46. ASPECTS OF THE GLACIAL HISTORY OF BYLOT ISLAND, DISTRICT OF FRANKLIN

Project 780018

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Abstract

Erratics derived from north-central Baffin Island prove that large glaciers have moved onto Bylot Island across both the north and south coasts. The maximum elevation to which such debris has yet been found is about 1100 m a.s.l. and these high-level erratics are considered to have been emplaced prior to the 'last' glaciation. During the 'last' glaciation ice form offshore sources carried debris to maximum elevations of between 300 and 550 m a.s.l.; debris was carried by two glaciers – the first flowed northward through Admiralty Inlet and then eastward within Lancaster Sound, while the second flowed northward through Milne Inlet and then eastward within Pond Inlet. Both glaciers were grounded within the marine channels that they occupied. Shell fragments from glacial and derived deposits associated with that stade have minimum amino acid ratios (free) of about 0.3. Shells from material deposited after that event are more than 35 000 radiocarbon years old and have amino acid ratios of about 0.24. Subsequent to the maximum of the last glaciation, Bylot glaciers expanded 10 to 15 km beyond their present limits.

Introduction

Northern Baffin and Bylot islands have conceivably been traversed by ice originating from major independent ice sheets that converged within Lancaster Sound and flowed eastwards towards northern Baffin Bay during Pleistocene glaciations. Accumulation areas of those ice sheets may have been located to the north, over the islands of the Arctic Archipelago, and to the south, over Foxe Basin or the main part of the Canadian Shield. The location of Bylot Island within that area of convergence and outflow suggests that evidence of glaciation from there is key to the glacial history of the entire eastern Canadian Arctic. Despite this, little geologic information about the area has been available.

During the summers of 1978 and 1979, the Geological Survey of Canada conducted field studies of the Quaternary geology and glacial history of the Bylot Island region (Fig. 46.1). Those studies addressed the extent of former glacier ice cover, the source areas(s) of that ice, and the timing of ice movement(s). Most of the fieldwork was done on Bylot Island. This is a preliminary report on the evidence of movement onto Bylot Island by ice from offshore sources and of interaction of that ice with glaciers nourished there during what is interpreted to have been the maximum of the last glaciation. For this report, 'last glaciation' refers to glacial events of approximately the last 125 000 years and is used in a general sense.

In this paper the term 'foreign' is used to describe either glacier ice or debris carried onto Bylot Island, in contrast to 'native' ice or debris that is considered to have originated there. It may also refer to landforms created by foreign ice. The glacial history of Bylot Island is essentially one of interaction between foreign and native ice. Focus on this interaction is important. Bylot Island is physically isolated from Baffin Island, despite their proximity, by deep (> 500 m) marine channels (Fig. 46.1). Consequently, foreign ice deposits on Bylot Island must relate to major glacial events elsewhere. The extent of interaction between foreign and native ice is then a potentially unique measure of the dynamics of a large ice sheet and conditions of glacierization along a segment of its margin.

Because a variety of lithologically distinct areas of bedrock is found within the region, foreign erratics can be distinguished easily from those of local glaciers. In areas lying above the limits of marine submergence, the presence of such debris is compelling evidence of glaciation by foreign ice and, where their bedrock sources can be determined, net flow paths within that ice as well. Thus, erratics on Bylot Island form the principal evidence discussed here.

Only evidence related to the maximum advance of foreign ice and the extent to which it interacted with native ice during the last glaciation has been considered. I do not wish to imply by its omission that evidence of other glacial events, either foreign or native, does not exist.

Bedrock Geology

Bedrock geology of the study area has been mapped at a scale of 1:250 000, although the level of detail varies greatly between adjoining map sheets. Consequently, the definition of distinctive bedrock sources for purposes of boulder tracing is restricted by the most general scheme of mapping. Five rock suites have been defined on the basis of their lithologic and faunal characteristics with reference to published work (Fig. 46.1); they form source areas for the dispersal of glacial erratics.

A variety of igneous and metamorphic rock types of Archean and Aphebian ages comprises a basement complex that underlies much of Bylot Island and north-central and northeastern Baffin Island (Fig. 46.2). This suite of crystalline rocks has not been divided further and is considered as a single source area. No attempt has been made to differentiate crystalline debris from Baffin Island from that originating on Bylot Island. Crystalline erratics, however, are easily distinguished from the other rock suites.

Proterozoic volcanic rocks comprise a second physically and lithologically distinctive suite that outcrops near the northern shore of Fury and Hecla Strait, along the eastern shore of Admiralty Inlet, and on northern Bylot Island (Fig. 46.1). Exposures along Admiralty Inlet are areally the largest. On Borden Peninsula and on Bylot Island this rock type is mapped as part of the Nauyat Formation (Jackson et al., 1978). The rocks are fine grained, brown to reddish brown, and amygdaloidal. Amygdules are infilled with calcite and quartz, among other minerals (Fig. 46.2a).

