in a vein known as the King Streak in the southern part of the district. Mining attention then turned to this area and small amounts of gold were recovered by: A.M. King (1905, 1908), Ophir Gold Mining Company (1908–1909), King Fissure Gold Mines Limited (1922), and United Gold Fields of Nova Scotia Limited (1936). Development in the district consisted of numerous shafts of varying depths, the deepest at 325 m at the Brookfield (Libbey) mine. From 1887 to 1936, production for the district amounted to 1 342 017 g of gold from 93 122 t of ore crushed.

The mines are in Brookfield, about 44 km northwest of Liverpool. Lat. 44°24′53″N, Long. 64°55′02″W (Brookfield (Libbey) mine); Lat. 44°24′56″N, Long. 64°54′33″W (Philadelphia (East) mine); Lat. 44°24′24″N, Long. 64°55′04″W (King (King Fissure) mine). *See* Map 64.

Road log from Highway 3 (Lighthouse Route) at **km 263.9** (*see* the Main Road Log on page 312):

km		
	0	Liverpool, junction of highways 3 and 8 (Kejimkujik Scenic Drive); proceed onto Highway 8.
	43.6	South Brookfield, junction of Highway 208; proceed north along Highway 208.
	50.6	Brookfield, junction; turn right (east) onto the mine road.
	51.9	Brookfield (Libbey) mine. The road log continues straight ahead (east).
	52.1	Junction, on the west side of the railway crossing. The road straight ahead leads east 600 m to the Philadelphia (East) mine; the road on right leads south 1 km to the King (King Fissure) mine.

Refs. 10 p. 18Q-19Q; 11 p. 135M-137M; 37 p. 136-137; 39 p. 342-353; 228 p. 59-61; 397 p. 45.

Maps (T): 21 A/7 Bridgewater
(G): 39A Nova Scotia Sheet (GSC, 1:506 880)
436A Malaga Lake Sheet (west half), Queens and Lunenburg counties; Nova Scotia (GSC, 1:63 360)
641 Western portion of Nova Scotia (GSC, 1:506 880)
1012 Brookfield gold district, Queens Co., Nova Scotia (GSC, 1:3000)
1225A Annapolis-St. Marys Bay area (east half), Nova Scotia (GSC, 1:126 720)
Metallogenic map of the province of Nova Scotia, 1983 (NSDNR, 1:500 000)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)



Plate 44.

Brookfield Mining Company, 1904. (GSC 18677)

Pleasant River Barrens mines

NATIVE GOLD

In quartzite

Native gold occurs in quartz veins and in quartz boulders derived from the veins.

In 1886, Mr. McRay of Cape Breton Island discovered gold in the Pleasant River Barrens district consisting of sparsely scattered veins in an area about 2400 by 2100 m. Small-scale mining began immediately. The veins were rich in outcrop, but the high grade did not persist at depth. In 1889, Messrs. Thompson and Newcombe opened the Mill vein and built a mill nearby. Several veins were opened in the 1890s, including the Pine Tree vein which was traced 122 m on the surface. The richest ore shoot was the Dunbrack vein on the Wilson property just south of Fish Weir Lake; the vein was of phenomenal richness, some of it yielding $3000 per tonne. In 1890 and 1891, Field of Gold Mining Company worked the vein from a 38 m shaft and produced 684.3 g of gold; in 1895, J.W. Ferguson and William McNeil did some additional work. In 1897, F.B. Wade produced 777.6 g of gold from the Mill vein, and Simeon Ernst recovered 311 g from the Ernst vein. In 1898, Brignell, Bent, and Rhodes mined 653.2 g from the Brignell vein, and Mrs. J. Thompson recovered 124.4 g from the Mill vein. In 1903, Simeon Ernst, Aaron Crouse, and Mr. Baker recovered 684 g from the Ernst vein. In 1912, W.H. Prest renewed activity in the Dunbrack vein (Wilson shaft) and obtained 373.2 g of gold. In 1928, Pleasant River Gold Mines Limited recovered gold from the Brignell shaft, the Ernst shaft, and the Wilson shaft. Gold-bearing quartz boulders have been found in the area on both sides of Highway 325 from the Mill shafts to the Ernst shaft, the richest being between the

Wilson and Ernst shafts. The workings consist of: Pine Tree shaft (22.9 m); Mill shafts (22.9 m, 15.2 m, 9.1 m, respectively); Brignell shaft (25.9 m); Wilson shaft (38.1 m) on the Dunbrack vein; and Ernst shaft (19.8 m). There were two stamp mills: the Thompson mill and the Brignell mill. Production from the district amounted to 3608 g of gold.

The Pleasant River Barrens district is about 50 km north of Liverpool and 25 km northwest of Bridgewater. Lat. 44°26′59″N, Long. 64°48′09″W (Pine Tree shaft); Lat. 44°26′59″N, Long. 64°47′55″W (Mill shafts); Lat. 44°26′36″N, Long. 64°47′36″W (Brignell shaft); Lat. 44°26′48″N, Long. 64°47′05″W (Wilson shaft); Lat. 44°26′10″N, Long. 64°46′40″W (Ernst shaft). *See* Map 64.

Road log from Highway 3 (Lighthouse Route) at **km 263.9** (*see* the Main Road Log on page 312):

km		
	0	Liverpool, junction of highways 3 and 8 (Kejimkujik Scenic Drive); proceed onto Highway 8.
	43.6	South Brookfield, junction of Highway 208; proceed north along Highway 208.
	61.1	Junction; turn right (southeast) onto Highway 325.
	62.7	Junction, trail on left leading north 150 m to the Pine Tree shaft.
	63.0	Mill shafts and site of the Thompson mill on the north side of the road.
	63.6	Junction, road on right leading south 470 m to the Brignell shaft and site of the Brignell mill.
	64.1	Junction, road on left leading east 245 m to the Wilson shaft (Dunbrack vein).
	65.3	Junction, road on right; the Ernst shaft is on the south side of Highway 325, 60 m west of this junction.

Alternate route along Highway 325 from Bridgewater:

Road log from Highway 331 (Lighthouse Route) at **km 345.3** (*see* the Main Road Log on page 312) in Bridgewater:

km		
	0	Bridgewater, junction of highways 331 (Lighthouse Route) and 325; proceed west along Highway 325.
	21.5	Highway crosses a brook flowing southwest from Seven Mile Lake. (This lake was formerly referred to as Rhyno Lake.)
	22.9	Junction, road on left; the Ernst shaft is on the south side of Highway 325, 60 m west of this junction.
	24.1	Junction, road on right leading east 245 m to the Wilson shaft (Dunbrack vein).
	24.6	Junction, road on left leading south 470 m to the Brignell shaft and site of the Brignell mill.
	25.2	Mill shafts and site of the Thompson mill on the north side of the road.
	25.5	Junction of a trail on right leading north 150 m to the Pine Tree shaft.
	27.1	Junction of Highway 208.

Refs.: 10 p. 19Q; 126 p. 259-263; 228 p. 157-159; 243 p. 131-133.

Maps (T): 21 A/7 Bridgewater
(G): 39A Nova Scotia Sheet (GSC, 1:506 880)
118A Pleasant River Barrens gold district, Lunenburg County, Nova Scotia (GSC, 1:6000)
436A Malaga Lake Sheet (west half), Queens and Lunenburg counties, Nova Scotia (GSC, 1:63 360)
641 Western portion of Nova Scotia (GSC, 1:506 880)
1225A Annapolis-St. Marys Bay area (east half), Nova Scotia (GSC, 1:126 720)
Metallogenic map of the province of Nova Scotia, 1983 (NSDNR, 1:500 000)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

Mill Village mines

NATIVE GOLD

In quartzite and slate

Native gold occurs with traces of sulphide minerals in mottled white and bluish grey quartz veins. Pockets of coarse native gold, including one that contained 3421 g (110 ounces), were found during mining operations. Native gold also occurs in drift.

The Mill Village mines consist of the Gold Eagle mine and the Thompson mine. In 1891, Solomon Newell (Noel) discovered native gold in drift at the Goddard prospect, 1280 m southwest of the deposit that became the Gold Eagle mine. From 1891 to 1899, George Goddard and W.H. Prest prospected the area and discovered the richest gold drift found in the district; the gold was derived from a 40 cm gold-bearing quartz vein which was unknown at the time but was discovered at a later date beneath 6 m of drift. In 1898 and1899, Jason Munroe and I.F. Jones discovered auriferous quartz veins beneath the drift. Gold Eagle Mining Company began development immediately. The company sank one shaft to 58 m and another to 18 m, installed a ten-stamp mill, and operated the mine until the mill burnt down in 1902. Between 1916 and 1919, D.M. Thompson prospected the area, found visible gold in a quartz vein about 520 m southwest of the Gold Eagle mine, and recovered 27 t of ore containing free gold; the new mine became known as the Thompson mine. In 1929 and 1930, Oak Hill Mining Company Limited sank shafts 67 m apart to 8.8 m and 8.2 m, respectively in the Thompson deposit, and recovered heavily impregnated gold ore from the surface of the vein. The ore was crushed in a five stamp mill on the site. In the 1980s, several companies investigated the mine, including Card Lake Copper Mines Limited, Talisman Mines Limited, and Seabright Resources Inc. Production between 1901 and 1951 amounted to 28 297 g of gold from 2071 t of ore crushed.

The Mill Village mines are about 14 km north of Liverpool and 4 km northwest of Mill Village. Lat. 44°09′39″N, Long. 64°41′52″W (Gold Eagle mine); Lat. 44°09′29″N, Long. 64°42′14″W (Thompson mine). *See* Map 65.

Road log from Highway 3 (Lighthouse Route) at **km 289.9** (*see* the Main Road Log on page 312):

km		
	0	Mill Village, junction of Highway 3 and the road to Charleston; proceed north to Charleston.

2.5 Charleston, junction; turn left onto a road leading west. A short distance from this junction, the road becomes a trail.

5.4 Gold Eagle mine. To reach the Thompson mine, continue southwest along the trail.

6.0 Thompson mine.

Refs.: 123 p. 377-378; 228 p. 123-124; 243 p. 119-123; 247 p. 117.

Maps (T): 21 A/2 Liverpool
(G): 39A Nova Scotia Sheet (GSC, 1:506 880)
439A Liverpool Sheet (east half), Queens and Lunenburg counties, Nova Scotia (GSC, 1:63 360)
641 Western portion of Nova Scotia (GSC, 1:506 880)
1225A Annapolis-St. Marys Bay area (east half), Nova Scotia (GSC, 1:126 720)
Metallogenic map of the province of Nova Scotia, 1983 (NSDNR, 1:500 000)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

Voglers Cove (East Eagle) mine

NATIVE GOLD

In slate and quartzite

Visible gold occurs in quartz veins. Abundant free gold was found during early mining operations.

Augustas Reinhart discovered the gold-bearing vein in the 1880s. Some gold was recovered in the early 1890s when a five-stamp mill was in operation. In 1899, J. Munro worked a narrow vein, and Messrs. Brown, Crowe, and Hutt sank a shaft to 7.6 m on a very rich vein. In 1901, the mine, then known as the East Eagle mine, was developed by two shafts. In 1904, Vogler's Cove Mining Company deepened the shafts to 38 m and 21 m respectively, and mined 181.4 t of ore which yielded 1365.4 g of gold.

The Voglers Cove (East Eagle) mine is about 3 km northeast of Voglers Cove village. Lat. 44°10′58″N, Long. 64°31′32″W. *See* Map 65.

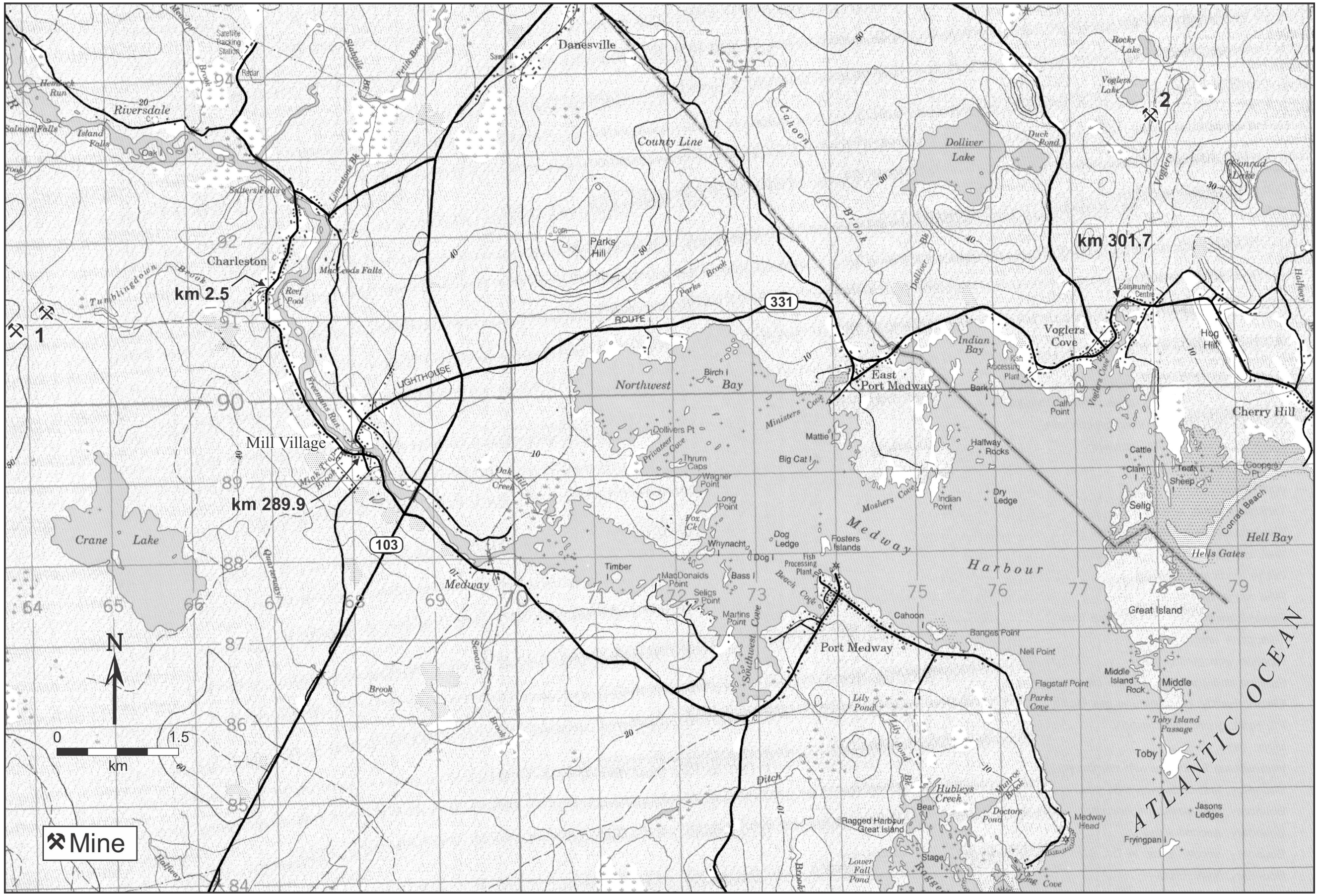
Road log from Highway 331 (Lighthouse Route) at **km 301.7** (*see* the Main Road Log on page 312):

km 0 Voglers Cove, junction of Highway 331 and the road to Voglers Lake; proceed north along the road to Voglers Lake.

2.5 Voglers Cove (East Eagle) mine.

Refs.: 117 p. 405A; 228 p. 199-200; 243 p. 223-224.

Maps (T): 21 A/2 Liverpool
(G): 39A Nova Scotia Sheet (GSC, 1:506 880)
439A Liverpool Sheet (east half), Queens and Lunenburg counties, Nova Scotia (GSC, 1:63 360)
641 Western portion of Nova Scotia (GSC, 1:506 880)
1225A Annapolis-St. Marys Bay area (east half), Nova Scotia (GSC, 1:126 720)



1. Mill Village mines 2. Voglers Cove (East Eagle) mine

Map 65. Mill Village

1960 Vogler Cove Sheet No. 90, Lunenburg County, Nova Scotia (GSC, 1:63 360)
Metallogenic map of the province of Nova Scotia, 1983 (NSDNR, 1:500 000)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

Leipsigate mines

NATIVE GOLD, ARSENOPYRITE

In quartzite and slate

Native gold occurs with traces of arsenopyrite in quartz veins, in float, and as fine grains in sand and in drift. Specimens of gold-bearing quartz were displayed in the Geological Survey of Canada economic minerals exhibit at the Paris International Exhibition held in 1900.

The Leipsigate gold district occupies an area 5 km long and 2.4 km wide at the southern end of Milipsigate (Leipsigate) Lake; auriferous veins and leads containing very rich pockets and pay streaks, and rich drift were found at various locations in the district. In 1883, Mr. Owen discovered a gold-bearing vein from which he recovered by hand a considerable amount of gold. In the following year, Messrs. Hall and Owen extracted 12 752 g of gold from 118 t of ore crushed in their ten-stamp mill on the north side of the lake. Rich gold float was extracted by cradle washings from sand drift at Ernst's gold washing located immediately south of the Ernst Washing lead, about 335 m west of the northwestern shore of the lake. In about 1899, Black Hawk Mining Company sank an 81 m shaft on the Gow lead and operated a ten-stamp mill on the southwestern tip of the lake. Most of the Leipsigate district production, however, came from the south side of the lake, notably from the Leipsigate vein which extended over 2745 m. Original development of the vein was done between 1886 and 1908 in three sections: western section (shafts to 29 m and 7.6 m, respectively), middle section (shaft to 55 m), and eastern section (shafts to 182 m and 15 m, respectively); the operators were Duluth and Nova Scotia Mining Company (1886), Millipsigate Gold Mining Company (1888–1892), Cashon and Hines (1896–1900), and Owen Gold Mining Company (1898–1900). From 1900 to 1908, Micmac Gold Mining Company took over operations and mined the eastern section. In 1946 to 1948, Queens Mines Limited sank a new 91 m shaft in the middle section and installed a mill. In 1985 to 1987, Coxheath Gold Holdings Limited examined the old workings and did some underground sampling and drilling. Production for the district from 1897 to 1908 amounted to 402 348 g of gold and 34 618 g of silver from 34 389 t of crushed ore.

The Leipsigate mines are about 9 km southwest of Bridgewater. Lat. 44°19′35″N, Long. 64°35′25″W (eastern section); Lat. 44°19′04″N, Long. 64°36′24″W (middle section); Lat. 44°18′53″N, Long. 64°36′46″W (western section); Lat. 44°19′17″N, Long. 64°37′19″W (Black Hawk main shaft); Lat. 44°20′29″N, Long. 64°36′25″W (Ernst's Washing). *See* Map 66.

Road log from Highway 331 (Lighthouse Route) at **km 344.6** (*see* the Main Road Log on page 312):

km		
	0	Bridgewater, junction of highways 331 and 3 (Dufferin Street); proceed southwest along Highway 3 (Dufferin Street).
	1.1	Junction; turn left (south) continuing along Highway 3.
	2.1	Junction; continue straight ahead along Highway 3.
	7.7	Junction; turn right (west) onto the road to Milipsigate Lake.



Plate 45.

Micmac mine, 1904. (GSC 7116)

10.2 Leipsigate mines eastern section main shaft is on the north side of the road just north of the power line; additional shafts are about 300 m to the northeast. The road log continues west.

10.9 Junction; turn right (west).

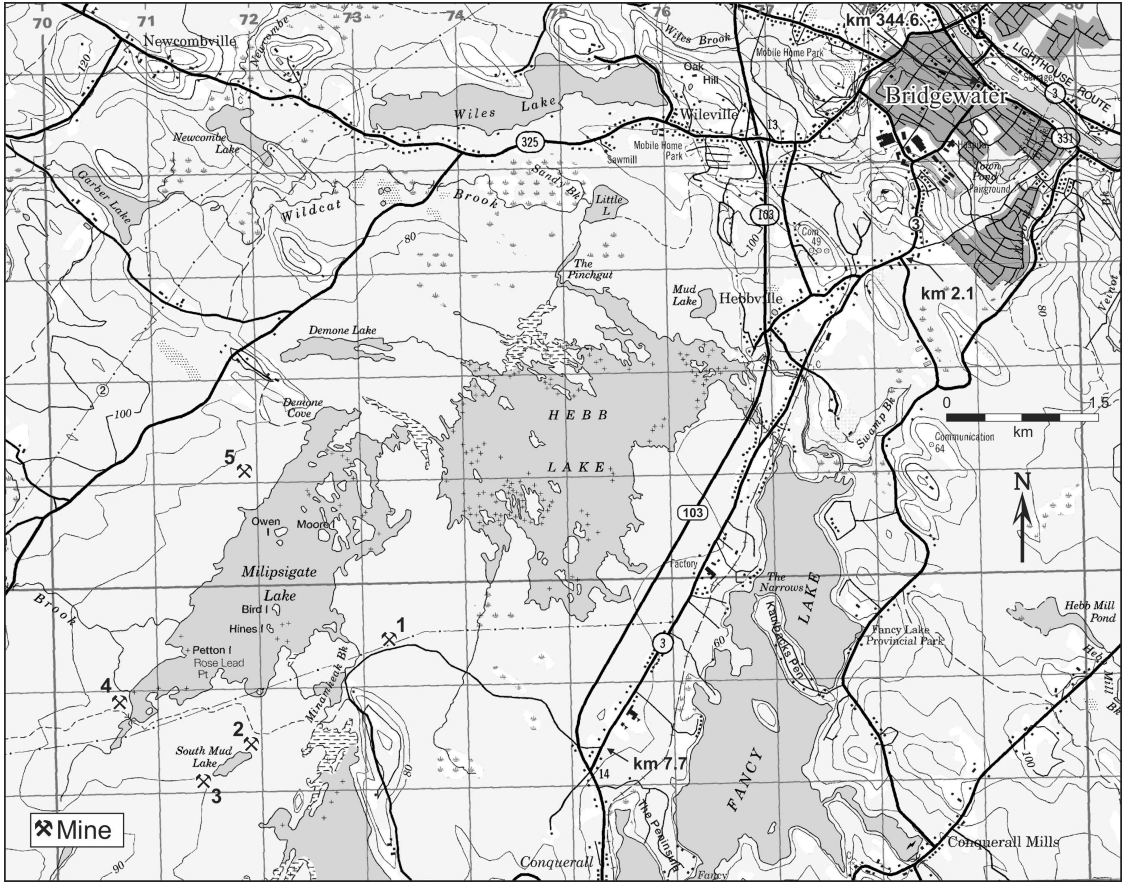
11.9 Junction; the Leipsigate mines middle section main shaft is about 130 m south of this junction. The road log continues straight ahead (north).

12.0 Junction of a trail leading west 820 m to the Leipsigate mines western section shafts. The road log continues straight ahead (north) to the workings at the southwestern end of Milipsigate Lake.

13.8 Leipsigate mines Black Hawk shaft.

Refs.: 37 p. 136-137; 39 p. 511-524; 71 p. 57; 119 p. 321A-329A; 228 p. 112-118; 397 p. 44; 400 p. 259; 412 p. 140.

Maps (T): 21 A/7 Bridgewater
(G): 39A Nova Scotia Sheet (GSC, 1:506 880)
435A Malaga Lake Sheet (east half), Queens and Lunenburg counties, Nova Scotia (GSC, 1:63 360)
641 Western portion of Nova Scotia (GSC, 1:506 880)



1. Eastern section 2. Middle section 3. Western section 4. Black Hawk main shaft
5. Ernst's Washing

Map 66. Leipsigate mines

937 Leipsigate gold district, Lunenburg Co., Nova Scotia (Plan and section) (GSC, 1:6000)
1225A Annapolis-St. Marys Bay area (east half), Nova Scotia (GSC, 1:126 720)
Metallogenic map of the province of Nova Scotia, 1983 (NSDNR, 1:500 000)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

The Ovens mine

NATIVE GOLD, ARSENOPYRITE, PYRITE, SIDERITE, QUARTZ CRYSTALS, TOURMALINE, SPHALERITE, CLINOPYROXENE, MAGNETITE, GOETHITE

In slate

Native gold, arsenopyrite (prisms up to 25 mm long), pyrite, and siderite occur in quartz veins. Transparent quartz crystals about 2 cm long occur in cavities in massive quartz. These minerals and yellow tourmaline, yellow sphalerite, green clinopyroxene, magnetite, and goethite occur as grains and small crystals in beach sands.

James Dowling discovered the gold deposit when he found a 2 cm wide gold-bearing quartz vein on June 13, 1861 on a headland known as The Ovens Bluff, immediately north of Cunard Cove. A month later, John Campbell discovered gold in the beach sand along the shore of Cunard Cove. In 1861 and 1862, about 62 206 g of gold were obtained from alluvial washings; this represented the bulk of gold production from the district. A small amount of gold was obtained from auriferous quartz veins crushed in a Chilean mill installed at Cunard Cove. The mill consisted of two sets of wheels; each set consisted of two white granite wheels 120 cm in diameter and 30 cm thick revolving on a base of white granite 173 cm in diameter and 33 cm thick. The alluvial gold originated from the auriferous quartz veins worn down by wave action which released gold particles subsequently deposited in the beach sand and gravel and in crevices in the steeply dipping slate beds. The richest placers were on the north side of Cunard Cove, and along the north shore of Rose Bay, 800 to 1600 m west of Ovens Point. In 1866 to 1869 and 1896 and 1897, various individual miners and companies worked the veins by several open cuts and shallow shafts (the deepest about 20 m), and drove an adit 43 m from sea-level into the headland. These operations recovered about 2582 g of gold from 214 t of ore. The old workings have been eroded but numerous quartz veins are exposed along the nearly vertical slate beds forming the shoreline cliffs characterized by deep indentations or caves formed by wave-action erosion; these caves are known locally as ovens. The area is now the site of The Ovens Natural Park.

The Ovens mine is on the shore of Cunard Cove, Lunenburg Bay, about 8 km southeast of Lunenburg. Lat. 44°19′15″N, Long 64°15′24″W (mine); Lat. 44°19′11″N, Long. 64°15′25″W (Cunard placers); Lat. 44°18′51″N, Long. 64°16′19″W to Lat. 44°19′00″N, Long. 64°15′46″W (Rose Bay placers). *See* Map 67.

Road log from Highway 332 (Lighthouse Route) at **km 370.5** (*see* the Main Road Log on page 312):

km		
	0	Junction, Highway 332 and the road to The Ovens; proceed east toward The Ovens.
	2.5	Junction; turn right (east) onto the Cunard Cove road.



Plate 46.

The Ovens gold washing, 1879. (National Archives of Canada PA 51114)

3.3 Junction, opposite the Rose Bay shore on right. Alluvial gold was found in placers along the Rose Bay shore from opposite this junction westward for about 1000 m. The road log continues east along the Cunard Cove road.

4.1 The Ovens Natural Park, entrance gate. Cunard Cove, the site of the original gold mine, is on the shore just east of the parking lot. Alluvial gold was found along the shore at Cunard Cove extending north about 170 m around The Ovens Bluff. There are old workings on the north side of the Cunard Cove road; these workings extend west from The Ovens Bluff for about 800 m.

Refs.: 150 p.18-19; 194 p. 42; 228 p. 156-157; 243 p. 125-129; 258 p. 49-50; 260 p. 340; 357 p. 103-107.

Maps (T): 21 A/8 Lunenburg
(G): 34-005 (Open File Map) Ovens gold district, Lunenburg Co., N.S. (NSDNR, 1:3000)
39A Nova Scotia Sheet (GSC, 1:506 880)
1225A Annapolis-St. Marys Bay area (east half), Nova Scotia (GSC, 1:126 720)
2154 Bridgewater Sheet No. 89, Lunenburg County, Nova Scotia (GSC, 1:63 360)
Metallogenic map of the province of Nova Scotia, 1983 (NSDNR, 1:500 000)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)



1. The Ovens mine 2. Indian Path mine 3. Rose Bay beach placers

Map 67. Lunenburg

Indian Path mine

NATIVE GOLD, SPHALERITE, GALENA, ARSENOPYRITE, PYRITE, SCHEELITE, QUARTZ CRYSTALS

In slate

Native gold occurs with sphalerite, galena, arsenopyrite, and pyrite in quartz veins. Light yellow scheelite occurs as clots, irregular patches, and lumps several centimetres across in the veins. Small white quartz crystals occur in cavities in massive quartz.

The mine is a former producer of gold and tungsten. The original discovery of gold was made in 1862. From 1868 to 1870, Messrs. Waddilow discovered several gold-bearing veins, sank a 7.6 m shaft, made several surface openings, and recovered gold using a water-powered crusher. A small amount of gold was obtained in 1876 and in 1896. Total production from 1868 to 1896 amounted to about 1555 g of gold from 300 t of crushed quartz. In 1926, scheelite-bearing boulders and float were discovered in the district, and trenching located a scheelite-rich vein. Exploration between 1927 and 1931 consisted of drilling, trenching, and sinking four shafts, the deepest being 70 m. In 1939 and 1940, Siscoe Gold Mines Limited did some drilling and removed bulk tungsten ore samples for testing at the Nova Scotia Technical College in Halifax. In 1941, Guysborough Gold Mines Limited explored the underground workings. In 1942, Tungsten Mines Limited sank a 76 m shaft, installed a twenty-stamp mill, and shipped ore concentrates to the Mines Branch in Ottawa for testing.

The Indian Path mine is about 7 km southwest of Lunenburg. Lat. 44°19′24″N, Long. 64°20′46″W (tungsten workings); Lat. 44°19′18″N, Long. 64°21′08″W (gold workings). *See* Map 67.

Road log from Highway 332 (Lighthouse Route) at **km 374.2** (*see* the Main Road Log on page 312):

km		
	0	Junction of Highway 332 and the road to Indian Path; proceed south toward Indian Path.
	0.7	Junction; turn right (west).



Plate 47.

Indian Path mine main shaft, 1931. (National Archives of Canada PA 14526)

1.2 Indian Path mine tungsten workings, about 150 m north of the road. To reach the gold workings, continue straight ahead along the road leading southwest.

1.7 Indian Path mine gold workings.

Refs.: 1 p. 69-73; 41 p. 143-154; 61 p. 130-137; 160 p. 41D; 219 p. 195-196; 228 p. 94-95; 243 p. 129-130; 249 p.262-263; 257 p. 40-42; 275 p. 69, 71, 73.

Maps (T): 21 A/8 Lunenburg
(G): 39A Nova Scotia Sheet (GSC, 1:506 880)
1225A Annapolis-St. Marys Bay area (east half) Nova Scotia (GSC, 1:126 720)
2154 Bridgewater Sheet No. 89, Lunenburg County, Nova Scotia (GSC, 1:63 360)
Metallogenic map of the province of Nova Scotia, 1983 (NSDNR, 1:500 000)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

Blockhouse mine

NATIVE GOLD, ARSENOPYRITE, PYRITE, CHALCOPYRITE, QUARTZ CRYSTALS

In slate

Native gold occurs with arsenopyrite, pyrite, and chalcopyrite in quartz veins. Native gold also occurs as fine grains in drift. Tiny quartz crystals occur in cavities in quartz.

The gold discovery in the district was made in 1879 by a Mr. Ernst who found gold in the drift. In 1885, the discovery of a gold-bearing boulder generated a prospecting rush which led to the discovery of occurrences of rich drift in the area. Ten years later, trenching located gold-bearing quartz veins. In 1896, W.H. Prest prospected along the line of drift boulders and discovered the gold-bearing vein that became the Blockhouse mine. Blockhouse Mining Company was formed to develop the property with W.H. Prest as manager; the company undertook underground exploration using two shafts, 43 m and 22 m deep, respectively. In 1899, Miner T. Foster deepened the shafts, installed a ten-stamp mill, and produced 30 481 g of gold from 511.5 t of crushed ore. In 1901, Blockhouse Mining Company conducted operations from shafts 62 m and 44 m deep, respectively and produced 25 131 g of gold from 421.8 t of crushed ore. In 1935 to 1938, Nugold Mining Corporation Limited renewed mining, operated a 22.7 t mill, and made seven bullion shipments. Development at that time consisted of three shafts, 96 m, 33.5 m, and 12 m deep, respectively.

The Blockhouse mine is about 3 km southwest of Mahone Bay. Lat. 44°26′05″N, Long. 64°25′04″W. *See* Map 68.

Road log from Highway 3 (Lighthouse Route) at **km 389.8** (*see* the Main Road Log on page 312):

km 0 Mahone Bay, junction of Highway 3 (Lighthouse Route) and the road to Blockhouse; proceed west toward Blockhouse.

4.0 Junction; turn left (south).

4.7 Junction; turn left onto the mine road.

4.9 Blockhouse mine.

Refs.: 228 p. 58; 243 p. 16-19; 398 p. 206.

Maps (T): 21 A/8 Lunenburg
(G): 39A Nova Scotia Sheet (GSC, 1:506 880)
1225A Annapolis-St. Marys Bay area (east half), Nova Scotia (GSC, 1:126 720)
2153 Mahone Bay Sheet No. 88, Lunenburg County, Nova Scotia (GSC, 1:63 360)
Metallogenic map of the province of Nova Scotia, 1983 (NSDNR, 1:500 000)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

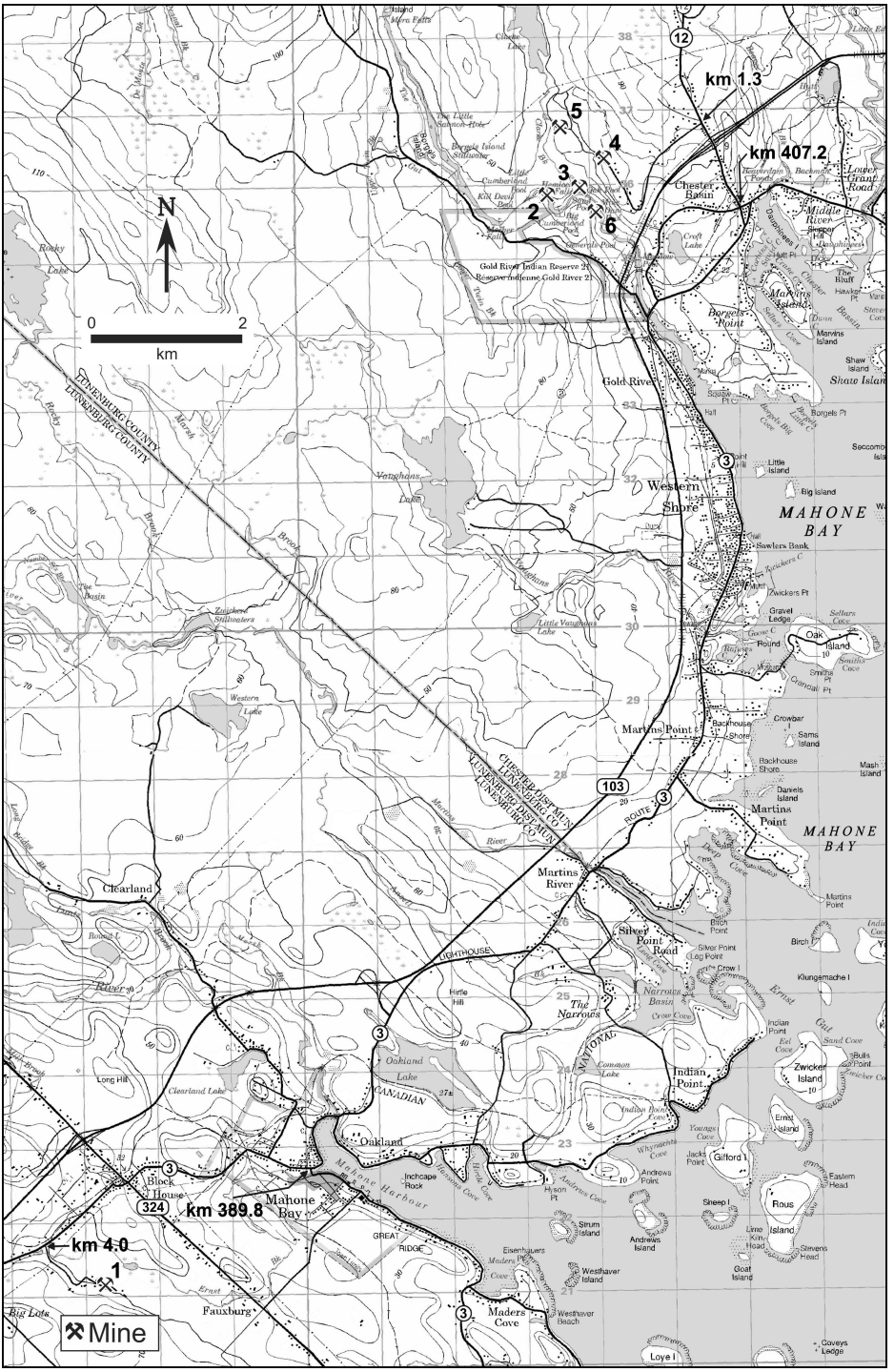
Gold River mines

NATIVE GOLD, ARSENOPYRITE, PYRITE, CHALCOPYRITE

In slate and quartzite

Native gold occurs with arsenopyrite and minor pyrite and chalcopyrite in quartz veins. Native gold also occurs as fine grains in drift. During mining operations, rich auriferous drift and veins containing rich streaks of native gold were found.

