

CORUNDUM AT FARSJØ, NES, ROMERIKE

BY

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In late autumn 1949 a specimen of a mineral from Årnes at Nes in Romerike was brought to the Geological Survey of Norway (Norges geologiske undersøkelse). The mineral proved to be corundum. The name of the finder is Andreas Martinsen. He had a pocket full of hexagonal tabular to prism-formed crystals. Most of them were about 2 cm in diameter and about 5 mm thick. The dimensions vary such that the largest diameter among the specimens brought are about 4 cm and many were 1.6 to 1.8 cm thick. The colour is brown with yellow shades. The hardness varies somewhat. Glass can be scratched, but some of the tables could be scratched with knife, which may be due to metamorphism into gibbsite, (hydrargillite). Determination of the refraction confirmed our assumption that the mineral was corundum. At my request Mr. Martinsen came back a few days later bringing some pieces of rocks from the locality. The corundum bearing rock proved to be a light mica schist, which could be partly characterized as a strongly pressed micaceous gneiss. The brown tables are embedded in the mica schist. Further the rock consists of a light mica resembling margarite. Some plagioclase is also seen. On November 19, 1949, I took the train to Årnes to examine the occurrence. Årnes is a station on the railway from Oslo to Kongsvinger. The distance from Oslo is 58 km. The locality where the corundum is found is situated at the south end of Farsjø, which is about 7 km southeast of Årnes railway station. Unfortunately, winter had come, so it could only be a preliminary orientation.

Mr. Martinsen took me to the locality which extends along the western side of the river Sagstuåen near the outlet of Farsjø. On the east side, the place Sagstuen is situated. The situation is seen from Figs. 1 and 2.

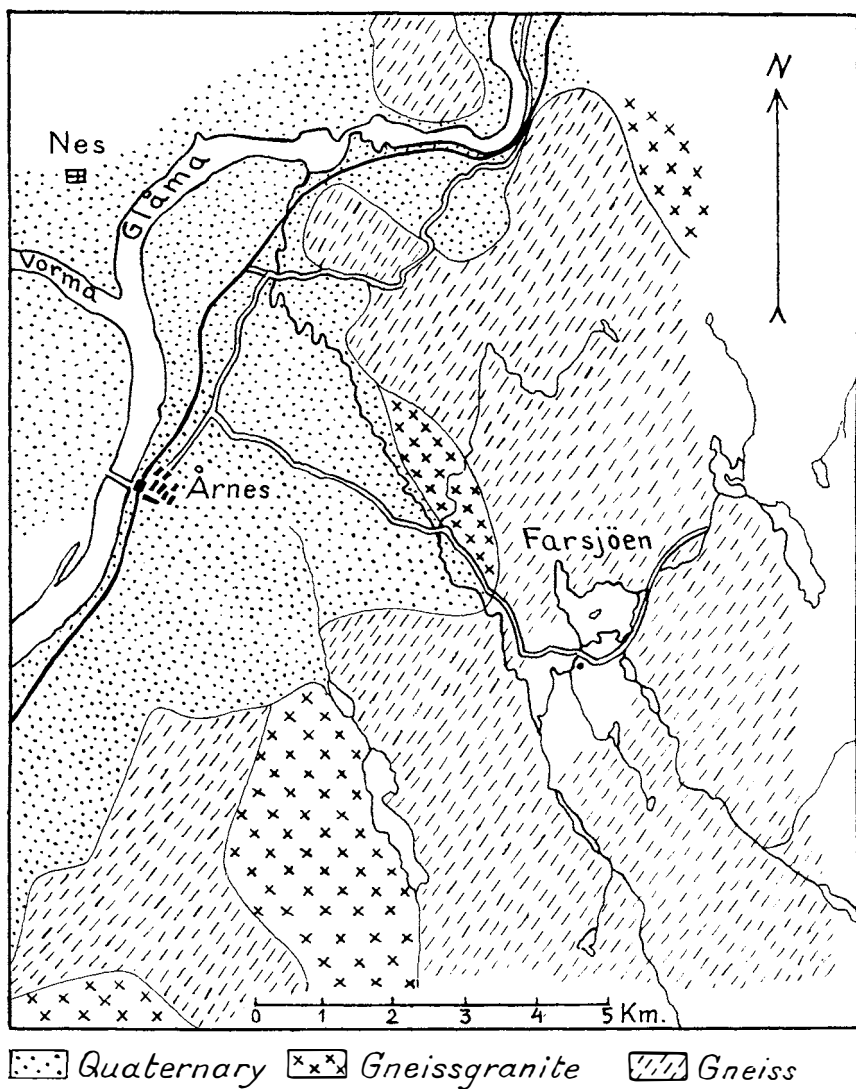


Fig. 1.