A third suite is comprised of silica-cemented quartz arenites of the Proterozoic Nauyat, Adams Sound, and Arctic Bay formations which are mapped across Borden Peninsula and western Bylot Island (Jackson and Davidson, 1975; Jackson et al., 1978). Only the outcrop area of Adams Sound

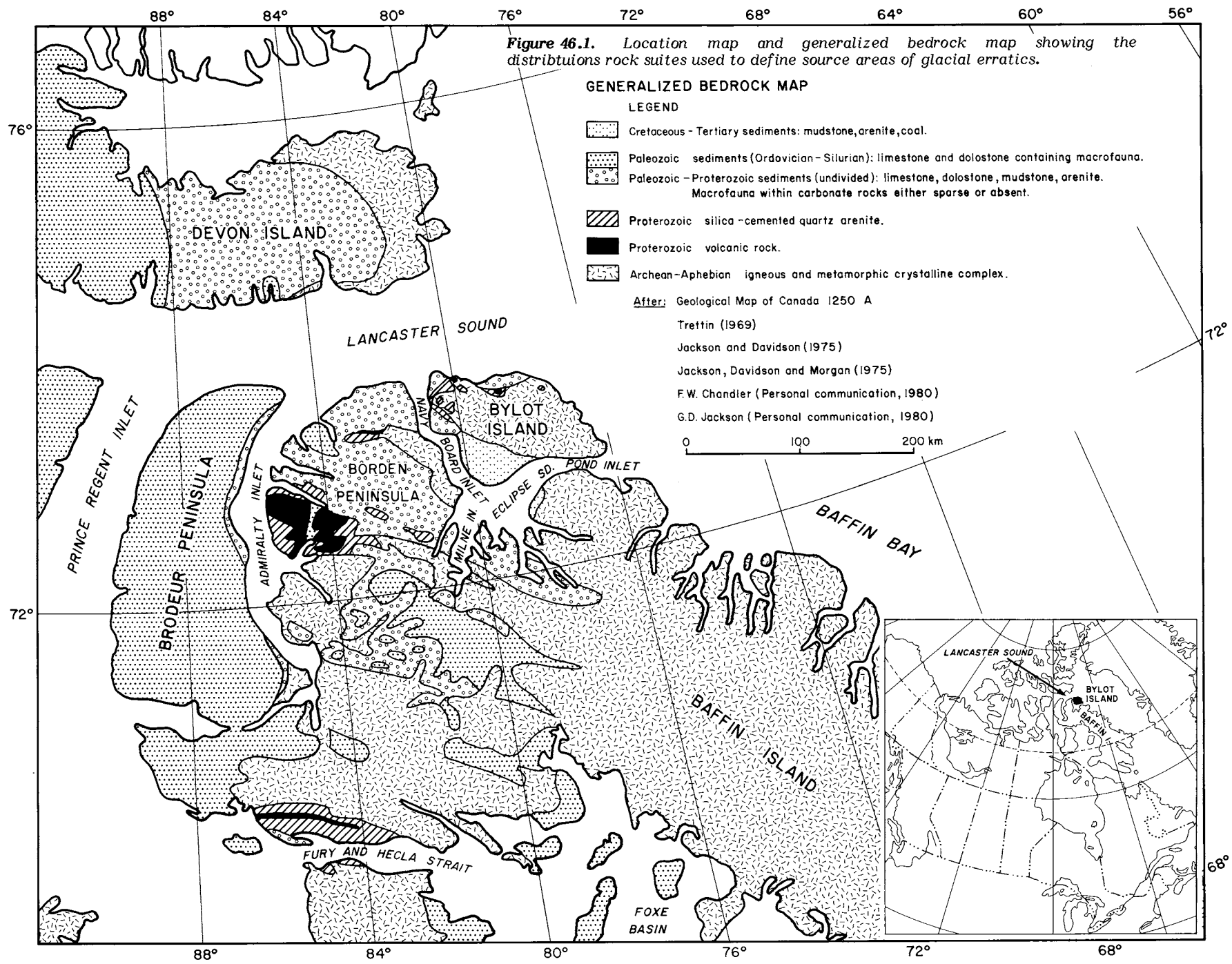


Figure 46.1. *Location map and generalized bedrock map showing the distribtuions rock suites used to define source areas of glacial erratics.*

Formation, the largest single source, is shown in Figure 46.1. Erratics found on Bylot Island are commonly pink and light brown and, in a few cases, are well rounded (Fig. 46.2b).

Proterozoic and Paleozoic sedimentary rocks that include diverse carbonate rock types, mudstones, and arenites underlie all of Brodeur and most of Borden peninsulas, much of western Bylot Island, and western Devon Island (Jackson et al., 1978; Trettin, 1969; Thorsteinsson, 1970) (Fig. 46.1). Although this suite represents several formations, only erratics containing abundant macrofauna can readily be matched to specific source areas, which lie on north-central Baffin Island south of Milne Inlet, on Borden Peninsula, and on westernmost Devon Island. Those erratics can be distinctive in appearance (Fig. 46.2c).

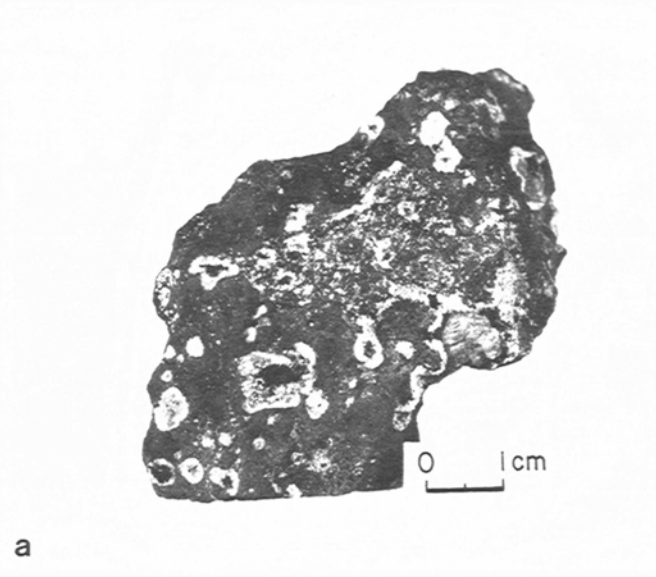
Poorly consolidated sedimentary rocks of Cretaceous-Tertiary age underlie the lowlands on southern Bylot Island and on Baffin Island to the south across Eclipse Sound (Fig. 46.1). The rocks of this fifth suite, which include mudstones, immature to mature arenites, and coal (Miall et al., 1980) are easily distinguished in the field from those of the Proterozoic and Paleozoic successions.