The Gold River gold district consists of several mines in an area 2130 m long and 1220 m wide straddling the Gold River. Most of the mining activity was on the east side of the river. In 1859, Daniel Dimock made the original discovery of gold in the district; the discovery site is on the east side of Gold River about 480 m west of the mouth of Clarke Brook (formerly referred to as Eastern Branch of Gold River). Mining in the district was done intermittently by several operators. Early mining operations were conducted in 1867 and 1868 by Colonel Briscoe. In 1885, Chas. Mills discovered auriferous veins just east of the confluence of Clarke Brook and Gold River; this discovery became the Jumbo mine consisting of two shafts to 30 m and 21 m, respectively, and a twenty-five-stamp mill. In 1886 and 1887, Gold River Mining Company discovered several new leads and crushed some ore. In 1889, the Neptune Gold Mining Association undertook development of rich auriferous outcrops about 450 m northeast of the Jumbo mine. The company produced some 5320 g of gold from 539 t of crushed ore between 1889 and 1894, when Lincoln Gold Mining Company took over operations and the mine became known as the Lincoln mine. In 1895 to 1899, T.N. Baker sank several shafts, the deepest to 30 m, on the rich North Star lead and milled the ore at his two-stamp mill; this mine, known as the North Star mine, is about 750 m northwest of the Lincoln mine. In 1907 to 1910, Chester Basin Gold Syndicate sank two shafts to 34 m and 20 m, respectively on leads on the west side of the Gold River (across the river from the old Croft mine) about 350 m southeast of the Jumbo mine; this became the Chester Basin mine. The company operated a five-stamp mill and built a power dam across the Gold River. Uniacke Mines and Power Company Limited operated the old Lincoln mine (1908–1910) and the Chester Basin Gold Syndicate mine (1911–1912). In 1915, J.A. Wheeler recovered some gold from the North Star mine. Production in the district between 1895 and 1915 amounted to about 93 500 g of gold from 2695 t of ore crushed. The final period of activity was from 1931 to 1937 when Lacey Gold Mining Company Limited carried out mining operations at the old Lincoln mine; at that time the main shaft was deepened to 122 m and the mine was known as the Lacey mine. In 1937 to 1940, the Nova Scotia government acquired the mine and conducted the Mine Apprentice Project which trained students in mining and milling methods. In 1987, Coxheath Gold Holdings Limited did some drilling and geophysical surveys on the



1. Blockhouse mine Gold River mines: 2. Dimock discovery
3. Jumbo mine 4. Lincoln (Lacey) mine 5. North Star mine
6. Chester Basin mine

Map 68. Mahone Bay

property. Development in the district consists of numerous shafts, the deepest being 122 m. Total production for the district from 1889 to 1940 amounted to 241 092 kg of gold from 26 217 t of ore crushed.

The Gold River mines are about 2 km northwest of Chester Basin. Lat. 44°34′05″N, Long. 64°20′35″W (Dimock discovery); Lat. 44°34′07″N, Long. 64°20′12″W (Jumbo mine); Lat. 44°34′21″N, Long. 64°20′00″W (Lincoln mine); Lat. 44°34′34″N, Long. 64°20′28″W (North Star mine); Lat. 44°33′58″N, Long. 64°20′03″W (Chester Basin mine). *See* Map 68.

Road log from Highway 3 (Lighthouse Route) at **km 407.2** (*see* the Main Road Log on page 312):

km		
	0	Chester Basin, junction of highways 3 (Lighthouse Route) and 12; proceed north along Highway 12.
	1.3	Junction; turn left (west).
	2.8	Sharp turn to the right (north).
	3.7	Turn-off (right) to the Lincoln (Lacey) mine. The Jumbo mine is on the east side of the mouth of Clarke Brook, about 450 m southwest of the Lincoln (Lacey) mine. The Dimock discovery site is on the east side of Gold River at a point 480 m west of the mouth of Clarke Brook. The Chester Basin mine is on the west side of Gold River 350 m southeast of the Jumbo mine. The road log continues straight ahead (northwest).
	4.45	North Star mine.

Refs.: 21 p. 33; 116 p. 217A-221A; 216 p. 51-67; 228 p. 87-91; 243 p. 46-59; 412 p. 140.

Maps (T): 21 A/9 Chester
(G): 39A Nova Scotia Sheet (GSC, 1:506 880)
90-9 Chester (N.T.S. sheet 21 A/09), Nova Scotia (NSDNR, 1:50 000)
94-01 South Mountain Batholith, Western Nova Scotia (NSDNR, 1:250 000)
844 Gold River gold district, Lunenburg County, Nova Scotia (GSC, 1:3000)
1225A Annapolis-St. Marys Bay area (east half), Nova Scotia (GSC, 1:126 720)
1981 Chester Basin Sheet No. 87, Lunenburg County, Nova Scotia (GSC, 1:63 360)
Metallogenic map of the province of Nova Scotia, 1983 (NSDNR, 1:500 000)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

East River Point quarries

CALCITE, PYRITE, FOSSILS

In limestone

Crystals of calcite and pyrite and shell fossils of Mississippian age occur in dark grey limestone.

The limestone forms an outlier extending 2 km northeastward from the tip of East River Point (formerly Indian Point). In the 1890s, Captain Edward D. Lordly operated a quarry for the production of lime at East River Point; the lime was used for the construction of the barracks and other buildings in Halifax. Sometime later, two other quarries provided limestone

for building stone. Mersey Paper Company Limited operated the Lordly quarry from 1930 to 1949; operations moved in 1950 to a new quarry 0.5 km to the northeast. The company shipped the limestone to its pulp and paper mill in Liverpool. Operations ended in 1964.

The quarries are at East River Point, about 1.5 km south of East River village. Lat. 44°34′26″N, Long. 64°09′48″W (Lordly quarry); Lat. 44°34′40″N, Long. 64°09′13″W (new quarry). *See* Map 69.

Access to the old Lordly quarry is by a 0.2 km road leading south from Highway 329 (Lighthouse Route) at **km 424.4**; the quarry is on the west side of this road at the junction of the shoreline road. Access to the new quarry is by a 0.5 km road leading northeast from Highway 329 (Lighthouse Route) at **km 424.6** (*see* the Main Road Log on page 312).

Refs.: 70 p. 140-143; 120 p. 149; 161 p. 91-92; 190 p. 19R; 343 p. 58.

Maps (T): 21 A/9 Chester
(G): 39A Nova Scotia Sheet (GSC, 1:506 880)
85-1 Industrial mineral commodities map of the Province of Nova Scotia (NSDNR, 1:500 000)
90-9 Chester (N.T.S. sheet 21 A/09), Nova Scotia (NSDNR, 1:50 000)
1036 St. Margaret Bay Sheet No. 71, Halifax and Lunenburg Counties, Nova Scotia (GSC, 1:63 360)
1225A Annapolis-St. Marys Bay area (east half), Nova Scotia (GSC, 1:126 720)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

Upper Blandford occurrences

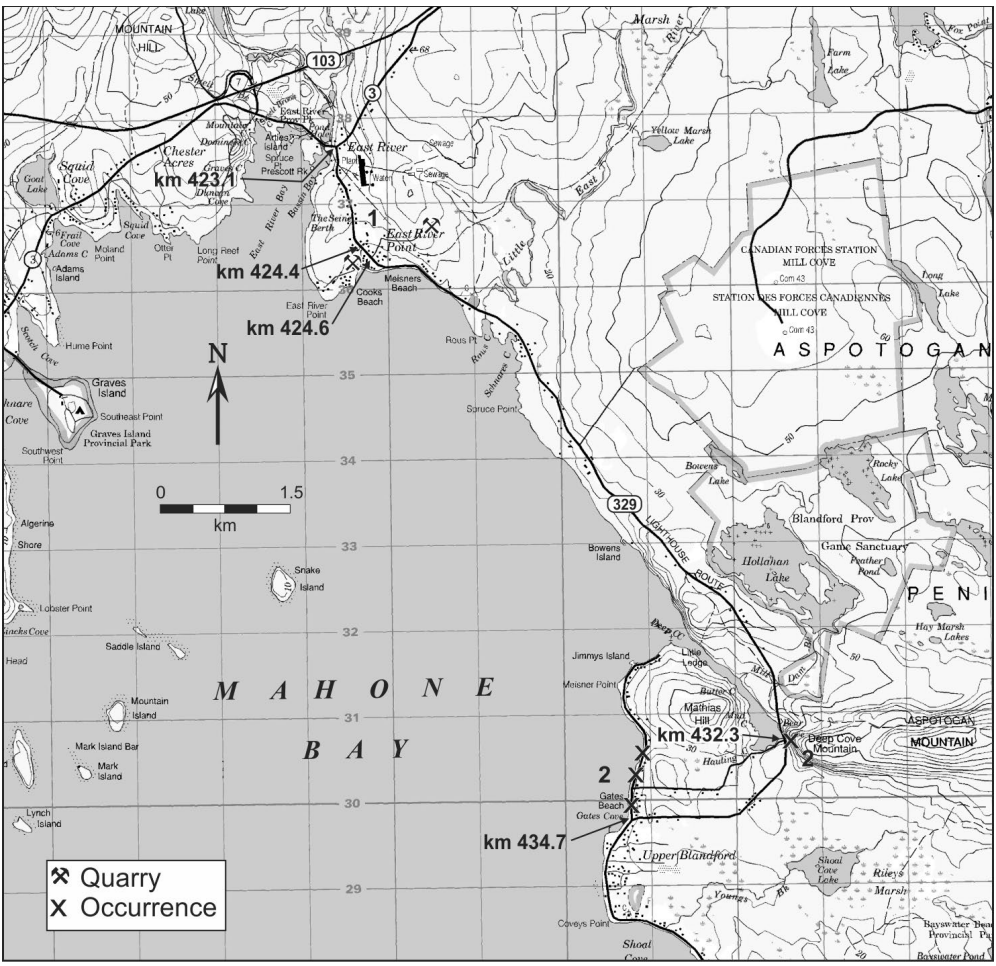
ANDALUSITE, CORDIERITE, SILLIMANITE, PYRITE, JAROSITE; TOURMALINE, SULPHUR

In slate; in granite pegmatite

Pink andalusite and dark blue cordierite occur as small crystals and porphyroblasts in slate; the chiastolite variety of andalusite occurs as small porphyroblasts. The slate also contains colourless fibrous aggregates of sillimanite, small pyrite crystals, and yellow powdery coatings of jarosite. Small black tourmaline crystals and zoned andalusite crystals occur in granite pegmatite which cuts the slate. The granitic rock contains pyrite crystals and crevices containing greyish-yellow powdery sulphur.

The occurrences are on the Aspotogan Peninsula about 9 km southeast of East River. Lat. 44°31′26″N, Long. 64°06′02″W (roadcuts); Lat. 44°30′56″N Long. 64°07′25″W (Gates Cove shore) to Lat. 44°31′27″N, Long. 64°07′17″W (shore 1 km north of Gates Cove). *See* Map 69.

The Upper Blandford occurrences are exposed in roadcuts along Highway 329 (Lighthouse Route) and in rock exposures along the shore of Mahone Bay near Gates Cove. The roadcuts are at **km 432.3** (*see* the Main Road Log on page 312). These roadcuts expose slate (altered to hornfels) containing andalusite, cordierite and sillimanite, and granite pegmatite containing andalusite, tourmaline, and pyrite. The andalusite-cordierite slate exposures occur along the shore of Mahone Bay extending north from Gates Cove over a distance of about 1 km; access to these shoreline occurrences is by a road leading north from Highway 329 (Lighthouse Route) at **km 434.7** (*see* the Main Road Log on page 312).



1. East River Point quarries 2. Upper Blandford occurrences

Map 69. Aspotogan

Refs.: 67 p. 40-41; 296 p. 21-22; 343 p. 42, 44.

Maps (T): 21 A/9 Chester

(G): 39A Nova Scotia Sheet (GSC, 1:506 880)

85-1 Industrial mineral commodities map of the Province of Nova Scotia (NSDNR, 1:500 000)

90-9 Chester (N.T.S. sheet 21 A/09), Nova Scotia (NSDNR, 1:50 000)

1043 Aspotogan Sheet No. 70, Halifax and Lunenburg Counties, Nova Scotia (GSC, 1:63 360)

1225A Annapolis-St. Marys Bay area (east half), Nova Scotia (GSC, 1:126 720)

Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

Upper Tantallon occurrence

FLUORITE

In biotite granodiorite

White to violet, granular, massive fluorite occurs in fractures and in cavities in a shear zone in the host rock.

The occurrence is exposed in a roadcut on Highway 103 about 2 km northeast of Upper Tantallon. Lat. 44°42′05″N, Long. 63°52′12″W.

Road log from Highway 3 (Lighthouse Route) at **km 484.6** (*see* the Main Road Log on page 312):

km		
	0	Upper Tantallon, junction of highways 3 (Lighthouse Route) and 333; proceed east along Highway 3.
	0.3	Junction, Highway 213; proceed north along Highway 213.
	2.6	Junction, Highway 103; proceed west along Highway 103.
	3.5	Roadcut (on right) at the top of a hill. This is the Upper Tantallon occurrence.

Ref.: 132 p. 235-236.

Maps (T): 11 D/12 Halifax
(G): 39A Nova Scotia Sheet (GSC, 1:506 880)
85-1 Industrial mineral commodities map of the Province of Nova Scotia (NSDNR, 1:500 000)
87-6 Halifax and Sambro (N.T.S. sheets 11 D/12 and 11 D/05)), Nova Scotia (NSDNR, 1:50 000)
1036 St. Margaret Bay Sheet No. 71, Halifax and Lunenburg Counties, Nova Scotia (GSC, 1:63 360)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

Peggys Cove occurrence

TOURMALINE

In aplite pegmatite

Tourmaline occurs as black prismatic crystals commonly forming rosettes and crystal aggregates forming pods and fracture fillings up to 30 cm long in fine- to medium-grained aplite grading to aplite pegmatite. The aplite pegmatite host rock occurs as sheets composed mainly of K-feldspar, quartz, and muscovite in light grey biotite granite country rock.

The occurrence outcrops along the Atlantic shore at Peggys Cove. Lat. 44°29′29″N, Long. 63°55′13″W (Peggys Point).

Access to the shore is by a road leading south 1 km from Highway 333 (Lighthouse Route) at **km 510.2** (*see* the Main Road Log on page 312).

Refs.: 210 p. 1249-1281; 357 p. 112-114.

Maps (T): 11 D/5 Sambro

(G): 39A Nova Scotia Sheet (GSC, 1:506 880)
53A Southeast Nova Scotia (GSC, 1:250 000)
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87-6 Halifax and Sambro (N.T.S. sheets 11 D/12 and 11 D/05), Nova Scotia (NSDNR, 1:50 000)
1043 Aspotogan Sheet No. 70, Halifax and Lunenburg Counties, Nova Scotia (GSC, 1:63 360)
Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

Governor Lake mine

ORTHOCLASE

In granite pegmatite

Orthoclase feldspar occurs with quartz and mica.

In 1921, Norman McMillan excavated a cut into the side of a hill and recovered 181.5 t of orthoclase feldspar. He shipped 14.5 t to the Brandram-Henderson Company paint works for testing. The open cut is 4.5 m wide and 7.6 m high.

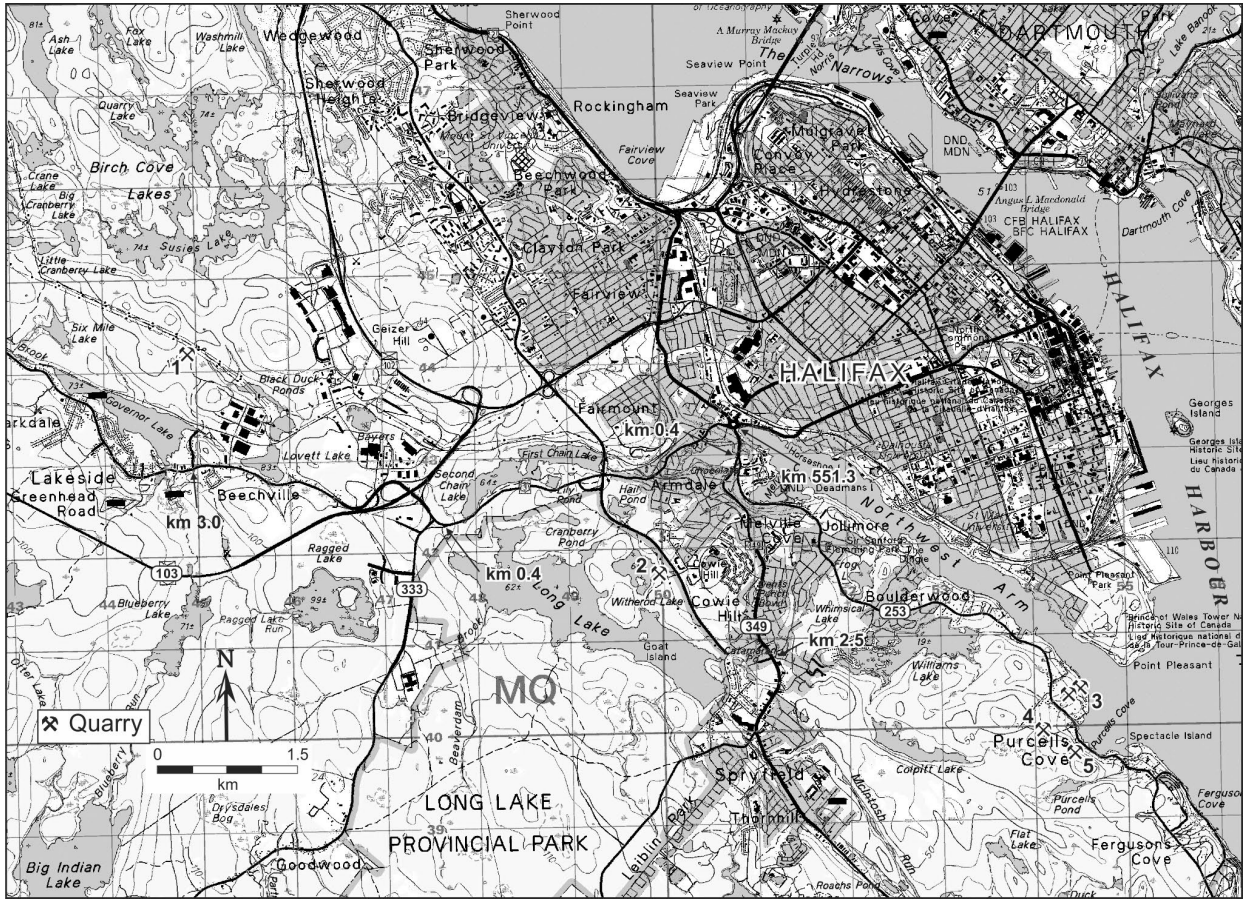
The mine is about 6 km west of Halifax. Lat. 44°38′57″N, Long. 63°41′43″W. *See* Map 70.

Road log from Highway 3 (Lighthouse Route) at **km 547.8** (*see* the Main Road Log on page 312):

km		
	0	Junction of highways 3 (Lighthouse Route) and 333; proceed west along Highway 3 toward Beechville.
	3.0	Junction; turn right (north).
	3.5	Railway. Walk along a path leading north up a hill for about 800 m to the Governor Lake mine on the side of a hill.

Refs.: 252 p. 166-168; 332 p. 81.

Maps (T): 11 D/12 Halifax
(G): 39A Nova Scotia Sheet (GSC, 1:506 880)
53A Southeast Nova Scotia (GSC, 1:250 000)
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1019 City of Halifax Sheet No. 68, Halifax County, Nova Scotia (GSC, 1:63 360)
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1. Governor Lake mine 2. John Kline quarry 3. King quarries 4. Queen quarry
5. Coughlan quarry

Map 70. Halifax

John Kline quarry

GRANITE

Grey, medium-grained, porphyritic granite is composed of white plagioclase, colourless to smoky quartz, and brown to black mica. It was used for monument and building stone.

John Kline of Kline Granite Works operated the quarry and a small plant for sawing, cutting, and polishing the rough stone. From 1905 to 1915, the quarry was one of the principal granite operations in the Halifax area.

The quarry is just east of Witherod Lake, about 2 km southwest of the Armdale Rotary in Halifax. Lat. 44°37′34″ N, Long. 63°37′52″W. *See* Map 70.

Road log from Highway 3 (Lighthouse Route) at **km 551.3** (*see* the Main Road Log on page 312):

km		
	0	Halifax, at the Armdale Rotary; proceed south onto Highway 349 (Herring Cove Road).
	2.5	Junction; turn right (west).
	2.9	Junction; turn right (northwest) onto North West Arm Drive.
	3.9	Turnoff (left) to the John Kline quarry, on the west side of the road.

Refs.: 45 p. 42-43; 91 p. 24, 26; 120 p. 148; 285 p. 138.

Maps (T): 11 D/12 Halifax
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King quarries

ANDALUSITE, CORDIERITE

In slate

Small andalusite crystals and cordierite grains occur sporadically in slate which was formerly quarried for use as a building stone, known commercially as *ironstone.* The slate is fine-grained and brownish-black; it shows a banded structure on the polished surface. The rock is composed of quartz, feldspar, muscovite, and biotite; alteration of pyrite grains in the rock produces a rusty stain on the surface.

Two quarries produced slate building stone for about one hundred years beginning in about 1810. The western quarry is 250 by 50 m and 10 m deep; the eastern quarry is 50 m in diameter and 30 m high. The stone was used in the construction of many government buildings in Halifax including Citadel Hill, and for parts of buildings at Dalhousie University, St. Mary's University, the Martello Tower, and the Citadel.

The King quarries are just north of Purcells Cove, 5 km southeast of the Armdale Rotary in Halifax. Lat. 44°36′50″N, Long. 63°34′33″W (western quarry); Lat. 44°36′51″N, Long. 63°34′28″W (eastern quarry). *See* Map 70.

Road log from Highway 3 (Lighthouse Route) at **km 551.3** (*see* the Main Road Log on page 312):

km		
	0	Halifax, at the Armdale Rotary; proceed onto Highway 349 (Herring Cove Road).
	0.4	Junction of Highway 253 (Purcells Cove Road); proceed onto Highway 253.
	5.5	King quarries, on the east side of the highway. The western quarry is 200 m east of the highway; the eastern quarry is 150 m further east.

Refs.: 67 p. 25; 91 p. 45; 120 p. 148; 285 p. 209-211.

Maps (T): 11 D/12 Halifax
(G): 39A Nova Scotia Sheet (GSC, 1:506 880)
53A Southeast Nova Scotia (GSC, 1:250 000)
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Geological highway map of Nova Scotia, Third edition, Special Publication No. 1 (Atlantic Geoscience Society, 1:640 000)

Queen quarry

GRANITE

The granite is light grey, medium-grained, and composed of white plagioclase, colourless to smoky quartz and brown to black mica. It takes a good polish and was used as a building stone. A rough block of granite and a polished 30 cm cube of granite were displayed in the Geological Survey of Canada economic minerals exhibit at the Philadelphia International Exhibition held in 1876.

The Queen quarry is one of the earliest quarries to operate in the area. The granite was used in the construction of several buildings in Halifax including many government buildings and the Citadel. In the 1820s, St. Marys Basilica in Halifax was constructed of Queen quarry grey granite with slate (*ironstone*) trim from the King quarries. Sometime before 1914, the quarry was operated by the Nova Scotia government. In the early 1960s, James Coughlan produced granite curbstones and monument bases from granite obtained from this quarry and from other Purcells Cove granite quarries.

The quarry is just west of Purcells Cove, 5 km southeast of the Armdale Rotary in Halifax. Lat. 44°36′40″N, Long. 63°34′40″W. *See* Map 70.

Road log from Highway 3 (Lighthouse Route) at **km 551.3** (*see* the Main Road Log on page 312):

km		
	0	Halifax, at the Armdale Rotary; proceed onto Highway 349 (Herring Cove Road).
	0.4	Junction; proceed south onto Highway 253.
	5.5	Purcells Cove school on right; proceed along a trail leading west from the school.
	5.75	Fork; proceed along the trail on right leading northwest.
	6.0	Queen quarry.

Refs.: 45 p. 42-43; 91 p. 30; 120 p. 148; 285 p. 138; 393 p. 98.

Maps (T): 11 D/12 Halifax
(G): 39A Nova Scotia Sheet (GSC, 1:506 880)
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Coughlan quarry

GRANITE

The granite is white to light grey, medium-grained with a uniform texture; it is composed of white plagioclase, colourless to smoky quartz, and brown to black mica. It takes a good polish and was used as a building and monument stone.

The Coughlan family operated the quarry for several generations until the early 1960s. The quarry was opened into the north side of a hill at an elevation of 45 m.

The quarry is just west of Purcells Cove, about 5 km southeast of the Armdale Rotary in Halifax. Lat. 44°36′31″N, Long. 63°34′24″W. *See* Map 70.

Road log from Highway 3 (Lighthouse Route) at **km 551.3** (*see* the Main Road Log on page 312):

km		
	0	Halifax, at the Armdale Rotary; proceed onto Highway 349 (Herring Cove Road).
	0.4	Junction; proceed south onto Highway 253.
	5.5	Purcells Cove school on right. Proceed along a trail leading west from the school.
	5.75	Fork; proceed straight ahead along the trail on left leading west, then turning south.
	6.2	Coughlan quarry.

Refs.: 45 p. 42-43; 91 p. 22.

Maps (T): 11 D/12 Halifax

(G): 39A Nova Scotia Sheet (GSC, 1:506 880)
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Authorized dealers (*see* Maps, telephone directory yellow pages (http://www.yellowpages.ca))
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http://www.nrcan.gc.ca/earth-sciences/products-services/mapping-product/obtaining-maps/10580

Geological maps and reports published by New Brunswick and Nova Scotia agencies

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Hugh John Flemming Forestry Centre, Room 150
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P.O. Box 6000
Fredericton, New Brunswick E3B 5H1
Tel.: 506-453-2206 Fax: 506-453-3671
E-mail: geoscience@gnb.ca
http://www.gnb.ca/0078/minerals/index-e.aspx

Nova Scotia Department of Natural Resources
1701 Hollis Street, 3rd Floor
P.O. Box 698
Halifax, Nova Scotia B3J 2T9
Tel.: 902-424-8633 Fax: 902-424-7735
E-mail: nsdnrlib@gov.ns.ca
http://novascotia.ca/natr/meb/maps/

Atlantic Geoscience Society
c/o Earth Sciences Department
Dalhousie University
Halifax, Nova Scotia B3H 4R2
Tel.: 902-494-2358 Fax: 902-494-6889
http://ags.earthsciences.dal.ca/ags.php

Road maps and travel information

New Brunswick Department of Tourism, Heritage and Culture
P.O. Box 12345
Campbellton, New Brunswick E3N 3T6
Tel.:1-800-561-0123
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Nova Scotia Department of Economic and Rural Development and Tourism
P.O. Box 456
Halifax, Nova Scotia B3J 2R5
Tel.: 902-425-5781, 1-800-565-0000 Fax: 902-424-2668
E-mail: explore@gov.ns.ca
http://www.novascotia.com

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New Brunswick

Quartermain Centre for Earth Sciences
University of New Brunswick, Department of Geology
2 Bailey Drive, Forestry-Geology Building
Fredericton, New Brunswick E3B 5A3
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http://unb.ca/fredericton/science/geology

Grand Manan Museum
1141 Highway 776
Grand Harbour, Grand Manan Island, New Brunswick E5G 4E9
Tel.: 506-662-3524 Fax: 506-662-3009
E-mail: gmadmin@grandmananmuseum.ca
http://www.grandmananmuseum.ca/

Albert County Museum
3940 Highway 114
Hopewell Cape, New Brunswick E4H 3J8
Tel.: 506-734-2003 Fax: 506-734-3291
E-mail: albertcountymuseum@nb.aibn.com
http://www.albertcountymuseum.ca/

Sunbury Shores Arts and Nature Centre
139 Water Street
St. Andrews, New Brunswick E5B 1A7
Tel: 506-529-3386 Fax: 506-529-4779
E-mail: info@sunburyshores.org
http://sunburyshores.org

New Brunswick Museum
1 Market Square
Saint John, New Brunswick E2L 4Z6
Tel.: 506-643-2300, 1-888-268-9595 Fax: 506-643-6081
E-mail: NBM-MNB@nbm-mnb.ca
http://www.nbm-mnb.ca

Quaco Museum
236 Main Street
St. Martins, New Brunswick E5R 1B8
Tel.: 506-833-4740, 506-833-2553 Fax: 506-833-2008
E-mail: quaco@nbnet.nb.ca
http://www.quaco.ca

Nova Scotia

Cape Chignecto Provincial Park - West Advocate Visitor Centre
1108 West Advocate Road
Advocate Harbour, Nova Scotia B0M 1A0
Tel.: 902-392-2085
E-mail: ccpp@creda.net
http://www.novascotiaparks.ca/parks/cape-chignecto.asp

Cumberland County Museum & Archives
150 Church Street
Amherst, Nova Scotia B4H 3C4
Tel.: 902-667-2561 Fax: 902-667-0996
E-mail: ccma@cumberlandcountymuseum.com
http://www.cumberlandcountymuseum.com/

Bass River Heritage Museum
5666 Highway 2
Bass River, Nova Scotia B0M 1B0
Tel.: 902-647-2648
E-mail: bassrivermuseumsocial@gmail.com
http://www.bassrivermuseum.ca/

Cobequid Interpretation Centre
3246 Highway 2
Economy, Nova Scotia B0M 1J0
Tel.: 902-647-2600
E-mail: wccda@ns.sympatico.ca
http://www.novascotia.com/see-do/attractions/cobequid-interpretation-centre/1421

DesBrisay Museum
130 Jubilee Road
Bridgewater, Nova Scotia B4V 2W9
Tel.: 902-543-4033 Fax: 902-543-4713
E-mail: museum@bridgewater.ca
http://desbrisaymuseum.ca

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http://earthsciences.dal.ca/index2.html

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http://www.smu.ca/academic/science/geology/

Nova Scotia Museum of Natural History
1747 Summer Street
Halifax, Nova Scotia B3H 3A6
Tel.: 902-424-7353 Fax: 902-424-0560
E-mail: nsmwebmaster@gov.ns.ca
http://naturalhistory/novascotia.ca/

Blue Beach Fossil Museum
127 Blue Beach Road
Hantsport, Nova Scotia B0P 1P0
Tel. : 902-684-9541
Courriel : bbfossils@xplornet.com
http://www.bluebeachfossilmuseum.com/

Joggins Fossil Centre
100 Main Street
Joggins, Nova Scotia B0L 1A0
Tel.: 902-251-2727, 1-888-932-9766 Fax: 902-251-2502
E-mail: info@jogginsfossilcliffs.net
http://jogginsfossilcliffs.net/centre/

Kings County Museum
37 Cornwallis Street
Kentville, Nova Scotia B4N 2E2
Tel.: 902-678-6237 Fax: 902-678-2764
E-mail: museum@okcm.ca
http://www.okcm.ca/

Moose River Gold Mines Museum
Moose River Gold Mines Provincial Park
6990 Moose River Road
Middle Musquodoboit, Nova Scotia B0N 1X0
Tel.: 902-384-2484 Fax: 902-384-2006
E-mail: mvta@ns.sympatico.ca
http://www.novascotiaparks.ca/brochures/moose_river.pdf

Annapolis Valley MacDonald Museum
21 School Street
Middleton, Nova Scotia B0S 1P0
Tel.: 902-825-6116 Fax: 902-825-0531
E-mail: macdonald.museum@ns.sympatico.ca
http://www.macdonaldmuseum.ca/

Fundy Geological Museum
162 Two Islands Road
Parrsboro, Nova Scotia B0M 1S0
Tel.: 902-254-3814, 1-866-856-3466 Fax: 902-254-3666
E-mail: info@bayoffundy.com
http://fundygeological.novascotia.ca/

Ottawa House By The Sea Museum
1155 Whitehall Road
Parrsboro, Nova Scotia B0M 1S0
Tel.: 902-254-2376
E-mail: ottawahouse@ns.sympatico.ca
http://www.ottawahousemuseum.ca/

Parrsboro Rock & Mineral Shop & Museum
349 Whitehall Road
Parrsboro, Nova Scotia B0M 1S0
Tel.: 902-254-2981
E-mail: eldongeorge@bellaliant.net
http://www.novascotia.com/see-do/outdooractivities/parrsboro-rock-and-mineral-shop-and-museum/2002

Amos Seaman School Museum
5518 Barronsfield Road
Minudie, Nova Scotia B0L 1G0
Tel.: 902-251-2289 Fax: 902-251-2422
Email: minudieheritage@gmail.com
http://www.novascotia.com/see-do/attractions/amos-seaman-school-museum/1546

The Ovens Natural Park
326 Ovens Road
P.O. Box 38
Riverport, Nova Scotia B0J 2W0
Tel.: 902-766-4621 Fax: 902-766-4344
E-mail: info@ovenspark.com
http://www.ovenspark.com/

Springhill Miners' Museum
145 Black River Road
Springhill, Nova Scotia B0M 1X0
Tel.: 902-597-3449 Fax: 902-597-3637
E-mail: springhillminersmuseum@hotmail.com
http://www.novascotia.com/see-do/attractions/tour-a-mine-springhill-miners-museum/1317

Watson Smith and Sons Tin Smith Shop Museum
2854 Main Street
Shubenacadie, Nova Scotia B0N 2H0
Tel. : 902-758-2013
E-mail: tinshopmuseum@hotmail.com
http://shubie.ca/index.php/site/tin_shop_museum/

Mastodon Ridge
87 Main Street West
Stewiacke, Nova Scotia B0N 2J0
Tel.: 902-639-2345 Fax: 902-639-2789
E-mail: mastodon@mastodonridge.com
http://www.mastodonridge.com/

Colchester Historical Museum
29 Young Street
Truro, Nova Scotia B2N 5C5
Tel.: 902-895-6284 Fax: 902-895-9530
http://colchesterhistoreum.ca/museum/

Waverley Heritage Museum
2463 Rocky Lake Drive
Waverley, Nova Scotia B2R 1S5
Tel.: 902-861-1463 Fax: 902-860-0743
E-mail: waverleyheritagemuseum@gmail.com
http://www.novascotia.com/see-do/attractions/waverley-heritage-museum/1418

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Huggins Science Hall
12 University Avenue
Wolfville, Nova Scotia B4P 2R6
Tel.: 902-585-2201
E-mail: agi@acadiau.ca
http://www.acadiau.ca

Yarmouth County Museum and Archives
22 Collins Street
Yarmouth, Nova Scotia B5A 3C8
Tel.: 902-742-5539 Fax: 902-749-1120
E-mail: ycmuseum@eastlink.ca
http://yarmouthcountymuseum.ca/

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GLOSSARY

Acadialite. Red, brownish-red, or yellowish-red variety of chabazite. The name was originally used for chabazite from Partridge Island and other Bay of Fundy occurrences. Not a valid mineral name.

