

## REVIEWS

DE GLACIOLOGISKA UNDERSÖKNINGARNA I KEBNEKAJSE 1946-49. (Glaciological studies in Kebnekajse).

By HANS W:SON AHLMANN. *Lund; Sweden: Geografisk Arsbok, No. 77 (1950) pp. 106-127. (In Swedish with a summary in English).*

In 1945, when Professor Ahlmann resumed his researches on the glaciers around the Norwegian Sea, he decided to undertake a systematic study of relatively continental glaciers. After a reconnaissance by his assistant, Valter Schytt, he chose the Storglaciär and the Rabots Gläciar in the Kebnekajsemassiv (67°50N.) of Swedish Lapland. The main objective was to study the effect of the modern climatic change on the volume of the glaciers. The field staff was headed by Schytt.

The accumulation of snow was determined with the aid of bamboo stakes, pits, and seismic soundings; the specific gravity of the snow was determined; and the volume of the water was calculated. Since meltwater trickling down into the snow refreezes upon reaching the cold lower strata, and since below the névé limit some meltwater forms superimposed ice, the ablation, or loss by melting and evaporation, is not easily determined.

Schytt and his associates therefore dug pits down to the autumn surface of the previous year to determine the water content of the snow at various levels and the thickness of the superimposed ice.

By comparison of old maps with recent maps and photographs the average annual decrease of the Storglaciär during the period 1922-46 was calculated to have been 2.6 million cubic metres of water. In 1946-7 the loss was 6.4 million cubic metres, in 1947-8 the budget was balanced, and in 1948-9 there was a surplus of about 2.8 million cubic metres of water.

The excessive ablation, which ended in 1947, was evidently connected with the climatic change which has gone on for about a hundred years; but whether the large snow surplus in 1948-9 was a temporary reversal of the preceding long trend or is the beginning of an opposite climatic trend, only the future can tell.

Ahlmann himself devoted the summers of 1948 and 1949 to the study of the crystal structure of glacier ice. E. Bergström mapped the numerous glaciers in the Kebnekajsemassiv, their moraines, and the adjacent vegetation belts. In addition meteorological observations were made, and instruments were tested.

ERNST ANTEVS

## NORTHERN NEWS

### Aircraft accident at Alert<sup>1</sup>

On 31 July 1950 an R.C.A.F. Lancaster aircraft crashed at the weather station Alert, near Cape Sheridan, north Ellesmere Island, killing Colonel C. J. Hubbard of the United States Weather Bureau, Dr. D. W. Kirk of the Geographical Branch, Department of Mines and Technical Surveys, and the seven members of the crew. The crew were: W/C D. French; F/O T. D. Martin; F/L L. M. Maclean; F/O J. R. Dube; F/L J. F. Swinton; F/O J. E. McCut-

eon; and LAC R. L. Sprange.

The Lancaster was one of two, based at Greenwood, N.S., used for long-range ice reconnaissance by the supply mission to the joint Canadian/United States northern weather stations. The aircraft was dropping supplies to the weather station when a parachute caught in the tail assembly causing the aircraft to crash. All the occupants were killed immediately and were buried at Alert. It had been intended that their bodies should be brought out, but a Canso which was sent north for this task hit some ice off the station and was dam-

<sup>1</sup>Reprinted in the main from the *Arctic Circular*, Vol. 3, No. 4 (1950) pp. 46-7.

aged; the crew however escaped safely.

Colonel C. J. Hubbard, a Fellow of the Arctic Institute, was chief of Arctic Projects in the United States Weather Bureau, and at the time of his death was acting as senior U.S.W.B. official on the supply mission. He had had considerable northern experience in the Labrador and during the war in the development of aviation facilities in the Hudson Bay area. He played a major part in the setting up and maintaining of the joint Canadian/United States weather stations in the far north and had been on the 1948 expedition which chose the site for Alert, the most northerly permanent weather station in the world.

#### **Air navigation in high latitudes**

When the Royal Air Force Lancaster "Aries" made its series of north polar flights in May 1945, it became the first British Commonwealth aircraft to fly over the North Pole. The main purpose of the flights, however, was to make the first critical test of up-to-date navigation equipment and methods in areas near the North Pole and the North Magnetic Pole, and no less than five navigation specialists from the Empire Air Navigation School at Shawbury, England, were included in the crew.