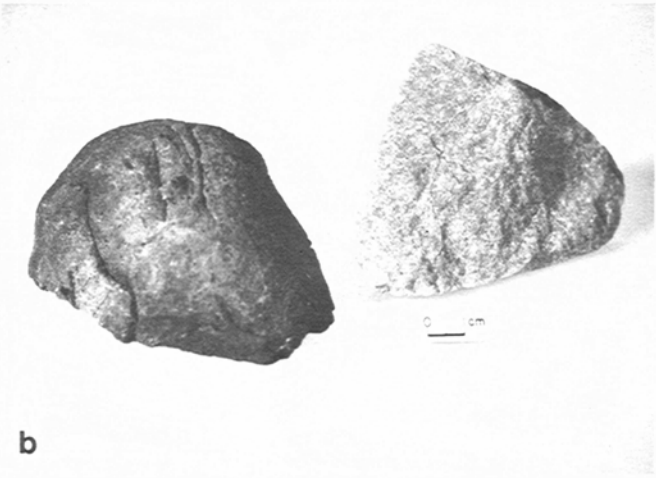
Most of the evidence presented here concerning glacier transport of debris onto Bylot Island refers to deposits located east of longitude 80°W on the island. East of that line the occurrence of either volcanic rocks or Proterozoic-Paleozoic sedimentary rocks as erratics can be taken as unequivocal evidence of onshore movement of foreign ice, excluding the lowland area near Maud Bight. Those erratic rock types stand in clear visual contrast with the underlying crystalline and Cretaceous-Tertiary sedimentary bedrock.

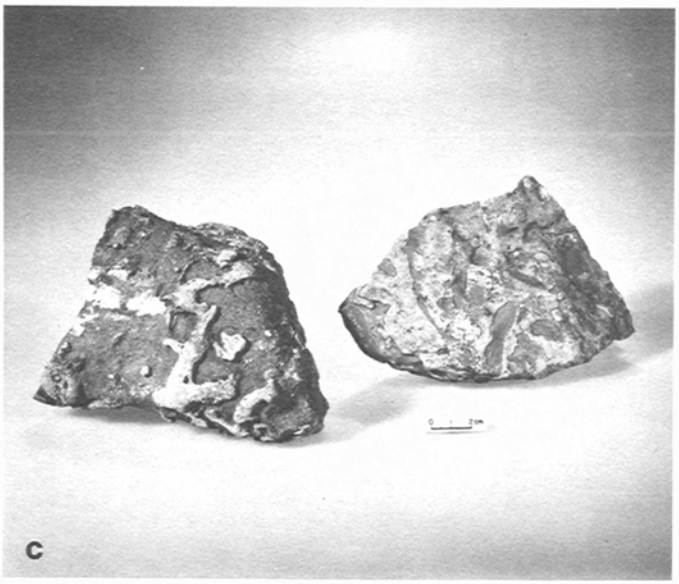
Distribution of Foreign Glacial Erratics

The distribution of foreign erratics has been mapped across both Bylot Island and the northern shore of Baffin Island along Eclipse Sound and Pond Inlet (Fig. 46.3). The maximum elevations to which this debris has been found vary around the margin of Bylot Island. Erratics of pink quartz arenite, thought to have been derived from either the Adams Sound or Nauyat formations, were found to 1130 m a.s.l. immediately west of Sermilik glacier, and erratics of other Proterozoic sedimentary rocks, including carbonates, were found at 820 m a.s.l. in the same area (Fig. 46.3). These are the highest elevations to which sedimentary erratics were found within the crystalline complex anywhere on the island.

The quartz arenites have, conceivably, an alternative native origin from small unmapped outliers of either Nauyat or Adams Sound formations within the Byam Martin Mountains. Although such outliers could exist, given the







a. *Amygdular volcanic rock found near Bathurst Bay at about 200 m a.s.l. GSC 203650-I ;*

b. *Pink and light brown quartz arenites, thought to have been derived from the Adams Sound Formation GSC 203650-A ;*

c. *Paleozoic carbonate rocks containing abundant macrofauna and typical of those types of erratics found within the outer foreign erratic zone. GSC 203650-F.*

Figure 46.2. *Foreign glacial erratics found on Bylot Island.*

regional geologic setting described by Jackson et al. (1975), none are known anywhere within the eastern portion of the crystalline highlands, and consequently their interpretation as foreign erratic debris is favoured.

In general, the maximum elevations attained by foreign debris were higher along the southern side of the island. Although the site elevations reported above were exceptionally high, foreign debris was found commonly at elevations to 700 m a.s.l. along Pond Inlet. Maximum levels on the northern side were about 550 m a.s.l.

Foreign debris can be characterized both by its abundance and by it gross lithologic composition; a broad "foreign erratic" zone can be mapped around most of the outer margin of Bylot Island on the basis of those criteria (Fig. 46.3). This outer zone is characterized by abundant foreign debris and, in areas not situated in front of large modern glaciers, extends to elevations between 300 m a.s.l. and 550 m a.s.l.; in front of some modern glaciers the maximum elevations of the foreign erratic zone are lower than on adjacent valley walls or foreign debris may be