Acanthite. Ag_2S. Hardness (H) = 2–2.5. Iron-black, metallic, prismatic aggregates. Sectile. Low-temperature form of silver sulphide, argentite being the high-temperature form. Ore of silver associated with other silver minerals.

Acmite. Not a valid mineral name; renamed 'aegirine'.

Actinolite. $Ca_2(Mg,Fe)_5Si_8O_{22}(OH)_2$. H = 5–6. Bright green to greyish-green, columnar, fibrous, or radiating prismatic aggregates. Occurs in metamorphic rocks. Commonly associated with epidote. Monoclinic variety of amphibole.

Adularia. Transparent to translucent, generally colourless variety of K-feldspar; may exhibit an opalescent effect, or schiller, as in moonstone. Occurs as pseudorhombohedra in low-temperature hydrothermal veins in schist and gneiss. Not a valid mineral name.

Aegirine. $NaFeSi_2O_6$. H = 6. Dark green to almost black or greenish-brown; prismatic, commonly elongated and striated crystals. Monoclinic variety of pyroxene.

Agate. Patterned and variously coloured variety of microcrystalline quartz (chalcedony). Translucent to opaque; colours are due to metallic oxide mineral impurities. Used as an ornamental stone. Agate is the Nova Scotia gemstone emblem.

Agglomerate. Rock formed by the consolidation of angular fragments ejected by volcanoes.

Agrellite. $NaCa_2Si_4O_{10}F$. H = 5.5. White, greyish, or greenish flat prismatic crystals with excellent cleavage; pearly lustre. Occurs in alkalic rocks. Originally described from the Kipawa area, Quebec.

Aikinite. $PbCuBiS_3$. H = 2–2.5. Dark grey to black metallic with coppery red tarnish. Massive; acicular to prismatic crystals. Associated with gold in vein deposits.

Akermanite. $Ca_2MgSi_2O_7$. H = 5. Colourless, greyish-green, brown to black; generally massive. Vitreous to resinous lustre. Subconchoidal fracture. Not readily distinguished in the hand specimen from other members of group. Melilite group.

Aktashite. $Cu_6Hg_3As_4S_{12}$. Grey, metallic. Occurs as grains with other mercury sulphide minerals.

Alaskite. Granitic rock composed of microcline, orthoclase, and quartz with few or no dark minerals such as amphibole, biotite, or pyroxene.

Albertite. Hydrocarbon. Black with brilliant lustre. Occurs in shale in Albert County, New Brunswick. Also known as 'albert coal'. Name is derived from the locality. Not a valid mineral name.

Albite. $NaAlSi_3O_8$. H = 6. White, tabular, striated crystals, or cleavable masses. Vitreous lustre. Variety of plagioclase feldspar. Used in the manufacture of ceramics.

Allanite. $(Ce,Ca,Y)_2(Al,Fe)_3(SiO_4)_3(OH)$. H = 6.5. Black or dark brown tabular aggregates, or massive with conchoidal fracture. Vitreous or pitchy lustre. Generally occurs in granitic rocks, in pegmatite, and is commonly surrounded by an orange halo. Distinguished by its weak radioactivity.

Allargentum. $Ag_{1-x}Sb_x$. Grey, metallic grains occurring in native silver or as veinlets in calcite containing high-grade silver ore.

Allemontite. A mixture of stibarsen and arsenic or antimony. Not a valid mineral name.

Alloclasite. (Co,Fe)AsS. Light grey, metallic; compact radiating crystal aggregates. Occurs in cobalt deposits.

Allophane. Amorphous hydrous aluminum silicate. H = 3. Light blue, green, brown, yellow, or colourless encrustations or powdery masses, also stalactitic or mammillary. Vitreous to waxy. Decomposition product of aluminous silicates such as feldspar.

Alluaudite. $(Na,Ca)_2(Mn,Mg,Fe)(Fe,Mn)_2(PO_4)_3$. H = 5–5.5. Yellow to brownish-yellow, massive granular or compact radiating fibrous aggregates. Generally opaque. Occurs as an alteration of varulite-hühnerkobelite in pegmatite.

Almandine. $Fe_3Al_2(SiO_4)_3$. H = 7–7.5. Dark red transparent to opaque dodecahedral or trapezohedral crystals; also massive. Generally occurs in mica schist or gneiss; also in granite and pegmatite. Used as an abrasive (sand paper); transparent variety used as a gemstone. Garnet group.

Altaite. PbTe. H = 3. Light grey, metallic, with bronze tarnish. Generally massive, but may occur as cubic or cubo-octahedral crystals. Sectile with perfect cleavage. Occurs with native gold and with other tellurides and sulphides in vein deposits.

Alunogen. $Al_2(SO_4)_3 \cdot 17H_2O$. H = 1.5–2. White fibrous crusts; powdery. Vitreous to silky lustre. Acid, sharp taste. Secondary mineral associated with pyrite or marcasite.

Amazonite. Green variety of microcline feldspar. Colour is due to natural irradiation of microcline containing Pb and H_2O. Occurs in pegmatite. Used as a gemstone and for ornamental purposes. Not a valid mineral name.

Amblygonite. $(Li,Na)Al(PO_4)(F,OH)$. H = 5.5–6. White to greyish-white prismatic crystals; cleavable or irregular masses. Perfect cleavage; uneven to conchoidal fracture. Occurs in granite pegmatite with spodumene, pollucite, and lepidolite.

Amethyst. Violet variety of quartz. Colour is due to natural irradiation of quartz containing Fe. Generally occurs in igneous and volcanic rocks. Transparent variety is used as a gemstone. Not a valid mineral name. Amethyst is the Ontario mineral emblem.

Amphibole. A mineral group consisting of complex silicates including tremolite, actinolite, and hornblende. Common rock-forming mineral.

Amphibolite. A metamorphic rock composed essentially of amphibole and plagioclase.

Amygdaloidal lava. Fine-grained lava (basalt) with cavities (amygdales) that may be filled with quartz, calcite, chlorite, zeolites, etc.

Analcime. $NaAlSi_2O_6 \cdot H_2O$. H = 5–5.5. Colourless, white, yellowish, or greenish vitreous, transparent, trapezohedral crystals, or massive granular. Distinguished from garnet by its inferior hardness. Often associated with other zeolites. Formerly known as ‘analcite’.

Anatase. TiO_2. H = 5.5–6. Yellowish- or reddish-brown pyramidal or tabular crystals with adamantine lustre; also grey or blue. Massive. Also known as 'octahedrite'.

Ancylite. $SrCe(CO_3)_2(OH)\cdot H_2O$. H = 4–4.5. Light yellow, yellowish-brown, or grey translucent prismatic crystals or rounded crystal aggregates. Splintery fracture. Soluble in acids. Rare mineral.

Andalusite. Al_2SiO_5. H = 7.5. White, grey, rose red, or brown prismatic crystals with almost square cross-section. Vitreous to dull lustre. Transparent to opaque. Chiastolite variety has carbonaceous inclusions arranged in crossed lines that are evident in cross-section. Occurs in metamorphosed shale. Used in the manufacture of mullite refractories, spark plugs; transparent variety used as a gemstone.

Andesite. A dark-coloured volcanic rock composed mainly of plagioclase feldspar with amphibole or pyroxene.

Andorite. $PbAgSb_3S_6$. H = 3–3.5. Dark grey, metallic, striated prismatic or tabular crystals; massive. Conchoidal fracture. Black streak. Soluble in HCl. Associated with sulphides and other sulphosalts.

Andradite. $Ca_3Fe_2(SiO_4)_3$. H = 7. Yellow, green, brown or black dodecahedral or trapezohedral crystals; massive. Occurs in chlorite schist, serpentinite, crystalline limestone. Gem varieties are demantoid (green), topazolite (yellow), and melanite (black). Garnet group.

Anglesite. $PbSO_4$. H = 2.5–3. Colourless to white, greyish, yellowish, or bluish tabular or prismatic crystals, or granular. Adamantine to resinous lustre. Characterized by high specific gravity (6.37) and adamantine lustre. Effervesces in HNO_3. Secondary mineral, generally formed from galena. Ore of lead.

Anhydrite. $CaSO_4$. H = 3–3.5. White, bluish, or greyish with vitreous lustre. Generally granular massive. Alters to gypsum by absorption of water. Distinguished from gypsum by its superior hardness. Used as a soil conditioner and in portland cement.

Ankerite. $CaFe(CO_3)_2$. Iron-bearing variety of dolomite from which it cannot be distinguished in the hand specimen.

Annabergite. $Ni_3(AsO_4)_2\cdot 8H_2O$. H = 1.5–2.5. Light green, finely crystalline or earthy encrustations. Soluble in acids. Secondary mineral formed by oxidation of cobalt and nickel arsenides. Colour and association with nickel minerals are distinguishing characteristics. Referred to as 'nickel bloom'.

Anorthite. $CaAl_2Si_2O_8$. H = 6. White or greyish cleavable masses; prismatic, striated crystals. Plagioclase feldspar.

Anorthoclase. $(Na,K)AlSi_3O_8$. H = 6–6.5. Colourless, white with reddish, greenish, or yellowish tint. May exhibit polysynthetic twinning. Occurs in volcanic and other igneous rocks. Feldspar group.

Anorthosite. An igneous rock composed almost entirely of plagioclase.

Anthophyllite. $(Mg,Fe)_7Si_8O_{22}(OH)_2$. H = 6. White, light grey to brown fibrous or prismatic aggregates with vitreous or silky lustre. Distinguished from tremolite by its fibrous habit and silky lustre. Fibrous variety resembles asbestos, but is more brittle. Used in asbestos cement, for boiler coverings, and fireproof paints because of its resistance to heat. Orthorhombic variety of amphibole.

Anthraxolite. Hydrocarbon. Black, massive. Submetallic to pitchy lustre. Uneven to conchoidal fracture. Friable, combustible. Exposed surface partly altered to orange powder. Not a valid mineral name.

Antigorite. $Mg_3Si_2O_5(OH)_4$. H = 2.5. Green, translucent, massive variety of serpentine with lamellar structure.

Antimony. Sb. H = 3–3.5. Light grey, metallic, cleavable, massive, also radiating or botryoidal. Perfect cleavage. Occurs in hydrothermal veins with silver, antimony, and arsenic ores. Minor source of antimony for use in alloys of lead and tin, and for flame-proofing textiles, paints, and ceramics.

Antiperthite. Lamellar intergrowth of potassium and sodium feldspars in which sodium feldspar is dominant.

Antlerite. $Cu_3SO_4(OH)_4$. H = 3.5. Emerald-green to dark green, tabular, prismatic, or acicular microscopic crystals. Vitreous lustre. Secondary mineral occurring in copper deposits. Ore of copper.

Apatite. $Ca_5(PO_4)_3(F,Cl,OH)$. H = 5. Green to blue, colourless, brown, or red hexagonal crystals or granular to sugary massive. Vitreous lustre. May be fluorescent. Distinguished from beryl and quartz by its inferior hardness; massive variety is distinguished from calcite and dolomite by lack of effervescence in HCl, and from diopside and olivine by its inferior hardness. Used in the manufacture of fertilizers and in the production of detergents. Apatite is a mineral group that includes fluorapatite, chlorapatite, hydroxylapatite, carbonate-fluorapatite.

Aplite. A light-coloured igneous (dyke) rock with fine-grained granitic texture and composition similar to granite.

Aplowite. $(Co,Mn,Ni)SO_4 \cdot 4H_2O$. H = 3. Pink, powdery, with vitreous lustre and white streak. Occurs as coatings on barite-siderite-sulphide specimens. Soluble in water. Originally described from the Magnet Cove barite mine, Walton, Nova Scotia, and named in honour of A.P. Low, director of the Geological Survey of Canada (1906–1907).

Apophyllite. $KCa_4(Si_4O_{10})_2(F,OH) \cdot 8H_2O$. H = 5. Colourless, grey, white, green, yellow, or less commonly, pink square, prismatic, or pyramidal crystals with pearly or vitreous lustre. Perfect basal cleavage and pearly lustre on cleavage face are diagnostic. Commonly associated with zeolites in basalt.

Aragonite. $CaCO_3$. H = 3.5–4. Colourless to white or grey and, less commonly, yellow, blue, green, violet, or rose-red prismatic or acicular crystals; also columnar, globular, or stalactitic aggregates. Vitreous lustre. Transparent to translucent. Distinguished from calcite by its cleavage, superior hardness, and higher specific gravity (2.93). Effervesces in dilute HCl. Pearly inner surfaces of sea shells and pearls are composed of aragonite.

Arenite. A pure or nearly pure sandstone containing less than 10% matrix material.

Arfvedsonite. $Na_3(Fe,Mg)_4FeSi_8O_{22}(OH)_2$. H = 5–6. Greenish-black to black tabular or long prismatic crystals. Vitreous lustre. Occurs in alkalic igneous rocks. Monoclinic variety of amphibole.

Argentite. Ag_2S. H = 2–2.5. Dark grey, metallic, cubic or octahedral crystals; arborescent, massive. Very sectile. Occurs in sulphide deposits with other silver minerals. Inverts to acanthite at temperatures below 180°C.

Argentopentlandite. $Ag(Fe,Ni)_8S_8$. Bronze-brown metallic octahedral crystals; massive. Associated with pyrite, cubanite, and chalcopyrite in veins and in sulphide deposits.

Argillite. A clayey sedimentary rock without slaty cleavage or shaly fracture.

Arizonite. Not a valid mineral name. *See* pseudorutile.

Arkose. A sandstone in which feldspar grains predominate over quartz.

Armenite. $BaCa_2Al_6Si_9O_{30}{\cdot}2H_2O$. H = 7.5. Colourless, white, or greyish-green prismatic crystals. Vitreous lustre. Associated with axinite, zoisite.

Arsenic. As. H = 3.5. Light grey to black, submetallic. Massive, reniform, or stalactitic. Volatile without fusion, giving off garlic odour. Occurs in veins with silver, cobalt, and nickel ores.

Arsenolite. As_2O_3. H = 1.5. White, botryoidal, stalactitic, earthy encrustations. Vitreous to silky lustre. Sweetish astringent taste. Secondary mineral formed by oxidation of arsenopyrite, smaltite, and other arsenic minerals.

Arsenopyrite. FeAsS. H = 5.5–6. Light to dark grey, metallic, striated prisms with characteristic wedge-shaped cross-section; also massive. Tarnishes to bronze colour. Ore of arsenic; may contain gold or silver. Referrred to as 'mispickle', 'arsenical pyrite'.

Artinite. $Mg_2(CO_3)(OH)_2{\cdot}3H_2O$. H = 2.5. White acicular crystals; fibrous aggregates forming botryoidal, spherical masses and crossfibre veinlets. Transparent with vitreous, silky, or satin lustre. Occurs in serpentine. Distinguished from calcite by its form and lustre.

Asbestos. Fibrous variety of certain silicate minerals such as serpentine (chrysotile) and amphibole (anthophyllite, tremolite, actinolite, crocidolite) characterized by flexible, heat- and electrical-resistant fibres. Chrysotile is the only variety produced in Canada; it occurs as veins with fibres parallel (slip fibre) or perpendicular (crossfibre) to the vein walls. Used in the manufacture of asbestos cement sheeting, shingles, roofing, and floor tiles, millboard, thermal insulating paper, pipe covering, clutch and brake components, reinforcing in plastics, etc.

Asbolane. $Mn(O,OH)_2{\cdot}(Co,Ni,Mg,Ca)_x(OH)_{2x}{\cdot}nH_2O$. Occurs as dull-black earthy or compact masses. Alteration product of manganese minerals. Formerly known as 'asbolite', 'asbolan', and 'cobaltian wad'.

Ashcroftine. $K_5Na_5Y_{12}Si_{28}O_{70}(OH)_2(CO_3)_8{\cdot}8H_2O$. Pink fibrous, prismatic, or powdery aggregates. Occurs in alkalic igneous rocks.

Asterism. Intersecting lines or bands of light forming a star, as seen in transmitted light in mica, or in reflected light in cabochon-cut sapphire, garnet, etc. Caused by light reflected from microscopic inclusions arranged along crystallographic directions.

Astrophyllite. $K_2NaFe_7Ti_2Si_8O_{26}(OH)_4F$. H = 3. Golden-yellow to bronze-brown elongated crystals or blades, often radiating; also micaceous with pearly or splendent lustre. More brittle than mica. Generally occurs in nepheline syenite.

Atacamite. $Cu_2Cl(OH)_3$. H = 3–3.5. Green, prismatic, tabular aggregates; granular massive, fibrous. Adamantine to vitreous lustre. Soluble in acids. Associated with other secondary copper minerals.

Augite. $(Ca,Mg,Fe)_2(Si,Al)_2O_6$. Dark green to black. Important constituent of basic and ultrabasic rocks. Monoclinic variety of pyroxene.

Augite syenite. A relatively coarse-textured igneous rock composed mainly of feldspar and pyroxene (augite) with little or no quartz. Used as a building stone.

Aurichalcite. $Zn_5(CO_3)_2(OH)_6 \cdot H$ = 1–2. Light green or blue silky to pearly acicular or lath-like crystals forming tufted, feathery, plumose, laminated, or granular encrustations. Transparent. Soluble in acids and in ammonia. Secondary mineral occurring in oxidized zones of copper and zinc deposits, associated with other secondary copper and zinc minerals.

Aurostibite. $AuSb_2$. H = 3. Dark grey, metallic. Occurs as grains with gold and sulphide minerals. Resembles galena. Not readily identified in hand specimen.

Autunite. $Ca(UO_2)_2(PO_4)_2 \cdot 10–12H_2O$. H = 2–2.5. Yellow earthy masses; less commonly tabular crystals. Dull lustre. Fluoresces yellowish-green in ultraviolet light. Secondary mineral formed by the alteration of uranium-bearing minerals.

Axinite. $Ca_2(Mn,Fe,Mg)Al_2BSi_4O_{15}(OH)$. H = 7. Violet, pink, yellow to brown wedge-shaped crystals or massive, lamellar. Vitreous lustre. Fuses readily with intumescence. Occurs commonly in contact-altered calcareous rocks. Transparent varieties are used as gemstones.

Azurite. $Cu_3(CO_3)_2(OH)_2$. H = 3.5–4. Azure-blue to inky blue tabular or prismatic crystals; also massive, earthy, stalactitic with radial or columnar structure. Vitreous lustre; transparent. Secondary copper mineral. Effervesces in acids. Ore of copper.

Baddeleyite. ZrO_2. H = 6.5. Cream-white, yellowish, or amber scaly, finely granular, powdery aggregates. Greasy to dull lustre. Associated with fluorite, dawsonite at the Francon Quarry, Montréal.

Barite. $BaSO_4$. H = 3–3.5. White, pink, yellowish, or blue tabular or prismatic crystals; granular massive. Vitreous lustre. Characterized by high specific gravity (4.5) and perfect cleavage. Used in glass, paint, rubber, and chemical industries, and in oil-drilling technology.

Barylite. $BaBe_2Si_2O_7$. H = 7. Colourless, white, or bluish tabular, prismatic crystals, or massive. Transparent, vitreous. Perfect cleavage.

Basalt. Dark, fine-grained volcanic rock or lava composed predominantly of an amphibole or a pyroxene with plagioclase. Amygdaloidal basalt contains cavities that may be hollow or occupied by one or more minerals.

Basaluminite. $Al_4(SO_4)(OH)_{10} \cdot 5H_2O$. White, powdery to compact, massive. Dull lustre. Conchoidal fracture. Secondary mineral, associated with gypsum, aragonite.

Bassanite. $2CaSO_4 \cdot H_2O$. White microscopic prisms, fibres, plates. Silky to dull lustre. Associated with gypsum on which it may form chalky coatings. Dehydration product of gypsum; also occurs in volcanic rocks.

Bastnaesite. $(La,Ce)(CO_3)F$. H = 4–4.5. Yellowish- to reddish-brown and grey platy, lath-shaped, or granular masses with dull, greasy, or pearly lustre; also greenish brown, earthy. Occurs with other rare-earth–element minerals. Soluble in HCl. Difficult to identify in hand specimen.

Batholith. A very large body of coarse-textured igneous rocks such as granite or diorite.

Baumhauerite. $Pb_3As_4S_9$. H = 3. Grey, metallic, striated prismatic or tabular crystals. Brown streak. Occurs with other lead sulphosalt minerals.

Bavenite. $Ca_4Be_2Al_2Si_9O_{26}(OH)_2$. H = 5.5. White; greenish-, pinkish-, or brownish-white prismatic crystals; also fibrous or radiating lamellar aggregates. Vitreous lustre. Associated with beryl in granite pegmatite.

Behoite. $Be(OH)_2$. H = 4. Colourless, white pseudo-octahedral crystals. Vitreous lustre. Occurs in granitic pegmatite and in syenite.

Berthierite. $FeSb_2S_4$. H = 2–3. Dark steel-grey, metallic, striated prismatic crystals; fibrous or granular masses. Tarnished surface is iridescent or brown. Generally associated with stibnite and not readily distinguished from it in hand specimen.

Bertrandite. $Be_4Si_2O_7(OH)_2$. H = 6–7. Colourless or light yellow tabular or prismatic crystals. Vitreous or pearly lustre. Associated with beryl in granite pegmatite.

Beryl. $Be_3Al_2Si_6O_{18}$. H = 8. White, yellow, green, or blue hexagonal prisms, or massive with conchoidal or uneven fracture. Vitreous lustre; transparent to translucent. Distinguished from apatite by superior hardness, from topaz by its lack of perfect cleavage; massive variety distinguished from quartz by its higher density. Ore of beryllium with numerous uses in nuclear energy, space, aircraft, electronic, and scientific equipment industries; used as alloying agent with copper, nickel, iron, aluminum, and magnesium. Gem varieties include emerald and aquamarine.

Betafite. $(Ca,U)_2(Ti,Nb,Ta)_2(O,OH)_7$. H = 4–5.5. Brown to black, waxy to submetallic octahedral or modified octahedral crystals. Metamict. Occurs with euxenite, fergusonite, cyrtolite in granite pegmatite and in calcite veins.

Beta-uranophane. $Ca(UO_2)_3$. H = 2.5–3. Yellow to yellowish-green aggregates of acicular crystals or short prismatic crystals. Silky to waxy lustre. May fluoresce green in ultraviolet light. Secondary mineral occurring in granitic rocks and calcite veins containing uranium minerals.

Beudantite. $PbFe_3(AsO_4)(SO_4)(OH)_6$. H = 3.5–4.5. Dark green, brown, or black rhombohedral crystals; also yellow earthy or botryoidal masses. Vitreous, resinous to dull lustre. Secondary mineral occurring in iron and lead deposits. Difficult to distinguish in hand specimens from other yellowish secondary minerals.

Beyerite. $(Ca,Pb)Bi_2(CO_3)_2O_2$. H = 2–3. White, yellow, greenish-yellow to green or grey platy, tabular crystals, or earthy. Vitreous to dull lustre. Occurs as encrustations, or fillings in cavities and fractures. Secondary mineral formed from bismuth minerals.

Bindheimite. $Pb_2Sb_2O_7$. H = 4–4.5. Yellow to brown, white to grey or greenish powdery to earthy encrustations; also nodular. Secondary mineral found in antimony-lead deposits. Difficult to identify except by X-ray methods.

Biomicrite. Limestone composed of skeletal fossil debris and carbonate mud (micrite). Described by major fossil type present, e.g. crinoid biomicrite.

Biotite. $K(Mg,Fe)_3(Al,Fe)Si_3O_{10}(OH,F)_2$. H = 2.5–3. Dark brown or greenish-black, transparent, hexagonal, platy crystals; platy or scaly aggregates. Splendent lustre. Occurs in pegmatite, calcite veins, pyroxenite. Constituent of igneous rocks (granite, syenite, diorite, etc.) and metamorphic rocks (gneiss, schist). Elasticity of individual plates or sheets distinguishes it from chlorite. Sheet mica is used as electrical insulators and for furnace and stove doors (isinglass); ground mica is used in the manufacture of roofing materials, wallpaper, lubricants, and fireproofing material. Mica group.

Birnessite. $Na_4Mn_{14}O_{27}{\cdot}9H_2O$. H = 1.5. Black opaque grains, granular aggregates, earthy. Dull lustre. Secondary mineral associated with other manganese minerals. Difficult to identify except by X-ray methods.

Bismoclite. BiOCl. H = 2–2.5. Cream-white to grey, brownish; greasy to silky, or dull lustre. Massive, earthy, columnar, fibrous, or scaly. Soluble in acids. Secondary mineral formed by alteration of bismuthinite or native bismuth.

Bismuth. Bi. H = 2–2.5. Light grey, metallic, reticulated crystal aggregates; also foliated or granular. Iridescent tarnish. Used as a component of low melting-point alloys and in medicinal and cosmetic preparations.

Bismuthinite. Bi_2S_3. H = 2. Dark grey, striated, prismatic, acicular crystals; also massive. Iridescent on tarnished surface. Ore of bismuth.

Bismutite. $Bi_2O_2(CO_3)$. H = 2.5–3.5. Yellowish-white to brownish-yellow, light green, or grey earthy or pulverulent masses; also fibrous crusts, spheroidal aggregates, scaly, or lamellar. Dull, vitreous, or pearly lustre. Effervesces in HCl. Uncommon secondary mineral formed by alteration of bismuth minerals.

Bitumen. Natural mixture of hydrocarbons that may be liquid (petroleum) or solid (asphalt or mineral pitch).

Bityite. $CaLiAl_2(AlBeSi_2)O_{10}(OH)_2$. H = 5.5. White, yellow, or brownish-white transparent tabular, pseudohexagonal crystals, or micaceous. Associated with lithium minerals in granite pegmatite.

'Black diamond'. A siliceous hematite that, when polished, takes a high, mirror-like lustre. Used as a gemstone.

Boehmite. AlO(OH). H = 3. White with pearly to silky lustre. Flaky, fibrous, granular, or powdery aggregates; also pisolitic. Associated with other aluminum minerals.

Bog iron ore. Loose porous iron ore formed by precipitation from water in bogs or swampy areas. Ore consists of limonite, goethite, and/or hematite.

Bohdanowiczite. $AgBiSe_2$. H = 3. Dark grey, metallic, microscopic grains associated with other selenides and with sulphides.

Boltwoodite. $KUO_2(SiO_3OH){\cdot}H_2O$. H = 3.5–4. Light yellow acicular, fibrous aggregates. Silky, vitreous, to dull lustre. Fluoresces dull green in ultraviolet light. Secondary mineral formed from uranium minerals.

Boracite. $Mg_3B_7O_{13}Cl$. H = 7–7.5. Colourless, white, yellow, green, or grey cubic or dodecahedral crystals; fibrous or granular aggregates. Transparent with vitreous lustre. Occurs in gypsum, halite, and potash deposits. Soluble in HCl.

Bornite. Cu_5FeS_4. H = 3. Reddish-brown, metallic. Usually massive. Tarnishes to iridescent blue, purple, etc. Ore of copper. Also known as 'peacock ore', 'variegated copper', 'vitreous copper', and 'purple copper ore'.

Botallackite. $Cu_2Cl(OH)_3$. Light green to bluish-green columnar crystals forming crusts. Secondary mineral associated with other copper minerals.

Boulangerite. $Pb_5Sb_4S_{11}$. H = 2.5–3. Dark bluish-grey, metallic; striated, elongated, prismatic to acicular crystals; also fibrous, plumose aggregates. Fibrous cleavage is distinguishing characteristic. Ore of antimony.

Bournonite. $PbCuSbS_3$. H = 2.5–3. Grey to blackish-grey, metallic. Short prismatic or tabular crystals with striations; massive. Occurs in veins with sulphides and sulphosalts. Not readily identified in the hand specimen.

Brannerite. $(U,Ca,Y,Ce)(Ti,Fe)_2O_6$. H = 4.5. Black opaque grains, prismatic crystals, granular masses. Resinous to dull lustre. Brownish-yellow on weathered surfaces. Conchoidal fracture. Radioactive. Ore of uranium.

Braunite. $Mn^{2+}Mn^{3+}{}_6SiO_{12}$. H = 6–6.5. Brownish black to steel-grey submetallic pyramidal crystals; granular massive. Uneven fracture. Slightly magnetic. Soluble in HCl. Occurs with other manganese minerals in veins or in lenses.

Bravoite. $(Ni,Fe)S_2$. Yellow to grey, metallic, with violet tinge. Pyrite group. Resembles pyrite except for colour.

Breccia. A rock composed of angular fragments; may be attractively patterned and coloured and used as an ornamental rock.

Breithauptite. NiSb. H = 5.5. Light copper-red with violet tint. Metallic lustre. Occurs as disseminated grains, massive, arborescent, and rarely as tabular or prismatic crystals. Reddish-brown streak. Associated with silver and nickel minerals in vein deposits.

Breunnerite. A variety of magnesite containing iron. White, yellowish- to brownish-white. Not a valid mineral name.

Brianroulstonite. $Ca_3B_5O_6(OH)_7Cl_2.8H_2O$. Colourless to white, transparent to translucent, micaceous aggregates to 2 mm long. Vitreous lustre. Associated with halite and borate minerals in evaporite. New mineral originally found in the Penobsquis (Sussex) mine, New Brunswick. Named in honour of Brian V. Roulston, Potash Corporation of America geologist.

Britholite. $(Ca,Ce)_2Y_3(SiO_4,PO_4)_3(O,OH,F)$. H = 4.5. Tan to brown prisms, platy aggregates, and massive. Resinous lustre. Difficult to distinguish in the hand specimen.

Brochantite. $Cu_4(SO_4)(OH)_6$. H = 3.5–4. Green acicular crystal aggregates; massive, granular. Vitreous lustre. Secondary mineral formed by oxidation of copper minerals. Distinguished from malachite by lack of effervescence in HCl.

Brookite. TiO_2. H = 5.5–6. Dark brown to black tabular or pyramidal crystals with metallic, adamantine lustre. Not readily identifiable in the hand specimen.

Brucite. $Mg(OH)_2$. H = 2.5. White, grey, light blue, or green tabular, platy, foliated, or fibrous aggregates; also massive. Pearly or waxy lustre. Soluble in HCl. Distinguished from gypsum and talc by its superior hardness and lack of greasy feel. Resembles asbestos, but lacks silky lustre. More brittle than muscovite. Used for refractories and as a minor source of magnesium metal.

Brugnatellite. $Mg_6Fe(CO_3)(OH)_{13}\cdot 4H_2O$. H = 2. White silky, pearly, or waxy; flaky aggregates, or foliated lamellar nodules; may be tinted reddish, yellowish, brownish. Associated with brucite and serpentine.

Burbankite. $(Na,Ca)_3(Sr,Ba,Ce)_3(CO_3)_5$. H = 3.5. Tiny yellow or greyish-yellow hexagonal crystals, massive; also colourless to reddish-pink fine hair-like aggregates in cavities with calcite. Associated with other rare-earth–element minerals. Effervesces in HCl. Not readily identifiable in the hand specimen.

Cabochon. A polished gemstone having a convex surface; translucent or opaque minerals such as opal, agate, jasper, and jade are generally cut in this style.

Cadmoselite. CdSe. H = 4. Black microscopic grains with resinous to adamantine lustre. Rare mineral associated with other selenium and cadmium minerals.

Cafarsite. $Ca_{5.9}Mn_{1.7}Fe_3Ti_3(AsO_3)_{12}\cdot 4–5H_2O$. Dark brown cubic, octahedral, or dodecahedral crystals. Opaque. Conchoidal fracture. Yellowish-brown streak.

Calaverite. $AuTe_2$. H = 2.5–3. Brass-yellow to silver-white, metallic, bladed, lath-like, or striated short prismatic crystals. Fuses readily; on charcoal, gives bluish-green flame and gold globules. Ore of gold. Occurs in veins with pyrite, native gold.

Calcite. $CaCO_3$. H = 3. Colourless or white rhombohedral, scalenohedral crystals; cleavable, granular massive. May be variously coloured due to impurities. Transparent to opaque. Vitreous, pearly, or dull lustre. May fluoresce in ultraviolet light. Effervesces in dilute HCl. Distinguished from dolomite by its inferior hardness and superior solubility in HCl. Major constituent of chalk and limestone.

Cancrinite. $(Na,Ca)_8(Al_6Si_6)O_{24}(CO_3,SO_4)_2\cdot 2H_2O$. H = 6. Yellow, pink, or grey massive or prismatic crystals; vitreous to greasy lustre. Effervesces in warm HCl. Associated with nepheline and sodalite in nepheline syenite.

Carbonate cyanotrichite. $Cu_4Al_2CO_3(OH)_{12}\cdot 2H_2O$. H = 2. Light blue to medium blue, finely granular encrustations with vitreous lustre; also silky fibrous. Secondary mineral formed from copper minerals and associated with other secondary copper minerals. Dissolves in HCl.

Carbonatite. An igneous rock composed of at least 50% carbonate minerals.

Carletonite. $KNa_4Ca_4Si_8O_{18}(CO_3)_4(F,OH)\cdot H_2O$. H = 4–4.5. Colourless, pink, or light blue flakes. Transparent to translucent; vitreous to pearly. New mineral originally described from Mount Saint-Hilaire, Quebec, where it is associated with pectolite, albite, arfvedsonite, calcite, fluorite, and apophyllite. Named in honour of Carleton University where this and several other new minerals have been identified.

Carnallite. $KMgCl_3\cdot 6H_2O$. H = 2.5. Colourless to white tabular crystals, or granular massive. Greasy or dull lustre. Deliquescent and soluble in water. Bitter taste. Occurs with halite and sylvite.

Carnelian. Red to reddish-brown or reddish-yellow translucent variety of chalcedony. Used as a gemstone.

Carrollite. $CuCo_2S_4$. H = 4.5–5.5. Grey, metallic; tarnishes to copper-red or violet-grey. Granular massive; octahedral crystals. Occurs with other sulphide minerals in vein deposits.

Cassiterite. SnO_2. H = 6–7. Yellow to brown prismatic crystals; twinning common. Also radiating fibrous, botryoidal, or concretionary masses; granular. Adamantine to splendent lustre. White to brownish or greyish streak. Distinguished from other light-coloured nonmetallic minerals by its high specific gravity (6.99), from wolframite by its superior hardness. Ore of tin. Concentrically banded variety is used as a gemstone. Occurs with gold in placers in Yukon.

Catapleiite. $Na_2ZrSi_3O_9{\cdot}2H_2O$. H = 6. Light yellow, tan, yellowish-brown, or colourless hexagonal plates with vitreous to greasy lustre. Occurs in nepheline syenite where it can be distinguished by its platy habit.

Cattierite. CoS_2. H = 4. Pinkish metallic granular intergrowths with other sulphide minerals; cubic crystals to 1 cm across.

Caysichite. $(Ca,Yb,Er)_4Y_4Si_8O_{20}(CO_3)_6(OH){\cdot}7H_2O$. Colourless, white, yellow, or green coatings or encrustations with divergent columnar structure. Associated with other yttrium minerals. Originally described from the Evans-Lou mine near Wakefield, Quebec. Named for the elements Ca, Y, Si, C, H.

Celadonite. $KMgFeSi_4O_{10}(OH)_2$. H = 2. Bluish-green to greyish-green scaly, fibrous, or earthy compact masses. Occurs in basalt with zeolites and quartz. Mica group.

Celestine. $SrSO_4$. H = 3–3.5. Transparent, colourless, white, or light blue tabular crystals; also fibrous, massive. Vitreous lustre. Perfect cleavage. Flame test produces crimson colour. Resembles barite but not as heavy. Ore of strontium. Formerly known as ‘celestite’.

Cement rock. *See* waterlime.

Cenosite. *See* kainosite.

Cernyite. Cu_2CdSnS_4. H = 4. Steel-grey, metallic. Occurs as rare grains in pegmatite at the type locality, the Bernic Lake (Tanco) mine, in Manitoba. Named in honour of Professor Petr Cerny, University of Manitoba.