One of these, Squadron Leader A. J. Hagger, an instructor at the time of the Specialist Course at Shawbury, flew as second pilot, meteorological observer, and photographer. Despite these multifarious duties, he was intimately associated with every aspect of the navigation from the earliest planning stages of the expedition to the final analysis of results, and is exceptionally well qualified to make a critical assessment. In a paper on "Air navigation in high latitudes" in the *Polar Record* (Vol. 5, No. 39, 1950, p. 440-9), Hagger reviews the special problems of polar navigation, treating in detail the difficulties and solutions of definition of direction, methods of steering, methods of fixing, and methods of plotting. Although the manuscript was received for publication in November 1947, it is an excellent summary of the air navigation problems as they exist in high latitudes today, and

as they will exist in all likelihood tomorrow.

As is well known a considerable amount of arctic flying has taken place since Hagger's paper was written, including the routine U.S.A.F. weather reconnaissance flights from Fairbanks, Alaska, to the North Pole. A few comments based on this recent experience may therefore be of interest.

The U.S.A.F. and R.C.A.F. navigators use grid directions<sup>1</sup> in high latitude flying, as explained in Hagger's paper, but prefer the 180th meridian as the "grid zero" direction from the pole, rather than the Greenwich meridian. The particular technique of astro compass measurement of aircraft heading, which they have found easiest to employ, requires the transformation of true direction to grid direction each time an observation is made. Using the 180th meridian as reference line, rather than the Greenwich meridian, eliminates the  $\pm 180^\circ$  from the arithmetic. The corresponding result that the grid direction of any heavenly body is then  $180^\circ$  different (or nearly so) from its Greenwich Hour Angle, has proved no great disadvantage.

The pilot's uncomfortable feelings, which Hagger experienced, when the navigator changes from true to grid direction, apparently vanish with practice. In fact in many cases the pilot's gyro is not adjusted throughout the flight, the navigator simply recording its error, and giving the pilot gyro headings to steer, rather than true headings or grid headings.

The long twilight of high latitudes, exaggerated often by the aircraft's motion over the earth, is, as mentioned by Hagger, a hazard to be reckoned with, since no heavenly bodies may be visible for direction or position checks for an extensive period. The recently developed Pfund Sky Compass, utilizing polarized light, can measure the direction of the sun when it is below the horizon, and so offset to some extent this difficulty.

Recent arctic flying has built up a considerable wealth of experience of

<sup>1</sup>See "Polar Navigation" in *Arctic*, Vol. 2 (1949) p. 183.

the radar returns from land and water in the Arctic, during all seasons of the year. Maps of northern Canada have also been corrected considerably so that aircraft carrying search radar often find radar fixing of position quite feasible.

Finally, the normal methods of sight reduction are generally used by northern navigators, altitude-azimuth tables now being available from 89°S. to 89°N. But as aircraft speeds increase even these methods seem too slow.

K. C. MACLURE

### **Waterfowl breeding ground survey in the Ungava Peninsula**

In the summer of 1949 Mr. Carl R. Eklund, biologist, with Mr. Leon D. Cool as pilot, investigated the waterfowl breeding grounds of the Ungava Peninsula. Ground studies were made in seven areas within the interior of the Peninsula and seventeen aerial transects, totalling 2476 miles, were flown between June 29 and August 3. The main bases of operation were Fort Chimo and Payne Lake, from which most of the aerial transects were flown. Flying was done with a Fairchild 24 aircraft at an elevation of 150 feet above the ground whenever possible. The principal rivers surveyed were the Payne, North Payne, Leaf, False, Whale, George, Koksoak, Kogaluk, and Povungnituk.

A detailed count was made of the various waterfowl observed. In the interior tundra regions of the area studied the Canada goose and the old-squaw were found to be the most abundant nesting species. Other species which probably nest there occasionally include: American golden-eye, red-breasted merganser and possibly the black duck. The Common eider is abundant in the tidal area along the west side of Ungava Bay and northward to Hudson Strait, while the king eider also probably nests along the Strait in limited numbers. In the taiga region studied the Canada goose and the black duck were the most important nesting species. Next in importance were the golden-eye and the merganser, together with an occasional old-squaw, pintail, scaup, and ring-necked duck.

