

Project 750063

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At a number of localities in southeastern Ellesmere Island and on Coburg Island (Fig. 53.2), submarine moraines are delineated by concentrations of stranded icebergs or, in shallower water, by rafted floes of sea ice. Although the situation varies from year to year, in a general way photographs taken in late spring or early summer, before breakup, are the most useful. This is particularly true if an abundance of icebergs drifted into the area during the preceding summer and autumn.

In areas where detailed soundings have been carried out and hydrographic charts are available (cf. Liestøl, 1972), submarine moraine ridges can be discerned without recourse to indirect methods; but in more remote and less-studied Arctic regions, mapping of moraines by the stranded icebergs aligned along them is a useful tool, as Løken (1973) has demonstrated already off the northeastern coast of Baffin Island. Investigations of the submarine moraines in the northern part of the Canadian

Arctic Archipelago are just commencing as part of a long-term project of deciphering the glacial history and geochronology of this vast region. The purpose of this report is to illustrate a few examples of the type of occurrence described above.

The unnamed outlet glacier shown in Figure 53.1 is on the west side of Coburg Island (Fig. 53.2). No chronological data are available as to when the outer submarine moraine formed, but the inner moraine appears to mark the position occupied by the glacier front in 1959, for the aerial photographs taken on July 16th of that year reveal the presence of only a single underwater ridge (Fig. 53.3). In this connection it is interesting to note that photographs (A22540-42 and -43) taken from an altitude of approximately 3090 m on August 19th, 1971, at a time when the waters around Coburg Island were ice free, show no trace of the submarine moraines in front of the glacier illustrated in Figures 53.1 and 53.3. This indicates that



Figure 53.1. View northeastward along the northwest coast of Coburg Island. Note how two submarine moraines are delineated by the patterns in the ice in front of the glacier in the foreground. Part of the outer moraine that is above sea level is indicated by the large arrow, and the two underwater ridges are located by the smaller arrows. July 2, 1970 (GSC-203181).

the moraine ridges lie in water deep enough that they are not visible on fairly low level photography. On the opposite side of Coburg Island, 'Laika Glacier' (unofficial name used by the North Water Project, leader F. Müller, ETH, Zürich) advanced across a series of raised beaches some time within the last few thousand years, probably within the last few hundred years, and it reached a

terminal position approximately at the shoreline. The glacier has since retreated from the position attained during that advance, leaving a prominent moraine (Fig. 53.4). The outer submarine moraine shown in Figure 53.1 may be related to the same expansion, for it would not be unreasonable if advances of outlet glaciers on both sides of Coburg Island had taken place at approximately the same time.