Cerussite. $PbCO_3$. H = 3–3.5. Transparent white, grey, or brownish tabular crystals with adamantine lustre; also massive. High specific gravity (6.5) and lustre are distinguishing features. Secondary mineral formed by oxidation of lead minerals. Fluoresces yellow in ultraviolet light. Soluble in dilute HNO_3. Ore of lead.

Cervantite. Sb_2O_4. H = 4–5. Yellow to yellowish-white powdery or fibrous crust. Greasy, pearly, or earthy lustre. Secondary mineral formed by oxidation of antimony minerals.

Chabazite. $CaAl_2Si_4O_{12}{\cdot}6H_2O$. H = 4. Square colourless, white, yellowish, or pinkish crystals. Vitreous lustre. Occurs in cavities in basalt. Distinguished from other zeolites by its almost cubic crystal form, from calcite by its superior hardness and its lack of effervescence in HCl.

Chalcanthite. $CuSO_4 \cdot 5H_2O$. H = 2.5. Light to dark blue tabular or short prismatic crystals; massive, granular. Vitreous lustre. Metallic taste. Secondary mineral formed in copper sulphide deposits. Distinguished from azurite by lack of effervescence in HCl.

Chalcedony. Translucent microcrystalline variety of quartz. Colourless, grey, bluish, yellowish, reddish, brown. Formed from aqueous solutions. Attractively coloured chalcedony is used for ornamental objects and jewellery. Varieties include agate, carnelian, jasper, etc. Not a valid mineral name.

Chalcoalumite. $CuAl_4(SO_4)(OH)_{12} \cdot 3H_2O$. H = 2.5. Light blue, bluish-green, or bluish-grey, transparent to translucent, platy, fibrous aggregates. Vitreous to dull lustre. Secondary mineral associated with copper minerals.

Chalcocite. Cu_2S. H = 3.5–4. Dark grey to black, metallic; massive. Tarnishes to iridescent blue, purple, etc. Also referred to as 'vitreous copper', 'sulphurette of copper', and 'copper glance'. Soluble in HNO_3. Black colour and slight sectility distinguish it from other copper sulphides. Ore of copper.

Chalcopyrite. $CuFeS_2$. H = 3.5–4. Brass-yellow, massive, or as tetrahedral crystals. Iridescent tarnish. Brass colour distinguishes it from pyrrhotite. Distinguished from pyrite by its inferior hardness, from gold by its superior hardness and lower density. Also called 'copper pyrite', 'sulphuret of copper', and 'yellow copper'. Ore of copper.

Chalcostibite. $CuSbS_2$. H = 3–4. Dark grey metallic blade-like crystals, or massive. Associated with copper and antimony minerals.

Chamosite. $(Fe,Mg,Al)_6(Si,Al)_4O_{10}(OH,O)_8$. H = 3. Yellowish to dull green or grey earthy or clay-like masses. Occurs in some sedimentary iron deposits. Chlorite group.

Chapmanite. $SbFe_2(SiO_4)_2(OH)$. H = 2. Yellowish-green lath-shaped crystals; powdery. Alteration product of silver-antimony minerals. Associated with native silver. Originally described from the Keeley mine, Cobalt district, Ontario. Named in honour of Edward J. Chapman, professor of mineralogy (1853–1895), University of Toronto.

Chert. SiO_2. H = 7. Massive opaque variety of chalcedony; generally drab colours: various tints of grey or brown.

Childrenite. $FeAl(PO_4)(OH)_2 \cdot H_2O$. H = 5. Brown to yellowish-brown pyramidal, prismatic, tabular, or platy crystals. Vitreous to resinous lustre. Soluble in acids. Occurs in granite pegmatite.

Chloanthite. Arsenic-deficient variety of nickel-skutterudite. Not a valid mineral name.

Chlorite. $(Mg,Fe,Al)_6(Al,Si)_4O_{10}(OH)_8$. H = 2–2.5. Transparent green flaky aggregates. Distinguished from mica by its colour and by its flexible, but nonelastic, flakes. Occurs in metamorphic, igneous, and volcanic rocks. Alteration product of amphibole, pyroxene, biotite.

Chloritoid. $(Fe,Mg,Mn)_2Al_4Si_2O_{10}(OH)_4$. H = 6.5. Dark grey to black tabular crystals; also platy, scaly, foliated aggregates and massive. Translucent. Pearly lustre. Occurs in schist, lava.

Chlorophane. A variety of fluorite that phosphoresces bright green when heated. Not a valid mineral name.

Chondrodite. $Mg_5(SiO_4)_2F_2$. H = 6–6.5. Orange-yellow grains and granular masses. Vitreous to slightly resinous lustre. Subconchoidal to uneven fracture. Occurs in crystalline limestone and in skarn deposits. Orange colour is distinguishing feature. Distinguished from tourmaline by its inferior hardness, from apatite by its superior hardness. Humite group.

Chrome-mica. Green chromium-bearing mica. Also known as 'fuchsite'. Not a valid mineral name.

Chromite. $FeCr_2O_4$. H = 5.5. Black metallic octahedral crystals (rare); generally massive. Distinguished from magnetite by its brown streak and weak magnetism. Commonly associated with serpentine. Ore of chromium.

Chrysoberyl. $BeAl_2O_4$. H = 8.5. Yellow, green, or brown tabular or short prismatic crystals commonly striated and twinned forming six broad radiating spokes. Vitreous; transparent to opaque. Transparent variety is used as a gemstone. Other gem varieties include alexandrite, which is green in natural light and red in artifical light, and cat's-eye, which exhibits a movable streak of light when cut in the cabochon style. Occurs in pegmatite and in mica schist.

Chrysocolla. $(Cu,Al)_2H_2(Si_2O_5)(OH)_4 \cdot nH_2O$. H = 2–4. Blue to blue-green, earthy, botryoidal, or fine grained massive. Conchoidal fracture. Secondary mineral found in oxidized zones of copper-bearing veins. Often intimately mixed with quartz or chalcedony, producing attractive patterns; being mixed with these minerals gives chrysocolla a superior hardness that renders it suitable for use in jewellery and ornamental objects. Minor ore of copper.

Chrysotile. $Mg_3Si_2O_5(OH)_4$. H = 2.5. Green, fibrous with silky lustre; fibres are generally flexible. Known as 'serpentine asbestos'. Serpentine group.

Cinnabar. HgS. H = 2–2.5. Orange-red to brownish-red, dark grey, rhombohedral, tabular, or prismatic crystals; also granular to earthy massive. Adamantine, metallic, or dull lustre. Opaque. Perfect cleavage. Occurs in veins formed at low temperatures. Commonly associated with pyrite, marcasite, and stibnite in silica-carbonate gangue. Ore of mercury.

Clausthalite. PbSe. H = 2.5–3. Dark grey metallic with bluish tint. Granular massive, foliated. Associated with other selenides in ore deposits.

Cleavelandite. Platy, tabular, or lamellar variety of albite; white with pearly lustre. Not a valid mineral name.

Clinopyroxene. Monoclinic. Pyroxene group. Includes aegirine, augite, clinoenstatite, diopside. Not a valid mineral name.

Clinosafflorite. $CoAs_2$. Monoclinic variety of safflorite. Associated with skutterudite in cobalt deposits.

Clinozoisite. $Ca_2Al_3(Si_2O_7)(SiO_4)O(OH)$. H = 7. Light green to greenish-grey prismatic crystals; also granular or fibrous masses. Vitreous lustre. Perfect cleavage. Epidote group. Occurs in metamorphic rocks.

Cobalt bloom. Term used by miners for erythrite.

Cobaltite. CoAsS. H = 5.5. Light grey metallic crystals (cubes, pyritohedrons), or massive. Perfect cleavage. Pinkish tinge distinguishes it from other grey metallic minerals. Crystals resemble pyrite, but differ in colour. Associated with cobalt and nickel sulphides or arsenides. Ore of cobalt.

Cobaltpentlandite. Co_9S_8. A rare mineral intimately associated with sulphides and arsenides in ore deposits at Cobalt, Ontario.

Coffinite. $U(SiO_4)_{1-x}(OH)_{4x}$. H = 5–6. Black with adamantine lustre; dull brown. Finely granular massive. Associated with uraninite from which it is indistinguishable in the hand specimen.

Colemanite. $Ca_2B_6O_{11}{\cdot}5H_2O$. H = 4.5. Colourless to white prismatic crystals; cleavable or granular massive. Transparent to translucent with vitreous lustre. Flame test produces green colour. Occurs in borate and gypsum deposits.

Colerainite. Thin, colourless to white, hexagonal plates forming rosettes and botryoidal aggregates. Pearly lustre. Associated with serpentine. Named for Coleraine Township, Quebec, where it was first found. Variety of clinochlore. Not a valid mineral name.

Coloradoite. HgTe. H = 2.5. Dark grey to black, metallic, granular masses. Soluble in HNO_3. Occurs with gold and silver tellurides.

Columbite. $(Fe,Mn)(Nb,Ta)_2O_6$. H = 6–7. Brownish-black to black prismatic or tabular crystals forming divergent or parallel groups; also massive. Submetallic lustre. Black to reddish-brown streak. Occurs in pegmatite. Ore of niobium used in high-temperature steel alloys.

Colusite. $Cu_{26}V_2(As,Sn,Sb)_6S_{32}$. H = 3–4. Bronze-yellow to bronze-brown granular massive or tetrahedral crystals. Associated with other copper minerals in ore deposits.

Concretion. Rounded mass formed in sedimentary rocks by accretion of some constituent (iron oxides, silica, etc.) around a nucleus (mineral impurity, fossil fragment, etc.).

Conglomerate. A sedimentary rock composed of rounded pebbles or gravel.

Congolite. $(Fe,Mg,Mn)_3\ B_7O_{13}Cl$. Colourless, grey, light red, transparent, finely granular massive; microscopic cubes forming aggregates. Occurs with other borate minerals.

Connellite. $Cu_{19}Cl_4(SO_4)(OH)_{32}{\cdot}3H_2O$. H = 3. Light azure-blue, translucent, acicular crystals. Vitreous lustre. Distinguished from azurite by lack of effervescence in HCl and by lighter colour.

Cookeite. $LiAl_4(Si_3Al)O_{10}(OH)_8$. H = 2.5–3.5. White, pink, greenish, yellowish, or brown pseudohexagonal plates; also scaly. Transparent to translucent with pearly or silky lustre. Occurs with lithium minerals in granite pegmatite. Chlorite group.

Copiapite. $Fe_5(SO_4)_6(OH)_2{\cdot}20H_2O$. H = 2.5–3. Light yellow to orange-yellow and greenish-yellow granular to scaly aggregates; also tabular crystals. Transparent to translucent. Vitreous to pearly lustre. Secondary mineral formed by oxidation of sulphides, especially pyrite. Yellow colour is characteristic.

Copper. Cu. H = 2.5–3. Massive, filiform, or arborescent; crystals (cubic or dodecahedral) rare. Hackly fracture. Ductile and malleable. Occurs in lava.

Coquimbite. $Fe_2(SO_4)_3{\cdot}9H_2O$. H = 2.5. White, yellowish, greenish, or violet, massive; also prismatic crystals. Vitreous lustre. Astringent taste. Secondary mineral formed from pyrite ore.

Cordierite. $Mg_2Al_4Si_5O_{18}$. H = 7. Blue to purplish-blue, bluish-grey, or colourless massive or irregular grains. Vitreous lustre. Subconchoidal fracture. Alters readily to muscovite or chlorite. Distinguished by its colour and by its alteration products. Occurs in metamorphic rocks (schist, gneiss). Gem variety is known as ‘iolite’.

Cordylite. $(Ce,La)_2Ba(CO_3)_3F_2$. H = 4.5. Short colourless or yellowish hexagonal prisms. Transparent; greasy to adamantine, pearly lustre. Occurs in nepheline syenite rocks.

Corundum. Al_2O_3. H = 9. Blue, red, yellow, violet, or brown hexagonal prisms or barrel-shaped, pyramidal, or flat tabular crystals. Uneven to conchoidal fracture. Adamantine to vitreous lustre. Distinguished by its hardness and characteristic barrel-shaped form. Used as an abrasive. Transparent red (ruby), blue (sapphire), yellow, and violet varieties are used as gemstones. Translucent varieties may produce star ruby and star sapphire gemstones.

Cosalite. $Pb_2Bi_2S_5$. H = 2.5–3. Dark grey, metallic, prismatic, needle-like, fibrous, or feathery aggregates; massive. Soluble in HNO_3. Associated with smaltite and cobaltite.

Covellite. CuS. H = 1.5–2. Inky blue, metallic; iridescent in shades of brass yellow, purple, coppery red. Massive; platy crystals (hexagonal) rare. Distinguished from chalcocite and bornite by its perfect cleavage and colour. Referred to as 'blue copper' and 'indigo copper'.

Crandallite. $CaAl_3(PO_4)(PO_3OH)(OH)_6$. H = 5. Minute yellow to white or grey prisms; also fibrous, nodular, or finely granular massive. Transparent to translucent with vitreous or dull lustre. Occurs with other secondary phosphate minerals.

Criddleite. $Ag_2Au_3TlSb_{10}S_{10}$. Fine grey metallic grains (up to 50 mm) associated with aurostibite; recognized only by microscopic examination of polished sections. Occurs in the Hemlo gold deposit, the type locality. Named in honour of ore mineralogist Alan J. Criddle, British Museum, London.

Cristobalite. SiO_2. H = 6.5. White, grey, bluish octahedral (less than 1 mm) crystals; fibrous, massive, stalactitic, botryoidal. Translucent to opaque; vitreous to dull lustre. Occurs in volcanic rocks.

Crocidolite. Blue or bluish-grey asbestiform variety of riebeckite (amphibole). Known as 'blue asbestos'. Used as an insulator. Not a valid mineral name.

Crocoite. $PbCrO_4$. H = 2.5–3. Red-orange to yellow prismatic crystals; massive. Transparent to translucent; adamantine to vitreous lustre. Secondary mineral formed by oxidation of minerals containing lead and chromium.

Cryolite. Na_3AlF_6. H = 2.5. Colourless, yellow, reddish, or brownish, massive granular; crystals with cubo-octahedral aspect. Transparent; vitreous to greasy. Appears to disappear when immersed in water. Soluble in H_2SO_4.

Cryptomelane. KMn_8O_{16}. H = 6–6.5. Grey, greyish-black to black compact to loosely granular massive; also radiating fibres, botryoidal. Metallic to dull lustre. Brownish-black streak. Secondary mineral associated with manganese minerals.

Crystalline limestone. A limestone that has been metamorphosed or recrystallized. Also known as 'marble'. Used as building, monument, and ornamental stone. Dolomitic crystalline limestone contains a high proportion of dolomite.

Cubanite. $CuFe_2S_3$. H = 3.5. Brass-yellow to bronze-yellow tabular crystals, or massive. Distinguished from chalcopyrite by its strong magnetism. Associated with other copper-iron sulphides. Rare mineral.

Cuprite. Cu_2O. H = 3.5–4. Red to almost black octahedral, dodecahedral, or cubic crystals, massive, earthy. Adamantine, submetallic, or earthy lustre. Brownish-red streak. Distinguished from hematite by its inferior hardness, from cinnabar and proustite by its superior hardness. On charcoal, it is reduced to a metallic globule of copper. Soluble in concentrated HCl. Associated with native copper and other copper minerals. Ore of copper. Referred to as 'ruby copper' and 'red vitreous copper'.

Curite. $Pb_3[(UO_2)_4O_4(OH)_3]_2 \cdot 2H_2O$. H = 4–5. Orange, yellow-brown, greenish-yellow to greenish-brown, finely granular. Waxy to dull lustre. Strongly radioactive. Associated with uraninite.

Cyanotrichite. $Cu_4Al_2(SO_4)(OH)_{12} \cdot 2H_2O$. Minute sky-blue to azure-blue acicular crystals commonly radiating; also extremely fine, plush or wool-like aggregates. Silky lustre. Secondary mineral found sparingly in copper deposits.

Cyrtolite. A radioactive zircon containing uranium and rare elements. Not a valid mineral name.

Dachiardite. $Na_4(Si_{20}Al_4)O_{48} \cdot 13H_2O$. H = 4–4.5. Colourless to white prismatic crystals, or fibres forming parallel, divergent groups. Transparent; vitreous to silky lustre. Zeolite group.

Dacite. An igneous rock composed mainly of plagioclase with some quartz and pyroxene or hornblende.

Danaite. Variety of arsenopyrite containing up to 9% cobalt. Not a valid mineral name.

Danburite. $CaB_2(SiO_4)_2$. H = 7. Transparent colourless, light yellow prismatic crystals; white nodules. Clear, colourless danburite is used as a gemstone.

Datolite. $CaBSiO_4(OH)$. H = 6.5. Short, transparent, colourless, light yellow, green, or white prismatic crystals; also botryoidal porcelain-like masses, or granular. Vitreous lustre. Easily fusible. Distinguished by its colour, glassy appearance, crystal form, and ease of fusibility.

Dawsonite. $NaAl(CO_3)(OH)_2$. H = 3. Transparent, striated, square prismatic crystals; rosettes or encrustations of bladed or acicular crystals; tufts of colourless needles; also very fine micaceous aggregates. Lustre is vitreous or pearly in crystals, and silky in micaceous variety. Effervesces in HCl. Distinguished by its striated crystal form. Generally difficult to identify in the hand specimen because crystals are very small. Originally found in Montréal, Quebec, near the McGill University campus. Named for John William Dawson (1820–1899), geologist and principal of McGill University.

Devilline. $CaCu_4(SO_4)_2(OH)_6 \cdot 3H_2O$. H = 2.5. Bright green to bluish-green, transparent, platy crystals forming rosettes or tiny masses. Associated with azurite, malachite on copper-bearing rocks; not readily distinguishable from other secondary copper minerals in the hand specimen.

Diabase. Dark-coloured igneous rock composed mostly of lath-shaped crystals of plagioclase and pyroxene. Used as a building, ornamental, and monument stone.

Diaspore. AlO(OH). H = 6.5–7. White, grey, yellow, brown, light violet, pink, or colourless foliated, scaly, granular, or massive aggregates. Platy or acicular crystals. Pearly, vitreous, or brilliant lustre. Associated with aluminous minerals in igneous and metamorphic rocks.

Diatomite. Pulverulent material composed of the siliceous remains of tiny organisms (diatoms), which accumulated on the bottoms of lakes and swamps in Recent geological time. Lightweight and resembles chalk. Used for insulation, filtration, abrasives, absorbents, etc.

Digenite. Cu_9S_5. H = 2.5–3. Bluish-black to black with submetallic lustre. Occurs as pseudocubic crystals or as intergrowths with other copper sulphides. Referred to as 'blue chalcocite'.

Diopside. $CaMgSi_2O_6$. H = 6. Colourless, white, grey, green, blue. Transparent to opaque with vitreous lustre. Occurs as short prisms or granular masses in calcium-rich metamorphic rocks. Monoclinic variety of pyroxene.

Diorite. A dark-coloured igneous rock composed mainly of plagioclase and amphibole or pyroxene.

Djurleite. $Cu_{31}S_{16}$. Properties similar to those of chalcocite from which it is indistinguishable in the hand specimen. Occurs in some Cobalt, Ontario, ore deposits.

Dolomite. $CaMg(CO_3)_2$. H = 3.5–4. Colourless, white, pink, yellow, or grey rhombohedral or saddle-shaped crystals; also massive. Vitreous to pearly lustre. Slightly soluble in cold HCl. Common vein-filling mineral in ore deposits and essential constituent of dolomitic limestone and dolomitic marble. Ore of magnesium used in the manufacture of lightweight alloys.

Dolomitic limestone. Limestone containing 10 to 50% dolomite.

Domeykite. Cu_3As. H = 3–3.5. Light grey, metallic; massive, reniform, or botryoidal. Becomes yellowish to brown or iridescent when tarnished. Occurs with other copper minerals. Soluble in HNO_3 but not in HCl.

Donnayite. $NaCaSr_3Y(CO_3)_6 \cdot 3H_2O$. H = 3. Yellow, colourless, white, grey, brown, or reddish-brown platy, tabular, columnar, or granular aggregates. Vitreous lustre. Associated with microcline, analcime, calcite, natrolite, chlorite, aegirine, and arfvedsonite in nepheline syenite at the type locality, Mount Saint-Hilaire, Quebec. It was named in honour of Professors J.D.H. Donnay and Gabrielle Donnay, McGill University.

Doverite. Not a valid mineral name. Renamed 'synchysite-Y'.

Doyleite. $Al(OH)_3$. H = 2.5–3. White platy crystals forming rosettes; pulverulent to compact globules, crusts. Dull lustre. Originally described from Mount Saint-Hilaire, Quebec, where it occurs in albitite, and from Francon quarry, Montréal, where it occurs on weloganite, calcite, and quartz. Named in honour of its discoverer, mineral collector E.J. Doyle of Ottawa.

Dresserite. $Ba_2Al_4(CO_3)_4(OH)_8 \cdot 3H_2O$. H = 2.5–3. White to colourless spheres commonly 3 to 4 mm in diameter; blade-like crystals with oblique terminations forming tufts, spheres. Transparent to translucent, opaque; silky to vitreous lustre. Effervesces in HCl. Distinguished from dawsonite by its oblique termination. Associated with weloganite in quartz-albite-lined cavities in igneous sill rock at the Francon quarry, Montréal, Quebec, the type locality. Named in honour of geologist John A. Dresser (1866–1954) in recognition of his geological work in the Monteregian Hills, Quebec.

Dufrénoysite. $Pb_2As_2S_5$. H = 3. Long, grey, metallic, striated tabular crystals. Reddish-brown streak. Perfect cleavage. Associated with sphalerite and arsenic minerals.

Dumortierite. $Al_7BSi_3O_{16}(O,OH)_2$. H = 7. Blue, violet, or greenish-blue columnar or fibrous masses; also massive. Vitreous or dull lustre. Transparent to translucent. Difficult to distinguish from cordierite except by X-ray methods. Used in the manufacture of porcelain spark plugs and as a gemstone.

Dundasite. $PbAl_2(CO_3)_2(OH)_4 \cdot H_2O$. H = 2. White silky to vitreous radiating crystals, spherical aggregates, matted encrustations. Effervesces in acids. Secondary mineral associated with lead minerals.

Dunite. Fine-grained, dull grey-black ultramafic igneous rock composed mainly of olivine.

Durangite. $NaAl(AsO_4)F$. H = 5. Orange-red vitreous pyramidal crystals associated with tin deposits. Soluble in H_2SO_4.

Dyke. A long narrow body of igneous rock cutting across the structure of other rocks that it intrudes.

Dyscrasite. Ag_3Sb. H = 3.5–4. Light grey, metallic, tarnishing to dark grey. Granular massive, foliated; also pyramidal crystals. Sectile. Occurs in veins with silver minerals and sulphide minerals. Decomposed by HNO_3.

Dzalindite. $In(OH)_3$. Yellowish-brown grains. Oxidation product of indite. Occurs in cracks in cassiterite.

Ekanite. $ThCa_2Si_8O_{20}$. H = 5. Dark reddish-brown, yellow, or green tetragonal prisms, or massive. Vitreous lustre. Transparent variety is used as a gemstone. Originally found in gem gravel of Sri Lanka.

Electrum. (Au,Ag). H = 2.5–3. Yellow, metallic. Natural alloy of gold and silver with 20% gold content.

Ellsworthite. Amber-yellow to dark brown, massive; adamantine lustre. Originally found in 1922 at the McDonald mine near Bancroft, Ontario, and named in honour of H.V. Ellsworth, mineralogist, Geological Survey of Canada. Subsequently found to be a uranpyrochlore. Not a valid mineral name.

Elpidite. $Na_2ZrSi_6O_{15} \cdot 3H_2O$. H = 7. White, light green, or grey fibrous, prismatic crystals or massive. Vitreous or silky lustre. Found in nepheline syenite. Not readily identifiable in the hand specimen.

Enargite. Cu_3AsS_4. H = 3. Greyish-black to iron-black, metallic (dull when tarnished), prismatic or tabular crystals; also massive or granular. When twinned, it forms star-shaped cyclic trillings. Perfect cleavage. Associated with pyrite, galena, sphalerite, and copper sulphides. Good cleavage is characteristic. Ore of copper.

Enstatite. $MgSiO_3$. H = 6. White, green, or brown with vitreous lustre. Occurs as coarse cleavable masses in pyroxenite, peridotite. Orthorhombic variety of pyroxene.

Epididymite. $Na_2Be_2Si_6O_{15} \cdot H_2O$. H = 5.5. White prismatic crystals, massive. Silky lustre. Occurs sparingly in nepheline syenite. Not readily identifiable in the hand specimen.

Epidote. $Ca_2FeAl_2(Si_2O_7)(SiO_4)O(OH)$. H = 6–7. Yellowish-green massive or fibrous aggregates. Vitreous lustre. Often associated with quartz and pink feldspar, producing attractive mottled or veined patterns (unakite). Forms during metamorphism of igneous rocks and limestone, and in veins. Takes a good polish and can be used for jewellery and other ornamental objects.

Epistilbite. $Ca_3(Si_{18}Al_6)O_{48}{\cdot}16H_2O$. H = 4. Colourless to reddish twinned prismatic crystals, spherical aggregates, or granular massive. Vitreous lustre. Occurs with stilbite and other zeolite minerals in cavities in basalt. Zeolite group.

Erythrite. $Co_3(AsO_4)_2{\cdot}8H_2O$. H = 1.5–2.5. Rose-red to crimson globular, radial, or reniform aggregates; also earthy or pulverulent; prismatic to acicular crystals (rare). Dull to adamantine lustre. Soluble in HCl. Secondary mineral formed by the oxidation of cobalt arsenides. Referred to as 'cobalt bloom'.

Esker. A long stream-deposited ridge or mound formed by the accumulation of sand, gravel, and boulders left by retreating glaciers.

Eucairite. CuAgSe. H = 2.5. Light grey, metallic; tarnishes to a bronze colour. Granular massive. Associated with other selenides in copper deposits.

Eucryptite. $LiAlSiO_4$. H = 6.5. Short colourless or white hexagonal prisms; more commonly massive granular. Transparent with vitreous lustre. Fluoresces pink in ultraviolet light. Occurs with lithium minerals in granite pegmatite.

Eudialyte. $Na_{1.5}Ca_6Fe_3Zr_3Si(Si_{25}O_{73})(O,OH,H_2O)_3(Cl,OH)_2$. H = 5–5.5. Pink, red, yellow, brown, massive; as grains, or tabular or rhombohedral crystals. Transparent with vitreous lustre. Occurs in nepheline syenite. Difficult to identify in the hand specimen.

Eulytine. $Bi_4(SiO_4)_3$. H = 4.5. Yellow, grey, light green, brown, or white tetrahedral crystal aggregates, also spherical forms. Associated with bismuth minerals. Formerly known as 'eulytite'.

Euxenite. $(Y,Ca,Ce,U,Th)(Nb,Ta,Ti)_2O_6$. H = 5.5–6.5. Black massive or prismatic crystals forming parallel or radial groups. Brilliant, submetallic, or greasy lustre. Conchoidal fracture. Radioactive. Distinguished from other radioactive minerals by X-ray methods.

Evaporite. Sedimentary rock formed by precipitation of minerals such as gypsum or halite from saline waters concentrated by evaporation.

Ewaldite. $Ba(Na,Ca,Y,Ce,K)(CO_3)_2{\cdot}2.6H_2O$. Bluish-green aggregates of microcrystals; tiny white tabular crystals. Associated with mckelveyite.

Facet cut. Polished gemstone featuring numerous flat surfaces, as in diamond.

Facies. A distinctive rock type corresponding to a certain environment or mode of origin.

Fairfieldite. $Ca_2(Mn,Fe)(PO_4)_2{\cdot}2H_2O$. H = 3.5. White, greenish-white, or yellow transparent prismatic crystals; also foliated, fibrous, lamellar, or radiating aggregates. Brilliant or pearly lustre. Soluble in acids. Occurs in granite pegmatite.

Faujasite. $(Ca,Na,Mg)_5(Si,Al)_{12}O_{24}{\cdot}15H_2O$. H = 5. Colourless or white octahedral crystals. Vitreous lustre. Distinguished from fluorite by its superior hardness.

Fault. Structural feature produced by the movement of one rock mass relative to another; the terms 'shear zone', 'brecciated zone', and 'fault zone' refer to the region affected by the movement.

Fayalite. Fe_2SiO_4. H = 6.5. Yellow, greenish- or brownish-yellow, yellowish-brown to brown transparent tabular crystals; granular massive. Vitreous to greasy lustre. Imperfect cleavage, conchoidal fracture. Olivine group.

Feldspar. A mineral group consisting of aluminosilicates of potassium and barium (monoclinic or triclinic), and of sodium and calcium (triclinic). Orthoclase and microcline belong to the first group, plagioclase to the second. Used in the manufacture of glass, ceramics, porcelain enamel, porcelain, pottery, scouring powders, and artificial teeth.

Felsic. A term describing an igneous rock composed mostly of light-coloured minerals such as feldspar, feldspathoids, quartz, and muscovite.

Felsite. A dense, fine-grained, light-coloured (pink or grey) igneous rock composed mainly of feldspar with little or no quartz.

Ferberite. $FeWO_4$. H = 4–4.5. Black striated wedge-shaped prisms; also bladed or massive. Metallic lustre. Brownish-black to black streak. Weakly magnetic. Ore of tungsten.

Fergusonite. $(Y,Ce,La,Nd)NbO_4$. H = 5.5–6.5. Black prismatic or pyramidal crystals; also massive. Brilliant to submetallic lustre on fresh surfaces; grey, yellowish, or brownish on exposed surfaces. Subconchoidal fracture. Radioactive. Occurs in granite pegmatite. Distinguished from other radioactive minerals by X-ray methods.

Fersmite. $(Ca,Ce,Na)(Nb,Ta,Ti)_2(O,OH,F)_6$. H = 4–4.5. Dark brown to black striated prisms; also tabular. Subvitreous to resinous lustre. Greyish-brown streak. Occurs with niobium minerals in marble and in pegmatite.

Fibroferrite. $Fe(SO_4)(OH)\cdot 5H_2O$. H = 2.5. White, yellow, or greenish fibrous masses; also radiating fibres. Silky or pearly lustre. Formed by oxidation of pyrite and associated with other secondary iron minerals from which it is distinguished by X-ray methods.

Fire-clay. Plastic kaolinitic clay with refractory properties. Used for manufacture of refractory bricks and furnace linings.

Fischesserite. Ag_3AuSe_2. H = 2. Metallic grains associated with clausthalite, native gold, chalcopyrite, pyrite, and other selenides.

Flint. Yellowish-grey or brown, or dark grey to black opaque variety of chalcedony. Used by primitive peoples for tools.

Fluoborite. $Mg_3(BO_3)\,F_3$. H = 3.5. Colourless, white, or pink transparent to translucent hexagonal prisms, prismatic or granular aggregates; vitreous, silky, or pearly lustre. May fluoresce white in ultraviolet light. Resembles apatite, but has an inferior hardness. Occurs in crystalline limestone.

Fluorescence. Property of certain substances to glow when exposed to ultraviolet light, X-rays, or cathode rays. It is caused by impurities in the substance or by defects in its crystal structure. Two wavelengths are commonly used to produce ultraviolet fluorescence: long wave (320 to 400 nm), short wave (253.7 nm).

Fluorite. CaF_2. H = 4. Transparent, colourless, blue, green, violet, or yellow cubic or, less commonly, octahedral crystals; also granular massive. Vitreous lustre. Good cleavage. Often fluorescent; this property derives its name from the mineral. Used in optics, steel-making, ceramics.

Fluor-richterite. Dark grey to dark greenish-grey long prismatic crystals or aggregates of crystals. Fluorine-rich variety of richterite; amphibole group. Not a valid mineral name.

Forsterite. Mg_2SiO_4. H = 6.5. White or light green square prismatic or tabular crystals; also massive. Vitreous lustre. Conchoidal fracture. Member of the olivine group; distinguished from other members of the group by X-ray methods. Used in the manufacture of refractory bricks.

Franconite. $Na_2Nb_4O_{11}\cdot 9H_2O$. White microscopic globules and globular aggregates (about 0.5 mm across) with vitreous to silky lustre. Dissolves in HCl. Occurs on weloganite, calcite, and quartz crystals at the Francon quarry, Montréal, the type locality. Named for the locality.

Freibergite. $Ag_6Cu_4Fe_2Sb_4S_{13}$. A silver-rich member of the tetrahedrite-tennantite series.

Freieslebenite. $AgPbSbS_3$. H = 2–2.5. Grey, metallic, striated prismatic crystals. Grey streak. Associated with silver and lead ores.

Frohbergite. $FeTe_2$. H = 4. Pinkish white, metallic. Occurs as intergrowths with other telluride minerals, chalcopyrite, and native gold. Distinguishable from other metallic minerals only by microscopic examination of polished surfaces. Originally found in the Robb-Montbray mine, near Arntfield, Quebec. Named in honour of mining geologist Dr. M.H. Frohberg of Toronto, Ontario.

Froodite. $PdBi_2$. H = 2. Grey, metallic grains associated with arsenic-lead-copper ores. Originally described from the Frood mine, Sudbury district, Ontario, for which it is named.

Fuchsite. An emerald-green chromian muscovite. Not a valid mineral name. Also known as ‘chrome mica’.

Gabbro. A dark, coarse-grained igneous rock composed mainly of calcic plagioclase and pyroxene. Used as a building stone and monument stone.

Gadolinite. $(Ce,Y)_2FeBe_2O_2(SiO_4)_2$. H = 6.5–7. Black prismatic crystals, or massive. Vitreous lustre. Occurs in pegmatite.

Gahnite. $ZnAl_2O_4$. H = 7.5–8. Dark blue-green, yellow, or brown octahedra, rounded grains, massive. Vitreous lustre. Occurs in granite pegmatite and in marble. Spinel group.

Gaidonnayite. $Na_2ZrSi_3O_9\cdot 2H_2O$. Colourless, white to light yellowish-brown striated bladed crystals. Transparent; vitreous. Occurs in nepheline syenite at Mount Saint-Hilaire, Quebec, as crystals on analcime, in cavities in natrolite; also occurs in pegmatite dykes with catapleiite, elpidite, hilairite, albite, microcline, chlorite, aegirine, epididymite, and goethite. Named in honour of Gabrielle Donnay, professor of crystallography, McGill University.

Galena. PbS. H = 2.5. Dark grey, metallic, cubic crystals or crystal aggregates; also massive. Perfect cleavage. Distinguished by its high specific gravity (7.58) and perfect cleavage. Ore of lead; may contain silver. Referred to as ‘plumbago’ and ‘lead glance’.

Galenobismutite. $PbBi_2S_4$. H = 3. Grey metallic massive; acicular striated or platy crystals; fibrous to columnar masses. Associated with other lead and bismuth minerals.

Galkhaite. $(Cs,Tl)(Hg,Cu,Zn)_6(As,Sb)_4S_{12}$. H = 3. Orange-red cubic crystals; granular aggregates. Vitreous to adamantine lustre. Occurs in arsenic-antimony-mercury deposits.

Garnet. $(Ca,Fe,Mg,Mn)_3(Al,Fe,Mn,Cr,Ti,V)_2(SiO_4)_3$. H = 6.5–7.5. Transparent red dodecahedral crystals, or massive; also colourless, yellow, brown, orange, green, black. Used as an abrasive; transparent garnet is used as a gemstone. Distinguished by its crystal form. Mineral group consisting of several species including almandine, grossular, pyrope, spessartine.

Genthelvite. $Zn_4Be_3(SiO_4)_3S$. H = 6–6.5. Light yellow to brown, yellowish-green, or reddish-brown tetrahedral crystals, and massive. Vitreous lustre. Uneven to conchoidal fracture. Helvite group.

Genthite. Hydrous nickel silicate, also known by the general term 'garnierite'. Not a valid mineral name.

Gersdorffite. $Ni(As,S)_2$. H = 5.5. Light to dark grey, metallic; octahedral, pyritohedral crystals or granular massive. Associated with other nickel minerals in vein deposits.

