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FIELD WORK IN THE FISKENÆSSET AREA, SOUTHERN WEST GREENLAND

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During June to September the systematic mapping of the Fiskenæsset area was continued. Apart from the author the following geologists took part: L. Skov Andersen (Univ. of Copenhagen), C. R. L. Friend, B. J. Walton (Portsmouth Coll. of Tech.), T. O. Frisch (Univ. of Alberta), A. M. Hopgood (Univ. of St. Andrews), D. K. Hutt (Univ. of London), J. S. Myers (GGU), G. A. G. Nunn (Univ. of Liverpool), J. R. Tomas (Geol. Surv. Prague), G. Rivalenti (Univ. of Modena) and R. H. Williams (Univ. of Exeter). A study of the Na^+ activity in natural waters, soils and vegetation was made by J. Bondam (see this report). R. T. Pidgeon (Scott. Res. React. Cent., East Kilbride) collected material in various parts of the area for radiometric dating.

The field parties were served by two helicopters and two motor cutters operating from the base camp Midgård with Ib Olsen (GGU) taking care of most of the practical arrangements.

At the beginning of the summer a tragic accident happened to one helicopter in which the Austrian pilot Peter Gschwend lost his life. It was only through the outstanding efforts of the other pilot, Paul Schmit, during the following weeks in search of the lost helicopter and subsequently as the only pilot, that the expedition was able to operate almost as normal during the first half of the summer.

The field work was again concentrated in the area between Frederikshåbs Isblink and Fiskenæsfjorden. The mapping of most of this area is now complete and the remaining part will be finished next year. Mapping of the region north of Fiskenæsfjorden started in 1971 and will be continued during the coming years. A more comprehensive report on the work in the Fiskenæsset area, with contributions of several of the expedition participants is in preparation.

Supracrustal amphibolites and the Ravns Storø belt

The field work in 1970 "cast doubt on the earlier opinion that the pyribolites and ultramafic rocks, which often fringe the anorthosite complex, actually belong to the complex" (see Kalsbeek, 1971). The reason for this conclusion was that the amphibolitic (locally pyribolitic) rocks, with which the anorthosites are often associated, were locally found to contain layers of mica schist of probable supracrustal origin, which therefore suggested a similar origin for the amphibolites. This conclusion has been supported by geochemical evidence (Windley *et al.*, in press). During the 1971 field work, further evidence was found which strengthens the opinion that the amphibolites, at least in part, have developed from supracrustal rocks. Detailed mapping of the Ravns Storø "greenschist" belt (the term "amphibolite belt" is now preferred) by Skov Andersen and Friend, has shown that there is a gradual transition from the clearly supracrustal metavolcanics, which locally contain remnants of pillow structures and porphyritic textures, into the normal-type black amphibolites. These in turn can be traced northwards through the adjoining area south of Bjørnesund, mapped by Tomas, and hence into the ground south and south-east of the head of Bjørnesund, mapped by Williams, where they are associated with meta-anorthositic rocks. This provides evidence for the correlation of the Ravns Storø supracrustals with the supposedly supracrustal amphibolites and pyribolites to the north, which are often associated with the anorthositic and leucogabbroic rocks of the Fiskenæsset anorthosite complex.

If this correlation (after further testing, both in the field and by petrographical/geochemical studies) proves to be correct, it implies that the Ravns Storø belt is older than the granulite facies metamorphism present in the northern part of the area. A comparable phase of high-grade metamorphism, affecting rocks in the region north of Godthåb, has been dated at 2800 m. y. (S. Moorbath, pers. comm. 1971).

Within the Ravns Storø supracrustals, apparently intrusive basic igneous rocks have also been found locally by Skov Andersen. These rocks show a well-developed rhythmic layering and reach a total thickness of approximately 1.5 km. The Ravns Storø belt is cut, especially in its marginal parts, by numerous sheets of granitoid rock.

The anorthosite complexes

In 1971 large occurrences of anorthositic and associated rocks were discovered and mapped by Hutt, Myers and Walton. These are situated farther inland than those mapped in detail previously; they are much larger and parts of them are less severely deformed. Beautiful examples of igneous layering have been found by Walton and Myers, and igneous textures are especially well preserved in the large body north of the head of Fiskenæsfjorden.

This body, mapped by Myers, is approximately 5 km across and consists mainly

of a layered sequence of metaleucogabbros and gabbros with relict plagioclase primocrysts often up to 10 cm in diameter. Hornblende, with smaller amounts of biotite, chromite and pyroxene, forms the matrix between the plagioclase primocrysts. Within the leucogabbros major masses of meta-anorthosite proper occur. These rocks appear to be younger than the rest of the complex because at places where the contacts are not deformed, the anorthosites cut across the folded tectonic foliation of the rocks of the layered sequence. The complex is cut by sheets of granitoid rocks.

The gneisses

Progress has also been made in understanding the origin of the gneisses. In several areas south of Bjørnesund, especially those mapped by Hopgood, Skov Andersen and Tomas, and in the area north of Fiskenæsfjorden mapped by Myers, it has been possible to differentiate between almost homogeneous granitoid gneisses and more clearly banded (diffusely biotite banded, pegmatite banded, or more irregularly banded "streaky") gneisses. Often the two types grade into each other but locally it can clearly be demonstrated that the homogeneous granitoid gneisses are younger than the streaky or banded gneisses. In the streaky gneisses, rocks of probable supracrustal origin, such as garnet-sillimanite gneiss and magnetite-bearing quartzitic rocks, have been found by Myers and Rivalenti. Gradual transitions, both across and along the strike between these rocks and the normal streaky and banded gneisses, suggest that part of the older gneisses are of supracrustal origin. This is also suggested by the presence of thin marble layers and of small outcrops of kyanite-sillimanite-garnet gneiss in the gneisses mapped by Hopgood.

Age relationships between anorthositic rocks and gneisses

Windley *et al.* (in press) have suggested that there is a basement-cover relationship between the gneisses and the supracrustal amphibolites, and that the anorthosites and associated rocks were emplaced both within these supracrustals and along the basement-cover contact. During the 1971 field work a search for evidence to support this hypothesis was unsuccessful. Lenses of both supracrustal-type amphibolite and anorthositic rocks are widespread within the streaky gneisses and both rock types are often cut by the more granitoid gneisses. They seem therefore to belong to the oldest group of rocks yet recognised in the area. The true relationship between the streaky gneisses and anorthositic rocks is not yet clear.

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