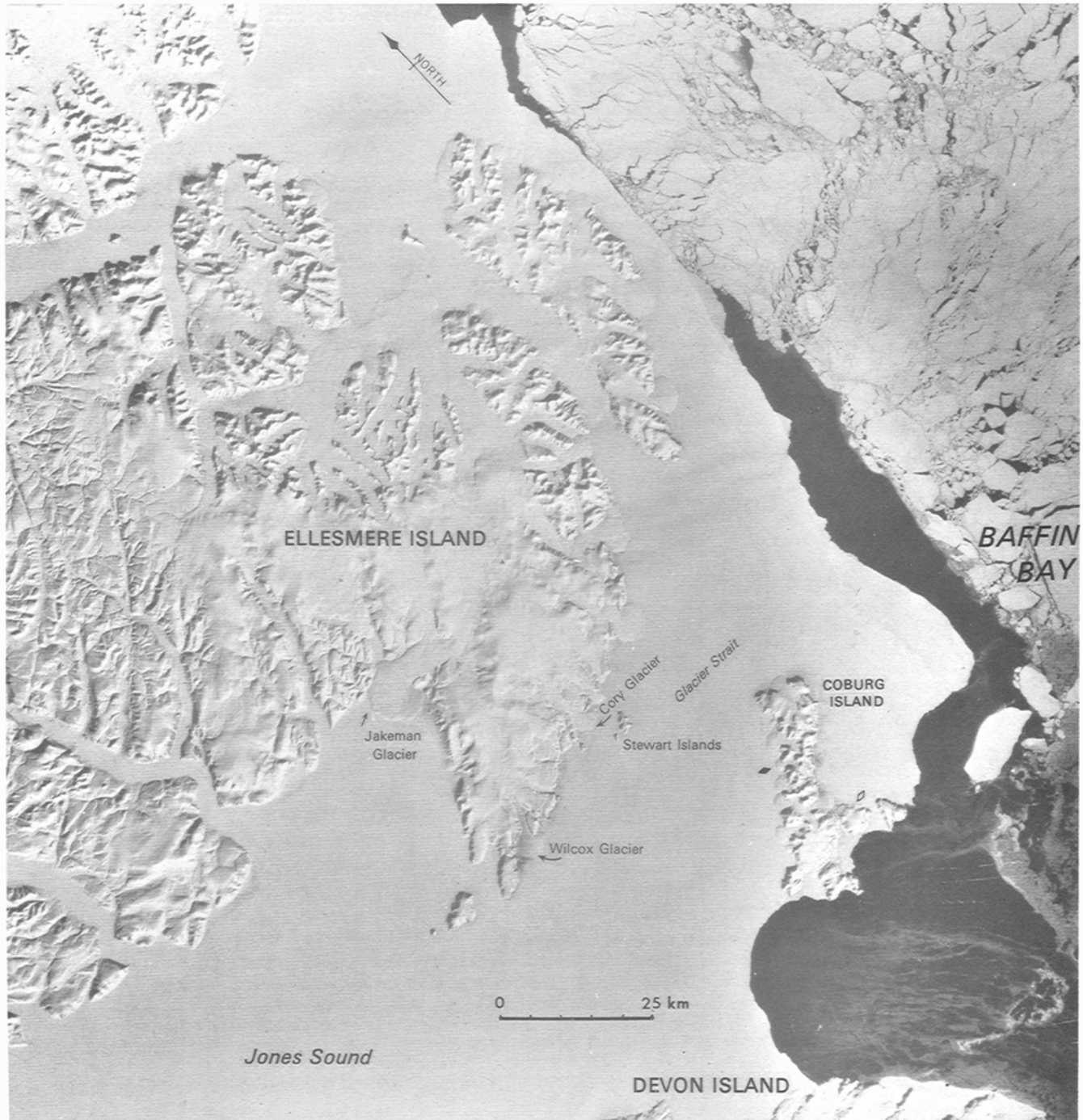


Figure 53.2. LANDSAT image of the eastern part of Jones Sound, showing the location of sites referred to in the text. The position of the unnamed glacier, shown in Figure 53.2, on the northwest side of Coburg Island is indicated by the black diamond; 'Laika Glacier' on the east side of the same island (Fig. 53.3) is indicated by the open diamond. Note the development of the North Water at the time the image was created, April 26, 1975 (image E-11007-17232, spectral band 7).



Figure 53.3. Vertical aerial photograph of the same glacier on the northwest side of Coburg Island that is shown in Figure 53.2. Note the single line of bergy bits, rafted ice, etc., extending out from the moraine on the south side of the glacier. Photograph A16682-16 taken from an altitude of ca. 9100 m, July 16, 1959. National Air Photographic Library, Department of Energy, Mines and Resources, Ottawa.



Figure 53.4. Aerial view southeastward along the east coast of Coburg Island. The terminal moraine of 'Laika Glacier' cuts obliquely across the series of raised beaches. July 2, 1970 (GSC-203182).

