

NOTE ON SOME ROCK SPECIMENS COLLECTED BY A. HØYGAARD AND M. MEHREN IN EAST GREENLAND

BY

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During their journey across the inland ice of Greenland¹ A. HØYGAARD and M. MEHREN collected four rock specimens from nunataks named after KNUD RINGNES and WESTFAL-LARSEN. The situation of these localities is shown on the sketch map, which includes also the Peterman Peak Region geologically explored by the Cambridge Expedition 1929 and described by J. M. WORDIE and W. F. WHITTARD². It will be seen that the nunataks in question are considerably farther inland than any localities hitherto visited by geologists, and therefore the specimens are of great interest. HØYGAARD and MEHREN handed the specimens to professor HOLTEDAHL, who has asked the writer to examine them microscopically. As the Expedition could not increase the weight of their baggage appreciably, the specimens had to be very small. All the rocks in question being rather fine-grained, however, we may assume that even small pieces will reveal the essential characters.

Two specimens representing a dark and a light colored rock were taken from the North slope of Knud Ringnes' Nunatak. According to the report of HØYGAARD and MEHREN the northern part of the nunatak consists of the dark rock, in which the light one is forming a vein or dike about 2 feet thick.

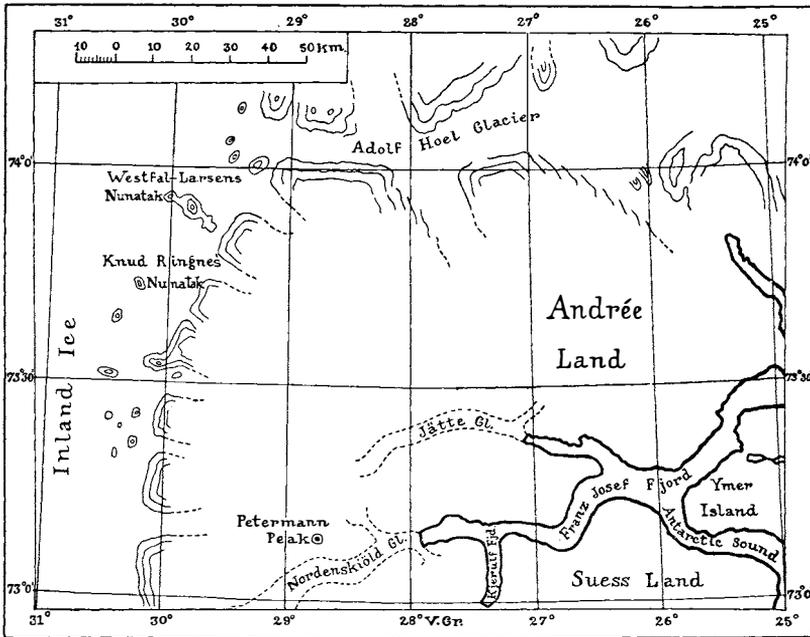
The light colored rock consists almost entirely of quartz grains, which seem to belong to two different habits. The one kind of quartz, which is predominant in quantity, forms interlocking grains

¹ ARNE HØYGAARD og MARTIN MEHREN: Tvers over Grønlands innlandsis. Norsk geogr. tidsskr. IV, 1—14, 1932.

OLAF HOLTEDAHL: Bemerkninger om de av Høygaard og Mehren medbragte bergartsprøver fra Grønlands innland. Ibid. 19—20.

² Geol. Mag. LXVII, 145—158, 1930.

of sizes between 0.1 and 0.8 mm. The second kind forms grains or sizes between 0.5 and 5 mm, occurring scattered or in small groups and showing undulose extinction. On an average the shape of the quartz grains is somewhat oblong, and their longitudinal directions are approximately parallel. In addition to the quartz only a few flakes of brown biotite, not reaching 1 mm in size, are observed.



The biotite flakes are mainly parallel to the longitudinal directions of the quartz grains. Sometimes they are forming small groups.

The rock thus evidently represents a quartz vein, which has been exposed to a certain amount of stress.

The dark rock is also rather fine-grained, the grains being mostly less than 2 mm across. It consists essentially of a green amphibole, which constitutes probably more than one half of the whole rock substance, and a plagioclase feldspar, which, judging from the few optical data obtainable, contains between 40 and 50% An. In some cases the feldspar shows an outer zone which is apparently formed by a secondary process, as it is fresher and more transparent than the inner parts. Minor constituents are brown biotite and quartz,

and small quantities of titanite, iron ore and tourmaline. Pleochroitic haloes occur in the mica and the amphibole. The amphibole sometimes contains dark inclusions in the shape of fine parallel needles.

The rock is obviously to be interpreted as a metamorphous gabbro, the feldspar of which belongs to the relatively acid andesine series.

I might draw attention to the fact that this rock shows some analogy to a rock described as a hornblende-pyroxene granulite by J. M. WORDIE and W. F. WHITTARD¹ and taken from the so called Metamorphic Complex to the East of the Petermann Series. The average composition of the feldspar of this granulite also corresponds to an andesine.

A *third specimen* was taken from the East side of the same nunatak. To the naked eye the rock appears as a reddish sandstone. The microscopic examination shows that it consists almost entirely of quartz. One part of the quartz forms rounded and oblong grains of sizes between 0.1×0.2 mm and 0.3×0.6 mm, generally well separated from each other by a cementing substance. The quartz grains show undulose extinction, and their rounded surfaces appear to have been a little disturbed through metamorphism. There is a tendency to parallel arrangement of the oblong quartz grains. The cementing substance, which plays a very important part constituting probably more than one half of the whole rock substance, consists of very small interlocking quartz grains sizes about 0.05 mm and muscovite flakes of about the same size. It contains also indeterminate impurities, probably iron oxides, and a few grains of iron ore (magnetite?) of sizes 0.1 to 0.2 mm.

As a result we may conclude that the rock is a sandstone, which has been exposed to some stress and has undergone a rather low grade metamorphism.

In connection with this rock I might draw attention to the Petermann Series as described by WORDIE and WHITTARD². It will be seen that this series contains quartzites representing slightly metamorphous sandstones and showing many analogies to the rock just described. This applies especially to the rocks described under (92) and (93) l. c. pp. 148 & 150. Apart from variations in the composition of the

¹ l. c. 155, collection number (104).

² l. c. 148—155.

cementing substance these rocks are nearly identical with that from Knud Ringnes' Nunatak, both petrologically and with regard to the grade of metamorphism.

The fourth specimen was taken from the Eastern part of Westfal-Larsens Nunatak. The rock is a dark colored and very fine-grained (about 0.03 mm) limestone. It has been broken up into irregular pieces, and the fissures are subsequently filled with white calcite. The fissures also contain some quartz and colourless mica. No recrystallisation seems to have taken place, except in the fissures. Apart from the purely mechanical disturbance there has hardly been any metamorphism at all.

In conclusion we may state, that slightly metamorphous sedimentary rocks which may very well belong to the Petermann Series, are found much farther to the West than expected by WORDIE and WHITTARD¹. The hornblende gabbro described above may possibly indicate that also the "Metamorphic Complex" has a very wide extension to the West.

¹ l c. 152 and the map p. 147.



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