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NORTHERN NEWS

Geomorphological work along the north shore of Great Bear Lake

With the help of a grant from the Banting Fund provided through the Arctic Institute the writer, assisted by Pamela Russel, both from McGill University, visited the area north of Dease Arm, Great Bear Lake, N.W.T., from late June to late August 1958 to study the glacial morphology.

The party flew in from Yellowknife by charter plane, establishing caches en route. Work had to be started farther south than originally planned because of late break-up on the northern lakes, and a landing was made about 40 miles north of Great Bear Lake, where a river cuts through a large esker at an altitude of about 835 feet above lake level. This esker is the largest the writer has found during air photo interpretation of the Barren Grounds. It has small branches, which join it at almost right angles from the north and south. The top of the esker stands 160 feet above the drift-covered plain to the south and has a caved-in top approximately half a mile wide.

The 80-mile descent to Great Bear Lake was made in a folding kayak down the river and short land traverses were made on the drift plain en route. Trees appear in the river valley approximately 20 miles north of the lake. The river is a youthful one, full of rapids, and passes in its lower course through a series of long lakes, which lie parallel to north-dipping sandstone ridges. The short links between these lakes consist of rapids and waterfalls. The greatest difference between any two lake levels was perhaps 160 feet.

Raised beaches are abundant along the lake shore. Their heights were measured in some cases by aneroid, in others by levelling. The most easterly beaches examined were 16 miles up the Dease River, in a bay of proto-Great Bear Lake, and measurements were continued to a bay 40 miles west of Haldane River. The dip of the beaches toward the west amounts to 115 feet over a distance of 100 miles. The highest beach is about 290 feet above the lake in the east and 175 feet in the west. To complete the picture further investigations will be necessary farther to the west, and north of the lake.

The remains of Fort Confidence and houses built along the Dease River by Hodgson, Hornby, Father Rouvier, and by the party led by George M. Douglas in 1911 were also visited.

ANNEMARIE KRÖGER

Lichenometrical studies in West Greenland

The great climatic differences between the humid outer coast and the arid margin of the inland-ice express themselves clearly in the vegetation of the Söndre Strömfjord area. Along this climatic gradient the changes in the vegetation of lichens and higher plants have been studied with the help of the previous work of T. W. Böcher, M. S. Christiansen, and K. Holmen in this region. The most rapid changes from oceanic to continental elements in the flora occur in the outer third of the fiord, they vary according to the terrain, taking place generally at sea-level nearer the coast and at higher altitudes farther inland. To obtain criteria of the micro- and macro-climate, as expressed in the growth of lichens, crustaceous species have been photographed at marked stations between Sukkertoppen and Söndre Strömfjord Air Base. The British Cambridge University West Greenland Expedition and the Franco-Suisse Greenland Expedition under René Dittert have taken additional photographs in their areas of investigation. The photographs with exact indications of their localities have been deposited at the Montreal Office of the Arctic Institute; they should be repeated in about 10 years.

The plant succession on the moraine systems of 15 glacier forelands has been studied. Diameters of rock lichens and cushion plants and growth rings of *Salix glauca* stems have been used to date the last glacier advances. Old grave stones in Sukkertoppen gave a preliminary dated base to find the speed of the growth of the lichens. This allows a reasonably accurate dating of moraines in the vicinity. Morphological characteristics of moraines, observed recession of glaciers since the air survey (carried out mainly from 1941 to 1943), and growth rings of woody plants permit a comparison with glaciers farther inland. All methods indicate a large advance around 1740 or 1780 or both of all glaciers visited; at larger ice bodies these moraines are the oldest Recent ones. Within these systems one finds generally traces of a re-advance culminating around 1880 and smaller moraines with greater local variation. Smaller glaciers show sometimes older, but still Recent moraines in front of the massive boulder ridges from the eighteenth century. By extrapolating the growth rate of lichens it is found that the older moraines have been formed around 1600. Still older moraines bear a lichen cover in balanced condition and do not differ in this respect from the region outside the moraines. The lichen thalli have reached maximum diameters and although these are smaller than in the Alps, their growth is so slow that in the continental region the largest thalli of *Rhizocarpon* spp. may well be 4,500 years old. Their maximum age in the coastal region lies between 1,500 and 2,500 years. Microclimatic differences due to variations of the duration of the snow cover and the exposure increase their effects on epipetric vegetation considerably in the continental part. The moraines with a minimum age of 1,500 to 4,500 years — as far as lichenometry can be applied — may be in part late glacial, but at least in one case a correlation with a low shore-line could be made, which suggests a re-advance after the thermal optimum. In contrast to the large amount of morainic material deposited during the Recent advance period from 1600 to 1880 older moraines are scarce and often small. Separate detailed reports on the glaciological and lichenometrical results and on the botanical results will be made later.

The field work was carried out by the writer and was made possible mainly through a grant from the Banting Fund, provided through the Arctic Institute of North America and the extremely kind collaboration of the Danish authorities.

R. E. Beschel

Geomorphological investigations in the Kaumajet Mountains and Okak Bay (North River) region of Labrador

During the summer season of 1958 the writer, assisted by his wife, worked in the Kaumajet Mountains and Okak Bay area of northeast Labrador. The party was taken by air to Hopedale and thence by coastal steamer to Nain. A fishing boat and crew from Nain transported the party to a narrow isthmus separating Kai-Kai Inlet and Neisser Inlet in the Kaumajet Mountains 120 miles northwest of Nain where a base camp was established on July 9. From there investigations were carried out on the inland block of the Kaumajet Mountains and on the lower land to the west as far as the Resolution Bay branch of Napartok Fiord. This camp was also used as a supply point for work on the two island blocks to the east, which together with the inland block constitute the Kaumajet Mountains.