People living in the vicinity had for a long time known of these brown tables, they thought it strange that they were always hexagonal, and that was the reason why Mr. Martinsen communicated with the Geological Survey of Norway.

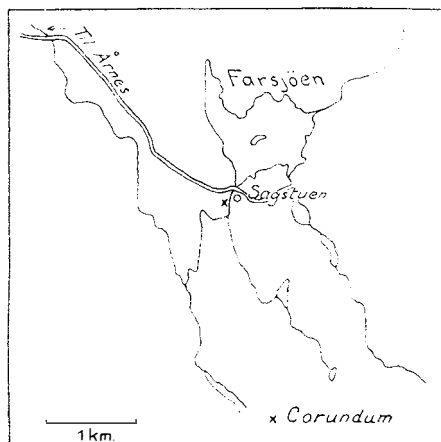


Fig. 2.

Reference is made to the geological quadrangle, Nannestad. Farsjø is situated on the eastern part of this map. The eastern part of this quadrangle was mapped geologically in 1884 by T. Ch. Thomassen. Fig. 1 shows a copy after Thomassen's geological map. According to his description, several kinds of gneiss occur, thus mica gneiss, hornblende gneiss and garnet gneiss. The granite is mentioned as striped granite (*stripet granitt*).

The corundum occurs in a mica schist along the westside of the river, partly also in the river-bed itself. The strike varies somewhat, chiefly $N 20^{\circ} W$, the dip about $34^{\circ} S$. The zone containing corundum begins about 50 meters south of the road and can be followed about 200 meters along the river. The breadth of the zone might perhaps be 10—15 meters. This will be easier determinable in summertime. Mr. Martinsen said that he had found corundum some hundred meters further south.

The mica schist contains light mica and a basic plagioclase. In thin sections leucoxene is also seen.

Mica occurs in large quantities as thin, light, shining laths. As margarite appears at so many corundum occurrences, it is of interest that the mica at Farsjø resembles margarite. Determination of the refractive index indicates, however, that the mica is nearer to muscovite (see page 82). This question, therefore, must be looked

further into when more material has been collected, so that a chemical analysis can be carried out. The mica, in which corundum is found, borders to the west on a pressed gabbro rock. This consists of basic plagioclase and hornblende. Likewise leucoxene is seen. The hornblende shows axial plane 010, opt.neg.

γ = dark blueish green.

β = dark green.

α = light yellow.

$c : \gamma = 17^\circ$.

Regarding the plagioclase reference is made to pag. 82.

Of chemical analysis so far I have had carried out determination only of Al_2O_3 in the corundum and in the mica schist. The analyses have been carried out by Civil Engineer Brynjolf Bruun of Statens Råstøfflaboratorium (The State Raw Material Laboratory),

	Corundum	Mica Schist containing Corundum
Al_2O_3	93.15 %	28.33 %

The analyses of the corundum is indicative of a hydration having taken place. This also appears from a thin section, showing under the microscope that the corundum is traversed by numerous veins, presumably consisting of gibbsite and diaspore. In between the hydrated veins small parties of primary corundum are seen in polarized light, with rather lively interference colours, because the thin section is comparatively thick. In another section all corundum is evidently hydrated.

The corundum crystals were examined by dr. Jens A. W. Bugge of the Geological Institute, The Technical University of Norway. He makes the following statement:

The forms appearing on the corundum crystals are

$c \{0001\}$ pinacoid

$a \{11\bar{2}0\}$ hexagonal prism of the 2nd order

$r \{10\bar{1}1\}$ rhombohedrons of the 1st order

$n \{22\bar{4}3\}$ hexagonal dipyramid of the 2nd order.

Indices for the planes were determined by the following angles corresponding with those given by Hintze in "Handbuch der Mineralogie": $cr = 57^\circ 34'$, $rr = 93^\circ 56'$, $cn = 61^\circ 11'$, $nn = 51^\circ 58'$.

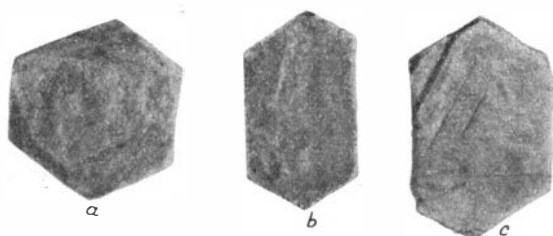


Fig. 3.

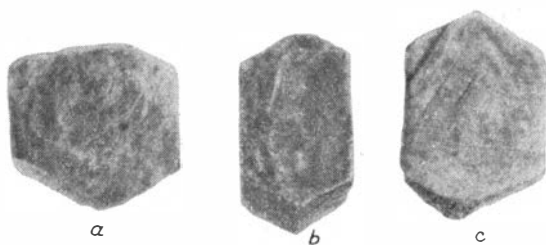


Fig. 4.