Getchellite. $AsSbS_3$. H = 1.5–2. Dark red, resinous, microscopic crystals; also granular or micaceous. May show violet or green iridescence. Associated with stibnite, realgar, orpiment.

Gibbsite. $Al(OH)_3$. H = 2.5–3.5. White, six-sided, tabular crystals; massive. Translucent, vitreous to pearly, or dull; earthy. Secondary mineral formed by alteration of aluminum minerals.

Ginorite. $Ca_2B_{14}O_{23}\cdot 8H_2O$. H = 3.5. Colourless, white platy crystals, dense masses, and microscopic pellets. Vitreous lustre. Formerly known as 'cryptomorphite'.

Gittinsite. $CaZrSi_2O_7$. H = 3.5–4. White fibrous radiating masses. Occurs as intergrowths with apophyllite in pegmatite. Originally described from the Kipawa area, Quebec, and named in honour of Professor John Gittins, University of Toronto.

Gladite. $PbCuBi_5S_9$. Dark grey, metallic, prismatic crystals. Associated with other lead-bismuth sulphide minerals.

Glaucodot. $Co_{0.5}Fe_{0.5}AsS$. H = 5. Light grey to reddish-grey, metallic, striated prismatic crystals, or massive. May form cruciform twins. Decomposed by HNO_3 forming a pink solution. Associated with cobaltite from which it is distinguished by crystal form and colour.

Glauconite. $(K,Na)(Fe,Al,Mg)_2(Si,Al)_4O_{10}(OH)_2$. H = 2. Greyish, bluish, or yellowish-green fine platy aggregates. Commonly occurs in sedimentary rocks. Mica group.

Gmelinite. $Ca_2(Si_8Al_4)O_{24}\cdot 11H_2O$. H = 4.5. Colourless, white, light yellow, green, or pink striated tabular, pyramidal, or rhombohedral crystals. Transparent, vitreous. Occurs in basalt and other igneous rocks. Zeolite group.

Gneiss. A coarse-grained, foliated, metamorphic rock composed mainly of feldspar, quartz, and mica. Used as a building stone and as monument stone.

Godlevskite. $(Ni,Fe)_9S_8$. Light yellow, metallic. Occurs as microscopic grains and aggregates associated with nickel and copper ores.

Goethite. FeO(OH). H = 5–5.5. Dark brown, reddish- or yellowish-brown earthy, botryoidal, fibrous, bladed, or loosely granular masses; also prismatic, acicular, or tabular crystals, or scaly. Characteristic yellowish-brown streak. Weathering product of iron-rich minerals. Ore of iron. Referred to as 'brown iron-stone', 'brown iron ore', and 'brown hematite'.

Gold. Au. H = 2.5–3. Yellow, metallic, irregular masses, plates, scales, nuggets. Rarely as crystals. Distinguished from other yellow metallic minerals by its hardness, malleability, high specific gravity (19.3). Precious metal. Gold is the Northwest Territories mineral emblem.

Gossan. Rusty oxidation product consisting of hydrated iron oxides derived from the weathering of pyrite and pyrrhotite. Commonly occurs as an outcrop of the upper zone of pyrite-bearing veins.

Götzenite. $NaCa_6Ti(Si_2O_7)_2OF_3$. Light yellowish-brown to colourless radiating acicular aggregates. Vitreous lustre. Rare mineral, difficult to identify in the hand specimen. Occurs with pectolite, natrolite, apophyllite at Mount Saint-Hilaire, Quebec.

Granite. Relatively coarse-grained grey to reddish igneous rock composed mainly of feldspar and quartz. Used as a building stone and as monument stone.

Granite gneiss. Gneiss having the mineral composition of granite.

Granite pegmatite. Pegmatite having the mineral composition of granite.

Granodiorite. A coarse-grained igneous rock with composition intermediate between granite and diorite.

Graphic granite. A granitic rock composed of a regular intergrowth of quartz and K-feldspar, producing a geometric pattern resembling hieroglyphic writing. An attractive ornamental stone.

Graphite. C. H = 1–2. Dark grey to black, metallic, flaky or foliated masses. Flakes are flexible. Greasy to touch. Black streak and colour distinguish it from molybdenite. Usually occurs in metamorphic rocks. Used as a lubricant and in the manufacture of 'lead' pencils and refractories.

Greenockite. CdS. H = 3–3.5. Yellow earthy coating; rarely as pyramidal crystals. Resinous to adamantine lustre. Associated with sphalerite. Dissolves in HCl giving strong H_2S odour.

Greenstone. A metamorphosed volcanic rock composed mainly of chlorite.

Greisen. A granitic rock altered by gaseous emanations from solidifying magma and composed mainly of quartz, muscovite, and topaz.

Greywacke. Sedimentary rock containing large amounts of amphibole or pyroxene and feldspar.

Grossular. $Ca_3Al_2(SiO_4)_3$. H = 6.5–7. Colourless, white, yellow, pink, orange, brown, red, black, or green, transparent to opaque, dodecahedral or trapezohedral crystals; massive granular. Vitreous lustre. Occurs in metamorphosed limestone and skarn zones with other calcium silicates. Transparent varieties are used as a gemstone. Garnet group.

Groutite. MnO(OH). H = 5.5. Black, lustrous, acicular, prismatic, wedge-shaped crystals. Associated with other manganese minerals.

Gudmundite. FeSbS. H = 6. Light to dark grey, metallic, elongated, striated prismatic crystals; also massive, lamellar. Light bronze when tarnished. Not readily distinguishable from other grey metallic sulphides in the hand specimen.

Gunningite. $ZnSO_4 \cdot H_2O$. H = 2.5. White powder occurring as an efflorescence on sphalerite from which it has oxidized. First described from the Keno Hill, Yukon, deposits, and named for Dr. H.C. Gunning, a former geologist with the Geological Survey of Canada and later head of the Geology Department, University of British Columbia.

Gustavite. $PbAgBi_3S_6$. Dark grey, metallic, tabular grains. Rare mineral associated with bismuth-lead-silver sulphosalt minerals.

Gypsum. $CaSO_4 \cdot 2H_2O$. H = 2. White, grey, light brown, granular massive; also fibrous (satin spar), or colourless transparent (selenite). Distinguished from anhydrite by its inferior hardness. Occurs in sedimentary rocks. Used in the construction industry (plaster, wallboard, cement, tiles, paint) and as a soil conditioner and fertilizer. Satin spar, selenite, and alabaster (fine-grained translucent variety) are used for carving into ornamental objects.

Gyrolite. $NaCa_{16}(Si_{23}Al)O_{60}(OH)_8 \cdot 14H_2O$. H = 3–4. Colourless to white concretions with a radiating internal structure. Vitreous lustre. Associated with zeolite minerals in cavities in basalt. Zeolite group.

Hackmanite. Variety of sodalite. Fades on exposure to sunlight and fluoresces when exposed to ultraviolet light. Not a valid mineral name.

Halite. NaCl. H = 2.5. Colourless, white, grey, yellow, or blue, transparent to translucent vitreous crystals (cubes), or granular masses. May be fluorescent. Water soluble. Occurs in sedimentary rocks, in springs, seas, and salt lakes, and in dried inland lake basins. Used for the production of sodium, chlorine, hydrochloric acid, and in its natural state as table salt.

Halotrichite. $FeAl_2(SO_4)_4 \cdot 22H_2O$. H = 1.5. White hair-like crystals; spherical aggregates. Vitreous lustre. Astringent taste. Secondary mineral formed by weathering of pyrite.

Harmotomite. $(Ba,K)_2(Si,Al)_8O_{16} \cdot 6H_2O$. H = 4.5. Colourless, white, grey, yellow, pink, or brown cruciform penetration twins or radiating aggregates. Transparent to translucent, vitreous. Occurs in basalt and other igneous rocks. Zeolite group. Formerly known as 'harmotome'.

Hatchettolite. Amber to black irregular masses. Occurs with radioactive zircon (cyrtolite) in pegmatite. Not a valid mineral name. Accepted name is uranpyrochlore.

Hauchecornite. Ni_9BiSbS_8. H = 5. Light yellow, metallic, tarnishing to dark bronze; tabular, bipyramidal, prismatic crystals. Conchoidal fracture. Black streak. Occurs in nickel-bismuth ores.

Hausmannite. Mn_3O_4. H = 5.5. Brownish-black, greasy to submetallic, fine-grained massive. Associated with other manganese minerals and difficult to distinguish from them in the hand specimen. Ore of manganese. Referred to as 'black manganese'.

Hawleyite. CdS. Bright yellow powdery coating; earthy. Associated with sphalerite and siderite. First described from the lead-silver-zinc deposit at the Hector-Calumet mine, Elsa, Yukon. Named for Professor J.E. Hawley, Queen's University, Kingston.

Heazlewoodite. Ni_3S_2. H = 4. Yellow, metallic; massive, granular, or platy aggregates. Distinguished from pyrite by its inferior hardness.

Hedenbergite. $CaFeSi_2O_6$. H = 6. Green to black short prismatic crystals or massive. Translucent to opaque; vitreous to dull. Monoclinic variety of pyroxene.

Heliotrope. Variety of chalcedony with green body colour and red spots. Also known as 'bloodstone'. Used as a gemstone.

Hellandite. $(Ca_3Y)Y_2AlB_4Si_4O_{22}(OH)_2$. H = 5.5. Red to brown tabular, prismatic crystals. Occurs with tourmaline and rare-earth–element minerals in granite pegmatite.

Hematite. Fe_2O_3. H = 5.5–6.5. Reddish-brown to black, massive, botryoidal, or earthy; also foliated or micaceous with high metallic lustre (specularite). Characteristic red streak. Greasy to dull lustre. Ore of iron. Referred to as 'red iron-stone' and 'iron glance'.

Hemimorphite. $Zn_4Si_2O_7(OH)_2{\cdot}H_2O$. H = 5. White, brownish, light blue, or green thin tabular crystals; also massive, stalactitic, or mammillary. Vitreous lustre. Associated with smithsonite in zinc deposits; distinguished from it by lack of effervescence in HCl and superior hardness. Minor ore of zinc. Formerly known as 'calamine'.

Hemloite. $(Ti,V,Fe,Al)_{12}As_2O_{23}(OH)$. Black, metallic to submetallic, with black streak. Occurs as grains associated with rutile, molybdenite, titanite, pyrite, sphalerite, arsenopyrite, vanadian muscovite, microcline, and quartz in the Hemlo gold deposit, the type locality. Named for the locality.

Hessite. Ag_2Te. H = 2–3. Grey, metallic, finely granular, massive. Sectile. Occurs with native gold and with other tellurides in vein deposits.

Heterogenite. CoO(OH). H = 3–4. Black to dark brown, reddish globular or reniform masses with conchoidal fracture. Alteration product of smaltite.

Heulandite. $NaCa_4(Si_{27}Al_9)O_{72}{\cdot}24H_2O$. H = 3–4. Colourless, white, pink, or orange tabular crystals. Vitreous or pearly lustre. Distinguished from other zeolites by its crystal form.

Hexahydrite. $MgSO_4{\cdot}6H_2O$. Colourless, white, finely fibrous, columnar; also globular encrustations. Pearly to vitreous lustre. Bitter, saline taste. Occurs sparingly as an alteration product of epsomite. Originally found at a Bonaparte River locality in British Columbia. Associated with other sulphates from which it is not readily distinguished.

Hibschite. $Ca_3Al_2(SiO_4)_{3-x}(OH)_{4x}$. H = 6. Colourless, light yellow, or greenish-white octahedral crystals (minute), or massive. Vitreous to greasy lustre. Uncommon mineral, not readily identifiable in hand specimen. Garnet group.

Hilairite. $Na_2ZrSi_3O_9{\cdot}3H_2O$. H = 4.5. Very small, trigonal, light brown, transparent crystals, and pink, porcelain-like, opaque crystals. Associated with analcime, natrolite, microcline, catapleiite, elpidite, aegirine, and chlorite in nepheline syenite at Mount Saint-Hilaire, Quebec, the type locality for which the mineral was named.

Hilgardite. $Ca_2B_5O_9Cl{\cdot}H_2O$. H = 5. Colourless, transparent, tabular crystals or platy aggregates. Vitreous lustre. Occurs with other borate minerals in potash deposits, and in halite and gypsum deposits.

Hiortdahlite. $Na_4Ca_8Zr_2(Nb,Mn,Ti,Fe,Mg,Al)_2(Si_2O_7)_4O_3F_5$. H = 5.5. Yellow to brown tabular crystals. Translucent to transparent; vitreous. Occurs in alkalic igneous rocks.

Hisingerite. $Fe_2Si_2O_5(OH)_4 \cdot 2H_2O$. H = 3. Black to brownish-black, compact, massive with conchoidal fracture. Greasy to dull lustre. Alteration product of iron-bearing minerals.

Hochelagaite. $CaNb_4O_{11} \cdot 8H_2O$. H ~ 4. White microscopic globules composed of radiating blades. Vitreous lustre. Occurs on crystals of weloganite, calcite, and quartz at the Francon quarry, Montréal, the type locality. Indistinguishable from franconite in the hand specimen. Named for Hochelaga, the original name for Montréal.

Hollingworthite. RhAsS. H = 6. Grey, metallic grains intergrown with platinum minerals such as sperrylite.

Holmquistite. $Li_2(Mg,Fe)_3Al_2Si_8O_{22}(OH)_2$. H = 5–6. Violet to light blue prismatic, acicular to fibrous aggregates; also massive. Transparent to translucent with vitreous lustre. Associated with lithium-rich pegmatite occurring in wall rock. Orthorhombic variety of amphibole.

Hornblende. $(Ca,Na)_2(Mg,Fe)_4Al(Si_7Al)O_{22}(OH,F)$. H = 6. Dark green, brown, or black prismatic crystals, or massive. Vitreous lustre. Common rock-forming mineral. Monoclinic variety of amphibole.

Howlite. $Ca_2B_5SiO_9(OH)_5$. H = 3.5. Colourless to white, vitreous, granular masses; transparent elongated tabular crystals; compact nodular masses. Crystals distinguished from selenite by superior hardness. Occurs in sedimentary rocks. Named after Henry How, Nova Scotia mineralogist who first described it in 1868.

Huebnerite. $MnWO_4$. H = 4–4.5. Brown tabular prismatic crystals; crystal aggregates. Resinous to submetallic lustre. Perfect cleavage, uneven fracture. Occurs with other manganese minerals in veins.

Humite. $(Mg,Fe)_7(SiO_4)_3(F,OH)_2$. H = 6–6.5. Yellow to orange, granular or massive. Vitreous to resinous lustre. Difficult to distinguish from other members of the humite group (chondrodite, norbergite, clinohumite). Occurs in crystalline limestone.

Hydroboracite. $CaMgB_6O_8(OH)_6 \cdot 3H_2O$. H = 2–3. Colourless, transparent, vitreous, prismatic crystals; white fibrous masses with silky lustre. Occurs in salt and borate deposits. Soluble in acids.

Hydrocarbon. Naturally occurring compounds of carbon and hydrogen such as paraffin, and compounds of carbon, hydrogen, and oxygen such as amber, petroleum, coal. Compounds are of organic origin and are not classified as minerals.

Hydrocerussite. $Pb_3(CO_3)_2(OH)_2$. H = 3.5. Tiny colourless to white or grey hexagonal scales and plates. Transparent to translucent with adamantine or pearly lustre. Associated with cerussite from which it is not readily distinguished. Alteration product of lead, galena.

Hydrodresserite. $BaAl_2(CO_3)_2(OH)_4 \cdot 3H_2O$. H = 3–4. White spheres and hemispheres (2 to 4 mm across) composed of radiating blades. Translucent to opaque. Dehydrates to dresserite from which it cannot be distinguished in hand specimen. Effervesces in HCl. Occurs with quartz, dawsonite, and weloganite at the Francon quarry, Montréal, the type locality. Named for its chemical relationship to dresserite.

Hydromagnesite. $Mg_5(CO_3)_4(OH)_2 \cdot 4H_2O$. H = 3.5. Colourless or white, transparent, flaky, acicular, or bladed crystals, aggregates forming tufs, rosettes, or encrustations; also massive. Vitreous, silky, or pearly lustre. Associated with serpentine, brucite, magnesite. Effervesces in acids. Distinguished from calcite by its habit.

Hydronepheline. Pink to orange-red nodular or irregular patches in nepheline syenite. Not a valid mineral name. In the Bancroft, Ontario, area, what was referred to as 'hydronepheline' is natrolite.

Hydrotalcite. $Mg_6Al_2(CO_3)(OH)_{16}\cdot 4H_2O$. H = 2. White, transparent, foliated, lamellar aggregates; also platy. Pearly to waxy lustre. Greasy feel. Distinguished from talc by its effervescence in dilute HCl and by its superior hardness. Associated with talc, serpentine deposits.

Hydroxylbastnaesite. $(Ce,La)(CO_3)(OH)$. H = 4. Yellow to brown, pinkish-brown, or dark green, opaque, irregular to reniform masses. Waxy, greasy, or resinous lustre. Associated with other rare-earth–element minerals.

Hydrozincite. $Zn_5(CO_3)_2(OH)_6$. H = 2–2.5. White to grey, yellowish, brownish, or pinkish, fine-grained, compact to earthy or gel-like masses; also stalactitic, reniform, pisolitic, concentrically banded, or radially fibrous aggregates; flat, blade-like crystals. Dull, silky, or pearly lustre. Fluoresces light blue or light violet in ultraviolet light. Secondary mineral found in oxidized zones in zinc deposits.

Hypersthene. $(Fe,Mg)SiO_3$. H = 6. Brown to blackish-brown prismatic crystals or granular to cleavable masses. May have a bronze lustre (bronzite). Occurs in anorthosite, peridotite, and pyroxenite. Intermediate member of the orthorhombic enstatite-ferrosilite series, pyroxene group. Bronze variety used as a gemstone.

Igneous. Rocks that have crystallized from magma or from the melting of other rocks; usually composed of feldspar, quartz, and hornblende, pyroxene, or biotite.

Ilesite. $MnSO_4\cdot 4H_2O$. Green to white, loose prismatic crystal aggregates. A secondary mineral formed by oxidation in sulphide veins.

Illite. $(K,H_3O)Al_2(Si_3Al)O_{10}(H_2O,OH)_2$. H = 1–2. White, finely micaceous to clay-like. Dull lustre. Perfect cleavage. Mica-clay mineral.

Ilmenite. $FeTiO_3$. H = 5–6. Black, metallic to submetallic. Compact or granular massive; thick tabular crystals. Black streak distinguishes it from hematite. Ore of titanium.

Ilmenomagnetite. Titanium-bearing magnetite containing ilmenite in exsolution. Not a valid mineral name.

Ilmenorutile. $(Ti,Nb,Ta,Fe)O_2$. H = 6. Black to greenish-black plates, rosettes. Opaque; velvety to submetallic lustre. Occurs in dawsonite, calcite at the Francon Quarry, Montréal.

Insizwaite. $PtBi_2$. Metallic grains and massive. Associated with pentlandite, chalcopyrite, and nickel and platinum minerals.

Inyoite. $CaB_3O_3(OH)_5\cdot 4H_2O$. H = 2. Colourless, transparent, prismatic to tabular crystals; granular massive. Vitreous lustre. Occurs in gypsum and borate deposits. Soluble in dilute acids and in hot water.

Irarsite. (Ir,Ru,Rh,Pt)AsS. Black, metallic, massive. Associated with platinum minerals.

Iridosmine. Not a valid mineral name. Name changed to osmium.

Iron. Fe. H = 4. Dark grey to greyish-black metallic blebs, or massive. Malleable and magnetic. Soluble in dilute HCl and in acetic acid. Occurs in meteorites. Terrestrial native iron (uncommon) occurs in volcanic rocks.

Iron-formation. Sedimentary rock containing iron minerals and silica.

Ixiolite. $(Ta,Mn,Nb)O_2$. H = 6–6.5. Grey, metallic, prismatic crystals. Occurs in granite pegmatite.

Jade. Term used for two gemstones, nephrite and jadeite. Jade is the British Columbia gemstone emblem.

Jamesonite. $Pb_4FeSb_6S_{14}$. H = 2.5. Dark grey, metallic, acicular, fibrous, columnar, or plumose aggregates commonly striated. Iridescent tarnish. Decomposes in HNO_3. Occurs in veins with other lead sulphosalts and sulphides.

Jarosite. $KFe_3(SO_4)_2(OH)_6$. H = 2.5–3.5. Yellow to brownish pulverulent coating associated with iron-bearing rocks and with coal. Distinguished from iron oxides by giving off SO_2 when heated.

Jasper. An opaque, dark red to brown, yellow, green, or light violet variety of chalcedony. Used as an ornamental stone and as a gemstone.

Jaspilite. A rock consisting of alternating bands of red jasper and iron oxides. An attractive ornamental rock.

Joaquinite. $NaBa_2FeTi_2Ce_2(SiO_3)_8O_2(OH)\cdot H_2O$. H = 5.5. Yellow to brown tabular or stubby pyramidal crystals. Transparent to translucent; vitreous. Occurs with aegirine and microcline in cavities in breccia at Mount Saint-Hilaire, Quebec. Rare mineral.

Junoite. $Cu_2Pb_3Bi_8S_{16}$. Metallic grains (up to 0.5 mm across) associated with chalcopyrite, sphalerite, colbaltite, kesterite, and mawsonite in the Kidd Creek mine, Timmins, Ontario.

Kaersutite. $NaCa_2(Mg_4Ti)(Si_6Al_2)O_{23}(OH)$. H = 5–6. Dark brown to black short prismatic crystals, or massive. Translucent to opaque; vitreous to resinous. Occurs in volcanic rocks. Amphibole group.

Kainosite. $Ca_2Y_2(SiO_3)_4(CO_3)\cdot H_2O$. H = 5–6. Yellow to brown, colourless, or pink prismatic crystals. Transparent, vitreous. Occurs in igneous rocks. Formerly known as ‘cenosite’.

Kaolinite. $Al_2Si_2O_5(OH)_4$. H = 2. White, greyish, yellowish, or brownish earthy masses. Dull lustre. Clay mineral formed chiefly by decomposition of feldspars. Becomes plastic when wet. Used as a filler (in paper) and in the manufacture of ceramics.

Karpinskyite. Mixture of leifite $[Na_2(Si,Al,Be)_7(O,OH,F)_{14}]$ and zinc-bearing montmorillonite. Not a valid mineral name.

Kasolite. $Pb(UO_2)SiO_4\cdot H_2O$. H = 4–5. Yellow, greenish-yellow, or brown, finely granular; also minute prismatic crystals. Dull to resinous lustre. Radioactive. Soluble in acids. Associated with uraninite and secondary radioactive minerals from which it is not easily distinguished in the hand specimen.

Kermesite. Sb_2S_2O. H = 1–1.5. Red hair-like or tufted radiating aggregates of lath-shaped crystals. Translucent with adamantine to semimetallic lustre. Sectile. Alteration product of stibnite. Colour and habit are characteristic. Minor ore of antimony.

Kesterite. $Cu_2(Zn,Fe)SnS_4$. H = 4.5. Greenish black, opaque, massive. Associated with sulphide minerals. Related structurally to stannite.

K-feldspar. $KAlSi_3O_8$. H = 6. Potassium feldspar includes sanidine (colourless), orthoclase (white, pink), and microcline (white, pink, green).

Kiddcreekite. Cu_6SnWS_8. Microscopic metallic irregular grains. Originally found intimately associated with scheelite, clausthalite, tennantite, and tungstenite in a bornite zone in the Kidd Creek mine, Timmins, Ontario. Named for the locality. Identified by microscopic examination of polished surfaces.

Kieserite. $MgSO_4 \cdot H_2O$. H = 3.5. White, granular, massive. Occurs in salt deposits. Dissolves slowly in water.

Kimberlite. Porphyritic igneous rock composed mainly of serpentinized olivine and chloritized phlogopite forming phenocrysts and the fine-grained matrix enclosing them. Common host rock for diamond.

Klockmannite. CuSe. H = 2–3. Grey, metallic, tarnishing to bluish black. Granular aggregates; tabular. Associated with other selenides in ore deposits.

Knebelite. Manganoan fayalite.

Kornerupine. $(Mg,Fe,Al)_{10}(Si,Al,B)_5O_{21}(OH,F)$. H = 6.5. Yellow, brown, red, blue, and green elongated prisms; also fibrous and columnar. Vitreous lustre. Transparent. Occurs in metamorphic rocks. Transparent variety used as a gemstone.

Kotulskite. Pd(Te,Bi). Metallic minute grains intergrown with chalcopyrite and platinum-group minerals. Identified by microscopic examination of polished surfaces.

Krennerite. $AuTe_2$. H = 2–3. Light grey to yellow, metallic, prismatic, striated crystals. Occurs with other gold tellurides and with native gold in vein deposits.

Krupkaite. $PbCuBi_3S_6$. H = 3.5. Grey metallic fibrous aggregates associated with bismuthinite.

Kulanite. $Ba(Fe,Mn,Mg)_2Al_2(PO_4)_3(OH)_3$. H = 4. Blue to green tabular plates forming rosette-like aggregates. Transparent with vitreous lustre. Type locality is an iron-formation exposure in 'Cross-cut Creek', Rapid Creek area, Yukon. Named for prospector Alan Kulan who discovered the new mineral in 1976.

Kyanite. Al_2SiO_5. H = 4–5, 6–7. Blue, green, greyish-blue, long, bladed crystals and bladed masses. Vitreous to pearly lustre. Hardness is 4 to 5 along the length of the crystal and 6 to 7 across it. Occurs in schist and gneiss. Colour and varied hardness are distinguishing characteristics. Used in the manufacture of mullite refractories.

Labradorite. $(Ca,Na)(Si,Al)_4O_8$. H = 6. Grey, vitreous, transparent to translucent. Commonly exhibits blue, green, yellow, or bronze iridescence and is used as a gemstone. Chief constituent of anorthosite and gabbro. Named for Labrador. Variety of plagioclase feldspar. Labradorite is the Newfoundland and Labrador mineral emblem.

Labuntsovite. $Na_4K_4Mg_2Ti_8O_4(Si_4O_{12})_4(OH)_4 \cdot 10–12H_2O$. H = 6. Pink, orange, red, or brownish-yellow prismatic, acicular crystals. Perfect cleavage. Occurs in nepheline syenite at Mount Saint-Hilaire, Quebec.

Laitakarite. Bi_4Se_3. H = soft. Grey, metallic, foliated plates and sheets to 2 mm across. Associated with junoite in the bornite zone at the Kidd Creek mine, Timmins, Ontario.

Lamprophyre. A dark porphyritic igneous rock with hornblende, pyroxene, and biotite forming phenocrysts in a fine-grained matrix composed of the same mafic minerals.

Langisite. CoAs. Pinkish, light brown, metallic. Occurs as grains, lamellae in safflorite. Named for the Langis mine, Cobalt, Ontario, where it was orignally found.

Langite. $Cu_4(SO_4)(OH)_6 \cdot 2H_2O$. H = 2.5–3. Transparent tiny blue crystals forming aggregates on copper-bearing rocks. Vitreous to silky lustre. Formed by oxidation of copper sulphides. Difficult to distinguish from other copper sulphates in the hand specimen.

Lapieite. $CuNiSbS_3$. H = 4–5. Grey, metallic, microscopic grains associated with pyrite, polydymite, gersdorffite, and millerite in a matrix consisting of quartz with altered spinel, magnesite, and bright green mica. Named for the Lapie River, Yukon, which was named for an Indian guide to explorer Robert Campbell.

Larosite. $(Cu,Ag)_{21}PbBiS_{13}$. Whitish, light brown, acicular crystals associated with chalcocite, stromeyerite in silver-copper ores. Originally found in the Foster mine, Cobalt, Ontario. Named for Mr. Fred LaRose, one of the discoverers of silver-cobalt ore in Cobalt.

Latite. A porphyritic igneous rock consisting of approximately equal amounts of plagioclase and K-feldspar phenocrysts, with little or no quartz, in a fine-grained to glassy matrix.

Laumontite. $CaAl_2Si_4O_{12} \cdot 4H_2O$. H = 4. White to pink or reddish-white, vitreous to pearly, prismatic crystal aggregates; also friable, chalky due to dehydration. Characteristic alteration distinguishes it from other zeolites.

Lava. Rock resulting from a volcanic eruption; also referred to as volcanic rock.

Lavendulan. $NaCaCu_5(AsO_4)_4Cl \cdot 5H_2O$. H = 2.5. Blue to light violet-blue radiating fibres or flakes forming botryoidal crusts. Vitreous or waxy lustre.

Lavenite. $(Na,Ca)_2(Mn,Fe)(Zr,Ti)Si_2O_7(O,OH,F)_2$. H = 6. Yellow to dark brown or brownish-red, prismatic, fibrous, acicular aggregates, or massive. Translucent; vitreous to greasy or dull lustre. Occurs in alkalic igneous rocks.

Lazulite. $MgAl_2(PO_4)_2(OH)_2$. H = 5.5–6. Blue pyramidal or tabular crystals; massive. Vitreous lustre. Soluble in hot acids. Transparent variety used as a gemstone. Lazulite is the Yukon gemstone emblem.

Lead. Pb. H = 1.5. Grey, metallic, platy, dendritic, rounded masses; less commonly octahedral, dodecahedral, or cubic crystals. Malleable and ductile. Rare mineral occurring in various rock environments and in placer deposits. Decomposes readily in HNO_3.

Lead (geological term). Synonym of lode.

Leadhillite. $Pb_4(SO_4)(CO_3)_2(OH)_2$. H = 2.5–3. Colourless, white, light blue to green tabular or prismatic crystals, or granular massive. Secondary lead mineral associated with galena and other lead minerals. Soluble in HNO_3. Exfoliates in hot water.

Lemoynite. $Na_2CaZr_2Si_{10}O_{26} \cdot 5–6H_2O$. H = 4. White or yellowish-white, minute, prismatic crystals, spheres. Occurs in nepheline syenite associated with microcline at Mount Saint-Hilaire, Quebec, the type locality. Named for Charles Lemoyne and his sons, seventeenth century explorers of New France.

Leonhardtite. Not a valid mineral name. Renamed ‘starkeyite’.

Lepidocrocite. FeO(OH). H = 5. Reddish-brown, submetallic, scaly or fibrous masses. Characteristic orange streak. Associated with goethite as an oxidation product of iron minerals.

Lessingite. Colourless, greenish, or reddish yellow. Vitreous lustre. Occurs with allanite, bastnaesite, cerite. Variety of britholite. Not a valid mineral name.

Leucogranite. A granite composed almost entirely of light-coloured minerals (feldspar, quartz), and less than 2% dark minerals.

Leucophanite. $NaCaBeSi_2O_6F$. H = 4. Green to greenish-yellow tabular crystals with vitreous lustre. Occurs sparingly in nepheline syenite. Not readily distinguished in the hand specimen.

Leucosphenite. $BaNa_4Ti_2B_2Si_{10}O_{30}$. H = 6.5. Light blue, white prismatic crystals; also tabular. Vitreous lustre. Occurs sparingly in nepheline syenite. Not readily distinguished in the hand specimen.

Leucoxene. A general term for alteration products of ilmenite. Not a valid mineral name.

Levyne. $Na_6(Si_{12}Al_6)O_{36}{\cdot}18H_2O$. H = 4–4.5. Colourless, transparent, tabular crystals or sheaf-like aggregates; also reddish or yellowish. Vitreous lustre. Occurs in cavities in basalt. Zeolite group.

Liebigite. $Ca_2(UO_2)(CO_3)_3{\cdot}11H_2O$. H = 2.5–3. Light green, or yellowish-green short prismatic crystals; also scaly, granular, botryoidal aggregates. Transparent to translucent with vitreous to pearly lustre. Fluoresces green in ultraviolet light. Secondary mineral formed in uranium deposits.

Limestone. Soft, white, grey, or greyish-brown sedimentary rock formed by deposition of calcium carbonate. Dolomitic limestone contains varied proportions of dolomite and is distinguished from normal limestone by its weaker (or lack of) effervescence in HCl. Used as a building stone and as road metal. Shell limestone (coquina) is a porous rock composed mainly of shell fragments. Crystalline limestone (marble) is a metamorphosed limestone and is used as a building and ornamental stone, as a filler for paper and paints, for the production of magnesium metal, and as crushed stone.

Limonite. Field term referring to natural hydrous iron oxides. Yellow-brown to dark brown, earthy, porous, ochreous masses; also stalactitic or botryoidal. Secondary product of iron minerals. Not a valid mineral name.

Linnaeite. Co_3S_4. H = 4.5–5.5. Light to dark grey, metallic, tarnishing to copper-red. Octahedral crystals, massive. Decomposed by HNO_3. Uncommon mineral associated with cobalt ores.

Lithiophilite. $LiMnPO_4$. H = 4–5. Yellow, yellowish-brown, brown, pink, cleavable to compact massive; crystals (prismatic) are rare. Transparent to translucent with vitreous to subresinous lustre. Becomes brown, dark grey to black on weathered surfaces. Soluble in acids. Occurs with other lithium and phosphate minerals in granite pegmatite. Forms a series with triphylite.

Lithiophosphate. Li_3PO_4. H = 4. Colourless, white, or pink prismatic crystals, or massive. Vitreous lustre. Perfect cleavage. Occurs with other lithium minerals in granite pegmatite.

Lode. A mineral deposit consisting of a system of veins or a zone of disseminations in consolidated rock.

Loellingite. $FeAs_2$. H = 5–5.5. Light to dark grey, metallic, prismatic crystals; also pyramidal crystals or massive. Occurs with nickel and cobalt minerals in the Cobalt, Ontario, deposits.

Lokkaite. $CaY_4(CO_3)_7 \cdot 9H_2O$. White radiating fibrous aggregates; massive. Alteration product of yttrium minerals.

Lorenzenite. $Na_2Ti_2O_3(Si_2O_6)$. H = 6. Colourless, fine, acicular crystals. Vitreous lustre. Occurs in nepheline syenite. Rare mineral. Not readily identifiable in the hand specimen. Formerly known as 'ramsayite'.

Ludwigite. Mg_2FeBO_5. H = 5. Greenish-black, opaque, longitudinally striated prisms; dull to submetallic lustre. Also fibrous, acicular, or granular masses. Occurs with brucite, serpentine in contact metamorphic zones.

Lyndochite. Th-Ca-Euxenite. H = 6.5. Black, lustrous, flat, prismatic crystals. Conchoidal fracture. Vitreous lustre. Occurs in pegmatite. Named for Lyndoch Township, Ontario. Not a valid mineral name.

Mackinawite. $(Fe,Ni)_9S_8$. H = 2.5. Yellow, metallic; light grey metallic on freshly broken surfaces. Tetragonal, platy, or pyramidal crystals; also massive, finely lamellar aggregates. Associated with sulphide ore minerals.

Mafic. A term describing an igneous rock composed mostly of dark (ferromagnesian) minerals such as amphibole, pyroxene, biotite.

Magnesite. $MgCO_3$. H = 4. Colourless, white, greyish, yellowish to brown, lamellar, fibrous, granular, or earthy masses; crystals rare. Vitreous, transparent to translucent. Distinguished from calcite by lack of effervescence in cold HCl and by superior hardness. Used in the manufacture of refractory bricks, cements, flooring, and magnesium metal.

Magnetite. Fe_3O_4. H = 5.5–6.5. Black metallic octahedral, dodecahedral, or cubic crystals; massive granular. Occurs in vein deposits, in igneous and metamorphic rocks, and in pegmatite. Strongly magnetic. Ore of iron.

Malachite. $Cu_2CO_3(OH)_2$. H = 3.5–4. Green granular, botryoidal, earthy masses; usually forms coatings with other secondary copper minerals on copper-bearing rocks. Distinguished from other green copper minerals by effervescence in HCl. Ore of copper.

Manganite. MnO(OH). H = 4. Steel-grey to iron-black, metallic, prismatic striated crystal aggregates; also columnar, fibrous, stalactitic, finely granular. Not readily distinguishable from other black manganese minerals in the hand specimen. Ore of manganese.