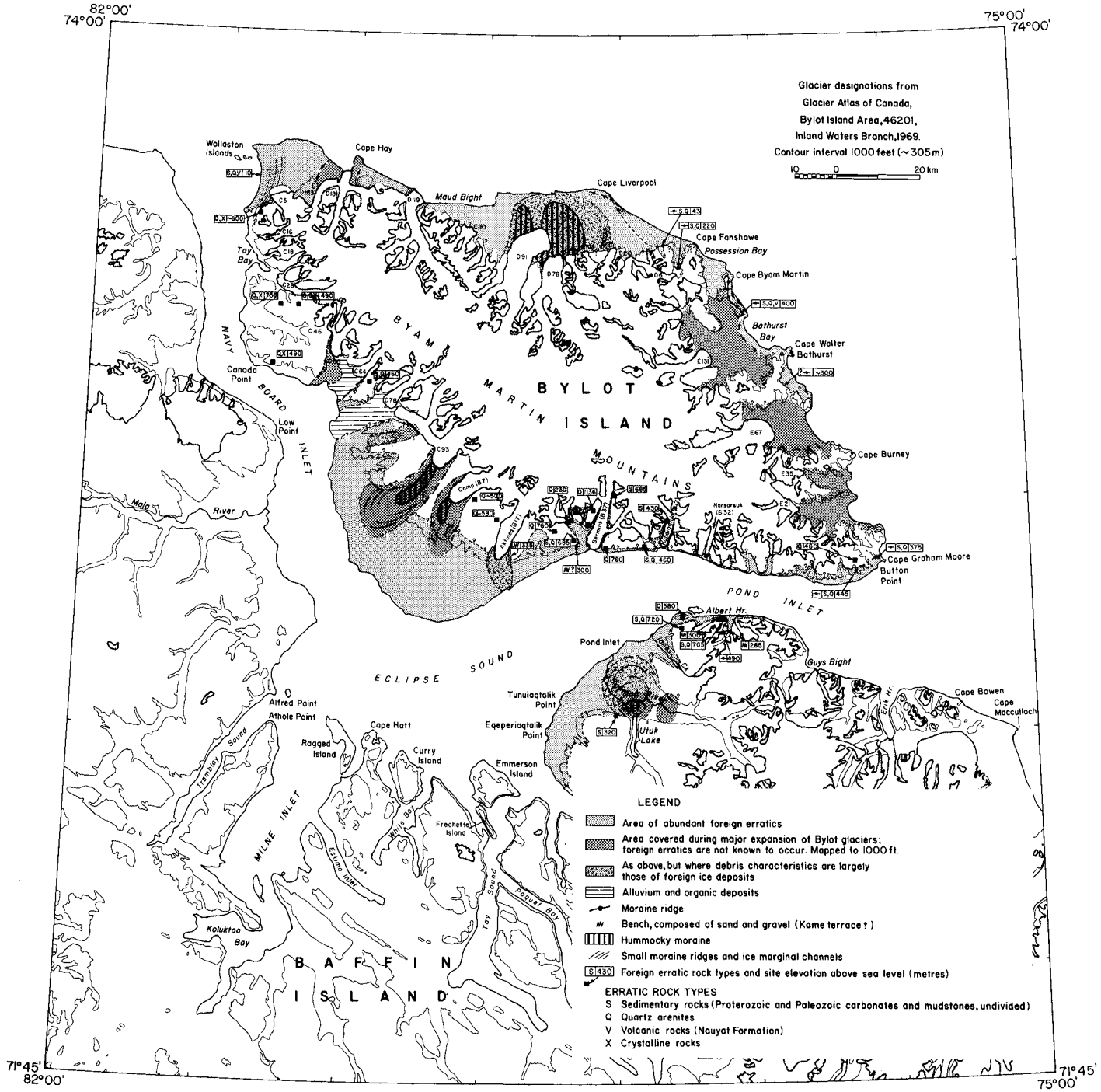


Figure 46.3. *Preliminary map showing the distribution of foreign and native erratics on Bylot Island and part of northern Baffin Island. Areas characterized by abundant foreign debris occur around the margins of Bylot Island and in places are bounded on their inland, distal side by moraines and by kame terraces. Sites where foreign erratics are found above that zone are also noted, along with their elevation.*

based on topographic maps, and extends more or less continuously for about 20 km between Cape Byam Martin and Bathurst Bay. It turns inland and declines in elevation along the northern side of the valley that ends in Bathurst Bay, but does not appear to extend more than a few kilometres up the valley (Fig. 46.5). Southeast of that bay it is less clearly defined and generally decreases in overall elevation along the outer coast. It is not evident southeast of Cape Burney.

A second foreign moraine also occurs along the northeast coast, but at much lower elevations (≤ 50 m a.s.l.). It can be traced across the outer valley floors in areas where the higher moraine has been observed. The relationship between the two moraines is not clear, but based on their morphological relationship the lower system is either roughly contemporaneous with or younger than the higher moraine.

Glacial Maximum: The Extent of Foreign vs. Native Ice

During the maximum of the last glaciation, at least some of the major native Bylot glaciers, and possibly all, were in contact and interactive with foreign ice that filled offshore areas. Some of the large modern glaciers, for example Aktineq (B17), Sermilik (B37) and glacier D91, currently lie well below and extend outwards beyond the maximum inland limits of foreign debris. Because it does not seem likely that those glaciers are less extensive today than during conditions of full glaciation, they must have been contiguous with the foreign ice, although overpowered by it, at least in their lower reaches.

The distribution of foreign debris in areas in front of Bylot glaciers is variable, and no foreign debris has yet been found within either the zone of hummocky moraine in front of glaciers C93 and B7 or in the main parts of valleys along the northeastern coast at, and southeast of, Bathurst Bay (Fig. 46.3). Areas where foreign debris does not occur are probably zones where native ice successfully restricted the influx of foreign ice; this is supported by the observation that foreign debris occurs to higher elevations across headlands between valleys where it has not been found.

