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CLIMATOLOGICAL NOTES FROM AXEL HEIBERG ISLAND, N.W.T., CANADA

The main purpose of the meteorological program of the Axel Heiberg Island Expedition during the summers 1960 to 62 was the evaluation of heat-energy balances at snow and ice surfaces for two localities on the island. Estimates have been made for a station on the ice cap in the main accumulation area of the island[1], operated by the writer and S. M. Stones in 1960, as well as for a glacier camp in an ablation area, the Lower Ice Station on White Glacier, for selected periods in 1960 (R. H. G. Andrews, unpub.) and in 1962 (Havens, unpub.). Sections of these heat-balance analyses are being incorporated into a study for separate publication. In the meantime this note summarizes some of the general information collected in the bare-ground and ablation areas of west-central Axel Heiberg Island (see *Arctic* 15:160 for location map). A summary of the data for 1960 from the ice cap station has been published[2].

Climatological data

Climatological investigations were undertaken not only to provide the necessary background material for the heat-balance studies, but also to supply information for a heretofore relatively unknown area. Table 1 summarizes some of the weather elements for the base camp area, so arranged as to draw attention to the considerable variety of

Table 1. Climatological information for the base camp station of the Axel Heiberg Island Expedition (79°25'N. 90°30'W.).

	July			*August 1-25*		
	1962	*1961*	*1960*	*1962*	*1961*	*1960*
	Air temperature					
Daily mean (°C.)	8.7	4.8	6.6	4.5	5.8	7.9
Highest maximum (°C.)	18.9	13.1	15.8	16.7	16.3	18.9
Days with max. ≧ 15°C.	8	0	1	3	2	2
	Precipitation					
Total (mm.)	18.5	98.0	61.8	17.8	1.5	13.8
Days with 0.3 mm. or more	8	18	12	4	2	9
Days with trace	11	23	16	9	6	12
	Bright sunshine					
Total hours	357.3	110.5*	236.9*	256.3	193.7*	248.6*
Daily mean (hrs.)	11.5	3.6*	7.6*	9.7	7.8*	9.9*
Per cent of possible	49	15	32	52	42	55

*Lower Ice Station

mean temperatures and total amounts of precipitation that was found during the two consecutive years of 1961 and 1962. These data have been taken from a report by Andrews[3], from data recorded by Dr. M. Diem (Karlsruhe) and his associates and published in part by Müller[4], and from unpublished data collected by me.

Most of the sunshine data refer to the White Glacier station. A limited study failed to show any significant difference between the duration of bright sunshine recorded there and at the base camp, 3 km. to the southwest on bare ground. The strong dependence of air temperature on insolation is indicated by the temperature and sunshine data.

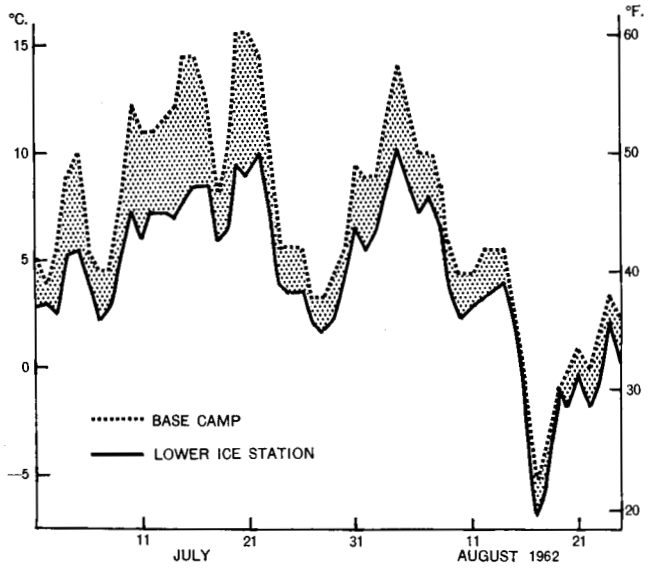

Fig. 1. Cooling effect (stippled area) of White Glacier, Axel Heiberg Island, N.W.T., Canada, defined as temperature difference between base camp and Lower Ice Station.