An 18-foot canoe powered by a 5½-hp. Johnson outboard motor was used for travel around the island and mainland coasts. Secondary base camps were established at points on the coast from where the inland areas were accessible. Auxiliary camps were established inland and investigations carried out from them. In this manner an extensive reconnaissance of the area was possible.

Fine weather during the first 9 days made intensive work possible in the inland area, particularly on the inland block of the mountains. Exploration of the islands was, however, hampered by 19 days of continuous fog.

Attention was concentrated on the glacio-geomorphic features of the area. Numerous distinctive glacial erratics show that mass movement of the ice in the area was from west to east and that at its maximum the ice overrode all the summits[1] (highest Mt. Brave, 4,500 feet). The direction of the ice movement was strongly influenced by the topography of the pre-glacial mountain blocks and smoothed rock forms indicate channelling of the ice from southwest to northeast through Kai-Kai Inlet and Mugford Tickle. An examination of raised deltas and fragmentary shore-lines of the small lakes in the centre of the middle Kaumajet block suggests that the final stage of deglaciation was that of downwasting, exposing the valley cols before the valley mouths. Fresh striae were found at 2,400 feet on the undulating summit surface of the inland mountains in a place considerably higher than the upper limit of the later cirque glaciation. Consideration of these and of kame terrace forms worked into frost-shattered mountain top detritus on both the inland mountains and Cod Island suggests that the base of the last major glaciation, tentatively correlated with the final stage of glaciation recognized in the Torngat Mountains[2], certainly covered two-thirds of the Kaumajet Mountains area and possibly overrode it all.

Final glacial activity in the area was confined to the well-developed cirques and the mountain valleys. The positions of terminal moraines indicate that the small glaciers of this period did not extend into the main troughs. The remarkable freshness of the material found in these moraines suggests that the disappearance of the cirque glaciers took place in comparatively recent historical time.

On August 15 the party moved by fishing boat to Okak Bay, which is approximately 50 miles southwest of the Kaumajet Mountains. A base camp was established at the head of the bay on a small point of land alongside the tents of two Eskimo families who were engaged in the summer occupation of trout fishing. From this camp investigations were carried out inland.

Travel was by canoe up the major rivers, additional camps were established when the chosen areas were reached and further examination was carried out on foot between auxiliary camps within these areas. The first area to be examined was to the north and east of Umiakovik Lake, accessible from Umiakovik Brook, a tributary of North River. The second was the high land to the north of the northern tributary of North River. The third was the Umiakoviarusek River and Umiakoviarusek Lake area accessible from Ikinet Brook.

The evidence collected may be fitted into a tentative chronology of the final

[1]Wheeler 2nd., E. P. 1958. Pleistocene glaciation in northern Labrador. Geol. Soc. Am. Bull. 69:343-4.

[2]Ives, J. D. 1959. Glacial geomorphology of the Torngat Mountains, northern Labrador. Geog. Bull. No. 12.

emergence of the whole area from the last ice-sheet. The wide-spread cover of ground moraine, the many striae, glacial flutings, chatter marks, and perched boulders, which are particularly numerous on the surface of the dissected upland, indicate that the whole area was covered with ice at the maximum of the late Pleistocene glaciation and that the flow of ice was from west to east. Late stages in the deglaciation were characterized by downwasting, exposing the higher surfaces first, and by the ice that filled the troughs damming extensive lakes in hanging valleys and in depressions in the upland surface. Final ice activity was confined to the troughs where well-developed push moraines indicate late re-advances of the ice-front before its final disappearance.

Examination of the mass of evidence found in the Kaumajet Mountains and the Okak Bay area suggests that the whole region was covered with ice, which originated in the west and flowed to the east, in the final stage of glaciation of the area, which may be tentatively correlated with the Wisconsin of central North America.

The party left Okak Bay on September 21 and returned to the McGill Subarctic Research Laboratory at Knob Lake via Nain and Hopedale. This work was made possible by a grant from the Banting Fund provided through the Arctic Institute of North America. The sincere thanks of the party are also due to the Johnson Outboard Motor Company who made the outboard motor available for use during the summer and to many friends on the coast for their invaluable help and encouragement. The writer wishes to acknowledge the invaluable help and advice given by Dr. E. P. Wheeler. The work is being written up in full at McGill University during the present winter.

R. F. Tomlinson

ELECTION OF FELLOWS

At the Annual Meeting of the Arctic Institute held in Montreal on December 5, 1958 the following were elected Fellows of the Institute:

Sq. Leader Scott Alexander, Downsview, Ont.
Dr. T. E. Armstrong, Scott Polar Research Institute, Cambridge, England.
Dr. C. A. Barnes, University of Washington, Seattle, Wash.
Dr. F. Graham Cooch, Canadian Wildlife Service, Winnipeg, Man.
Mr. Patrick McTaggart Cowan, Toronto, Ont.
Dr. Francis Fay, U.S. Public Health Laboratory, Anchorage, Alaska.
Dr. Dean Fisher, Fisheries Research Board of Canada, Montreal, P.Q.
Dr. George Llano, National Academy of Science, Washington, D.C.
Mr. Alan Loughrey, Canadian Wildlife Service, Ottawa, Ont.
Dr. Waldo K. Lyon, Naval Electronics Laboratory, San Diego, Calif.
Dr. Robert A. McKennon, Dartmouth College, Hanover, N.H.
Dr. Siemon W. Muller, Stanford University, Stanford, Calif.
Dr. Donald S. Rawson, University of Saskatchewan, Saskatoon, Sask.
Dr. Kirk Stone, University of Wisconsin, Madison, Wisc.
Rear Adm. (ret.) Charles W. Thomas, University of Washington, Seattle, Wash.