While there were no heavy concentrations of geese, they were fairly well distributed. The species appears to favour the larger lakes and rivers, with the Whale, Payne, Leaf, and Kogaluk rivers being the most productive. The nesting season was late; all Canada geese observed appeared to have hatched during the first two weeks of July. There was no evidence that predators affect the waterfowl although it is possible that the arctic fox may prey on the nests. As far as could be ascertained weather and water conditions did not seem to be direct limiting factors in the waterfowl productiveness of the area.

### **British West Greenland Expedition**

A British expedition sailed from Copenhagen for West Greenland towards the end of June. The expedition plans to continue the geological investigations on Ubekendt Ø, off Svartenhuk Halvø, carried out by British expeditions in 1938 and 1939, and to initiate glaciological studies on the nearby mainland. Those taking part in 1950 are: H. I. Drever, leader and senior geologist; W. S. MacKenzie, geologist; P. J. Wyllie, glaciologist; T. J. Ransley and C. G. M. Slessor, surveyor-mountaineers; N. S. Tennent, mountaineer and photographer. It is expected that at least four Greenlanders will be employed by the expedition.

The 1938 and 1939 expeditions both established their base camps at Igdlorssuit, on the east coast of the island. A summary of the work of these expeditions was published in *Nature* (Vol. 144, No. 3661 (1939) pp. 1073-1074). Other results have been published in *Meddelelser om Grønland* (Vol. 134, No. 8 (1948) pp. 1-34) and the *Geographical Journal* (Vol. 94 (1939) pp. 388-401).

The 1950 expedition plans to establish a base at Igdlorssuit again and in addition one at Nugatsiaq, on Qequertarsuaq Ø to the northeast. It is thought that three weeks of intensive field work should be sufficient to complete the petrographical examination of Ubekendt Ø begun in 1938-9.

The glaciological work will be carried out from the base at Nugatsiaq. The

Umiamako Isbrae and Rinks Isbrae on the mainland are within easy reach of Nugatsiaq. Both these glaciers are very active and fast moving, and it is hoped that a study of them may provide valuable information on glacier flow. In addition to surveying and making photographic records of these glaciers, the crystallography and texture of the ice will be examined by methods developed by Seligman and Perutz. The geology of the metamorphic complex through which the glaciers flow will be studied for the Danish Geological Survey.

The plans of the expedition have been approved by the Danish Government and the Danish Commission for Scientific Investigations in Greenland. Transportation is being provided by the Grønlands Styrelse.

#### **Award of Bruce Memorial Prize to Dr. M. J. Dunbar**

It has recently been announced that Dr. M. J. Dunbar, Associate Professor of Zoology at McGill University and a Governor of the Arctic Institute, has been awarded the Bruce Memorial Prize for 1950 in recognition of his contributions to scientific research in the Arctic. The prize is given in memory of Dr. W. S. Bruce, the Scottish oceanographer who led the Scottish National Antarctic Expedition of 1902-4. The prize consists of a bronze medal and twenty guineas and was awarded by a joint Committee of the Royal Society of Edinburgh, the Royal Physical Society, and the Royal Scottish Geographical Society.

Since 1935 and 1936 when he was a member of the Oxford University expe-

ditions to Greenland Dr. Dunbar has carried out marine investigations in Alaska, Greenland, and the Eastern Canadian Arctic. For the past three years he has been studying Eastern Arctic waters for the Fisheries Research Board of Canada. The purpose of the investigations has been to discover marine resources which might be useful to the natives and to add to the knowledge of the oceanography and hydrography of the area. The *Calamus*, a 49-foot ketch (*Arctic*, Vol. 2 (1949) p. 56), has been built for this work.

#### **Presumed death of Mr. Rodgers D. Hamilton**

At midday on 9 May 1950 Mr. Rodgers D. Hamilton and Mr. Burt Galbraith, pilot, left Tigvariak Island in a Norseman aircraft to fly to Point Barrow, Alaska, some 220 miles. The aircraft did not arrive at its destination nor did it report elsewhere. An immediate search was started with Alaska Airlines, who owned the missing aircraft, Wien Airlines, and the Tenth Air-Sea Rescue Squadron, Ladd Air Force Base. This search has been unsuccessful and it is presumed that Mr. Hamilton and the pilot have been killed.

At the time of his disappearance Mr. Hamilton was carrying out field studies on arctic invertebrates under contract with the Johns Hopkins University. In 1948 and 1949 he had received research grants from the Arctic Institute to study the wood frog along the rivers of northern Alaska and the Northwest Territories of Canada.