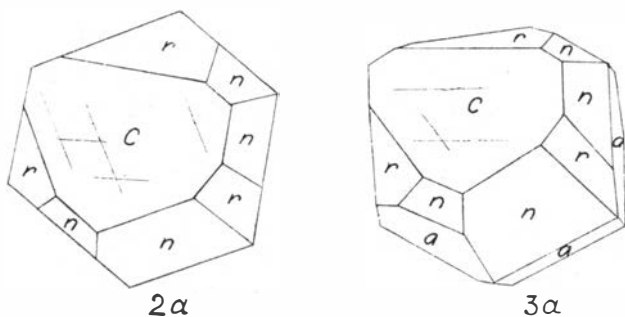


Fig. 5.

As several of the planes are rather uneven an inaccuracy of $\pm 30'$ is found. Figs. 3 and 4 show characteristic corundum crystals. In fig. 3 they are photographed vertically on 0001, in fig. 4 at an oblique angle so that the prism planes are seen. Fig. 5 shows a drawing of figs. 3 a and 4 a. As will be seen, planes of the same form are of rather varying sizes. The lower pyramid planes and two of the upper ones are not developed at all.

Figs. b and c are tabular in habit. Fig. b has only developed the forms $\{0001\}$ and $\{11\bar{2}0\}$, while fig. c also has developed the rhombo-

hedron $\{10\bar{1}1\}$. It is seen as small pyramids on the basis planes. On the lower basis plane the triangles are lying with the points orientated contrawise.

All crystals show a fine streaking and a lamellar twinning parallel to $10\bar{1}1$. The white veins on the crystal planes have arisen through the metamorphism of the corundum.

Jens Bugge has at the same time examined the light mica which occurs together with corundum and the plagioclase in the pressed gabbro rock. With regard to the mica he states:

Light mica was determined by refraction index on $001 : \gamma'_{Na} = 1.600$. Axial angle was determined with a Federow-table to $2V = -40^\circ$ and the angle between the acute bisectrix α and the normal on $001 = 2^\circ$. According to Winchell this corresponds to a mica of the muscovite series:

47 pct. muscovite

33 pct. phengite

20 pct. Fe^{+11} -phengite.

Together with the light mica some chlorite appears. It shows $\beta_{Na} = 1.607$ and $2V = 0^\circ$, very low birefringence. According to Winchells tables it is delessite σ : penninite, rich in iron. Pleochroism

$\gamma = \beta = \text{green}$

$\alpha = \text{pale yellow.}$

The plagioclase in the pressed gabbro rock was determined by the index of refraction on the cleavage plane: $\alpha'_{Na} = 1.570$, which corresponds to $Ab_{20}An_{80}$.

As regards previous findings of corundum in Norway it is stated that J. H. L. Vogt (1910) mentions corundum in titaniferous magnetite which occurs in a pressed gabbroic rock at Rausand in North western Norway. Small granules of corundum have been traced in thin sections. J. Schetelig (1916) and Barth (1927) have described corundum as crystals in pegmatite on Seiland. The mineral was first found by A. Hoel. N. H. Kolderup (1936) has described corundum in anorthosite gabbro in the Bergen field.

In the Oslo region traces of corundum are found in some contactmarble, for instance Gjellebekk in Lier. This type of occurrence will be the subject of a future investigation.

As regard occurrences of corundum in other countries it may be said that the mineral is found both as metamorphosed mineral and in magmatic rocks and it is also found alluvially.

As regards corundum of magmatic genesis it is a peculiar fact that the corundum is not exclusively found in rocks high in alumina but also in connection with rocks poor in alumina and at the same time low in silica (peridotite).

In Ontario corundum occurs in syenites, partly nepheline syenites. In U. S. A. corundum and emery occur in many places. In basic rocks (peridotite, gabbro, norite) corundum and emery are found at many places along the Appalachian region from Alabama to Massachusetts.

In Transvaal large occurrences of corundum and emery are found in coarse-grained diorite and in pegmatite. There are also occurrences of corundum on Madagascar and in India.

The largest known occurrences of emery are on the island Naxos and other islands in the Greek Archipelago and in some places in Asia Minor. In these places emery occurs in metamorphosed limestone.

Literature cited.

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- J. Schetelig: Om høgbomit i norsk jernmalm. Norsk geol. Tidsskr. bd. IV, 1918.
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- N. H. Kolderup: Korund, Högbomit, Staurolith und Skapolith in den Anorthosit-gabbros des Bergengebietes. Bergens Mus. Årbok 1936. Nat. rekk. no. 8.