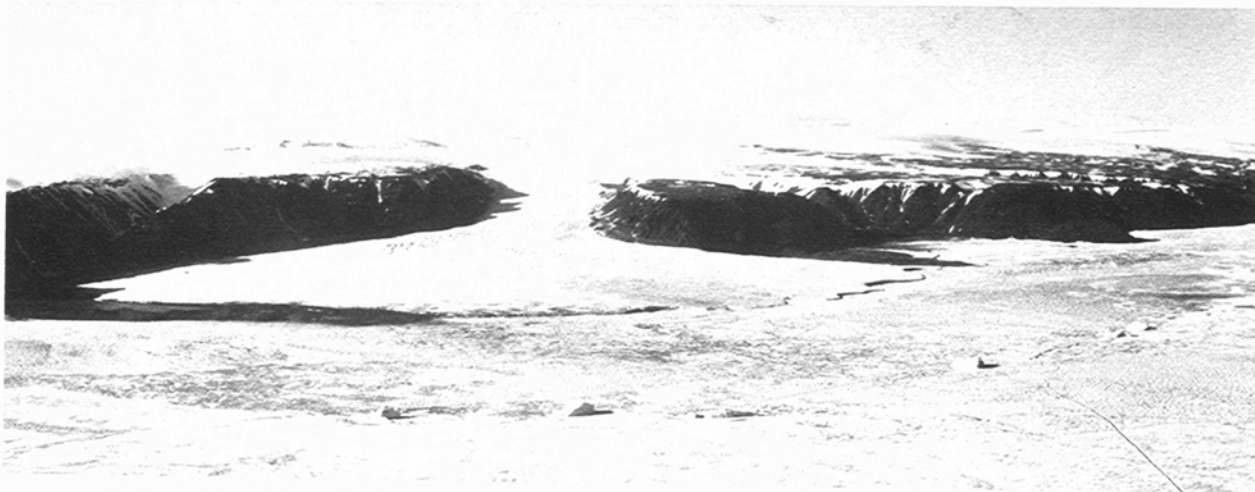


Figure 53.5. Aerial view northward at Wilcox Glacier, Ellesmere Island, with a group of icebergs aligned in concentric fashion in the foreground. July 2, 1970 (GSC-203183).

The line of icebergs shown in Figure 53.5, south of Wilcox Glacier, southeastern Ellesmere Island (Fig. 53.2), is considerably farther from the glacier than is the case with the moraines on Coburg Island. The only chronological data in the immediate vicinity are from Cory Glacier, some 20 km to the northeast (cf. Fig. 53.6). There, organic material believed to represent a lagoonal deposit (Blake, 1970, 1975) is present within a beach ridge at an

elevation of 10 m and over 1 km from the present shore; the organic material was determined to be 6490 ± 140 years old (GSC-1170). Obviously a sequence of younger beaches formed before Cory Glacier readvanced, created a series of moraines, and diverted meltwater to truncate and destroy much of the beach area. In addition, one area on the lowest beaches is occupied by the ruins of typical Thule culture houses (site RbHa-1; Fig. 53.6). It seems

