Conclusion

This regional survey has shown that the West Greenland tungsten province is about 300 km long and up to 120 km wide. It is, however, likely that the tungsten province extends for at least another 100 km farther north. The survey has also outlined scheelite-bearing areas south of Godthåb, which seem to be just as promising from an economic point of view as the Kidd Creek Mines Ltd. exploration concession area.

Acknowledgements. The author is grateful to Charlotte Clausen for her valuable assistance in the field, and to E. Leonardsen, Geological Institute, University of Copenhagen, for X-ray determination of the scheelite.

References

Appel, P. W. U. 1983: Tungsten in the Godthåb area, West Greenland. *Rapp. Grønlands geol. Unders.* **115,** 59–63.

Appel, P. W. U. 1984: Tungsten mineralisation in the Godthåb area, West Greenland. *Rapp. Grønlands geol. Unders.* **120,** 51–54.

Appel, P. W. U. 1985: Strata-bound tourmaline in the Archaean Malene supracrustals, West Greenland. *Can. J. Earth Sci.* **22,** 1485–1491.

Bridgwater, D., Keto, L., McGregor, V. R. & Myers, J. S. 1976: Archaean gneiss complex of Greenland. *In* Escher, A. & Watt, W. S. (edit.) *Geology of Greenland,* 18–75. Copenhagen: Geol. Surv. Greenland.

Chadwick, B. & Coe, K. 1983: Geological map of Greenland 1:100 000 Buksefjorden 63 V.1 Nord. Descriptive text. Copenhagen: Geol. Surv. Greenland.

Michard-Vitrac, A., Lancelot, J., Allegre, C. J. & Moorbath, S. 1977: U-Pb ages on single zircons from the early Precambrian rocks of West Greenland and the Minnesota River Valley. *Earth planet. Sci. Lett.* **35,** 449–453.

Tungsten mineralisation in Archaean supracrustal rocks at Sermitsiaq, southern West Greenland

Hans Kristian Olsen

The purpose of the field work was detailed mapping of the eastern part of the island Sermitsiaq in outer Godthåbsfjord, with special reference to its tungsten mineralisation (Appel, 1983). During six weeks in the summer of 1985 a geological map was made using enlarged aerial photographs at scale 1:10 000, and scheelite showings were localised with ultra-violet lamps at night (fig. 1). The following report is based on field observations and X-ray determination of scheelite in four rock samples.

