

## University of Colorado: 1970 Summer Field Season in East Baffin Island

Field work continued during the 1970 summer season at an intensified level and a total of 16 persons were involved: 2 faculty members of the Institute of Arctic and Alpine Research (INSTAAR), 1 research climatologist, 1 professional photographer, 9 graduate students and 2 assistants; Mr. K. Dudley of Toronto also assisted us.

### LATE GLACIAL AND NEOGLACIAL CHRONOLOGY AND RECENT CRUSTAL MOVEMENTS

Field work continued on this program with the main emphasis being shifted to Narpaing Fiord and outer Okoa Bay. Marine limits were measured at many localities in the two areas and some samples of marine shells were collected for dating. Marine limits ranged from c. 40 m. on the outer Okoa Bay coast to 15-25 m. at the head of Narpaing Fiord. Studies continued on the task of subdividing the glacial deposits on the basis of a number of weathering criteria such as: depth of pitting, surface texture of boulders, soil development, X-ray analysis for clay minerals and Free-iron content. The combined results suggest several episodes of glaciation with a general decrease of glacier area and volume throughout the Wisconsin. A tentative chronology for Early Wisconsin events is being constructed with the aid of uranium series dates run on marine shells by Dr. B. Szabo of the U.S.G.S., Denver plus amino acid methods developed by Dr. E. Hare of the Geophysical Laboratory, Washington, D.C.

A tentative lichen growth-curve is being developed based on a variety of evidence, and it is considered that the graph may usefully be extended back to 8,000 or 10,000 years ago. Work on a series of corrie moraines at the heads of Narpaing and Quajon fiords suggests that the outermost south-facing moraines at 600 m.a.s.l. may be 15,000 years old whereas the north-facing moraines at 550 m.a.s.l. are 8,000 to 10,000 years old. Ice-cored moraines date from 5,000 BP and younger. Moraines older than 5,000 BP are not ice-cored suggesting a period of melting > 5,000 and < 8,000 BP. *Alectoria minuscula* s. l. was remeasured after two years at the head of Quajon Fiord and showed measurable growth.

Early Wisconsin marine limits are  $\geq 70$  m.a.s.l. on the outer coast, and the Late Wisconsin sea level may have been at 18

m.a.s.l. as shown by a major terrace at the elevation. Wave-cut rock terraces at about 7 m.a.s.l. were conspicuous along the outer coast in several localities and are inferred to date from the last interglacial.

### GLACIOLOGY AND CLIMATOLOGY

A series of 7 weather stations were established at different exposures and elevations in the area between the head of Quajon and Narpaing fiords. Each station consisted, at a minimum of a thermograph or thermohygrograph, maximum and minimum thermometers and a Tru-check precipitation gauge. Other sites had wind-run anemometers, and two actinographs were set at the "Divide" station (approximately 1,300 m.a.s.l.) and at "Glacier Camp" (approximately 1,100 m.a.s.l.) on the Boas Glacier. At Glacier Camp a micro-meteorological station (Thornthwaite temperature profile, wind profile and net radiation systems) was established with the addition of a Kipp pyranometer and two solarimeters to measure the albedo. A string of thermistors were placed in the ice to depths of 2 m. up the long profile of the Boas Glacier and to a depth of 5 m. at Glacier Camp. Synoptic weather records were kept at Glacier Camp and at Base Camp in the trough valley linking Quajon and Narpaing fiords.

Mass budgets were measured in early June and mid-August using a variety of methods. Stakes, probing and pits were used to detail the progress of melting during the ablation season. In early June the specific net budget was  $+ 0.42 \text{ cm.} \pm 0.06$  and in mid-August was  $+ 0.38 \pm 0.06 \text{ cm.}$  water equivalent. In complete contrast to 1969, no ice was showing on the glacier and the summer melt had been compensated by snowfalls throughout the "ablation" season. Surface lowering amounted to about 45 cm. of snow and this was nearly identical to the mass added in the growth of superimposed ice. Because of low temperatures the glacier was acting nearly as a closed system. The low run-off indicated by these data is in accord with the general features of the stream-flow of meltwater streams. A rating curve was obtained with the use of dyes and a colorimeter.

A velocity profile was surveyed at the beginning and end of the season in the approximate position of the equilibrium line (at about 1,050 m.a.s.l. if the AAR ratio of 0.7 is applied to the glacier). A strain network was also established. These will be resurveyed in 1971.

The Hoinkes precipitation storage gauges appeared to undercatch for the winter 1969-70 season by at least 50 per cent although a

satisfactory performance was noted for 1968-69. The values indicate that most records for winter precipitation in the arctic are minimum estimates.

In the near future, detailed energy and mass budgets will be constructed for the Boas Glacier. They will be used to establish control points for a computer program that estimates total daily solar radiation for a system of grid-points, taking into account such factors as shadow effects, etc. Analysis will also be made of the topoclimatic variability in the area based on these calculations and on the records from the station network.

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## Scandinavian - Canadian Field Workshop On *Rangifer* - Snow Ecology

Immediately following the third Winter Ecology course at Oulanka Biological Station in the Oulanka National Park, Finland, a group of six specialists assembled near Vittangi, Sweden (21-28 March 1971) for an informal field workshop on *Rangifer*-snow ecology. The base camp was a reindeer herder's hut, one kilometre south of Lake Jeutojaure and about twenty kilometres east of Mount Tjåktjo, near the Norwegian border.

The participants were: Olof Eriksson, Institute of Plant Biology, University of Uppsala, Sweden; Seppo Sulkava, Department of Zoology, University of Oulu, Finland; Erik Nyholm, Zoologiske Institutionen, University of Helsinki, Finland; Terje Skogland, Direktoratet for Jakt, Viltstell og Ferskvoannsfiske, Trondheim, Norway; Lars Larsson Blind,

Mertjärvi, Karesuando, Sweden; William O. Pruitt, Jr., Department of Zoology, University of Manitoba, Winnipeg, Canada.

Several days were spent observing reindeer-snow interactions, measuring and discussing snow morphology, and comparing various instruments and study techniques.

While the group had no authority whatever, we did arrive at several conclusions and decisions concerning our own winter ecology studies and those of our students; these were:

1) To assemble all known snow terms in all northern languages, and to illustrate each term with a photograph or accurate drawing. We believe that publication of such a lexicon would materially advance the study of boreal ecology. (We invite submission of snow terms and photographs for possible inclusion in the lexicon.)

2) To standardize snow observations to a limited extent and then only when concerned primarily with reindeer/caribou winter ecology. (Interested workers may contact me at the above address for details.)

3) To include, in tundra snow observations, data from ramsonde tests. We can see, at the present time, no direct correlation between *Rangifer* activity and behaviour and the parameters measured by the ramsonde, but we feel there may be hidden relationships which might tell us something.

4) To continue the approach initiated by Telfer in analysing the variability of snow covers with the aim of, eventually, being able to make statements on the variability of the major snow cover types.

In addition, we were all introduced to some new instruments and home-made modifications of familiar ones. There is now under way an active exchange of instruments.

Being a small informal group we made no firm plans for future field workshops, but we hope to reassemble in about two years, probably in Manitoba. We are all deeply grateful for the enthusiastic support of the Scandinavian Committee on Terrestrial Ecology and the Canadian Wildlife Service, which made the workshop possible.

*William O. Pruitt, Jr.*

## International Geographical Congress

The 22nd International Geographical Congress is due to take place in Montreal 10-17 August 1972, and several thousand geographers will participate. Later, 21-30 August 1972, the 24th International Geological Con-