Between Cape Hay and Cape Fanshawe, till within modern end moraines of native glaciers differs lithologically from the older till that lies distal to them between the highlands and the coast. The older till contains a much higher component of sedimentary rocks. Although no debris that is unequivocally foreign has been found here above elevations of 50 m a.s.l., it seems reasonable to suggest that the older till was deposited by ice flowing along the mountain front, parallel to Lancaster Sound rather than into it. Thus, it would seem that native ice did not successfully restrict onshore movement of ice in the Cape Hay – Cape Fanshawe region.

Native Ice Advance

Landforms in front of large Bylot glaciers, including meltwater channels and both lateral and end moraines, demonstrate that at least one major expansion of native ice did occur subsequent to high level inundation of the island by foreign ice. This has also been noted by Hodgson and Haselton (1974). During that advance, native ice extended 10 to 15 km beyond its present limits. In some areas overridden by native ice during the major advance (e.g. in front of Aktineq (B17), Sermilik (B37), glacier (D91), however, glacial deposits contain abundant foreign debris and can be strikingly different in texture and lithology from material within modern moraines (Fig. 46.3). This suggests that little if any erosion or redistribution of drift occurred during that major expansion of native ice.

Timing of the Last Major Foreign Ice Advance

Evidence bearing on the timing of the maximum foreign ice advance of the last glaciation is derived from both ^{14}C analysis and ratios of the amino acids D-allo isoleucine to L-isoleucine from **Hiatella arctica** and **Mya truncata** found within Quaternary sediments. The amino acid ratios referred to here are based on the 'free' or naturally hydrolyzed protein

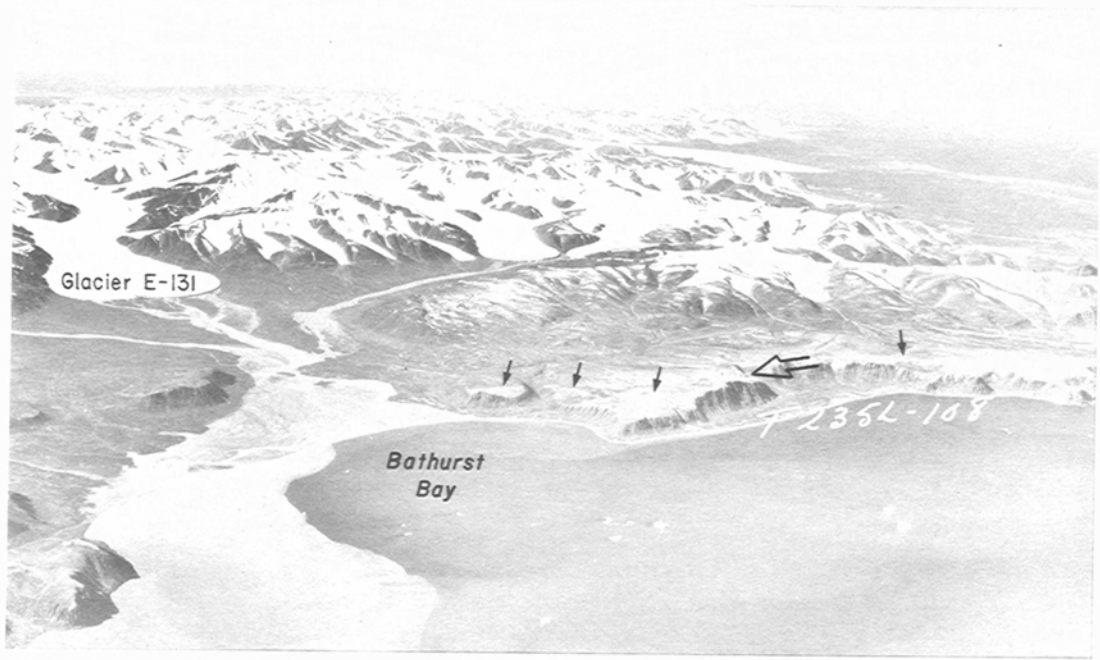


Figure 46.5. *Foreign moraine (black arrows) on northeastern Bylot Island along the southern coast of Lancaster Sound. The highest point along the cliff is 410 m a.s.l. The view shown in Figure 46.4 is indicated by an open arrow (EMR T23SL-108).*

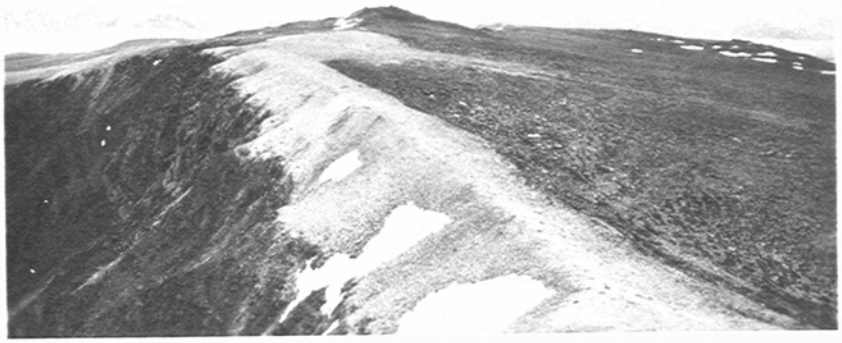


Figure 46.4

Moraine formed by foreign ice moving onto the northeastern coast of Bylot Island out of Lancaster Sound. The moraine contains a high proportion of carbonate sedimentary rocks and is consequently light toned in contrast to the crystalline bedrock. No foreign debris occurs distal to it. Note the tor-like features on the skyline. The clifftop position of this moraine, which lies between 350 and 400 m a.s.l., is shown more clearly in Figure 46.5. GSC 203639-K

altogether absent (e.g. glacier C93, glacier E67*). (The term 'abundant' is used here in a general sense to mean that such debris can be readily seen by examination of erratics in the field.) Farther inland and above the foreign erratic zone, the abundance of foreign debris is markedly lower, and in many transects made across the mapped boundary no such debris was found on the inland (distal) side. In those situations the abrupt change in lithologic composition is striking. It is important to note, however, that foreign debris can be found on the inland side of the mapped boundary in some places (Fig. 46.3).