The cooling effect of a glacier terminus on the lower atmosphere

Various authorities have commented on the well-known ability of glacier termini to lower appreciably the temperature of the overlying air. As glacier snouts advance into lower altitudes this ability would appear to increase. However, the resulting enhanced ablation leaves glacier snouts covered with dirt and rock debris that effectively insulate the underlying ice as well as the surrounding air.

White Glacier is, as its name implies, a relatively "clean" glacier. It is in addition well situated for a study of its cooling effect on the lower atmosphere. The Lower Ice Station was in operation approximately 1 km. up-glacier from the terminus during the summers 1960 to 1962. Daily observations are readily available for only the summer of 1962, however, for an evaluation of the cooling effect of the glacier. The control station used is the base camp of the expedition, situated at almost the same altitude, 200 m. above sea-level.

Mean daily temperatures at the base camp and at the Lower Ice Station are plotted in Fig. 1. Their differences, defined as the cooling effect, average 3.3°C. for the unusually warm month of July 1962, but for the longer period from July 1 to August 25 the mean difference is slightly less with 2.7°C. Maximum values of the cooling effect correspond to warm, sunny days, whereas minimum values are found during overcast, unsettled weather. From comparison with temperature means for 1961[4], which had a cooler

than normal summer, a cooling effect of only 1.5°C. is indicated. Average values should lie somewhere between these extremes.

Two other studies of this kind may be mentioned for comparison. Schytt[5] found the cooling effect of Stor Glacier, Swedish Lapland, to amount to 2.2°C. in July and 1.1°C. in August 1947, and Eriksson[6] has shown that this effect usually results in a temperature depression of 3 to 4° C. at the Skagastøl Glacier, Norway during the summer. In reality the magnitude of the cooling effect can be compared regionally only very approximately because of the dissimilar environments encountered. For a specific locality, however, it provides insight into the climatic character of a particular observation season, as well as its year-to-year variation, by virtue of a simple and easily determined parameter that reflects those elements that in combination produce above-freezing temperatures in high latitudes. The cooling-effect parameter also gives some indication of the magnitude of the convective-heat-transfer term in the heat-balance equation.

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OBSERVATIONS OF BIRDS AND MAMMALS IN THE PERRY RIVER REGION, N.W.T.

Introduction

During the summer of 1963, John Ryder and the author studied the breeding ecology of a colony of Ross's geese at Arlone Lake (67°23′N., 102°12′W.) approximately 28 miles south of Perry Island, N.W.T. Because of the inaccessibility of this remote region its vertebrate fauna has remained almost undescribed. The discovery of the nesting grounds of Ross's goose near the Perry River by Gavin in 1940 has encouraged a small number of investigators to conduct studies in the area. The purpose of this paper is to make additions to the lists of Hanson, Queneau and Scott[1] and to report changes in the status of some species.

The work was done under the auspices of the Canadian Wildlife Service. The Perry River Eskimos proved to be a valuable source of information especially for data on mammals. The most helpful of the Eskimos was Angulalik, one of the older men at Perry River. Mr. Duncan Pryde, manager of the Hudson's Bay Company post at Perry Island, helped as interpreter and with his knowledge of the area. Thanks are extended to Dr. Victor Lewin of the University of Alberta, Zoology Department, for his assistance in the preparation of the manuscript.

We arrived at Perry Island on May 21, 1963, and established camp at Arlone Lake on June 1. The geese left the area after completion of hatching and we had to move to the coast on July 12. There we set up our banding camp near the mouth of the Perry River from July 31 until August 10, when our work in the Perry River region ended for that season.

Most of the observations were recorded within a 2-mile radius of our base camp at Arlone Lake.

Topography

The following excerpt from ref. 1 describes the terrain generally. "Glaciation and differential erosion have