Manganocolumbite. $(Mn,Fe)(Nb,Ta)_2O_6$. H = 6. Black, brownish-black tabular crystals. Occurs in granite pegmatite. Forms series with manganotantalite and ferrocolumbite.

Manganotantalite. $MnTa_2O_6$. H = 6–6.5. Brownish-black, tabular, short prismatic crystals, or massive. Dark red streak. Vitreous to resinous lustre. Iridescent on tarnished surfaces. Occurs in granite pegmatite. Columbite group.

Manganous manganite. Not a valid mineral name. Renamed 'birnessite'.

Marble. *See* limestone.

Marcasite. FeS_2. H = 6–6.5. Light bronze to grey, metallic, radiating, stalactitic, globular, or fibrous; twinning produces cockscomb and spear shapes. Yellowish to dark brown tarnish. Massive variety is difficult to distinguish from pyrite in the hand specimen.

Mariposite. Bright green. Chrome variety of muscovite. Not a valid mineral name.

Martite. Black octahedral crystals. Dull to splendent lustre. Hematite pseudomorphous after magnetite. Not a valid mineral name.

Matildite. $AgBiS_2$. H = 2.5. Black to grey, metallic, granular massive; striated indistinct prismatic crystals (rare). Uneven fracture. Occurs intergrown with galena from which it alters. Associated with sulphide minerals in deposits formed at moderate to high temperatures.

Mattagamite. $CoTe_2$. Grey, metallic, with violet to pink tinge. Occurs as microscopic grains and bladed aggregates with altaite, pyrrhotite, and chalcopyrite. Named for Mattagami Lake, Quebec, which is near the mine where it was originally found.

Maucherite. $Ni_{11}As_8$. H = 5. Grey, metallic, with reddish tinge tarnishing to copper-red. Tabular or pyramidal crystals; also massive, granular, or radiating fibrous. Decomposed by acids. Associated with cobalt-nickel ores.

Mawsonite. $Cu_6Fe_2SnS_8$. H = 3.5–4. Metallic microscopic irregular to rounded grains associated with bornite and other copper sulphide minerals.

Mcauslanite. $HFe_3Al_2(PO_4)_4F{\cdot}18H_2O$. H = 3.5. Yellowish-white radiating acicular to tabular crystal aggregates. Silky or vitreous lustre. Associated with other phosphate minerals including fluorapatite, triplite, vivianite, phosphophyllite, and childrenite-eosphorite. New species originally found at the East Kemptville mine. Mcauslanite is named in honour of Dr. David A. McAuslan who discovered the deposit while co-ordinating the Shell Canada Resources Limited exploration program in the East Kemptville area, Nova Scotia.

Mckelveyite. $Ba_3Na(Ca,U)Y(CO_3)_6{\cdot}3H_2O$. Green, yellowish-green, or yellow crystal aggregates or platy crystals. Occurs with donnayite, natrolite, microcline in carbonate cavities at Mount Saint-Hilaire, Quebec.

Mckinstryite. $(Ag,Cu)_2S$. Steel grey, metallic, becoming black on exposure to air. Associated with silver ore minerals. Originally found in the Foster mine, Cobalt, Ontario.

Melaconite. Dull powdery coatings or masses; lustrous, resembling coal; reniform or colloform masses. Soluble in HCl or HNO_3. Known as 'copper pitch ore'. Not a valid mineral name. Name changed to tenorite.

Melanterite. $FeSO_4{\cdot}7H_2O$. H = 2. Greenish-white to green or blue, massive, pulverulent; also stalactitic, concretionary, fibrous, or capillary; short prismatic crystals (less common). Vitreous to dull lustre. Metallic, astringent taste. Soluble in water. Secondary mineral associated with pyrite and marcasite.

Melilite. $(Ca,Na)_2(Al,Mg)(Si,Al)_2O_7$. H = 5. White, light yellow, greenish; square or octagonal prisms. Vitreous to resinous lustre. Conchoidal to uneven fracture. Difficult to identify in the hand specimen.

Melonite. $NiTe_2$. H = 1–1.5. Reddish-white, metallic, tarnishing to brown. Tiny hexagonal plates or lamellae. Dark grey streak. Perfect cleavage. Occurs with sulphides and other tellurides in nickel-copper deposits.

Meneghinite. $Pb_{13}Sb_7S_{24}$. H = 2.5. Blackish-grey, metallic. Slender, striated prismatic crystals, fibrous, massive. Oxidized by HNO_3. Associated with sulphides and sulphosalts.

Merenskyite. $PdTe_2$. Minute metallic grains intergrown with platinum minerals. Distinguished from associated minerals by microscopic examination of polished surfaces.

Mertieite. $Pd_8(Sb,As)_3$. Yellow metallic grains, massive. Sparingly associated with platinum minerals.

Mesolite. $Na_2Ca_2Al_6Si_9O_{30}{\cdot}8H_2O$. H = 5. Colourless or white acicular crystals and radiating aggregates; as tufts. Vitreous lustre. Generally associated with other zeolites in amygdaloidal basalt and distinguished from them by X-ray methods.

Meta-autunite. $Ca(UO_2)_2(PO4)_2{\cdot}2–6H_2O$. H = 2–2.5. Yellow earthy masses. Dull lustre. Fluoresces yellowish-green in ultraviolet light. Occurs with autunite.

Metagabbro. A metamorphosed gabbro.

Metamict mineral. Mineral rendered amorphous by the destruction of its crystal structure by radiation from radioactive elements it contains. Zircon and allanite may be metamict.

Metasedimentary rock. Metamorphosed sedimentary rock.

Metatorbernite. $Cu(UO_2)2(PO_4)2{\cdot}8H_2O$. H = 2.5. Green tablets; platy, lamellar, or sheaflike aggregates. Vitreous to subadamantine lustre. Soluble in acids. Secondary mineral formed in copper-uranium deposits.

Metavolcanic rock. Metamorphosed volcanic rock.

Metavoltine. $K_2Na_6Fe_7O_2(SO_4)_{12}{\cdot}18H_2O$. H = 2.5. Yellowish, greenish or orange-brown minute tabular hexagonal crystals; also scaly or granular aggregates. Resinous lustre. Partially soluble in H_2O and decomposed by dilute acids. Occurs in fumaroles and with other sulphates.

Miargyrite. $AgSbS_2$. H = 2.5. Black to dark grey, metallic, striated tabular crystals; massive. Red streak. Occurs with other silver sulphosalts and with sulphide minerals in low-temperature hydrothermal veins.

Mica. A mineral group of hydrous aluminum silicates characterized by sheet-like platy structure producing perfect basal cleavage. Muscovite, biotite, and phlogopite are common members of this group.

Michenerite. PdBiTe. H = 2.5. Greyish-white, metallic, minute grains; massive. Black streak. Associated with gold, platinum, and bismuth minerals. Originally described from the Frood mine, Sudbury, Ontario, and named in honour of geologist C.E. Michener, who discovered the mineral.

Microcline. $KAlSi_3O_8$. H = 6. White, pink to red, or green (amazonite) crystals or cleavable masses. Distinguished from other feldspars by X-ray diffraction and chemical analysis. Triclinic member of K-feldspar.

Microlite. $(Ca,Na)_2Ta_2(O,OH,F)_7$. H = 5–5.5. Yellow to brown, reddish octahedral crystals, grains, or massive. Translucent to opaque with vitreous lustre. Occurs with lithium minerals in granite pegmatite.

Micropegmatite. A granitic rock composed of an irregular microscopic intergrowth of quartz and K-feldspar. Synonym of granophyre.

Migmatite. A coarse-grained composite rock consisting of a foliated granitic component and a gneissoid metamorphic component. An attractive rock composed of contrasting white to grey irregular patches and bands; may be used as an ornamental or building stone.

Millerite. NiS. H = 3–3.5. Light brass-yellow, slender, elongated, striated crystals; acicular radiating or hair-like aggregates. Grey iridescent tarnish. Distinguished from pyrite by its crystal form and its inferior hardness. Ore of nickel.

Minium. Pb_3O_4. H = 2.5. Bright red to brownish-red, earthy, pulverulent masses with greasy to dull lustre. Orange-yellow streak. Affected by HCl and HNO_3. Secondary mineral formed by alteration of galena, cerussite.

Miserite. $KCa_6Si_8O_{22}(OH)$. H = 5.5–6. Pink to light violet fibrous, scaly, or cleavable masses. Vitreous or pearly lustre. Associated with wollastonite, eudialyte, scapolite.

Mixite. $BiCu_6(AsO_4)_3(OH)_6{\cdot}3H_2O$. H = 3–4. Green acicular crystals with brilliant lustre; hair-like tufts; compact spherical masses. Occurs in copper and bismuth deposits.

Molybdenite. MoS_2. H = 1–1.5. Dark bluish-grey, metallic, tabular, foliated, scaly aggregates or hexagonal crystals; also massive. Sectile with greasy feel. Distinguished from graphite by its bluish-lead-grey colour and by its streak (greenish on porcelain, bluish grey on paper). Ore of molybdenum.

Molybdite. MoO_3. Very soft, yellow, fibrous or earthy crusts or coatings. Secondary mineral formed by alteration of molybdenite.

Molybdomenite. $PbSeO_3$. H = 3.5. Colourless to white, yellowish-white scaly aggregates. Pearly to greasy lustre. Occurs with clausthalite from which it forms.

Monadnock. A residual hill or mountain rising conspicuously above a peneplain having resisted the long erosion that produced the plain.

Monazite. $(Ce,La,Nd,Th)PO_4$. H = 5–5.5. Yellow, reddish-brown, or brown equant or flattened crystals and grains. Resinous to vitreous lustre. Radioactive. Resembles zircon, but it is not as hard. Distinguished from titanite by its superior hardness and radioactivity. Occurs in granitic rocks. Ore of thorium.

Montbrayite. $(Au,Sb)_2Te_3$. H = 2.5. Greyish-white to yellowish-white, metallic. Occurs as intergrowths with other telluride minerals, chalcopyrite, and native gold. Distinguishable from other metallic minerals only by microscopic examination of polished surfaces. Originally found in the Robb-Montbray mine, Montbray Township, near Arntfield, Quebec. Named for the type locality.

Monteregianite. $KNa_2YSi_8O_{19}{\cdot}5H_2O$. H = 3.5. Colourless, white, grey, rarely light violet or light green. Transparent; vitreous to silky lustre. Acicular radiating or tabular crystals. Occurs in cavities in nepheline syenite at Mount Saint-Hilaire, Quebec, the type locality, where it is associated with calcite, pectolite, microcline, albite, aegirine, arfvedsonite. Named for the Monteregian Hills, Quebec, igneous monadnocks protruding from Ordovician limestone; Mount Saint-Hilaire is one of the Monteregian Hills.

Monticellite. $CaMgSiO_4$. H = 5. Colourless, grey, small prismatic crystals or grains. Vitreous lustre. Occurs in calcite and crystalline limestone. Related to the olivine group. Not readily identifiable in the hand specimen.

Montmorillonite. $(Na,Ca)_{0.3}(Al,Mg)_2Si_4O_{10}(OH)_2 \cdot nH_2O$. H = 1–2. White, grey, greenish, yellowish, flaky or finely granular massive. Waxy to dull lustre; opaque. Expands with absorption of water, becoming viscose, gelatinous.

Montroyalite. $Sr_4Al_8(CO_3)_3(OH)_{26} \cdot 10H_2O$. H = 3.5. White, translucent, distorted spheres (1 mm across) with bumpy to botryoidal surface. Dull lustre. Soluble in HCl. Fluoresces white in ultraviolet light. Occurs on platy albite and quartz lining of cavities in silicocarbonatite sill at the Francon quarry, Montréal, the type locality. Named after Mont Royal, the name given by Jacques Cartier to Mount Royal from which the name Montréal is derived.

Monzogranite. A variety of granite containing equal proportions of alkali feldspar and plagioclase.

Moorhouseite. $CoSO_4 \cdot 6H_2O$. H = 2.5. Pink, powdery, with vitreous lustre and white streak. Occurs as coatings on barite-siderite-sulphide specimens. Soluble in water. Originally described from the Magnet Cove barite mine, Walton, Nova Scotia, and named in honour of W. Wilson Moorhouse, professor of geology, University of Toronto.

Mordenite. $(Na_2,Ca,K_2)_4(Al_8Si_{40})O_{96} \cdot 28H_2O$. H = 3–4. White, pink, or reddish tabular crystals; also as spheres or nodules with compact fibrous structure. Crystal form is not easily distinguished from other zeolites; compact fibrous structure is characteristic. Named for Morden, Nova Scotia, where it was first found.

Morenosite. $NiSO_4 \cdot 7H_2O$. H = 2–2.5. Light green to greenish-white fibrous encrustations; stalactitic. Generally translucent to opaque. Vitreous to dull lustre. Astringent metallic taste. Soluble in water. Secondary mineral formed by oxidation of nickel sulphide minerals.

Morinite. $NaCa_2Al_2(PO_4)_2(OH)F_4 \cdot 2H_2O$. H = 4–4.5. Colourless, pink translucent striated prismatic or tabular crystals; columnar or fibrous aggregates, massive. Vitreous to oily lustre.

Mosandrite. $Na_2Ca_4REETi(Si_2O_7)_2OF_3$. (Note: REE = rare-earth elements) H = 5. Yellow to brown, translucent, prismatic or tabular crystals; massive, vitreous to greasy lustre. Uneven or conchoidal fracture. Occurs in nepheline syenite.

Mudstone. Hardened mud-like sediment composed chiefly of clay minerals.

Muscovite. $KAl_2(Si_3Al)O_{10}(OH)_2$. H = 2–2.5. Colourless or light green, grey, brown; transparent with splendent or pearly lustre. Tabular hexagonal crystals, sheet-like, platy, or flaky aggregates. Occurs in pegmatite. Constituent of granitic and metamorphic rocks. Sericite is a white, silky, fine, scaly aggregate of muscovite that occurs as an alteration of minerals such as topaz, kyanite, feldspar, spodumene, and andalusite. Used as electrical and heat insulator; in cosmetics, paints, and wallpaper to produce a pearly lustre; in the manufacture of simulated pearls; as a filler for plastics.

Mylonite. Chert-like rock with streaky, banded, or flow structure.

Nacrite. $Al_2Si_2O_5(OH)_4$. H = 2–2.5. White thin tabular crystals; scaly or granular massive. Silky to earthy lustre. Kaolinite group.

Nahcolite. $NaHCO_3$. H = 2.5. Colourless, white prismatic crystals; fibrous, concretionary; fibrous, porous masses. Transparent to translucent; vitreous to resinous. Associated with sodium chloride, carbonate, borate, and sulphate minerals.

Narsarsukite. $Na_2(Ti,Fe,Zr)Si_4(O,F)_{11}$. H = 7. Yellow tabular or short prismatic crystals. Vitreous lustre. Weathers to brownish grey or brownish yellow. Rare mineral occurring in nepheline syenite and pegmatite.

Natrojarosite. $NaFe_3(SO_4)_2(OH)_6$. H = 3. Yellow to brownish-yellow, earthy, minute tabular crystals. Dull lustre. Secondary mineral formed from alteration of iron minerals such as pyrite, marcasite.

Natrolite. $Na_2Al_2Si_3O_{10}{\cdot}2H_2O$. H = 5. Colourless, white, reddish needle-like crystals often forming radiating or nest-like aggregates; also nodular or slender prisms. Vitreous to pearly lustre. May be distinguished from other zeolites by its acicular habit. Occurs with other zeolite minerals in amygdaloidal basalt and in some igneous rocks.

Naumannite. Ag_2Se. H = 2.5. Dark grey to black, metallic, tarnishing to iridescent brown. Granular massive, platy; cubic crystals. Associated with copper minerals and gold in vein deposits.

Nemalite. A fibrous variety of brucite. Not a valid mineral name.

Nenadkevichite. $(Na,Ca)(Nb,Ti)Si_2O_7{\cdot}2H_2O$. H = 5. Dark brown to pink foliated masses. Opaque; dull lustre. Occurs in alkalic igneous rocks.

Nepheline. $NaAlSiO_4$. H = 6. White to grey irregular masses, less commonly as hexagonal prisms. Greasy to vitreous lustre. Distinguished from feldspar and scapolite by its greasy lustre and by its gelatinizing in HCl. Used in the manufacture of glass and ceramics.

Nephrite. Dense, compact, fibrous variety of tremolite-actinolite group. Green to black, grey, white. Occurs in metamorphic rocks, peridotite, or serpentinite. Very tough. Nephrite is one variety of jade used as a gemstone and as an ornamental stone; another variety is jadeite. Not a valid mineral name.

Neptunite. $KNa_2Li(Fe,Mn)_2Ti_2Si_8O_{24}$. H = 5–6. Black, dark red, prismatic crystals. Vitreous lustre. Occurs in nepheline syenite. Rare mineral.

New mineral. A mineral approved by the Commission on New Minerals and New Mineral Names of the International Mineralogical Association upon determining that the mineral's physical, structural, optical, and chemical properties are distinct from those of any known mineral. The proposed name of the new mineral must also be approved.

Niccolite. *See* nickeline.

Nickel bloom. Term used by miners for annabergite.

Nickeline. NiAs. H = 5–5.5. Copper-coloured to pinkish coppery, metallic, massive, reniform with columnar structure; crystals (tabular, pyramidal) rare. Exposed surfaces alter readily to annabergite. Occurs in veins with cobalt arsenides and native silver. Colour is distinctive. Formerly known as 'niccolite'.

Niggliite. PtSn. H = 3. Silver-white, metallic, minute grains. Associated with platinum and palladium minerals.

Niocalite. $Ca_7Nb(Si_2O_7)_2O_3F$. H = 6. Yellow prismatic crystals with vitreous lustre; also massive granular. Occurs commonly as twinned crystals. Associated with other niobium minerals. Granular variety resembles apatite, but is harder. Originally found in the niobium deposit at Oka, Quebec; named for the elements niobium and calcium.

Norbergite. $Mg_3SiO_4F_2$. H = 6–6.5. Yellow to orange, transparent to translucent squat crystals, grains. Vitreous to resinous lustre. Occurs in crystalline limestone. Humite group; distinguished from other members of the group by X-ray diffraction and chemical analysis.

Nordmarkite. A quartz-bearing syenite. Used as a building stone and an ornamental stone.

Nordstrandite. $Al(OH)_3$. H = 3. Colourless to white, yellowish, or greyish-white transparent, tabular, blade-like crystals or fine crystal aggregates. Vitreous, pearly to greasy lustre. Occurs in limestone and altered igneous rocks.

Norite. A gabbro with orthopyroxene (hypersthene) as the dominant ferromagnesian component.

Ochre. Impure iron oxides composed of limonite or goethite (yellow ochre), or of hematite (red ochre). Pulverulent, yellow, brownish red, massive. Used as a pigment.

Okenite. $Ca_{10}Si_{18}O_{46}{\cdot}18H_2O$. H = 4.5–5. White, vitreous to pearly, blade-like crystals; compact fibrous massive. Occurs in amygdaloidal basalt.

Oligoclase. $(Na,Ca)(Si,Al)_4O_8$. H = 6–6.5. Colourless, white, pink, grey, greenish, yellowish, or brown transparent to translucent cleavable masses; tabular crystals (less common). Vitreous to pearly lustre. Occurs in pegmatite, granitic rocks. Plagioclase feldspar group.

Olivine. $(Mg,Fe)SiO_4$. H = 6.5. Yellowish- to brownish-green, vitreous, granular masses or rounded grains; also colourless, yellowish to brownish, black. Distinguished from quartz by its cleavage, from other silicates by its yellowish-green colour. Used in the manufacture of refractory bricks; transparent variety (peridot) used as a gemstone. Mineral group that includes the fayalite-forsterite series.

Opal. $SiO_2{\cdot}nH_2O$. H = 5.5–6.5. Colourless, green, grey to black with waxy lustre, and iridescence (play of colour) in gem varieties. Common or nongem variety lacks iridescence, is translucent to opaque, colourless to white, red, brown, grey, green, yellow, etc. Massive, botryoidal, mammillary, or pisolitic forms. Distinguished from chalcedony by its inferior hardness, lower specific gravity. Formed at low temperatures by silica-bearing waters seeping into fissures and cavities in sedimentary and volcanic rocks; silica is in the form of cristobalite.

Orpiment. As_2S_3. H = 1.5–2. Yellow foliated, columnar, fibrous, reniform, botryoidal, granular to powdery aggregates; short prismatic crystals (rare). Transparent to translucent with pearly or resinous lustre. Alteration product of arsenic minerals, notably realgar. Associated with arsenic and antimony minerals.

Orthoclase. $KAlSi_3O_8$. H = 6. Colourless, white, pink, green, grey, yellow transparent to translucent squat prismatic or tabular crystals; cleavable massive. Vitreous to pearly lustre. Perfect cleavage. Occurs as a constituent of pegmatite and granitic rocks. Distinguished from plagioclase feldspar by the absence of twinning striations. Monoclinic variety of K-feldspar.

Orthogneiss. A gneiss derived from the metamorphism of an igneous rock.

Orthopyroxene. Orthorhombic variety of pyroxene, including enstatite and hypersthene.

Osmium. (Os,Ir). H = 6–7. Light grey, metallic, tabular, or rarely, short prismatic crystals; flakes, flattened grains. Perfect cleavage. Associated with gold and platinum in placer deposits. Formerly known as ‘iridosmine’.

Ottrelite. $MnAl_2O(SiO_4)(OH)_2$. H = 6.5. Green, grey to black tabular crystals; also scaly, platy, or foliated. Lamellar varieties resemble mica or chlorite, but are distinguished by their brittleness and hardness. Occurs in metamorphosed sedimentary rocks.

Overite. $CaMgAl(PO_4)_2(OH)\cdot 4H_2O$. H = 3.5–4. Light green to colourless platy crystals and aggregates; massive. Vitreous lustre. Soluble in hot HNO_3. Associated with other phosphate minerals.

Paragneiss. A gneiss derived from a sedimentary rock.

Parapierrotite. $Tl(Sb,As)_5S_8$. H = 2.5–3. Black, semimetallic, small prismatic crystals. Occurs in cavities in realgar and in the Hemlo gold deposit.

Pararammelsbergite. $NiAs_2$. H = 5. Light grey, metallic, rectangular tablets, or massive. Exposed surfaces alter readily to erythrite. Associated with nickel and cobalt minerals in the Cobalt district, Ontario.

Pararealgar. As_4S_4. H = 1–1.5. Yellow, orange-yellow to orange-brown powdery to granular aggregates. Vitreous to resinous lustre. Associated with realgar, stibnite.

Paratacamite. $Cu_3(Cu,Zn)(OH)_6Cl_2$. H = 3. Green, dark green to greenish-black vitreous, translucent to semi-opaque rhombohedral crystals; also granular massive, powdery encrustations, or fibrous or spherulitic aggregates. Easily soluble in acids. Secondary mineral formed by alteration of copper minerals.

Pargasite. $NaCa_2(Mg_4Al)(Si_6Al_2)O_{22}(OH)_2$. H = 5–6. Bluish-green, light brown to brown, grey prismatic crystals, or massive. Occurs in igneous and metamorphic rocks. Monoclinic member of the amphibole group.

Parisite. $Ca(Ce,La)_2(CO_3)_3F_2$. H = 4.5. Yellow, brownish, or greyish-yellow hexagonal pyramids or rhombohedral crystals. Striated. Transparent to translucent; vitreous, resinous, or pearly lustre. Soluble in hot acids.

Parkerite. $Ni_3(Bi,Pb)_2S_2$. H = 2. Bronze, metallic. Exhibits lamellar twinning. Occurs as microscopic grains intimately associated with bismuthinite, native bismuth, cobalt pentlandite, siegenite, and bravoite at the Langis mine, Cobalt, Ontario. Effervesces in dilute HNO_3.

Pavonite. $AgBi_3S_5$. Grey, metallic, lath-like or elongated grains. Occurs in bismuthinite-matildite-native bismuth intergrowths in the Keeley mine, Cobalt, Ontario.

Pearceite. $Cu(Ag,Cu)_6Ag_9As_2S_{11}$. H = 3. Black, metallic, hexagonal tabular prisms with bevelled edges and triangular striations on the basal face. Decomposed by HNO_3. Associated with silver minerals such as argentite, native silver.

Pectolite. $NaCa_2Si_3O_8(OH)$. H = 5. White needle-like crystals forming radiating and globular masses. Silky to vitreous lustre. Decomposed by warm dilute HCl. Associated with zeolites in basalt. Blue gem variety known as 'larimar stone'.

Pegmatite. A very coarse-grained igneous rock occurring as dykes, lenses, and veins at the margins of batholiths.

Pekoite. $CuPbBi_{11}S_{18}$. Grey, metallic, thin-bladed crystals associated with lead-bismuth minerals.

Penobsquisite. $Ca_2Fe[B_9O_{13}(OH)_6]Cl{\cdot}4H_2O$. Light yellow transparent equant or tabular crystals to 1.5 mm across. Vitreous lustre. Associated with halite and borate minerals in evaporite. New mineral species originally found in the Penobsquis mine, Sussex, New Brunswick. Named for the type locality.

Pentlandite. $(Fe,Ni)_9S_8$. H = 3.5–4. Light bronze-yellow, massive, granular aggregates. Octahedral parting distinguishes it from pyrrhotite with which it is commonly associated. Nonmagnetic. Ore of nickel.

Periclase. MgO. H = 5.5. Colourless to grey and, less commonly, yellow, green, or black octahedrons or grains. Transparent with vitreous lustre. Soluble in dilute HCl. Distinguished from spinel by its inferior hardness; spinel is not soluble in HCl.

Peridotite. An igneous rock consisting almost entirely of olivine and pyroxene with little or no plagioclase feldspar.

Peristerite. White or reddish albite having a blue schiller (iridescence). Intergrowth of K-feldspar and albite. Also called 'moonstone'. Used as a gemstone. Not a valid mineral name.

Perovskite. $CaTiO_3$. H = 5.5. Reddish-brown to black cubic or octahedral crystals; also granular massive. Adamantine to metallic lustre. Uneven fracture. White to grey streak. Distinguished from titanite by its crystal form, from pyrochlore by its lustre and streak.

Perrierite. $Ca_4MgFe_2Ti_2O_8(Si_2O_7)_2$. H = 5.5. Dark reddish-brown to black, opaque, striated tabular plates, or flat prismatic crystals; resinous to greasy lustre. Occurs in crystalline limestone, in weathered tuff. Resembles titanite; striations, platy habit, and lustre distinguish it from titanite.

Perthite. A subparallel intergrowth of pink microcline or orthoclase and colourless albite. Exhibits silky sheen with golden aventurescence. Named for Perth, Ontario, where it was originally found. Used as a gemstone. Not a valid mineral name.

Petalite. $LiAlSi_4O_{10}$. H = 6–6.5. Colourless, white, grey, or yellow, cleavable, massive. Vitreous to pearly lustre. Transparent to translucent. Associated with lepidolite in granite pegmatite.

Petarasite. $Na_5Zr_2Si_6O_{18}(Cl,OH){\cdot}2H_2O$. H = 5–5.5. Amber yellow, greenish yellow, massive. Transparent to translucent; vitreous. Associated with biotite, microcline, catapleiite, apatite, zircon, aegirine in nepheline syenite at Mount Saint-Hilaire, Quebec, the type locality. Named in honour of Dr. Peter Tarassoff, collector and amateur mineralogist from Dollard-des-Ormeaux, Quebec.

Petrukite. $(Cu,Fe,Zn)_3(Sn,In)S_4$. H = 4.5. Brown to grey microscopic grains in galena or in sphalerite. Metallic lustre. Identified with magnification on polished section. Named in 1989 for William Petruk, Canada Department of Mines mineralogist.

Petzite. Ag_3AuTe_2. H = 2.5–3. Light to dark grey, metallic; massive granular. Associated with other tellurides in vein deposits. Decomposed by HNO_3.

Phenocryst. Distinct crystal in a fine-grained igneous rock referred to as porphyry.

Phillipsite. $Ca_3(Si_{10}Al_6)O_{32}{\cdot}12H_2O$. H = 4–4.5. White radiating aggregates of prismatic crystals with pyramidal terminations. Translucent to opaque, vitreous. Associated with other zeolites in basalt.

Phlogopite. $KMg_3Si_3AlO_{10}(OH)_2$. H = 2.5. Amber to light brown variety of mica. Used in the electrical industry.

Phosphophyllite. $Zn_2(Fe,Mn)(PO_4)_2{\cdot}4H_2O$. H = 3–3.5. Colourless to bluish-green prismatic or tabular crystals. Transparent with vitreous lustre. Fluoresces violet in ultraviolet light. Soluble in acids. Occurs in granite pegmatite.

Phosphorescence. Property of certain substances to continue to glow after heating or exposure to ultraviolet rays.

Phyllite. A lustrous metamorphic rock with a texture between that of schist and slate.

Picrolite. A nonflexible fibrous variety of antigorite (serpentine).

Piemontite. $Ca_2MnAl_2(Si_2O_7)(SiO_4)O(OH)$. Violet-red, reddish-brown to reddish-black prismatic or acicular crystals; also fibrous, massive. Occurs in igneous rocks and in schists. Epidote group. Also known as 'piedmontite'.

Pinakiolite. $(Mg,Mn)_2(Mn,Sb)BO_5$. H = 6. Black thin rectangular tabular crystals. Metallic lustre. Associated with other manganese minerals.

Pitchblende. Massive uraninite containing trace amounts of thorium and rare-earth elements. Not a valid mineral name.

Placer. Sand or gravel deposit containing gold and/or other heavy minerals; generally refers to deposits in paying quantities.

Plagioclase. $(Na,Ca)(Si,Al)_3O_8$. H = 6. White or grey tabular crystals and cleavable masses having twinning striations on cleavage surfaces. Vitreous to pearly lustre. Distinguished from other feldspars by its twinning striations. Feldspar group.

Platinum. Pt. H = 4–4.5. Grey, metallic grains, scales, nuggets, cubic crystals (rare). Hackly fracture. Malleable and ductile. Occurs in mafic and ultramafic igneous rocks and in placers.

Plumbojarosite. $PbFe_6(SO_4)_4(OH)_{12}$. Yellowish-brown to dark brown, dull to silky, powdery, earthy, or compact encrustations; microscopic hexagonal plates. Soft, and feels like talc. Dissolves slowly in acids. Oxidation product of lead ores. Not readily identified in the hand specimen.

Pollucite. $Cs(Si_2Al)O_6{\cdot}nH_2O$. H = 6.5–7. Colourless, white, grey, massive; crystals (cubic) are rare. Transparent to translucent with vitreous to pearly lustre. Conchoidal to uneven fracture. Associated with spodumene, amblygonite in granite pegmatite. Resembles quartz, but has a slightly greasy lustre. Zeolite group. Ore of cesium.

Polybasite. $(Ag,Cu)_{16}Sb_2S_{11}$. H = 2–3. Black, metallic, tabular crystals, or massive. Thin splinters are dark red. Decomposed by HNO_3. Occurs with silver-bearing minerals in veins.

Polycrase. $Y(Ti,Nb)_2(O,OH)_6$. H = 5.5–6.5. Black prismatic crystals; parallel to radial aggregates of crystals, or massive. Submetallic to greasy lustre. Yellowish, greyish, or reddish-brown streak. Radioactive. Conchoidal fracture. Occurs in granite pegmatite.

Polydymite. Ni_3S_4. H = 4.5–5.5. Grey, metallic, octahedral crystals, massive. Associated with other sulphide minerals in hydrothermal vein deposits.

Polylithionite. $KLi_2AlSi_4O_{10}F_2$. H = 2.5–4. White, pink, micaceous; tabular crystals. Pearly lustre. Variety of lepidolite.

Polymorph. Mineral having the same chemical composition as another mineral, but a different crystal structure.

Porphyroblast. A large crystal formed in a metamorphic rock by recrystallization, e.g. garnet in schist. Also referred to as 'metacryst'.

Porphyry. A dyke rock consisting of distinct crystals (phenocrysts) in a fine-grained matrix. The matrix may be diorite, diabase, rhyolite, etc.; these terms are then used to describe the rock.

Posnjakite. $Cu_4(SO_4)(OH)_6 \cdot H_2O$. H = 2–3. Minute, blue, flaky, radiating, sheaf-like aggregates on copper-bearing rocks. Associated with other secondary copper minerals; not readily distinguished from them in the hand specimen.

Prehnite. $Ca_2Al_2Si_3O_{10}(OH)_2$. H = 6.5. Light green, globular, stalactitic masses with fibrous or columnar structure; tabular crystals. Vitreous lustre. Colour and habit are distinguishing features. Associated with zeolite minerals in basalt, and as an alteration of plagioclase.

Priceite. $Ca_2B_5O_7(OH)_5 \cdot H_2O$. H = 3–3.5. White, earthy, nodular or irregular masses. Occurs in gypsum and borate deposits. Soluble in acids.

Pringleite. $Ca_9B_{26}O_{34}(OH)_{24}Cl_4 \cdot 13H_2O$. H = 3–4. Colourless or orange prismatic crystals and platy aggregates. Transparent to translucent with vitreous lustre. Occurs with hilgardite, halite, and sylvite. Originally described from the Penobsquis potash mine, Sussex, New Brunswick, and named in honour of Gordon J. Pringle, Geological Survey of Canada mineralogist.

Probertite. $NaCaB_5O_7(OH)_4 \cdot 3H_2O$. H = 3.5. Colourless, transparent acicular crystals; radiating crystal aggregates; massive. Occurs with other borate minerals. Soluble in dilute acids.

Proustite. Ag_3AsS_3. H = 2–2.5. Red with adamantine lustre. Prismatic crystals or massive. Associated with other silver minerals. Referred to as 'ruby silver'. Ore of silver.

Pseudoixiolite. A disordered columbite-tantalite. Not a valid mineral name.

Pseudorutile. $Fe_2Ti_3O_9$. H = 3.5. Brown to black, platy or granular. Opaque; submetallic lustre. Reddish-brown streak. Alteration product of ilmenite. Formerly known as 'arizonite'.

Psilomelane. Not a valid mineral name. Renamed 'romanechite'.

Pumpellyite. $Ca_2(Mg,Fe)Al_2(SiO_4)(Si_2O_7)(OH)_2 \cdot H_2O$. H = 5.5. Bluish-green to green or white tiny fibrous aggregates; also platy, massive. Silky to vitreous lustre. Occurs in amygdaloidal basalt and in metamorphic rocks.

Pyrargyrite. Ag_3SbS_3. H = 2.5. Dark red prismatic crystals, or massive. Adamantine lustre. Dark red streak. Occurs in veins carrying other silver minerals. Referred to as 'ruby silver'. Ore of silver. Colour is identifying characteristic.

Pyrite. FeS_2. H = 6–6.5. Light brass-yellow (iridescent when tarnished) metallic crystals (cube, pyritohedron, octahedron), or massive granular. Distinguished from other sulphides by colour, crystal form, and superior hardness. Referred to as 'sulphuret of iron'. Source of sulphur.

Pyroaurite. $Mg_6Fe_2(CO_3)(OH)_{16}{\cdot}4H_2O$. H = 2.5. Colourless, yellowish, blue, green, or white, flaky, nodular or fibrous. Pearly or waxy lustre. Crushes to talc-like powder. Effervesces in HCl. Becomes golden yellow and magnetic when heated. Occurs with brucite in serpentine and in crystalline limestone.

Pyrochlore. $Ca_2Nb_2O_7$. H = 5–5.5. Dark brown, reddish-brown to black octahedral crystals, or irregular masses. Vitreous or resinous lustre. Light brown to yellowish-brown streak. Distinguished from perovskite by its lustre and streak, from titanite by its crystal form. Ore of niobium.

Pyrochroite. $Mn(OH)_2$. Colourless, yellow, light green, or blue, altering to dark brown and black on exposure to air. Associated with manganese minerals.

Pyroclastic rock. A rock composed of fragments of volcanic rocks.

Pyrolusite. MnO_2. H = 6–6.5 (crystals), 2–6 (massive). Light to dark grey, metallic, with bluish tint. Columnar, fibrous, or divergent masses; reniform, concretionary, granular to powdery and dendritic. Soils fingers easily and marks paper. Ore of manganese.