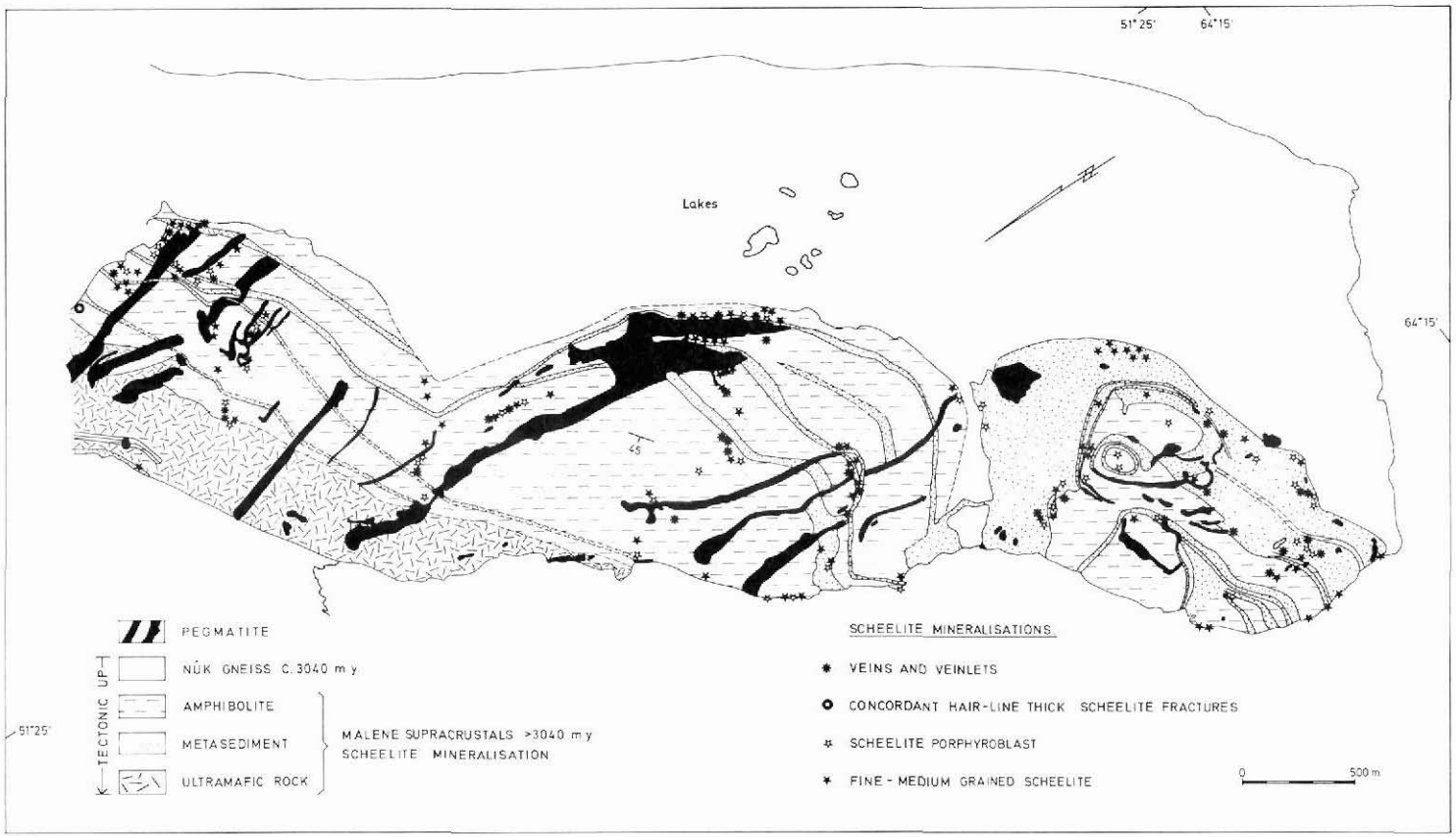

Fig. 1. Geological sketch map of the south-eastern part of Sermitsiaq with locations of scheelite showings.

Geology of Sermitsiaq

The oldest rocks are the more than 3040 Ma old Malene supracrustal rocks (Bridgwater *et al.*, 1976), which crop out as a north-east trending band in the north-western half of the mapped area, and which have intermediate dips to the north-west. The Malene rocks are enclosed in the *c.* 3040 Ma old Nûk gneisses, which underlie the south-eastern part of the area. The Malene and Nûk lithologies were intruded by granitic pegmatites, presumably of late Archaean age. The rocks have been repeatedly deformed and metamorphosed under amphibolite facies conditions.

Malene supracrustal rocks

The Malene supracrustal rocks consist of altered ultramafic rocks, amphibolites and metasediments. The ultramafic rocks, distinguished by their green colour, crop out in the northwestern part of the area. They reach a thickness of 400 m. In the ultramafic rocks several, 1–3 m thick, fine to medium-grained garnet- and pyrite-bearing quartz-rich metasediments are intercalated.

The amphibolites occur as fine to medium-grained, strongly sheared and finely banded rocks with quartz veins of varying thickness, mostly concordant. The amphibolites can be classified into five types: (1) fine to medium-grained mica-rich amphibolites, (2) amphibolites with deformed garnet porphyroblasts, (3) amphibolites with fine to coarse-grained tourmaline, (4) amphibolites with disseminated iron and copper sulphides, and (5) amphibolites with tightly spaced and boudinaged calc-silicate and hornblenditic bands.