Along the southern coast of Bylot Island the outer foreign erratic zone contains erratics clearly representative of three source areas: (1) Proterozoic and Paleozoic carbonate sedimentary rocks (undifferentiated); (2) quartz arenites; and (3) carbonate rocks containing abundant macrofauna, listed in decreasing order of abundance. Inland of that zone no sedimentary rocks with macrofauna have been found and quartz arenites appear to be the predominant foreign erratic type. The source areas of much of the foreign debris within the outer foreign erratic zone must lie on north-central Baffin Island south of Milne Inlet, a conclusion based primarily on the distribution of erratics of fossiliferous Paleozoic sedimentary rocks.

Along the northern coast, foreign erratics include representatives of all of the lithologic groups, with the possible exception of Cretaceous-Tertiary sedimentary rocks. Because of the diverse and scattered distribution of potential source areas of the sedimentary erratics, they can be used only to demonstrate flow of foreign ice onto the island without providing evidence of specific source areas.

The volcanic erratics, however, are of particular interest because of the more restricted extent of outcrop source areas. They have been found in glacial deposits along the northern coast of Bylot Island from its westernmost tip as far east as Bathurst Bay. Some of these erratics are fine grained and amygdular and are similar in appearance to outcrops described from Admiralty Inlet (Jackson et al., 1978; p. 4); outcrops of volcanic rocks on Bylot Island are thought to be coarser grained and lacking in amygdules (G.D. Jackson, personal communication, 1980). If the source area of the amygdular volcanic erratics is Admiralty Inlet, as it appears to be, then their presence in glacial deposits along the northern coast strongly indicates that they were carried there by a glacier that moved northward through Admiralty Inlet and eastward down Lancaster Sound.

Foreign Glacial Landforms

Foreign landforms and deposits coincident with the inland margin of the outer foreign erratic zone can be traced on air photographs around much of the island (Fig. 46.3). Across most of the southern lowland of Bylot Island the inland margin was defined at about 500 m a.s.l. by ground checking of the distribution of erratic types. A continuous morphologic boundary along that margin was not identified in that area, although as mapped the margin is associated with the headward limit of abundant small meltwater channels. East of Aktineq glacier (B17) a bench (kame terrace?) composed mostly of sand and gravel at about 335 m a.s.l. marks the inland boundary; a similar feature at a comparable elevation occurs above Sermilik glacier (B37) although it is not known if it too lies along the inland limit of the foreign erratic zone (Fig. 46.3). Between Sermilik glacier and Button Point the coast is fronted by steep cliffs that in places rise to more than 1000 m a.s.l.; consequently moraines either were not deposited or their position and elevation are difficult to determine. Along that section of coast, ice marginal positions are thought to lie between about 400 and 450 m a.s.l. based on the recognition of abundant foreign debris below those altitudes at a few sites and on the occurrence of trimlines and short segments of lateral moraines inland along the walls of valleys that intersect the coast. Above Button Point foreign moraines are draped across headlands between valleys and are coincident with the inland boundary of the foreign erratic zone. Neither the inland extension of those moraines nor any foreign debris was seen in that area more than 1 to 2 km inland beyond the valley mouths and at much lower elevations than the moraines.

Along the northeastern coast of Bylot Island, southeast of Cape Fanshawe, a foreign moraine follows closely along the edge of high (300 to 400 m) coastal cliffs (Fig. 46.3, 46.4). It is easily identified by virtue of its morphologic definition and 'perched' topographic position and, as first suggested by Hodgson and Haselton (1974, p. 7), probably represents a maximum ice-marginal position for a large glacier grounded within Lancaster Sound. This conclusion is further supported by observations of the considerable abundance of foreign debris which it contains and the apparent absence of foreign debris inland (distal) from it. The moraine varies in form along its length from a broad, thin (< 1 m thick) surface cover of foreign debris to a well defined sharply peaked ridge several metres high. It lies between 350 and 400 m a.s.l.,

*Glacier designations from the Glacier Atlas of Canada (1969).

