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An occurrence of ironstone enclaves east of Sukkertoppen, southern West Greenland

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Helicopter reconnaissance mapping began in 1976 in the Godthåbsfjord region (Allaart *et al.,* 1977) progressed northwards as far as Evighedsfjord, north of Sukkertoppen during the summer of 1977 (Allaart *et al.,* this report). Amîtsoq and Nûk type gneisses were widely recognised in the inner Godthåbsfjord region and the stratigraphy determined from coastal work by McGregor (1973) was corroborated. Friend & Hall (1977) have described the discordant relationship of Nûk gneiss sheets to the older Amîtsoq banded gneisses in the Ivisârtoq area. North of the Ataneq fault, which runs from Isua south-west into Godthåbsfjord, amphibolite horizons occur as complex interference fold structures within the predominant homogeneous, poorly foliated granitic (*sensu lato*) bodies such as the Taserssuaq granodiorite (Allaart *et al.,* 1977) which are believed by the field geologists to be of Nûk age. These rocks grade into gneisses and pegmatites rich in amphibolite agmatite and/or enclaves which continue to Evighedsfjord in amphibolite to granulite facies.

A narrow horizon of rusty weathering banded ironstone enclaves was found within amphibolite-facies banded gneisses and pegmatites east of the Qardlît taserssuat lake at the north-east end of the Majorqaq moraine valley (fig. 21). This zone is 150 m long and is surrounded by typical amphibolite agmatitic gneisses within which the amphibolite blocks and enclaves are also locally rusty weathering. The ironstone enclaves comprise a quartz+magnetite+amphibole rock in which centimetre-scale banding is sometimes preserved, locally interleaved with thin layers of magnetite-bearing garnet quartzite. At a second locality on the 550 m nunatak east of the Majorqaq valley rare clinopyroxene+hornblende+garnet bearing 'quartzite' enclaves were found in which the hornblende appeared to form corona structure to pale green pyroxenes.

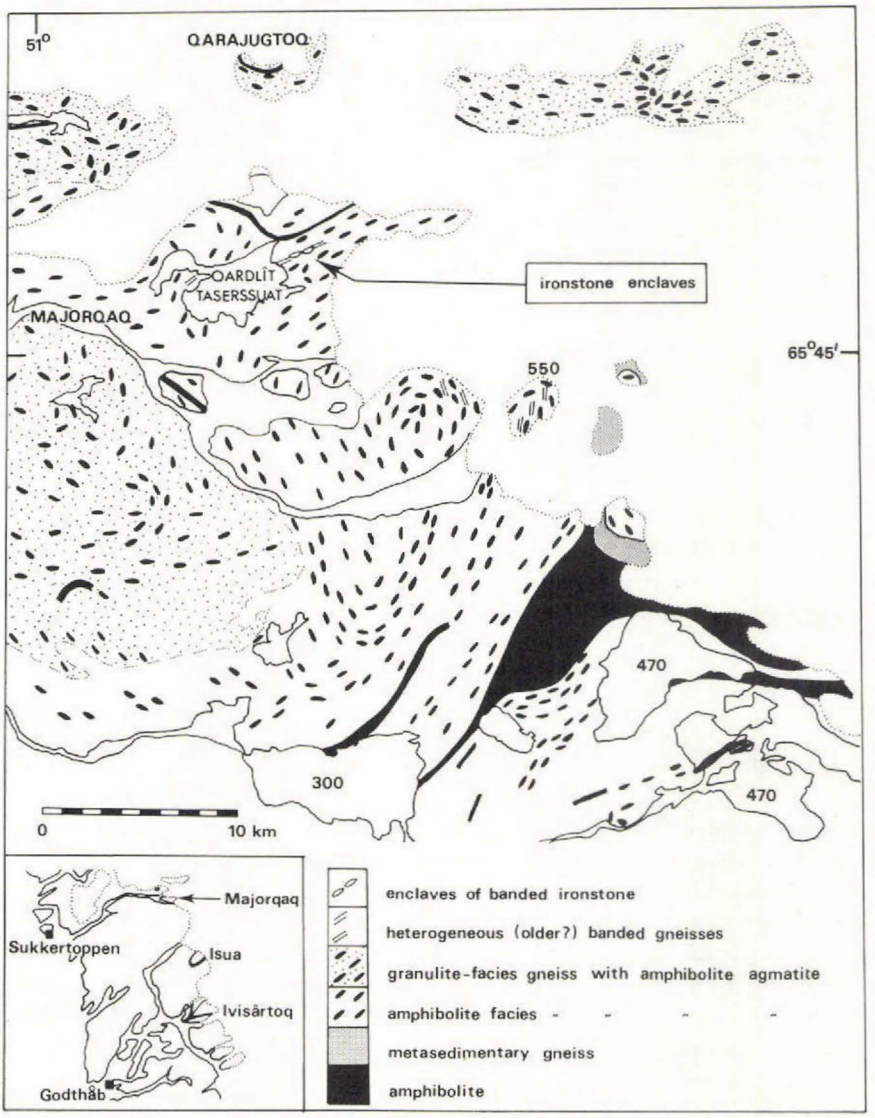

Fig. 21. Geological sketch map of the Qardlît taserssuat area, southern West Greenland.

