New Geographical Station in Greenland

By Børge Fristrup

As a contribution to the IGY, investigations of four Greenland glaciers were carried out by the Geographical Institute, at the University of Copenhagen, 1956-58. The main purpose was to study variations in the ice front and material balance (*Fristrup,* 1960). Of these especially selected glaciers the Mitdluagkat Gletscher (36,4 km²) on the island Angmagssalik represents the East Greenland type (high annual precipitation) with a temperature profile that – apart from the upper metres – is practically isothermal and very close to 0°, i.e. belonging to the temperate glacier type according to Ahlmann's definition. Mitdluagkat is typical in size and shape for the smaller glaciers of the district. It is a transection glacier, to the east and south bounded by mountain ranges with the 1084 m high Vegas Fjeld as the highest mountain. Toward the north and the west the glacier has more or less the character of a not very well defined highland glaciation. The glacier is penetrated by the nunatak Mitdluagkat which has given name to it. On account of the last years' ablation, the nunatak is now growing more and more together with the surrounding highland, but in return another nunatak has appeared on the lower glacier tongue. The glacier is drained towards the Sermelik Fjord; a short, now very steep tongue falls down into an approx. 800 m long and 200 m wide U-shaped valley with a very shallow delta extending to a number of rock islands formerly inhabited by eskimos. In 1958, the runoff from the glacier was studied by *Hans Valeur Larsen* who – apart from a period with glacier torrents – found a rate of discharge amounting to 2-4 m³/sec. in summertime.

In 1933, the glacier was studied by *Keld Milthers* who established a number of measuring points from where the ice front could be determined by means of a phototheodolite. In 1958, these points

were used for measurements undertaken by the Geographical Institute under the leadership of the author and again in 1969 when a third, exact re-surveying was made by Geographical Institute, supported by *Statens Videnskabsfond* and *Ministry of Greenland.*

The outermost moraines of the glacier lie near the coast and represent presumably a maximum extension. From this outer moraine there is a distance of 253 m to the front position as measured by Milthers, and it is still possible on the basis of the photos from 1933 to determine in details the glacier front on the basis of some large stones. At the re-surveying in 1958 the front had receded 472 m and, as it appears from fig. 1 and fig. 3, its appearance had changed. At the re-surveying in 1969, the ice front had receded further 259 m and showed a heavy subsidence. In 1958 a very large calderon was characteristic for the lower tongue, but here was now a nunatak and a number of Milthers' outermost photopoints had become useless as the glacier front could no longer be seen from them. New points were therefore established.

In 1970, a further retreat of 62 m of the glacier front was measured simultaneously with some subsidence of the glacier surface. An exact levelling has now been carried out upon the glacier tongue.

In 1969 a number of stakes were established for measurements of the material balance, but unfortunately many of them were lost during the violent pieteraq raging the area in February 1970. Luckily the uppermost stake was found, though broken, but in such a state that it could be ascertained that the material balance even here in the upper part of the glacier had been negative with a total ablation of 1 m superimposed ice.

From the above it will appear that throughout the years a number of investigations have been undertaken in this area by the Geographical Institute. Additionally, the glacier was re-photoed by a British expedition in 1966, and *Hans Valeur Larsen* and *Jens Fabricius,* both of them participants in the 1958-expedition, have further had the opportunity of taking air-photos of the glacier in connection with the ice reconnaissances of the area undertaken by the *Meteorological Institute.* Among other things these photos show that some ice-dammed lakes, in 1958 a very characteristic feature for the glacier, have now disappeared or undergone changes. In 1958, the drainage of one of these ice-dammed lakes was studied in greater detail by *Valeur Larsen* (1960). From a physical-geographical point of view the area must therefore be considered to be very active and

thanks to the photographic records of front positions and location of a great number of characteristic boulders, a very exact dating of many points is rendered possible.

The establishment of the station

For a long time a permanent station in Greenland has been heavily wanted by the Greenland Division of the Geographical Institute, a station for scientific research and for training the increasing number of students majoring in geography, who want to undertake special studies of an arctic area.

The station must therefore have facilities for studies within arctic climatology, glaciology, hydrology, geomorphology, and other fields within the physical-geographical research.