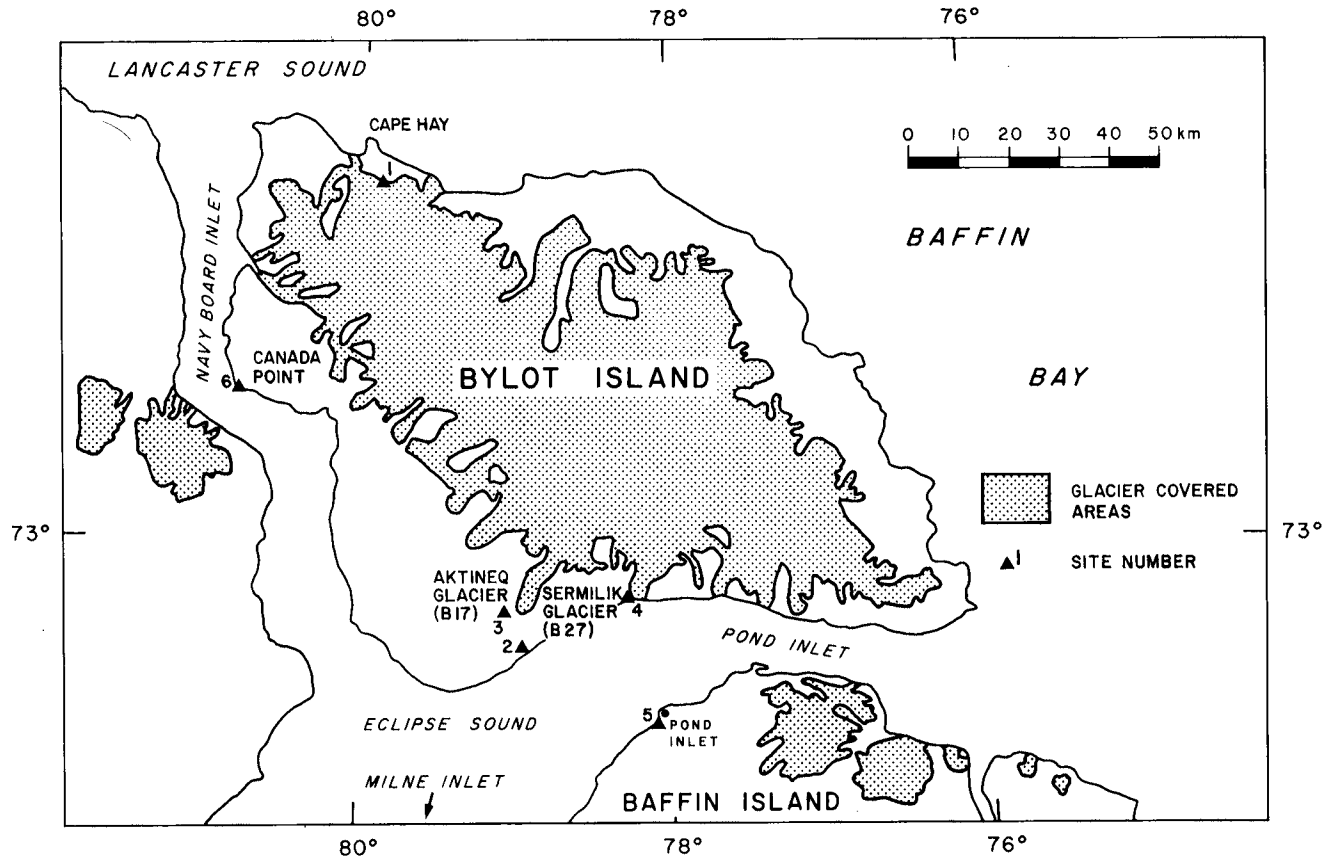


Figure 46.6. *Location map of shell collections referred to in Table 46.1.*

component of the shells (cf. Miller et al., 1977). Although amino acid ratios are not necessarily directly proportional to absolute shell ages, in this report that relationship will be assumed and the ratios will be referred to as though they can define a chronostratigraphic boundary. Few analyses are available, and, consequently, conclusions drawn from these must be considered as preliminary.

Small marine shell fragments have been found within deposits of foreign glacial debris at sites near Aktineq glacier (B17), Sermilik glacier (B37), and eastwards of Cape Hay (sites 1 to 4, Fig. 46.6). The shells are thought to have been transported onto the island by foreign ice either because they were found at altitudes above expected maximum marine limits or because they were collected from sediments thought to be of glacial origin. Although the fragments are clearly not in situ and consequently do not necessarily bear any close age relationship to the enclosing sediments, they can be used to provide a 'maximum' estimate for the age of the ice advance. In this case, the ratios ranged between 0.3 and 0.5 (Table 46.1). Thus, a minimum amino acid ratio 'dating' this advance is thought to be of the order of about 0.3. The small size of these fragments and problems of species determination require that caution be used in their interpretation, and they are presented here only as a guide.

In southeastern Baffin Island, amino acid ratios of at least 0.4 to 0.45 are associated with deposits of the last interglaciation (Brigham, 1980; Miller et al., 1977). Thus, it would appear that the last major advance of foreign ice onto Bylot Island occurred some time during the last glaciation, probably shortly after the last interglacial.

Estimates of the minimum age of the foreign ice advance are considered to be based on better evidence. At Canada Point, whole valves of **Mya truncata** were collected from a large deltaic complex that did not appear to have been modified or covered by glacier ice. Many shells were found paired and oriented with their siphuncle ends upward, and are consequently considered to have been found in situ. The shells were well preserved, most having retained either all or part of their periostracum, and no pitting or other alteration, apart from minor surface chalkiness, was observed. The shells were aragonitic (W. Blake, Jr., personal communication, 1980). They were estimated to be more than 35 000 (GSC-2916) radiocarbon years old and their amino acid ratios were about 0.24 (AAL-1218; Table 46.1). These determinations are considered to constitute an upper 'time' boundary of the last major advance of foreign ice onto Bylot Island.

The timing of the major expansion of native ice is not known. Based on ^{14}C analysis of peat buried beneath the end moraine of Aktineq glacier, that glacier "is as far advanced as it has been in the past 7000 to 8000 years, or longer." (DiLabio and Shilts, 1979, p. 148). Observations of advanced weathering of glacial erratics within the zone of former native ice cover suggest that the major native ice advance is much older than the ^{14}C date.