Pyromorphite. $Pb_5(PO_4)_3Cl$. H = 3.5–4. Green, yellow to brown prismatic crystals; also rounded barrel-shaped or spindle-shaped forms, subparallel crystal (prismatic) aggregates; globular, reniform, or granular. Resinous to subadamantine lustre. Crystal form, lustre, and high specific gravity (7.04) are distinguishing features. Soluble in acids. Secondary mineral formed in oxidized galena deposits.

Pyrope. $Mg_3Al_2(SiO_4)_3$. H = 7–7.5. Red transparent dodecahedral or trapezohedral crystals; grains. Vitreous lustre. Occurs in serpentinite, peridotite, and kimberlite. Used as a gemstone. Garnet group.

Pyrophanite. $MnTiO_3$. H = 5. Dark red or reddish-brown thin tabular crystals or fine flakes. Metallic to adamantine lustre. Conchoidal fracture. Ilmenite group.

Pyrophyllite. $Al_2Si_4O_{10}(OH)_2$. H = 1–2. White, grey, green, or yellow foliated, lamellar, fibrous, or granular compact masses. Pearly, greasy, or dull lustre. Resembles talc, but has slightly superior hardness. Used for carved ornamental objects, in the manufacture of ceramics and insecticides, and for refractories.

Pyroxene. $(Ca,Mg,Fe,Mn,Na,Li)(Al,Mg,Fe,Mn,Cr,Sc,Ti)(Si,Al)_2O_6$. A mineral group consisting of Mg, Fe, Ca, and Na silicates related structurally. Diopside, augite, aegirine, jadeite, spodumene, enstatite, and hypersthene are members of the group. Common rock-forming mineral.

Pyroxenite. An igneous rock composed mainly of pyroxene with little or no feldspar.

Pyrrhotite. Fe_7S_8. H = 4. Brownish bronze, massive granular. Black streak. Magnetic; this property distinguishes it from pyrite and other bronze sulphides. Referred to as 'magnetic pyrite'.

Quartz. SiO_2. H = 7. Colourless, yellow, violet, pink, brown, or black six-sided prisms with transverse striations, or massive. Transparent to translucent with vitreous lustre. Lack of cleavage distinguishes it from other colourless and white minerals. Rock-forming mineral. Occurs in veins in ore deposits. Used in glass and electronic industries. Transparent varieties used as gemstones.

Quartzite. A quartz-rich rock formed by metamorphism of sandstone. Used as a building stone, a monument stone, and an ornamental stone; high-purity quartzite is used in the manufacture of glass.

Radioactive minerals. Minerals that give off radiation due to spontaneous disintegration of uranium or thorium atoms. Detected by Geiger counter.

Raite. $Na_3Mn_3Ti_{0.25}Si_8O_{20}(OH)_2 \cdot 10H_2O$. H = 3. Gold to brown acicular crystals. Occurs in alkalic igneous rocks.

Rammelsbergite. $NiAs_2$. H = 5.5–6. Light grey, metallic, tinged with red; massive with granular texture or prismatic, radial fibrous structure. Occurs in vein deposits with nickel and cobalt minerals such as smaltite and nickeline.

Ramsayite. Not a valid mineral name. Renamed 'lorenzenite'.

Ramsdellite. MnO_2. H = 3. Black massive or platy crystal aggregates. Metallic lustre and black streak. Associated with other manganese minerals in manganese deposits.

Rancieite. $(Ca,Mn)_{0.2}MnO_2 \cdot 0.6H_2O$. Black, dark brown, grey metallic, massive; also lamellar. Associated with manganese minerals.

Rare-earth elements. A series of elements from atomic number 57 (lanthanum) to 71 (lutetium) and yttrium that were originally believed to be of rare occurrence.

Realgar. AsS. H = 1.5–2. Orange-red to orange-yellow, granular to compact massive; also striated, short, prismatic crystals. Resinous to greasy lustre. Transparent on freshly broken surface. Alters to light yellow to reddish-yellow powder (consisting of orpiment and arsenolite) on exposure to light. Occurs with orpiment and other arsenic minerals and with ores of antimony, lead, silver, and gold. Decomposed by HNO_3 and aqua regia.

Retgersite. $NiSO_4 \cdot 6H_2O$. H = 2. Dark green to blue-green fibrous encrustations and veinlets; crystals (prismatic) rare. Vitreous lustre. Greenish-white streak. Alteration product of nickeline.

Rhabdophane. $(Ce,La)PO_4 \cdot H_2O$. H = 3.5. Pinkish, yellowish-white, or brown stalactitic or botryoidal encrustations with radial structure. Translucent; waxy lustre. Occurs in pegmatite.

Rhodochrosite. $MnCO_3$. H = 4. Pink to rose, less commonly yellowish to brown, massive granular to compact; also columnar, globular, botryoidal; crystals (rhombohedral) uncommon. Vitreous lustre, transparent. Soluble in warm HCl. Distinguished from rhodonite by its inferior hardness. Ore of manganese.

Rhodonite. $MnSiO_3$. H = 6. Pink to rose red, massive, commonly veined with black manganese minerals. Conchoidal fracture, very tough. Resembles rhodochrosite from which it is distinguished by its superior hardness and lack of effervescence in HCl. Associated with manganese ores. Used as a gemstone and an ornamental stone.

Rhyolite. A fine-grained volcanic rock with composition similar to granite.

Richterite. $Na_2Ca(Mg,Fe)_5Si_8O_{22}(OH)_2$. H = 5–6. Green, brown to brownish-red, yellow, rose-red long prismatic crystals. Transparent to translucent; vitreous. Monoclinic member of amphibole group.

Rickardite. Cu_7Te_5. H = 3.5. Purplish-red, metallic; massive. Soluble in HNO_3. Associated with other tellurides from which it is distinguished by its colour resembling tarnished bornite.

Rinkite. $(Ca,Ce)_4Na(Na,Ca)_2Ti(Si_2O_7)_2F_2(O,F)_2$. H = 5. Yellow, yellowish-green to brown tabular or prismatic crystals, and massive. Vitreous to greasy lustre. Rare mineral occurring in nepheline syenite. Not easily identified in the hand specimen.

Rock wool. Felted or matted fibres produced by blowing or spinning molten self-fluxing siliceous and argillaceous dolomitic limestone. Used as insulating material and for acoustic tiles. Now replaced by fibreglass for insulation.

Roemerite. $Fe_3(SO_4)_4{\cdot}14H_2O$. H = 3–3.5. Yellow to rust- or violet-brown, pink, powdery, granular, crystalline (tabular) encrustations; also stalactitic. Oily to vitreous; translucent. Saline, astringent taste. Formed from oxidation of pyrite. Not easily distinguished in the hand specimen from other iron sulphates.

Romanechite. $(Ba,H_2O)_2Mn_5O_{10}$. H = 5–6. Black, massive, botryoidal, stalactitic, or earthy. Dull to submetallic lustre. Black streak. Associated with other manganese minerals, from which it is distinguished by superior hardness, black streak, and amorphous appearance. Ore of manganese. Formerly known as ‘psilomelane’.

Romeite. $(Ca,Fe,Mn,Na)_2(Sb,Ti)_2O_6(O,OH,F)$. H = 5.5–6.5. Yellow to brown small octahedral crystals; massive. Vitreous, greasy, or subadamantine lustre. White to light yellow streak. Occurs with rhodonite and other manganese minerals.

Roquesite. $CuInS_2$. H = 3.5–4. Grey, metallic, with bluish tint. Microscopic grains associated with copper ore minerals.

Roscoelite. $K(V,Al,Mg)_2(AlSi_3)O_{10}(OH)_2$. H = 2.5. Reddish-brown to greenish-brown scaly aggregates. Pearly lustre. Occurs in gold and vanadium deposits. Mica group.

Rose quartz. Pink to rose-coloured variety of quartz; used as an ornamental stone.

Routhierite. $Tl(Cu,Ag)(Hg,Zn)_2(As,Sb)_2S_6$. Reddish-black metallic grains and veinlets associated with stibnite, sphalerite, pyrite, realgar, and orpiment.

Roxbyite. Cu_9S_5. H = 2–3. Bluish-black metallic grains; bronze flakes. Occurs with other copper sulphides.

Rozenite. $FeSO_4{\cdot}4H_2O$. White or greenish-white, finely granular, botryoidal, or globular encrustations. Metallic astringent taste. Difficult to distinguish in the hand specimen from other iron sulphates with which it is associated.

Ruby silver. The silver minerals, pyrargyrite and proustite, are known as ‘ruby silver’ because of their colour.

Ruitenbergite. $Ca_9B_{26}O_{34}(OH)_{24}Cl_4 \cdot 13H_2O$. Monoclinic polymorph of pringleite with which it is associated and identical in appearance. Originally described from the Penobsquis potash mine, Sussex, New Brunswick, and named in honour of Arie A. Ruitenberg of the New Brunswick Geological Survey.

Rutile. TiO_2. H = 6–6.5. Brownish-red to black striated prismatic or acicular crystals; massive. Crystals are often twinned, forming elbow shapes. Adamantine lustre. Resembles cassiterite, but not as heavy and has light brown streak (cassiterite has white streak). Ore of titanium.

Sabinaite. $Na_4TiZr_2O_4(CO_3)_4$. White powdery coatings, compact, finely flaky aggregates. Silky to pearly lustre. Effervesces in warm HCl. Commonly coated with white powdery gibbsite-like mineral that fluoresces strongly in ultraviolet light. Associated with weloganite, dawsonite, quartz, calcite, and dresserite in igneous sills at the Francon quarry, Montréal, the type locality. Named in honour of Ann P. Sabina, Geological Survey of Canada mineralogist, who discovered the Francon mineral locality in 1966.

Safflorite. $CoAs_2$. H = 4.5–5. Light grey, metallic, massive, with radiating fibrous structure; prismatic crystals resembling arsenopyrite. May form cruciform or six-ray star twins. Occurs with cobalt and nickel minerals and with native silver in vein deposits.

Samarskite. $(Y,Ce,U,Fe,Nb)(Nb,Ta,Ti)O_4$. H = 5–6. Black, brownish-black prismatic or tabular crystals, massive. Vitreous, resinous, or splendent lustre. Radioactive. Exposed surfaces alter to brown or yellowish-brown. Conchoidal fracture. Dark brown to reddish or yellowish-brown streak. Occurs in granite pegmatite.

Samsonite. $Ag_4MnSb_2S_6$. H = 2.5. Dark grey to black metallic striated prisms. Associated with silver and manganese minerals.

Sandstone. A sedimentary rock composed of sand-sized particles, mostly quartz.

Sanidine. Colourless glassy monoclinic variety of potash feldspar.

Sapphirine. $Mg_4(Mg_3Al_9)O_4(Si_3Al_9O_{36})$. H = 7.5. Light to dark blue, greenish-blue grains; also tabular crystals. Vitreous lustre. Uncommon mineral. Difficult to identify except by X-ray methods.

Scapolite. $(Na,Ca)_4(Si,Al)_{12}O_{24}(Cl,CO_3,SO_4)$. H = 6. White, grey, or less commonly pink, yellow, blue, or green prismatic and pyramidal crystals; also massive granular with splintery, woody appearance. Vitreous, pearly to resinous lustre. Distinguished from feldspar by its square prismatic form, its prismatic cleavage, its splintery appearance on cleavage surfaces. May fluoresce under ultraviolet rays. Clear varieties may exhibit chatoyancy (cat's-eye effect) when cut in the cabochon style. Mineral group including marialite, meionite.

Schachnerite. $Ag_{1.1}Hg_{0.9}$. Grey metallic crystals up 1 cm long. Alteration product of silver-mercury minerals in zone of oxidation.

Schapbachite. High-temperature form of matildite, $AgBiS_2$. Not a valid mineral name.

Scheelite. $CaWO_4$. H = 4.5–5. White, yellow, brownish, transparent to translucent; massive. Also dipyramidal crystals. High specific gravity (about 6). Generally fluoresces bright bluish white under short ultraviolet rays; this property is used in prospecting for this tungsten ore mineral.

Schiller. Internal near-surface reflection of light, producing a display of spectral colours, or iridescence, as in feldspar (peristerite).

Schist. A metamorphic rock composed mainly of flaky minerals such as mica and chlorite.

Scolecite. $CaAl_2Si_3O_{10}{\cdot}3H_2O$. H = 5. Colourless to white prismatic crystals (generally twinned); also radiating acicular to fibrous aggregates. Vitreous lustre. Occurs in cavities in basalt. Zeolite group.

Scorodite. $FeAsO_4{\cdot}2H_2O$. H = 3.5–4. Green, greyish-green to brown crusts composed of tabular or prismatic crystals; also massive, earthy, porous, or sinter-like. Vitreous to subresinous or subadamantine lustre. Soluble in acids. Secondary mineral formed by oxidation of arsenopyrite.

Selenite. Colourless, transparent variety of gypsum.

Selenium. Se. H = 2. Grey, metallic, acicular, tube-like crystals; aggregates of crystals forming sheets. Red streak. Associated with pyrite deposits.

Seligmannite. $PbCuAsS_3$. H = 3. Dark grey to black, metallic; short prismatic to tabular crystals. Brown to purplish-black streak. Associated with sulphide and sulphosalt minerals.

Sellaite. MgF_2. H = 5. Colourless to white transparent prismatic crystals; acicular or fibrous aggregates. Vitreous lustre. Occurs in potash and magnesite deposits.

Senarmontite. Sb_2O_3. H = 2–2.5. Colourless to greyish white, transparent; octahedral crystals or granular, massive. Forms crusts. Resinous to subadamantine lustre. Soluble in HCl. Secondary mineral formed by oxidation of antimony minerals. Minor ore of antimony.

Sepiolite. $Mg_4Si_6O_{15}(OH)_2{\cdot}6H_2O$. H = 2–2.5. White, greyish, yellowish, fibrous, scaly, earthy, clay-like, or compact nodular; silky, waxy, or dull lustre. Secondary mineral formed from serpentine, magnesite. Massive variety is referred to as 'meerschaum' and was used for making tobacco pipes.

Serandite. $NaMn_2Si_3O_8(OH)$. Pink to reddish prismatic crystal aggregates. Vitreous lustre. Occurs with analcime, aegirine in nepheline syenite. Distinguished by its colour and crystal form.

Sericite. Fine scaly or fibrous muscovite; an important constituent of some schist and gneiss.

Serpentine. $(Mg,Al,Fe,Mn,Ni,Zn)_{2–3}(Si,Al,Fe)_2O_5(OH)_4$. H = 2–5. White, yellow, green, blue, red, brown, black massive; may be mottled, banded, or veined. Waxy lustre. Translucent to opaque. Mineral group including chrysotile, picrolite, and antigorite. Formed by alteration of olivine, pyroxene, amphibole, or other magnesium silicates. Found in metamorphic and igneous rocks. Used as an ornamental building stone (verde antique) and for ornamental objects.

Serpentinite. A metamorphic rock consisting almost entirely of serpentine.

Serpierite. $Ca(Cu,Zn)_4(SO_4)_2(OH)_6{\cdot}3H_2O$. Light blue, minute, elongated, lath-like crystals; also tufts, crusts of flattened fibres. Transparent with vitreous to pearly lustre. Secondary mineral associated with other sulphate minerals in copper deposits.

Shale. A fine-grained sedimentary rock composed of clay minerals and having a laminated structure.

Shear zone. A region in which lateral movement along rock planes has produced crushed or brecciated rocks.

Siderite. $FeCO_3$. H = 3.5–4. Brown rhombohedral crystals, cleavable masses, earthy, botryoidal. Soluble in HCl. Distinguished from calcite and dolomite by its colour and higher specific gravity, from sphalerite by its cleavage. Ore of iron.

Siderophyllite. $KFe_2Al(Al_2Si_2)O_{10}(OH)_2$. H = 2.5. Dark brown to black tabular crystals, sheets, scales, flakes. Variety of biotite.

Siderotil. $FeSO_4 \cdot 5H_2O$. White, light green to bluish fibrous crusts, needle-like crystals, or finely granular encrustations. Vitreous lustre. Metallic, astringent taste. Not distinguishable in the hand specimen from other iron sulphates.

Siegenite. $CoNi_2S_4$. H = 4.5–5.5. Grey, metallic, tarnishing to copper-red. Octahedral crystals or massive granular. Uncommon mineral occurring with copper, nickel, or iron sulphides in vein deposits.

Silex. An obsolete term for flint. Used in the Gaspé region, Quebec, for grey to brown chalcedony pebbles found in the area.

Siliceous sinter. H = 7. White porous quartz. Occurs in cavities in basalt.

Sill. A long narrow body of igneous rock that parallels the structure of the rock it intrudes.

Sillimanite. Al_2SiO_5. H = 7. White, colourless, fibrous, or prismatic masses. Vitreous or silky lustre. Distinguished from wollastonite and tremolite by its superior hardness. Occurs in schist and gneiss.

Siltstone. A very fine-grained sedimentary rock with composition between sandstone and shale, lacking the fissility of shale.

Silver. Ag. H = 2.5–3. Grey, metallic, arborescent, wiry, leaf, platy, or scaly forms; crystals (cubic, octahedral, dodecahedral) rare. Tarnishes to dark grey or black. Hackly fracture. Ductile, malleable. Colour, form, and sectility are identifying characteristics.

Sinhalite. $MgAl(BO_4)$. H = 6.5–7. Colourless, yellow, pink, greenish to pinkish-brown, or dark brown transparent vitreous grains, or massive. Occurs in skarn zones, in marble, and in crystalline limestone. Transparent varieties used as a gemstone.

Sjogrenite. $Mg_6Fe_2(CO_3)(OH)_{16} \cdot 4H_2O$. H = 2.5. Transparent tiny thin flexible hexagonal plates; colourless to yellowish- or brownish-white. Glistening, vitreous, or pearly lustre. Rare mineral associated with pyroaurite.

Skarn. An altered rock zone in limestone and dolomite in which calcium silicates (garnet, pyroxene, epidote, etc.) have formed.

Sklodowskite. $Mg(UO_2)_2(SiO_3OH)_2 \cdot 6H_2O$. H = 2–3. Light yellow to greenish-yellow small acicular crystals or fibres forming rosettes, radial tufts; also powdery to earthy. Silky, vitreous to dull lustre. Secondary mineral formed from uranium minerals.

Skutterudite. $CoAs_{3-x}$. H = 5.5–6. Grey, metallic, cubic, cubo-octahedral, or pyritohedral crystals; massive, colloform. Resembles arsenopyrite, but is distinguished by its crystal form. Associated with other cobalt and nickel minerals in vein deposits.

Slate. A fine-grained compact metamorphic rock characterized by a susceptibility to split into thin sheets.

Smaltite. An arsenic-deficient variety of skutterudite. Not a valid mineral name.

Smithsonite. $ZnCO_3$. H = 4–4.5. Greyish-white to grey, greenish or bluish; also yellow to brown. Generally botryoidal, reniform, stalactitic, granular, porous masses; also indistinct rhombohedral crystalline aggregates. Vitreous lustre. Has high specific gravity (4.4). Effervesces in acids. May fluoresce bluish white under ultraviolet rays. Associated with zinc deposits.

Smythite. Fe_3S_4. Bronze to brownish-black metallic plates or flakes. Magnetic. Resembles pyrrhotite from which it is distinguished by X-ray diffraction. Occurs with other sulphides such as pyrrhotite, pyrite, chalcopyrite, marcasite.

Soapstone. A metamorphic rock composed chiefly of talc; massive fibrous texture and unctuous feel. Used as a carving medium, for refractory bricks, as marking crayons for metalworkers, and as heat-resistant pads and plates.

Sodalite. $Na_4(Si_3Al_3)O_{12}Cl$. H = 6. Royal blue to purplish-blue granular masses, dodecahedral crystals. Vitreous lustre. Resembles lazurite, but is harder; also distinguished by its association: sodalite in nepheline rocks, lazurite in crystalline limestone.

Soddyite. $(UO_2)_2SiO_4{\cdot}2H_2O$. H = 3.5. Yellow, amber-yellow to yellowish-green small bipyramidal or tabular crystals or radial fibrous aggregates; powdery to earthy masses and crusts. Vitreous, resinous to dull lustre. Secondary mineral formed from uraninite.

Spangolite. $Cu_6Al(SO_4)(OH)_{12}Cl{\cdot}3H_2O$. H = 3. Green tabular or prismatic crystals. Transparent with vitreous lustre. Secondary mineral occurring in copper deposits.

Specularite. Black variety of hematite having a brilliant lustre.

Sperrylite. $PtAs_2$. H = 6–7. Light grey, metallic, cubic or cubo-octahedral crystals. Associated with pyrrhotite-pentlandite-chalcopyrite ores.

Spertiniite. $Cu(OH)_2$. Blue to blue-green transparent vitreous lath-like crystals forming microscopic botryoidal aggregates. Soluble in acids and decomposes in hot water. Associated with native copper, chalcocite, atacamite. Named in honour of Dr. Francis Spertini, geologist at the Jeffrey mine, Asbestos, Quebec, the type locality.

Spessartine. $Mn_3Al_2(SiO_4)_3$. H = 7–7.5. Orange to orange-red and brown transparent dodecahedral or trapezohedral crystals; grains. Vitreous lustre. Occurs in granite pegmatite. Used as a gemstone. Garnet group.

Sphalerite. ZnS. H = 3.5–4. Yellow, brown, or black, granular to cleavable massive; also botryoidal. Resinous to submetallic. Light yellow streak. Soluble in HCl, giving off H_2S. Ore of zinc. Referred to as ‘zinkblende’.

Sphene. Synonym for titanite.

Spinel. $MgAl_2O_4$. H = 7.5–8. Dark green, brown, black, dark blue, pink, or red grains or octahedral crystals; also massive. Conchoidal fracture. Vitreous lustre. Distinguished from magnetite and chromite by its superior hardness and lack of magnetic property. Transparent varieties used as gemstones.

Spionkopite. $Cu_{39}S_{28}$. Grey to black, metallic, with green, violet iridescence; microscopic flakes forming aggregates. Generally intergrown with other copper sulphides. Originally described from sandstone and quartzite copper deposits in the Yarrow Creek and Spionkop Creek areas, southwestern Alberta; named for the locality.

Spodumene. $LiAlSi_2O_6$. H = 6.5. White, grey, pink, violet, green long prismatic crystals or platy masses. Perfect cleavage. Vitreous lustre. Distinguished by its form and cleavage. Occurs in granite pegmatite. Ore of lithium. Used in ceramics. Transparent pink (kunzite), green (hiddenite), and yellow varieties are used as gemstone.

Stannite. Cu_2FeSnS_4. H = 4. Grey to greyish-black, metallic; granular massive or disseminated grains. Bluish tarnish. Black streak. Occurs in tin-bearing veins associated with chalcopyrite, sphalerite, tetrahedrite, pyrite, and cassiterite.

Stannoidite. $Cu_8(Fe,Zn)_3Sn_2S_{12}$. H = 4. Brown metallic. Massive. Occurs with other sulphides in tin deposits.

Starkeyite. $MgSO_4 \cdot 4H_2O$. Dull white encrustations. Bitter, metallic taste. Difficult to distinguish visually from other sulphates. Formerly known as 'leonhardtite'.

Staurolite. $Fe_2Al_9Si_4O_{23}(OH)$. H = 7. Brownish-yellow to brown prismatic crystals commonly twinned forming cruciform shapes. Vitreous to resinous lustre. Colour and habit are diagnostic. Occurs in schist and gneiss.

Steenstrupine. $Na_{14}Ce_6Mn_2Fe_2Zr(PO_4)_7Si_{12}O_{36}(OH)_2 \cdot 3H_2O$. H = 5. Reddish-brown to black rhombohedral crystals or massive. Opaque. Occurs in nepheline syenite.

Stephanite. Ag_5SbS_4. H = 2–2.5. Black, metallic, striated prismatic or tabular crystals, or massive. Decomposed by HNO_3. Occurs in veins in silver deposits.

Stibarsen. SbAs. H = 3–4. Tin-white, reddish-grey, metallic; fibrous, lamellar, reniform, mammillary, or finely granular masses. Tarnishes to grey or brownish black. Perfect cleavage in one direction. Fuses to a metallic globule. Occurs in veins with other arsenic and antimony minerals, and in pegmatite containing lithium minerals.

Stibiconite. $Sb_3O_6(OH)$. H = 4.5–5. Yellow, vitreous, granular to powdery encrustations; also radiating fibrous aggregates (pseudomorphs after stibnite), botryoidal, or concentric. Secondary mineral formed by oxidation of stibnite and other antimony minerals. Yellow colour distinguishes it from other secondary antimony oxides. Minor ore of antimony.

Stibnite. Sb_2S_3. H = 2. Lead-grey, metallic (bluish iridescent tarnish), striated prismatic crystals; also acicular crystal aggregates, radiating columnar or bladed masses, and granular. Soluble in HCl. Most important ore of antimony. Referred to as 'grey antimony'.

Stichtite. $Mg_6Cr_2(CO_3)(OH)_{16} \cdot 4H_2O$. Light violet scaly micaceous masses associated with serpentine. Also occurs as blebs and veinlets in serpentine.

Stilbite. $NaCa_4(Si_{27}Al_9)O_{72} \cdot 28H_2O$. H = 4. Colourless, pink, or white platy crystals commonly forming sheaf-like aggregates. Vitreous, pearly lustre. Transparent. Sheaf-like form distinguishes it from other zeolites with which it is associated in volcanic rocks. Also occurs in metamorphic and granitic rocks. Stilbite is the Nova Scotia mineral emblem.

Stillwellite. $(Ce,La,Ca)BSiO_5$. Grey, pink, brownish-yellow, brownish-red to brown translucent to opaque, hexagonal tabular or rhombohedral crystals; also massive, compact, porcelain-like. Waxy to resinous lustre. Occurs with other rare-earth–element minerals in marble.

Stilpnomelane. $(K,Ca,Na)(Fe,Mg,Al)_8(Si,Al)_{12}(O,OH)_{36}\cdot nH_2O$. H = 4. Black, dark green, golden to reddish-brown foliated plates, fibrous aggregates. Associated with magnetite, hematite, goethite in iron deposits, and with chlorite and epidote in schist.

Stromeyerite. CuAgS. H = 2.5–3. Dark grey, metallic, with blue tarnish. Prismatic crystals or massive. Soluble in HNO_3. Distinguished from arsenopyrite by its darker colour and inferior hardness.

Strontiodresserite. $(SrA0_2)(CO_3)_2(OH)_4\cdot H_2O$. White silky flakes forming coatings; white spheres (1 mm in diameter). Effervesces in HCl. Associated with weloganite, strontianite, quartz in igneous sill rock, Francon quarry, Montréal, the type locality. Named for its chemical relationship to dresserite.

Strontioginorite. $(Sr,Ca)_2B_{14}O_{23}\cdot 8H_2O$. H = 2–3. Colourless transparent tabular crystals. Occurs in borate deposits.

Strüverite. Black. Tantalum-rich variety of rutile. Not a valid mineral name.

Sudburyite. PdSb. Microscopic metallic grains occurring in cobaltite and maucherite. Identified by microscopic examination of polished section of ore minerals. Originally described from the Copper Cliff South and Frood mines, Sudbury, Ontario, and named for the locality.

Sulphur. S. H = 1.5–2.5. Yellow, reddish, greenish tabular, bipyramidal crystals; massive. Transparent; greasy to resinous lustre. Black when admixed with pyrite from which it alters.

Sunstone. A feldspar (orthoclase or oligoclase) containing flaky inclusions of goethite or hematite that cause bright copper-coloured reflections. Used as a gemstone.

Syenite. An igneous rock composed mainly of feldspar with little or no quartz. Used as a building stone.

Sylvanite. $AgAuTe_4$. H = 1.5–2. Light grey to dark grey, metallic; prismatic or tabular crystals, bladed aggregates, granular. Associated with native gold and tellurides in vein deposits. Distinguished from other gold tellurides by its inferior hardness.

Sylvite. KCl. H = 2.5. Colourless, white, orange-red cubic crystals, or granular massive. Vitreous lustre. Sectile. Bitter taste. Soluble in water. Occurs with halite and gypsum. Used in fertilizers. Sylvite is the Saskatchewan mineral emblem.

Synchisite. $Ca(Ce,La)(CO_3)_2F$. H = 4.5. Yellow to brown tabular or platy aggregates. Greasy, vitreous, or subadamantine lustre. Translucent. Soluble in acids. Associated with other rare-earth–element minerals in pegmatite. Not easily distinguished in the hand specimen.

Synchisite-Y. $CaY(CO_3)_2F$. H = 6–7. Small pink to reddish-brown prismatic crystals; massive granular. Associated with yttrium minerals. Formerly known as ‘doverite’.

Szaibelyite. $MgBO_2(OH)$. H = 3–3.5. White, fine, fibrous or platy matted or hair-like aggregates. Silky lustre. Soluble in acids. Uncommon mineral not readily identified in the hand specimen.

Szmikite. $MnSO_4 \cdot H_2O$. H = 1.5. White to pink, reddish stalactitic, botryoidal masses. Earthy. Secondary mineral found with manganese minerals.

Szomolnokite. $FeSO_4 \cdot H_2O$. H = 2.5. White to pinkish-white, fine, hair-like aggregates or finely granular encrustations; also botryoidal, globular crusts. Vitreous lustre. Metallic taste. Associated with pyrite and other iron sulphates from which it is not readily distinguishable in the hand specimen.

Talc. $Mg_3Si_4O_{10}(OH)_2$. H = 1. Grey, white, green, finely granular or foliated. Translucent with greasy feel. Massive impure varieties are known as 'steatite' and 'soapstone', and because of their suitability for carving are used for ornamental purposes. Formed by alteration of magnesium silicates (olivine, pyroxene, amphibole, etc.) in igneous and metamorphic rocks. Used in cosmetics, ceramics, paint, plastic, rubber, chemical, roofing, and paper industries.

Tancoite. $HNa_2LiAl(PO_4)_2(OH)$. H = 4–4.5. Colourless to pink equant or tabular crystals, often elongated and commonly in parallel multiple growth. Transparent with vitreous lustre. Conchoidal fracture and two cleavages. Associated with lithiophosphate and apatite in spodumene-bearing pegmatite. Soluble in dilute HNO_3 and in HCl. Originally described from the Bernic Lake (Tanco) mine, Bernic Lake, Manitoba, for which it is named.

Tapiolite. $(Fe,Mn)(Ta,Nb)_2O_6$. H = 6–6.5. Black, short prismatic or equant crystals with submetallic to subadamantine lustre. Rusty or greyish-brown to brownish-black streak. Occurs in granite pegmatite.

Tellurantimony. Sb_2Te_3. Pink, metallic, lath-like microscopic grains associated with altaite. Originally found in the Mattagami Lake mine, Mattagami, Quebec. Named for its composition.

Tellurobismuthite. Bi_2Te_3. H = 1.5–2. Dark grey, metallic, platy, foliated aggregates. Laminae flexible; sectile. Triangular striations on cleavage surfaces. Occurs in auriferous quartz veins.

Temiskamite. Name was given to a bronze-coloured material with radiating structure occurring in the Elk Lake-Gowganda (Ontario) silver-cobalt deposits. Synonym for maucherite. Not a valid mineral name.

Tengerite. $Y_2(CO_3)_3 \cdot 2\text{-}3H_2O$. Dull white, powdery, fibrous coating, or encrustations; associated with yttrium minerals from which it alters.

Tennantite. $Cu_{12}As_4S_{13}$. H = 3–4.5. Dark grey to greyish-black, metallic, tetrahedral crystals; compact to granular massive. Black, brown to red streak. Occurs in hydrothermal veins with copper, lead, zinc, and silver minerals. Forms a series with tetrahedrite, but is much less abundant.

Tenorite. CuO. H = 3.5. Steel-grey to black, metallic, platy, lath-like, scaly aggregates; also black, submetallic, earthy, or compact coal-like masses with conchoidal fracture. Associated with other copper minerals in the oxidized portion of copper deposits. Soluble in HCl or HNO_3. Ore of copper. Referred to as 'copper pitch ore'. Formerly known as 'melaconite'.

Tetradymite. Bi_2Te_2S. H = 1.5–2. Light grey, metallic, indistinct pyramidal crystals; also bladed, foliated, or granular aggregates. Blades are flexible, inelastic. Tarnishes to dull or iridescent surfaces. Soils paper as does graphite. Occurs with telluride and sulphide minerals in gold-quartz veins formed at moderate to high temperatures, and in contact metamorphic deposits.

Tetrahedrite. $Cu_{12}Sb_4S_{13}$. H = 3–4.5. Dark grey to greyish-black, metallic, tetrahedral crystals; granular to compact massive. Black to brown streak. Ore of copper; silver-rich variety may be important ore of silver. Occurs with chalcopyrite, galena, pyrite, sphalerite, bornite, and argentite in hydrothermal veins. Forms a series with tennantite.

Tetranatrolite. $(Na,K)_2(Si,Al)_5O_{10}\cdot 2H_2O$. White prismatic crystals and fibrous aggregates; earthy. Translucent to opaque; vitreous to dull lustre. Transparent in specimens freshly broken from the rock, becoming white, opaque, friable on exposure to air. Associated with natrolite, analcime, and microcline in nepheline syenite at Mount Saint-Hilaire, Quebec. Named for its structure, tetragonal natrolite. Zeolite group.

Thaumasite. $Ca_3Si(OH)_6(CO_3)(SO_4)\cdot 12H_2O$. H = 3.5. Colourless to white, acicular or massive. Transparent to translucent; vitreous, silky lustre to greasy. Occurs with calcium silicate and sulphate minerals.

Thenardite. Na_2SO_4. H = 2.5–3. Colourless, white, greyish, reddish, yellowish, brownish, powdery; tabular, dipyramidal crystals. Dull to vitreous lustre. Formed from evaporation of salt lakes.

Thomsonite. $NaCa_2Al_5Si_5O_{20}\cdot 6H_2O$. H = 5–5.5. White, pinkish-white to reddish, light green radiating columnar or fibrous masses; also compact. Vitreous to pearly lustre. Transparent to translucent. Associated with other zeolites. Massive variety used as a gemstone.

Thorbastnaesite. $ThCa(CO_3)_2F_2\cdot 3H_2O$. White silky fibres forming spheres less than 1 mm in diameter; coatings. Associated with baddeleyite, zircon (cyrtolite) at the Francon quarry, Montréal.

Thorianite. ThO_2. H = 6.5. Dark grey to black cubic crystals or rounded grains. Dull to submetallic lustre. Grey streak. Radioactive. Soluble in HNO_3 and H_2SO_4. Occurs in pegmatite, crystalline limestone, stream gravels.

Thorite. $ThSiO_4$. H = 5. Black to reddish-brown tetragonal prisms with pyramidal terminations; also massive. Resinous to submetallic lustre. Conchoidal fracture. Radioactive. Distinguished by its crystal form, radioactivity. Source of thorium. Occurs in pegmatite, crystalline limestone, and hydrothermal veins.

Thorogummite. $ThU[(SiO_4),(OH)_4]$. Grey, light brown, yellowish brown to dark brown, earthy, nodular, massive; encrustation or replacement of thorite or thorium minerals. Secondary mineral formed from thorium minerals.

Thucholite. Hydrocarbon containing U, Th, rare-earth elements, and silica. H = 3.5–4. Jet black with brilliant lustre and conchoidal fracture. Occurs in pegmatite. Not a valid mineral species.

Titanite (sphene). $CaTiSiO_5$. H = 6. Brown wedge-shaped crystals; also massive granular. May form cruciform twins. Adamantine lustre. White streak. Distinguished from other dark silicates by its crystal form, lustre, and colour.

Tochilinite. $6Fe_{0.9}S{\cdot}5(Mg,Fe)(OH)_2$. Black, finely fibrous, acicular, flaky, or platy aggregates; bronze lustre. Occurs in serpentine and in serpentine-bearing marble. Distinguished from graphite by its bronze lustre. Alteration product of pyrrhotite.

Tomichite. $(V,Fe)_4Ti_3AsO_{13}(OH)$. Minute, black, opaque, tabular crystals. Black streak. Associated with vanadian muscovite and quartz.