Ironstones have been reported previously from this region of West Greenland in the Isua area (Allaart, 1976) and as enclaves variably scattered throughout the Amîtsoq gneisses of the Godthåbsfjord district (Allaart *et al.*, 1977; Friend & Hall, 1977). The Isua ironstones have been dated at 3760 m.y. (Moorbath *et al.*, 1973) and are correlated with the Akilia supracrustal association (McGregor & Mason, 1977) traceable from the west coast to Isua. The only possible ironstones associated with the younger (3000 m.y.) Malene supracrustal

suite occur on the Simiútat islands to the south of the mouth of Godthåbsfjord (B. Chadwick, personal communication). These occur with "quartz-rich rocks similar to those of the pre-Amîtsoq suite" (Chadwick *et al.*, 1975) as rare lenses and thin layers within Malene paragneisses and at Malene/Amîtsoq interfaces. However, the true nature, origin and significance of these rocks is as yet uncertain. The Akilia fragments within the Amîtsoq gneisses of inner Godthåbsfjord include 'impure quartzites' comprising variable assemblages of quartz+magnetite+hornblende+pyroxene+garnet (Friend & Hall, 1977). The quartz-rich enclaves found east of Majorqaq closely resemble some of these Akilia rocks.

Associated with the Majorqaq ironstones and quartz-rich enclaves are heterogeneous, well-banded gneisses and homogeneous diorite enclaves both of which are uncommon in the agmatitic rocks of the surrounding area. These banded gneisses occur commonly on the 550 m nunatak interleaved with homogeneous, pale grey, pegmatite veined gneiss. They contain numerous straight-sided boudins of amphibolite in contrast to the irregular agmatitic blocks and rounded enclaves which predominate elsewhere, and several small net-veined pods of hornblendite. The field evidence observed during the reconnaissance visits is inconclusive as to whether they are relics of a discrete, older (Amîtsoq?) complex incorporated in younger gneisses. A homogeneous grey gneiss dyke was seen to cut an intensely flattened augen gneiss (fig. 22) which resembles a distinctive Amîtsoq gneiss type (cf. Bridgwater *et al.*, 1976, fig. 16) at the locality east of Qardlît taserssuat.

Friend & Hall (1977) recognised the progressive break-up of deformed Amîtsoq gneisses within sheets of homogeneous grey Nûk gneiss in the Ivisârtoq area. During this fragmentation of the older gneisses, the composite portions of pre-Amîtsoq inclusions, Amîtsoq gneiss and Ameralik dyke amphibolite boudins become separated in a 'lit-par-lit' structure and occur as discrete rafts within the Nûk gneiss. It is possible that the heterogeneous gneisses east of the Majorqaq valley have resulted from the same process and that they represent disseminated fragments of Amîtsoq gneisses.

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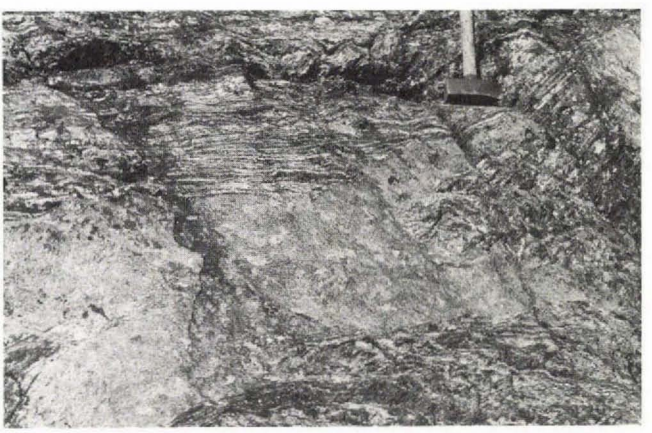

Fig. 22. Homogeneous pale grey gneiss dyke cutting older (Amîtsoq?) heterogeneous banded gneisses, east of Qardlît taserssuat.

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Precambrian studies in the Buksefjorden region, southern West Greenland

Report on the last field season in the programme 1972–1979

Brian Chadwick, Kenneth Coe and Allen Nutman

The 1977 field season was the last in the series of six planned by GGU and the University of Exeter for the mapping of the Buksefjorden region (fig. 23). As in some of the earlier years, operations were mounted from a base at Nordafar. Support was provided by the GGU motor cutter *N. V. Ussing* throughout the season and on four days by helicopter from Greenlandair Charter A/S. We wish to acknowledge the assistance provided by officials at Nordafar, by Mr. Dave Pedersen of Greenlandair Charter A/S and especially by skipper Flemming Nielsen. We also wish to record the valuable contribution made during the season by M. Ramakrishnan of the Geological Survey of India who worked with the group, nominally as an assistant. The weather was exceptionally good and this contributed to the smooth running of the programme.

As a conclusion to a sequence of field seasons, time was spent in correlative work,