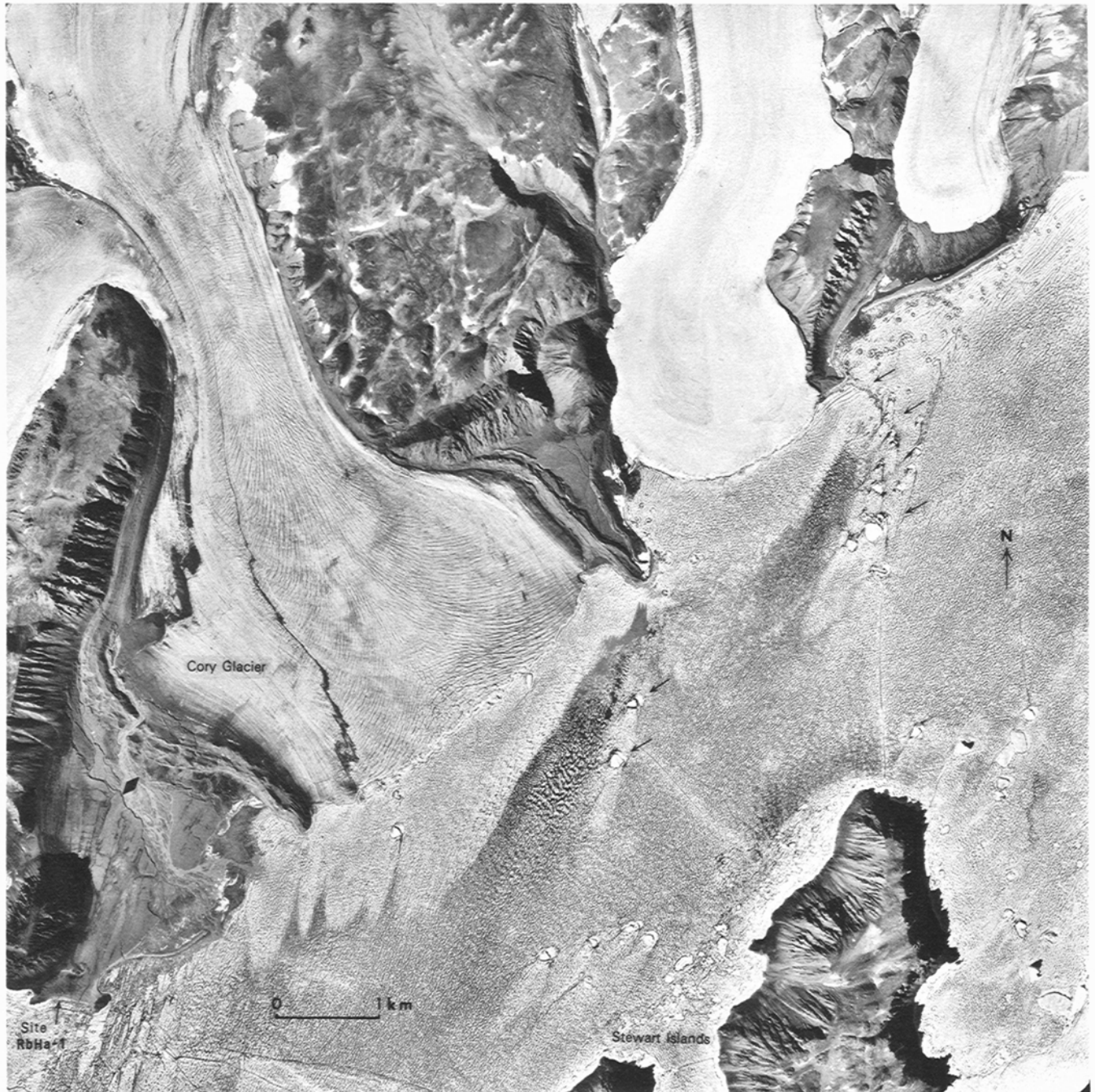


Figure 53.6. Vertical aerial photograph of Cory Glacier and the adjacent unnamed glacier, Ellesmere Island. Note the stranded icebergs (arrows) on the limbs of the submarine moraines and the way in which the beaches have been truncated by the ice-marginal river. The black diamond indicates the location of the dated lagoonal deposit referred to in the text. Photograph A16682-170 taken from an altitude of ca. 9100 m, July 16, 1959. National Air Photographic Library, Department of Energy, Mines and Resources, Ottawa.

reasonable to assume that this site was occupied some time during the last 1000 years, for a Thule settlement farther west along the coast of Jones Sound (site RCHv-1) contains whale bone which is 1110 ± 80 years old (GSC-1899; Blake, 1975)¹. If this assumption is correct and if it

also can be assumed that the readvance of Cory Glacier postdates the occupation of site RbHa-1, then the submarine moraines formed relatively recently, i.e., within the last few hundred years. Another line of evidence is provided by the presence of peat underlying

¹McGhee (1975) has suggested that "the main thrust of the Thule movement into Arctic Canada occurred between A.D. 1100 and 1400, and that by the latter date the Thule occupation had spread throughout most of the Central and Eastern Arctic".

colluvium or solifluction debris adjacent to Jakeman Glacier (Fig. 53.2); this material is 1470 ± 80 years old (GSC-1562). The advance of the glacier that caused the ice-marginal river to impinge on the succession of marine deposits and to excavate the section where the peat is exposed must postdate the development of the peat.

In Figure 53.6 the stranded icebergs carried onto the submarine moraine in front of both Cory Glacier and the unnamed glacier to the northeast are readily discernible. In this area, because of the southwestward-flowing current in Glacier Strait, the icebergs tend to cluster on the eastern limbs of the submarine moraines. The relationship, if any, of the icebergs nearer the Stewart Islands to moraines beneath the sea is uncertain. As observed earlier with regard to the glacier on the west side of Coburg Island, submarine moraines in front of Wilcox Glacier and Cory Glacier cannot be detected on aerial photographs taken under ice free conditions; e.g., during August 1959 (flight lines A16779 and 16787) and August 1971 (flight line A22540).

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