Metasedimentary horizons alternate with the amphibolites. The thickest metasediments occur in the south-western part of the area and comprise garnet- and tourmaline-porphyroblastic mica-schist, garnet-porphyroblastic mica-schist where the deformed garnets can be found as large clusters the size of a fist, and sillimanite-bearing siliceous metasediments with concordant quartz veins.

Scheelite mineralisation

Scheelite occurs in the Malene amphibolites and metasediments. Only very little scheelite was found in other lithologies: in ultramafic rocks as very small disseminated grains at contacts to amphibolites, and as centimetre-sized porphyroblasts in a shear zone with quartz veins.

In the amphibolites the scheelite mostly occurs locally as fine-grained disseminated grains and as porphyroblasts several centimetres in size. Sometimes it was possible to trace intermittent scheelite showings for several hundreds of metres within the same lithological layer of host rocks. The scheelite also occurs as veins, mostly several millimetres thick and less than 5–10 cm long. It was possible to trace a 5–10 cm thick quartz vein with closely spaced, 2 mm thick scheelite veins for about 25 m, and a 2 mm thick scheelite vein for 5 m. Scheelite veinlets also occur which are less than 1 mm thick and several millimetres long. They are parallel to lithological banding and were found as coatings on dip-slope surfaces.

Scheelite mineralisation is associated with all the local amphibolite types, but is most abundant in the calc-silicate amphibolites and along the concordant quartz veins.

In the metasediments the scheelite occurs finely disseminated and as porphyroblasts sev-

eral centimetres in size, as well as small veins and veinlets. The porphyroblasts are mostly associated with tourmaline and garnet-mica-schists, while the veins and veinlets occur concordantly along widely spaced quartz veins. In two localities scheelite showings were found in folded metasediments.

The scheelite mostly has a bluish fluorescent colour, indicating a low Mo content. Locally, however, it occurs with a bright white fluorescent colour corresponding to a Mo content of the order of 0.5%. In several localities in the amphibolites and metasediments the scheelite has a strong yellow fluorescent colour indicating a Mo content exceeding 5%.

Acknowledgements. The author is grateful to Arent Zakarias Heilmann for his valuable assistance in the field, to E. Leonardsen, Geological Institute, University of Copenhagen, for X-ray determination of scheelite, and to Lissie Jans, Geological Institute, University of Aarhus, for drawing the field map. Financial support was received from Bikuben, Det Kongelige Grønlandsfond, Greenex A/S and Grønlandsbanken. A. A. Garde and P. W. U. Appel are thanked for advice and help.

References

Appel, P. W. U. 1983: Tungsten in the Godthåb area, West Greenland. *Rapp. Grønlands geol. Unders.* **115,** 59–63.

Bridgwater, D., Keto, L., McGregor, V. R. & Myers, J. S. 1976: Archaean gneiss complex of Greenland. *In* Escher, A. & Watt, W. S. (edit.) *Geology of Greenland,* 18–75. Copenhagen: Geol. Surv. Greenland.

Geologisk Institut,
Aarhus Universitet,
DK-8000 Århus C,
Denmark.

Field observations around northern Godthåbsfjord, southern West Greenland

Adam A. Garde

Mapping for the Fiskefjord map sheet was continued (Garde, 1984) for eight weeks in 1985. The author was first accompanied by F. Kalsbeek, and continued with H. K. Olsen and then J. Sangstad as assistants. The GGU cutter *J. F. Johnstrup* and a Jet Ranger helicopter on day charter from Nuuk provided logistic support.

Mapping was carried out in the eastern part of the map sheet area along the coasts of Godthåbsfjord and Qugssuk, and on the peninsula Ivnarssuaq towards the eastern map sheet boundary at 50° 54'W (fig. 1).

The main lithological units consist of various supracrustal rocks equivalent to Malene rocks and large masses of late Archaean orthogneisses, which have intruded them. The mapping confirmed the tentative genetic and age relations between metadiorite, grey tonalitic gneiss, Taserssuaq tonalite and Qugssuk granite suggested by Garde (1984) and Garde *et al.* (in press) from neighbouring areas. The field work area in 1985 includes an important meta-