It was a primary demand that the station could be reached most of the year at reasonable transport expenses, i.e. it should be placed within a not too long distance from regularly used airfields. From a safety point of view the terrain should not be too difficult, and as experience shows that it cannot be taken for granted that a small group is able to maintain regular radio contact with the Greenland radio stations, the station should be placed so that one or more men in case of emergency were able to walk to a larger settlement or town for assistance. Thus, besides the demands made for scientific reasons there were also practical problems which can usually be left out of account when establishing a scientific station.

Hurlbut Gletscher, Sermikavsaq, Sermersoq, and Mitdluagkat Gletscher were gone through on the basis of these premises. The final choice was relatively easy, as Mitdluagkat Gletscher lies on Angmagssalik Ø, with fairly easy access to the town Angmagssalik by a 30 km long route. From here there is boat or sledge connection to the airfield Kulusuk with good connections to the main airport Søndre Strømfjord.

It was decided to build the station of prefabricated house elements, only changed somewhat for the special purpose. A Norwegian constructed Langmoen mountain hut was chosen. It is isolated according to Norwegian standard for residence all the year round in northern Norway. Considering the danger of fire and as reserve house, it was decided to build also a store house at a safe distance from the main house.

The station was paid by *University of Copenhagen* and was erected during the summer of 1970 under the leadership of the author with the architect, *Verner Classen*, as technical adviser and

with assistance of stud. scient. *Leif Tang Lassen,* who also joined the surveying in 1969, and of stud. scient. *Palle Jørgensen.*

The plans went according to schedule with departure from Copenhagen on the 6th of July and arrival at Angmagssalik next day. The vessel "Ejner Mikkelsen" took us to the Sermelik Fjord where we disembarked on the 9th of July. With kind assistance from the crew, the goods were unloaded upon an ice floe, carried ashore and further up to the site. On July 11 the carrying work was done. On the same evening the measuring and marking of the ground was made, and next day we started to dig out the base. On account of the gales raging in the area at times, the house was ensured with a heavy foundation of timberwork at 70-80 cm depth, sill and load-bearing elements rest on concrete blocks and stones. When first the foundation work had been done and the sill bolted on to the timber base, which was again covered, it was fairly quickly done to raise the wall elements. July 15, the last rafters were put in, and the following day the expedition had the honour of seeing *Their Royal Highnesses, Princess Margrethe* and *Prince Henrik* for a short "rejsegilde" ceremony. In memory of this visit there was later placed a wedding silver coin under the floor with a brief description of the establishing of the Sermelik Station, now being its official name.

With the finishing of the roof, insulation of floor and roof could be made. The house measures 16.20 m × 6.60 m with a total area of 108 m². As seen on fig. 6, the station contains three rooms each equipped with two bunk beds and cupboards and tables for two men. Furthermore there are washing room, kitchen and a large common room opening to the fjord.

When the roof was quite finished, the house was additionally secured by means of two sets of wire across the roof ridge and fixed by earth anchors. The station lies well sheltered; in spite of the pieteraq in 1970, a Stevenson Screen left in 1969 had not suffered much damage.

Thereafter the store house was erected. This is not especially insulated and not yet furnished with floor, but it is bolted to a buried timber base in the same way as the main house. Among other things the store house contains the electricity generator for the station.

On the whole, the construction work was finished on August 15, and the remaining time was spent by re-surveying and other scientific tasks on the glacier.

On September 1, the expedition returned to Søndre Strømfjord.

The Sermelik Station is furnished with instruments for registering the discharge of the glacial river, sedimentation, etc. Necessary equipment for climatological and micro-climatological measurements, including radiation records will be available later. A detailed glaciological programme has been planned, and it is the aim to continue the photogrammetric recording of all Milthers' stations from 1933 which was carried out in 1958. Furthermore the station will be incorporated in the network of stations under the international hydrological decade.

LITTERATUR

Fristrup, B. (1960): Studies of Four Glaciers in Greenland. Geografisk Tidsskrift bd. 59.

Larsen, Hans Valeur (1959): Runoff Studies from the Mitdluagkat Gletscher in SE-Greenland During the Late Summer 1958. Geografisk Tidsskrift bd. 58.