Tonalite. A quartz-rich diorite containing hornblende and biotite as the chief dark minerals.

Topaz. $Al_2SiO_4F_2$. Colourless, white, light blue, yellow, brown, grey, or green prismatic crystals with perfect basal cleavage; also massive granular. Vitreous lustre, transparent. Distinguished by its crystal habit, cleavage, and hardness. Used as a gemstone.

Torbernite. $Cu(UO_2)_2(PO_4)_2{\cdot}8{-}12H_2O$. H = 2–2.5. Green transparent tabular crystals; lamellar aggregates. Vitreous to subadamantine lustre. Secondary mineral associated with autunite and other uranium minerals.

Tourmaline. $(Na,K,Ca)(Mg,Fe,Mn,Li,Al)_3(Al,Fe,Cr,V)_6Si_6O_{18}(BO_3)_3(O,OH,F)_4$. H = 7.5. Black, dark green, blue, pink, brown, or yellow prismatic crystals; also columnar, granular. Prism faces are vertically striated. Vitreous lustre. Conchoidal fracture. Distinguished by its triangular cross-section in prisms and by its striations. Used in the manufacture of pressure gauges; transparent varieties are used as gemstones. Mineral group consisting of several species including dravite, schorl, elbaite, and uvite.

Trachyte. A light-coloured lava composed essentially of orthoclase with minor biotite, amphibole, and/or pyroxene.

Trap rock. Dark-coloured, fine-grained dyke rock.

Trembathite. $Mg_3B_7O_{13}Cl$. H = 6–8. Colourless to light blue transparent rhombohedral crystals. Vitreous lustre. Occurs with hilgardite and halite. Originally described from the Salt Springs potash deposit, Sussex, New Brunswick, and named in honour of Professor Lowell T. Trembath, University of New Brunswick.

Tremolite. $Ca_2Mg_5Si_8O_{22}(OH)_2$. H = 5–6. White, grey, striated prismatic crystals, bladed crystal aggregates, or fibrous; perfect cleavage. Usually occurs in metamorphic rocks. Fibrous variety is used for asbestos. Monoclinic member of amphibole group.

Triphylite. $LiFePO_4$. H = 4–5. Greenish to bluish grey, cleavable to compact massive; prismatic crystals rare. Transparent to translucent with vitreous to subresinous lustre. Occurs with lithium and phosphate minerals in granite pegmatite.

Triplite. $(Mn,Fe)_2(PO_4)(F,OH)$. H = 5–5.5. Reddish brown to brown or pink, altering to brownish black. Massive with uneven fracture. Vitreous to resinous lustre. Occurs in granite pegmatite.

Troctolite. A gabbro with olivine as the dominant ferromagnesian component.

Trondhjemite. A light-coloured igneous rock composed mainly of Na-plagioclase with quartz and biotite.

Tuff. A rock formed from volcanic ash.

Tundrite. $Na_2Ce_2TiO_2SiO_4(CO_3)_2$. H = 3. Brownish or greenish-yellow acicular crystals occurring individually or forming spheres. Occurs in nepheline syenite.

Tungstenite. WS_2. H = 2.5. Dark grey, metallic, massive, or fine scaly aggregates. Associated with scheelite, wolframite, and sulphide minerals.

Tungstite. $WO_3 \cdot H_2O$. H = 2.5. Yellow to yellowish-green aggregates of microscopic plates, or powdery to earthy masses. Resinous or pearly lustre. Oxidation product of tungsten minerals.

Tungusite. $Ca_{14}Fe_9Si_{24}O_{60}(OH)_{22}$. H ~ 2. Green to yellow-green platy aggregates resembling chlorite. Pearly lustre. Associated with analcime and other zeolites in lava.

Tvalchrelidzeite. Hg_3SbAsS_3. Dark grey, metallic, granular aggregates with dark reddish tint. Adamantine lustre. Associated with cinnabar and realgar.

Twinnite. $PbSb_2S_4$. Black, metallic, minute grains. Streak is black with brownish tint. Rare mineral associated with other sulphosalts. Originally described from a prospect pit near Madoc, Ontario.

Type locality. Locality from which a mineral species was originally described.

Ulexite. $NaCaB_5O_6(OH)_6 \cdot 5H_2O$. H = 1. White with silky lustre. Occurs as nodules composed of fine fibres and as compact fibrous veins. Source of borax. Occurs in gypsum deposits in Nova Scotia and New Brunswick.

Ullmannite. NiSbS. H = 5–5.5. Silver-white to grey, metallic, cubic, octahedral, or pyritohedral crystals with striations on cube faces. Greyish-black streak. Perfect cleavage. Occurs with nickeline and other nickel minerals in vein deposits. Distinguished from pyrite by its colour.

Umangite. Cu_3Se_2. H = 3. Bluish-black grains or massive granular. Metallic lustre. Associated with copper sulphide and selenide minerals such as chalcocite, chalcomenite, and chalcopyrite.

Unakite. A rock consisting of pink to orange-red feldspar, epidote, and some quartz. Used as an ornamental stone.

Uraconite. Probably a uranium sulphate. Yellow to green, earthy, nodular, scaly, or botryoidal crust. Not a valid mineral name.

Uraninite. UO_2. H = 5–6. Black, brownish-black cubic or octahedral crystals; also massive, botryoidal. Submetallic, pitchy to dull lustre. Uneven to conchoidal fracture. Radioactive. Distinguished by its high specific gravity (10.3 to 10.9), crystal form, and radioactivity.

Uranophane. $Ca(UO_2)_2(SiO_3OH)_2 \cdot 5H_2O$. H = 2–3. Yellow fibrous, radiating aggregates; massive. Occurs with uraninite from which it alters.

Uranothorite. Black prismatic crystals, grains. Pitchy lustre. May have orange-coloured sunburst effect on enclosing rock. Radioactive. Occurs in granitic and pegmatitic rocks. Granular variety distinguished from thorite and uraninite by X-ray methods. Variety of thorite containing uranium. Not a valid mineral name.

Uranpyrochlore. $(Ca,U,Na,Ce)_2Nb_2(O,OH,F)_7$. H = 4.5. Yellowish-brown to black octahedral crystals, or massive. Resinous to adamantine lustre. Occurs in granite pegmatite. Pyrochlore group.

Valentinite. Sb_2O_3. H = 2.5–3. Colourless, white to greyish prismatic or tabular striated crystal aggregates; also massive with granular or fibrous structure. Adamantine to pearly lustre. Transparent. Associated with stibnite and secondary antimony oxides resulting from oxidation of metallic antimony minerals.

Valleriite. $2[(Fe,Cu)S]\cdot 1.53[(Mg,Al)(OH)_2]$. Very soft, sooty. Bronze-black, platy, massive with perfect cleavage. Occurs in high-temperature copper deposits.

Veatchite. $Sr_2[B_5O_8(OH)]_2B(OH)_3\cdot H_2O$. H = 2. Colourless, transparent, platy or prismatic crystals; white fibrous masses with silky lustre. Occurs with howlite, colemanite, and other borate minerals.

Vermiculite. $Mg_{0.7}(Mg,Fe,Al)_6(Si,Al)_8O_{20}(OH)_4\cdot 8H_2O$. H = 1.5. Silvery-amber or light brown, flaky, sheet-like aggregates. Pearly lustre. Expands or exfoliates on heating, which distinguishes it from mica. Formed by alteration of phlogopite and biotite. Used as an insulator in the construction industry, for concrete and plaster, as a lubricant, and as a soil conditioner.

Vesuvianite. $(Ca,Na)_{19}(Al,Mg,Fe)_{13}(SiO_4)_{10}(SiO_7)_4(OH,F,O)_{10}$. H = 7. Yellow, brown, green, violet transparent, prismatic, or pyramidal crystals with vitreous lustre; also massive, granular, compact, or pulverulent. Distinguished from other silicates by its tetragonal crystal form; massive variety is distinguished by its ready fusibility and intumescence in a blowpipe flame. Also known as 'idocrase'. Transparent varieties are used as a gemstone.

Villiaumite. NaF. H = 2–2.5. Dark red, pink, orange, finely crystalline or massive. Transparent; vitreous. Occurs in nepheline syenite.

Vinogradovite. $(Na,Ca,K)_5(Ti,Nb)_4(Si_6BeAl)O_{26}\cdot 3H_2O$. H = 4. Colourless to white fibrous and spherical aggregates; prismatic crystals less common. Transparent; vitreous. Occurs in nepheline syenite.

Violarite. $FeNi_2S_4$. H = 4.5–5.5. Light grey, brilliant metallic; tarnishes to violet-grey. Massive. Distinguished by its violet tarnish. Associated with copper, nickel, and iron sulphides in vein deposits. Rare mineral.

Vivianite. $Fe_3(PO_4)_2\cdot 8H_2O$. H = 1.5–2. Colourless transparent on fresh surfaces, becoming blue, greenish-blue to dark blue translucent due to oxidation. Vitreous to dull lustre. Prismatic crystals; bladed, globular, fibrous, powdery to earthy aggregates. Streak is colourless to bluish white, quickly altering to dark blue or brown. Soluble in acids. Darkens in H_2O_2. Occurs as a secondary mineral in metallic ore deposits and as a weathering product of iron-manganese phosphates in pegmatite.

Vlasovite. $Na_2ZrSi_4O_{11}$. Colourless to light brown crystals and grains. Vitreous, pearly, or greasy lustre. Excellent cleavage. Occurs in alkalic rocks.

Voggite. $Na_2Zr(PO_4)(CO_3)(OH)\cdot 2H_2O$. Colourless, transparent, acicular, microscopic crystals; white matted fibres. Occurs in centimetric cavities in an amygdaloidal basalt dyke cutting a weloganite-bearing sill at the Francon quarry, Montréal, the type locality. Resembles dawsonite. Name in honour of its discoverer, mineral collector Adolf Vogg of Arnprior, Ontario.

Volkovskite. $KCa_4[B_5O_8(OH)]_4[B(OH)_3]_2Cl\cdot 4H_2O$. H = 2.5. Colourless to pink thin platy crystals. Transparent with vitreous lustre. Occurs with other borate minerals in potash deposits.

Voltaite. $K_2Fe_8Al(SO_4)_{12}\cdot 18H_2O$. H = 3. Greenish-black to black, dark green cubic or octahedral crystals; also massive granular. Resinous lustre. Greyish-green streak and conchoidal fracture. Decomposed by water, leaving a yellow precipitate. Soluble in acids. Associated with other iron sulphate minerals.

Wacke. A sandstone consisting of generally unsorted angular mineral and rock fragments in a clay-silt matrix.

Wad. A field term used for substances consisting mainly of manganese oxides.

Wakefieldite. YVO_4. H = 5. Amber, yellow, brownish, white, grey, pulverulent; coatings. Dull lustre. Occurs in pegmatite with rare-earth–element minerals. Named for Wakefield Lake, Quebec, which is near the Evans-Lou mine, the type locality.

Walkerite. $Ca_{16}(Mg,Li)_2[B_{13}O_{17}(OH)_{12}]_4Cl_6\cdot 28H_2O$. H = 3. Colourless to white transparent to translucent acicular crystals or fibrous bundles to 7 mm long. Vitreous lustre. Associated with halite and borate minerals in evaporite. New mineral species originally found in the Penobsquis (Sussex) mine, New Brunswick. Named for Thomas Leonard Walker (1867-1942), University of Toronto mineralogist and first director of the Royal Ontario Museum.

Wall rock. Rock forming the walls of a vein, dyke, or other ore deposit.

Warwickite. $Na_2Sr_3Zr(CO_3)_6\cdot 3H_2O$. H = 3.5–4. Black opaque prismatic crystals without terminations, rounded grains, granular aggregates. Adamantine to submetallic, dull, or pearly lustre. May have coppery-red tarnish on the surface. Occurs with spinel, chondrodite, serpentine in crystalline limestone.

Waterlime. A clayey limestone containing alumina, silica, and lime in the proper proportions to produce cement by the addition of water. Also known as ‘cement rock’.

Wehrlite. Mixture of hessite (Ag_2Te) and pilsenite (Bi_4Te). Not a valid mineral name.

Weloganite. $Sr_3Na_2Zr(CO_3)_6\cdot 3H_2O$. H = 3.5. Transparent yellow to orange-yellow, colourless prismatic crystals terminated by pyramids; also massive. Conchoidal fracture. Vitreous lustre. Effervesces in HCl. Originally found at the Francon quarry, Montréal, and named for Sir William E. Logan, first director of the Geological Survey of Canada.

Whitlockite. $Ca_9Mg(PO_3OH)(PO_4)_6$. H = 5. Colourless to white, grey, or yellowish rhombohedral crystals; granular to earthy massive. Transparent to translucent with vitreous to subresinous lustre. Soluble in dilute acids. Occurs in phosphate rock deposits and in pegmatite.

Willemite. Zn_2SiO_4. H = 5.5. Colourless, yellow, green, white, reddish brown, massive or granular; also prismatic crystals. Vitreous lustre. Soluble in HCl. May fluoresce green. Nonfluorescent variety difficult to identify in hand specimen. Minor ore of zinc.

Wilsonite. An altered scapolite (to muscovite). Pink, rose-red, mauve to violet. Translucent variety used as a gemstone. Named for Dr. James Wilson of Perth, Ontario, where it was originally found. Not a valid mineral name. Pinite is the preferred term for muscovite alteration from scapolite, feldspar, or spodumene.

Witherite. $BaCO_3$. H = 3–3.5. Colourless to white, greyish, yellowish, greenish, or brownish six-sided dipyramids and prisms; also tabular, globular, botryoidal, fibrous, or granular massive. Transparent to translucent with vitreous to resinous lustre. Effervesces in dilute HCl. Occurs with barite and galena in low-temperature hydrothermal veins.

Wittichenite. Cu_3BiS_3. H = 2–3. Grey, metallic, tabular crystals, or columnar, acicular aggregates; massive. Fuses easily. Soluble in HCl and gives off H_2S; decomposed by HNO_3. Alters readily to yellowish-brown, red, blue, and eventually forms covellite.

Wodginite. $MnSnTa_2O_8$. H ~ 6. Reddish-brown to dark brown and black irregular grains. Submetallic lustre. Occurs in granitic rocks. Ore of tantalum with uses in electrolytic, nuclear reactor, and aircraft industries.

Wöhlerite. $NaCa_2(Zr,Nb)(Si_2O_7)(O,F)_2$. H = 5.5–6. Yellow, brown, orange tabular or prismatic crystals. Vitreous lustre. Occurs in nepheline syenite. Rare mineral.

Wolframite. $(Fe,Mn,Mg)WO_4$. H = 4–4.5. Dark brown to black, short, prismatic striated crystals; lamellar, or granular. Submetallic to adamantine lustre. Perfect cleavage in one direction. Distinguishing features are colour, cleavage, and high specific gravity (7.1–7.5). Ore of tungsten.

Wollastonite. $CaSiO_3$. H = 5. White to greyish-white compact, cleavable, or fibrous masses with splintery or woody structure. Vitreous to silky lustre. May fluoresce in ultraviolet light. Distinguished from tremolite (H = 6) and sillimanite (H = 7) by its inferior hardness and by its solubility in HCl. Occurs in crystalline limestone and skarn zones. Used in ceramics and paints.

Woodhouseite. $CaAl_3(PO_4)(SO_4)(OH)_6$. H = 4.5. Violet, pink, white, or colourless tiny, pseudocubic striated crystals. Vitreous, transparent. Secondary mineral associated with topaz, lazulite, pyrophyllite.

Wulfenite. $PbMoO_4$. H = 3.5–4. Orange to yellow, orange-brown, tan, brown transparent to translucent square to thin tabular, octahedral, or prismatic crystals; massive, granular. Resinous. Secondary mineral in oxidation zone associated with vanadinite, mimetite, pyromorphite, galena, cerussite.

Wurtzite. ZnS. H = 3.5–4. Brownish-black resinous crystals (pyramidal, prismatic, tabular) or fibrous, columnar, concentrically banded crusts. Like sphalerite, but has darker colour and brown streak. Occurs with sulphide minerals.

Xanthoconite. Ag_3AsS_3. H = 2–3. Dark red to orange or brown tabular or lath-shaped crystals. Adamantine lustre. Orange-yellow streak. Fuses readily. Associated with ruby silver; at LaRose mine and at Keeley mine, Cobalt, Ontario.

Xenotime. YPO_4. H = 4.5. Reddish or yellowish-brown, grey prismatic crystals similar to zircon. Vitreous to resinous lustre. Distinguished from zircon by its inferior hardness. Occurs in pegmatite and alkalic igneous rocks.

Xonotlite. $Ca_6Si_6O_{17}(OH)_2$. H = 6.5. Pink to white, microscopic to fine, compact fibrous masses. Vitreous to waxy lustre. Very tough. Weathered surface is chalk white. Pink variety is used as a gemstone.

Yarrowite. Cu_9S_8. Dark grey to black, metallic, flaky or platy (microscopic) aggregates with green-violet iridescence. Associated with chalcopyrite, bornite, and other copper minerals from which it alters. Indistinguishable in the hand specimen from spionkopite. Originally described from the sandstone and quartzite copper deposits in the Yarrow and Spionkop Creeks area, southwestern Alberta; named for the locality.

Yofortierite. $Mn_5Si_8O_{20}(OH)_2(OH_2)_4 \cdot 8–9H_2O$. H = 2.5. Pink to violet radiating fibres. Associated with analcime, serandite, eudialyte, polylithionite, aegirine, microcline, and albite in pegmatite veins cutting nepheline syenite at Mount Saint-Hilaire, Quebec, the type locality. Named in honour of Dr. Y.O. Fortier, Arctic geologist and director (1964–1973) of the Geological Survey of Canada.

Yttrofluorite. Yttrian fluorite with yttrium substituting for calcium. Yellow, brown, violet, or blue, granular massive. Density and hardness are somewhat greater than in fluorite. Not a valid mineral name.

Yttrotantalite. $(Y,U,Fe)(Ta,Nb)(O,OH)_4$. H = 5–5.5. Black to dark brown prismatic or tabular crystals; irregular grains, massive. Submetallic, vitreous to greasy lustre and conchoidal fracture. Grey streak. Occurs in pegmatite.

'Yukon diamond'. A term used in the North for concentrically banded black, dark brown, or tan cassiterite pebbles found in placers in Yukon. Also known as 'wood tin'. Used as a gemstone.

Yukonite. $Ca_7Fe_{15}(AsO_4)_9O_{16} \cdot 25H_2O$. H = 2–3. Black to dark brown irregular masses. Decrepitates at low heat and when immersed in water. Easily fusible. Found originally at Tagish Lake, Yukon. Named for the locality.

Zavaritskite. BiOF. Yellow to grey, granular to powdery, with greasy to submetallic lustre. Associated with bismutite, bismuthinite, bismuth.

Zeolites. A group of hydrous silicates of related composition, but differing crystallization; water is given off continuously when heated, but can be taken up again. Heulandite, chabazite, stilbite, natrolite, analcime belong to this group. Formed from magmatic or hydrothermal solutions, or by alteration of feldspar minerals. Used as water softeners, as gas and impurity absorbents, and in heat reservoirs.

Zinc. Zn. H = 2. Light grey, metallic crystals, grains, scales. Brittle. Perfect cleavage. Formed from oxidation of sphalerite.

Zinkenite. $Pb_9Sb_{22}S_{42}$. H = 3–3.5. Grey, metallic, columnar to radial fibrous aggregates, massive; indistinct slender striated prisms. Tarnishes to iridescent surfaces. Occurs with stibnite, jamesonite, and other sulphosalts, and galena, pyrite, and sphalerite in veins formed at low to moderate temperatures.

Zircon. $ZrSiO_4$. H = 7.5. Pink, reddish to greyish-brown tetragonal prisms terminated by pyramids; also colourless, green, violet, or grey. May form knee-shaped twins. Adamantine lustre. May be radioactive. Distinguished by its crystal form, hardness. Ore of zirconium and hafnium. Used in moulding sand, ceramics, and refractory industries; transparent varieties are used as gemstones.

Zoisite. $Ca_2Al_3(SiO_4)_3(OH)$. H = 6.5. Grey to brownish-grey, yellowish-brown, violet-pink, green aggregates of long prismatic crystals (striated); also compact fibrous to columnar masses. Vitreous to pearly lustre. Transparent to translucent. Massive variety distinguished from amphibole by its perfect cleavage. Transparent varieties used as gemstones; pink variety known as 'thulite', transparent blue variety as 'tanzanite'.

CHEMICAL SYMBOLS FOR SELECTED ELEMENTS

Ag - silver
Al - aluminum
As - arsenic
Au - gold
B - boron
Ba - barium
Be - beryllium
Bi - bismuth
Br - bromine
C - carbon
Ca - calcium
Cd - cadmium
Ce - cerium
Cl - chlorine
Co - cobalt
Cr - chromium
Cs - cesium
Cu - copper
Dy - dysprosium
Er - erbium
F - fluorine
Fe - iron
Ga - gallium
Gd - gadolinium
Ge - germanium
H - hydrogen
Hf - hafnium
Hg - mercury
I - iodine
In - indium
Ir - iridium
K - potassium
La - lanthanum
Li - lithium
Mg - magnesium
Mn - manganese
Mo - molybdenum
N - nitrogen
Na - sodium
Nb - niobium
Nd - neodymium
Ni - nickel
O - oxygen
P - phosphorus
Pb - lead
Pd - palladium
Pt - platinum
Rb - rubidium
Re - rhenium
Rh - rhodium
Ru - ruthenium
S - sulphur
Sb - antimony
Sc - scandium
Se - selenium
Si - silicon
Sm - samarium
Sn - tin
Sr - strontium
Ta - tantalum
Te - tellurium
Th - thorium
Ti - titanium
Tl - thallium
U - uranium
V - vanadium
W - tungsten
Y - yttrium
Zn - zinc
Zr - zirconium

LIST OF MINERALS, ROCKS, AND FOSSILS IN THE TEXT

Acanthite
Actinolite
Agate
Aikinite
Alabaster
Albertite
Alunite
Amblygonite
Amethyst
Amphibole
Analcime
Andalusite
Anhydrite
Ankerite
Apatite
Aplowite
Apophyllite
Argentite
Arsenopyrite
Atacamite
Autunite
Azurite
Barite
Beryl
Biotite
Birnessite
Bismuth, native
Bismuthinite
Boracite
Bornite
Botallackite
Braunite
Breccia, volcanic
Brianroulstonite
Brochantite
Calcite crystals
Calcite, fluorescent
Carnelian
Cassiterite
Celadonite
Celestine
Chabazite
Chalcanthite
Chalcedony
Chalcocite
Chalcopyrite
Chert
Chiastolite
Childrenite
Chlorite
Chloritoid
Chrysocolla
Clay minerals
Clinoamphibole
Clinopyroxene
Coal
Colemanite
Columbite
Columbite-tantalite
Concretions
Congolite
Copper, native
Cordierite
Cosalite
Covellite
Cuprite
Dacite, porphyritic
Danburite
Digenite
Diorite
Dolomite
Dolomite crystals
Durangite
Dzalindite
Epidote
Epistilbite
Erythrite
Fire-clay
Fluorapatite
Fluorite
Fossil trees
Fossils

Freibergite
Gabbro
Gahnite
Galena
Galenobismutite
Garnet
Gersdorffite
Ginorite
Glaucodot
Glauconite
Gmelinite
Goethite
Gold, native
Granite
Graphite
Gypsum
Gyrolite
Halite
Hausmannite
Heliotrope
Hematite
Heulandite
Hilgardite
Howlite
Huebnerite
Hydroboracite
Illite
Ilmenite
Inyoite
Ironstone
Ixiolite
Jarosite
Jasper
Kaolinite
Kesterite
Knebelite
Krupkaite
Kulanite
Langite
Laumontite
Lavendulan
Lepidolite
Levyne
Limonite
Loellingite
Magnesite
Magnetite
Malachite
Manganite
Marble
Marcasite
Mawsonite
Mcauslanite
Mesolite
Meta-autunite
Metatorbernite
Metavoltine
Microcline
Mixite
Molybdenite
Monazite
Montmorillonite
Moorhouseite
Mordenite
Morinite
Muscovite
Nacrite
Natrolite
Okenite
Orthoclase
Paratacamite
Pearceite
Penobsquisite
Pentlandite
Petrukite
Phosphophyllite
Pinakiolite
Pitchblende
Plagioclase
Prehnite
Priceite
Pringleite
Probertite
Proustite
Psilomelane
Pyrargyrite

Pyrite
Pyrite crystals
Pyrolusite
Pyrrhotite
Quartz
Quartz crystals
Quartz, rutilated
Ramsdellite
Rhodochrosite
Rhyolite
Roquesite
Roscoelite
Roxbyite
Rozenite
Ruitenbergite
Rutile
Satin spar
Schachnerite
Scheelite
Scolecite
Selenite
Sellaite
Sericite
Serpentine
Siderite
Siderophyllite
Siliceous sinter
Sillimanite
Silver, native
Slate
Spangolite
Specularite
Sphalerite
Spionkopite
Spodumene
Stannite
Stannoidite
Staurolite
Stibnite
Stilbite
Stromeyerite
Strontioginorite
Sulphur
Sylvite
Szaibelyite
Szomolnokite
Tapiolite
Tennantite
Tetrahedrite
Thenardite
Thomsonite
Titanite
Topaz
Torbernite
Tourmaline
Trembathite
Triplite
Tungstite
Ulexite
Uraninite
Valentinite
Veatchite
Vivianite
Volkovskite
Walkerite
Wittichenite
Wolframite
Yarrowite
Zeolites
Zinnwaldite
Zircon
Zoisite

LIST OF MINES, QUARRIES, AND OCCURRENCES IN THE TEXT

Acadia mines
Adam Island mine
Admiral Rock quarries
Albertite mines
Alma Beach occurrence
Annidale mine
Ardoise mine
Aylesford mine
Baccaro occurrences
Bailey mine
Ballou mine
Bass River mine
Basswood Ridge mine
Baxters Harbour occurrence
Bayside Black Granite quarry
Bear Cove occurrence
Beaver Harbour occurrences
Bennett (Woodworth) Bay occurrence
Berryton mine
Big Cove occurrence
Birchtown quarries
Bishop Brook mine
Bishop Brook occurrence
Black Rock mine
Black Rock occurrence
Blakeney (Basswood Ridge) mine
Blanche occurrences
Blenkhorn mine
Blockhouse mine
Boston Gold (Ballou) mine
Brazil Lake occurrence
Brier Island occurrences
Broad (Deep) Cove occurrence
Brookdale mine
Brookfield mine
Brookfield mines
Brookville quarry
Burntcoat Head occurrences
Cain (Lower) mine
Calamites Ledges occurrence
Canada Creek occurrence

Cape Blomidon occurrence
Cape Blomidon-Cape Split occurrences
Cape d'Or mine
Cape Dorchester occurrence
Cape Enrage occurrence
Cape Negro Island occurrence
Cape Spencer mine
Cape Split occurrence
Cape Tenny occurrence
Caribou mines
Carleton mine
Central Tower Hill occurrence
Chambers mine
Charlotte County Granite quarry
Chegoggin Point occurrences
Chegoggin Point quarry
Chester Basin mine
Cheverie cliffs occurrence
Cheverie gypsum mines
Chipman Brook occurrence
Chute Cove occurrence
Clarke Head occurrence
Clifton (Old Barns) mine
Clover Hill mine
Coldstream mine
College Bridge quarries
Cook Brook mine
Cooks Brook quarry
Cookson Island occurrences
Copp occurrence
Coughlan quarry
Cowan mine
Cranberry Head mine
Cranberry Head occurrence
Crane Point occurrence
Cream Pot (Cranberry Head) mine
Dalhousie East occurrence
Dark Harbour occurrence
Dean and Chapter (Upper) mine
Deep Cove occurrence
Delaps Cove occurrence
Densmore Mills mine
Dick (Annidale) mine

Digby Gut occurrence
Digdeguash Lake quarry
Dimock discovery
Dorchester mine
Duncan mine
East Bay occurrence
East Eagle mine
East Head occurrence
East Kemptville mine
East Milford mine
East mine
East Mountain (Fraser) mine
East Mountain quarry
East Point occurrences
East Rawdon mines
East River Point quarries
East Sandy Cove occurrence
Economy (Gerrish) Mountain occurrence
Elgin occurrence
Eureka (Bass River, Duncan) mine
Faulkner mine
Fern Ledges occurrence
Feuchtwanger mine
Fifteenmile Brook mine
Fish Head occurrence
Five Islands occurrences
Fletchers Lake occurrence
Flour Cove occurrence
Folly Lake quarry
Foote Cove occurrence
Forbes Cove occurrence
Fraser mine
Frenchmans Creek occurrence
Fry's Mountain mine
Fundy Coastal Drive roadcut
Gays River (Coldstream) mine
Gays River Lead mine
Gerrish Mountain occurrence
Glebe mine
Glenbervie (Pembroke) mine
Glenvale (Petitcodiac) mine
Gold River mines
Golden Grove occurrence

Goodfellow mine
Goose Creek mine
Gooseberry Cove occurrences
Goshen mine (New Brunswick)
Goshen mine (Nova Scotia)
Gouldville mine
Governor Lake mine
Gowland Mountain mine
Grand Manan Island
Grand Passage occurrences
Grey Island occurrence
Gullivers Cove occurrence
Halls Harbour occurrence
Hampton occurrence
Harbourville occurrence
Harrington Cove occurrence
Hatt Farm occurrence
Hawk Point occurrence
Hibernia mine
Highway 3 roadcut
Highway 12 roadcut
Highway 172 roadcuts
Hilden quarry
Hillsborough-Albert Mine mines
Hilton workings
Hopewell mine
Horton Bluff occurrences
House Cliff (Broad) Cove occurrence
Hunts Point occurrences
Indian Path mine
Indiantown quarries
Joggins Fossil Cliffs occurrence
John Kline quarry
Johns Island occurrences
Johnson Cove occurrence
Johnson (Wheal Louisiana) mine
Jordan Falls occurrence
Jordan Mountain copper mine
Jordan Mountain manganese mine
Jumbo mine
Kedron Stream occurrence
Kempt mine
Kemptville mines

King Fissure mine
King mine
King quarries
L.E. Shaw pits
Lacey mine
Lake (Macumber) mine
Lantz (L.E. Shaw) pit
Lavers mine
Leadvale mine
Leckie mine
Leipsigate mines
Lepreau Falls occurrence
Lepreau mine
Lepreau River occurrence
Letang quarry
Letete mine
Libbey mine
Lime-kiln Brook quarry
Lincoln mine
Little Lepreau Basin occurrence
Little River Cove occurrence
Little Split Rock Cove occurrence
Londonderry (Acadia) mines
Londonderry East mines
Long Beach occurrence
Lorneville occurrence
Lower Burlington occurrence
Lower Economy occurrence
Lower Five Islands occurrence
Lower Maccan occurrence
Lower mine
Ludgate Lake occurrence
Lumsden mine
MacDonald mine
Maces Bay occurrences
Macumber mine
Magnet Cove mine
Malaga (Molega) mines
Manganese Mines mine
Marble Cove mine
Margaretsville occurrence
Markhamville mine
Marpic mine

Marrtown mine
Martial's Cove occurrence
Maynard mine
McCoy Head occurrence
McKay (McCoy) Head occurrence
McKay Section (Maynard) mine
McNutts Island occurrence
Meadow mine
Meander River occurrence
Memel mine
Memramcook (Gouldville) mine
Middle Musquodoboit (Murphy Brook) pit
Middle Stewiacke mine
Midway (Copp) mine
Mill Village mines
Miller Creek mine
Millet Brook occurrence
Milner mine
Minasville School mine
Mink Cove occurrence
Molega mines
Morden occurrence
Morley's pegmatite occurrence
Mosher mine
Mount Pleasant mine
Mount Uniacke mines
Murphy Brook pit
Nappan gypsum mine
Nappan salt mine
Navy Island occurrence
Negro Harbour occurrences
Nerepis occurrences
New Building (Newhouse) Cove occurrence
New mine
New Horton mine
New Russell mine
New Russell road roadcuts
Newhouse Cove occurrence
Nichols (Aylesford) mine
Nictaux quarries
North Mountain mine
North River (Noth River of Fire Islands) occurrences
North River of Five Islands occurrences

North Star mine
Northern Head occurrences
Ogilvie occurrence
Old Barns mine
Old Mountain mine
Oldham mines
Oliver Cameron mine
Paint Brook occurrence
Parker Douglas mine
Parker mine
Parkers Cove occurrence
Parrsboro barite occurrence
Partridge Island occurrences
Pearson mine
Peggys Cove occurrence
Pembroke mine
Pembroke shoreline occurrences
Penobsquis (Sussex) mine
Petit Passage occurrence
Petitcodiac mine
Philadelphia mine
Pink Ledge (Pink Rocks) occurrence
Pink Rocks occurrence
Pinkneys Point occurrences
Pleasant River Barrens mines
Point Prim occurrence
Point Wolfe mine
Port George occurrence
Port Lorne occurrence
Port Mouton Island occurrence
Potter mine
Pubnico occurrences
Quaco Head occurrence
Queen quarry
Quispamsis occurrence
Ragged Point occurrence
Rawdon mines
Red Head occurrence (New Brunswick)
Red Head occurrence (Nova Scotia)
Red Head Harbour mine
Red Point occurrence
Reeves Farm occurrence
Renfrew mines

Riddle mine
Rose Bay beach placers
Roseway Beach occurrences
Roseway River occurrence
Ross Creek occurrence
Round Bay occurrences
Saints Rest Beach occurrence
Salt Springs (Clover Hill) mine
Sandy Bay occurrence
Sandy Cove occurrence
Sawpit Cove occurrence
Scots Bay occurrence
Scott Falls occurrence
Seffernsville occurrence
Selma mine
Seven Days Work occurrence
Shaw and Churchill mine
Shear mine
Shelburne Harbour western and eastern occurrences
Shelburne-Jordan Falls occurrences
Sheldon Point occurrence
Shepody Bay occurrence
Shepody Mountain (Hopewell) mine
Shubenacadie (L.E. Shaw) pit
Simpson Corner occurrence
Simpsons Island mine
Sloop Cove mine
Smithfield (Leadvale) mine
South Branch (Upper Stewiacke) mine
South Brook occurrence
South Maitland occurrence
South Mountain mine
South Uniacke mines
Southwest Head occurrence
Spicers Cove occurrence
Split Rock mine
Spoon (Cookson) Island occurrences
Square Lake occurrences
St. Alphonse quarry
St. Andrews occurrence
St. Croix Cove occurrence
St. George granite quarries
St. Marys Bay occurrence

St. Stephen Nickel mine
Starratt Brook (Martial's Cove) occurrence
Stephens mine
Stephens occurrence
Stevens mine
Stronach Brook occurrence
Sturgis mine
Summerville occurrence
Summerville Beach occurrence
Sussex mine
Swan Creek occurrences
Taylors Island occurrence
Teahan (Goodfellow) mine
Tennycape mine
The Brothers (Two Islands) occurrences
The Islands Provincial Park quarry site
The Ledge (Charlotte County Granite) quarry
The North Mountain coastline
The Ovens mine
Todd (St. Stephen Nickel) mine
Tower Hill Road occurrence
Trout Cove occurrence
Turner mine
Turtle Creek (Berryton) mine
Two Islands occurrences
UNESCO World Heritage Site
Upper mine
Upper Blandford occurrences
Upper Musquodoboit quarries
Upper Stewiacke mine
Upper Tantallon occurrence
Vernon (Goose Creek) mine
Voglers Cove mine
Walker (New Russell) mine
Walton gypsum mines
Walton (Magnet Cove) mine
Wasson Bluff occurrences
Waverley mines
Waweig River occurrences
Wentworth Creek mine
West Bay occurrences
West Gore mine
West mines

Western Head occurrences
Whale Cove occurrence
Whale Cove occurrences (Grand Manan)
Whale Creek mine
Wheal Louisiana mine
Wheelock mines
Whiteburn mines
Whitehall Creek occurrence
Youngs Cove occurrence