Discussion

Whether all of the observed foreign debris was emplaced during the last glaciation or not is currently unknown, although it seems clear that foreign ice did attain elevations between 300 and 550 m a.s.l. during the maximum stage of that event. This conclusion is based mainly on the amino acid ratios of ice-transported shell fragments. The only indication of more than one major inundation of Bylot Island by ice is based on the coincidence of moraines and

Table 46.1

Site No. (see Fig. 46.6)	Laboratory Sample No.[1]	Locality	Elevation (m a.s.l.)	Amino Acid Ratio[2]	^{14}C Age[3]	Species	Comments
1	AAL-1971	10 km east of Cape Hay	∿ 335	0.3	-	**Hiatella arctica**(?)	Small shell fragment within foreign glacial debris at surface. Only one amino acid determination.
2	AAL-1392	Near Aktineq Glacier (B17)	∿ 12	0.39	-	**Hiatella arctica**(?)	Small shell fragment within foreign glacial deposit that forms part of a stratigraphic section. Only one amino acid determination.
3	AAL-1470	Near Aktineq Glacier (B17)	∿ 230	0.41, 0.50	-	**Hiatella arctica**	Angular shell fragments from ice-contact fluvial deposit. Deposit partly stratified and contains abundant foreign debris.
				0.37, 0.50	-	**Mya truncata**	
4	AAL-1475	Near Sermilik Glacier (B37)	-	0.30, 0.29	-	**Mya truncata**(?)	Small shell fragments from foreign glacial deposit that forms part of a stratigraphic section.
5	GSC-1964	∿1.5 km southwest of Pond Inlet	65	-	33 300 ± 800	**Mya truncata**	Shell fragments from ice-contact fluvial deposits or marine deposits (from Hodgson and Haselton, 1974, p. 7).
	No AAL no. available	∿1.5 km southwest of Pond Inlet	65	0.27	-	**Mya truncata**	
6	GSC-2916	Canada Point	25	-	>35 000	**Mya truncata**	Shell in situ within a large delta complex. Valves intact and well preserved.
	AAL-1218	Canada Point	25	(0.23, 0.26), (0.13, 0.24), 0.22)		**Mya truncata**	

[1] AAL – Institute of Arctic and Alpine Research, Amino Acid Laboratory.
GSC – Geological Survey of Canada, Radiocarbon Dating Laboratory.

[2] Ratios of D-allo isoleucine to L-isoleucine in naturally hydrolyzed protein fraction.

[3] Radiocarbon years before present (B.P.)

other ice-contact deposits with the inland limits of abundant foreign debris (~300 to 550 m a.s.l.) well below the maximum elevations (800 to 1100 m a.s.l.) to which foreign debris has been found. That coincidence would appear to define an ice-marginal position attained by foreign ice during the maximum of the last glaciation; by implication then, this interpretation requires the existence of at least one earlier glacial event of greater magnitude to account for the high-level erratics.

At the time of emplacement of the high-level erratics, foreign ice must have crossed the topographic divide of Bylot Island at least in the few places where its elevation lies below about 1100 m a.s.l. From examination of topographic maps it is evident that during that event foreign ice flowing from the south probably contributed to northward-flowing native glaciers terminating at the western end of Maud Bight and to glaciers ending along the northeast coast between Cape Burney and Button Point. It is possible that the foreign ice was much thicker than the maximum elevations to which foreign erratics have been found and, in that case, more of the island would have been covered by foreign ice.

The glacial erratics found on Bylot Island demonstrate that during the maximum of the last glaciation foreign ice crossed onto the island from the north out of Lancaster Sound and from the south out of Eclipse Sound and carried debris to elevations of between 300 and 550 m a.s.l. That ice must have completely covered the marine channels and have been grounded within them. Because the maximum depths of those channels are about 1000 m (Canadian Hydrographic Services Chart 7220), a minimum estimate of ice thickness around Bylot Island is about 1500 m.

The volcanic erratics along the northern coast of Bylot Island indicate that the ice that carried them probably flowed northwards through Admiralty Inlet before turning eastwards towards Baffin Bay. The source of the ice was then either at or south of north-central Baffin Island. Because the glacier remained against the northern coast of Bylot Island and was at least 1500 m thick there, it is suggested here that it must have merged with a larger glacier within Lancaster Sound and held the status of a coalescent tributary glacier. The tributaries of that large glacier within Lancaster Sound probably included a north-flowing glacier within Prince Rupert Inlet to the west and ice from Devon Island to the north.

Across southern Bylot Island erratics of fossiliferous Paleozoic sedimentary rocks also indicate a source for foreign ice on or south of north-central Baffin Island. A direct route northwards through Milne Inlet and then eastwards towards Baffin Bay is the most reasonable path for the ice that carried them.

Interaction between native and foreign glaciers appears to have varied greatly in character around the margins of Bylot Island. In the south and possibly on the northern coast as well, foreign ice was dominant, whereas along the northeast coast native ice was dominant. The reasons for this are not known, although it seems likely that valley aspect relative to the direction of foreign ice flow, submarine topography, and overall decrease in surface elevation of the foreign ice sheet towards Baffin Bay all may have played a role.

Despite clear morphologic evidence of a major advance of Bylot glaciers after the major foreign advance, till in front of and beside some glaciers within the area covered during that advance is significantly different from that of modern end moraines (e.g. Aktineq (B17), Sermilik (B37) and glacier D91). This implies some sort of difference in ice flow compared with present conditions. It is possible that the ice of the older native advance was cold-based and consequently did not erode pre-existing deposits.

Conclusions

The main conclusions drawn from this work can be summarized as follows:

1. Ice from major ice sheets has moved northwards across Baffin Island and crossed onto Bylot Island. To date, the highest level demonstrated to have been attained by foreign ice is about 1130 m a.s.l. and this was probably achieved during a glaciation prior to the 'last'. During that 'maximum' event, foreign ice could have flowed northward across the topographic divide of Bylot Island.
2. During the last glaciation two major glaciers moved onto Bylot Island across both the north and south coasts and carried debris to elevations of about 300 to 550 m a.s.l., which was probably their maximum extent. One glacier moved northward across north-central Baffin Island and through Milne Inlet before turning eastward to Pond Inlet; the second flowed northward through Admiralty Inlet and then eastward down Lancaster Sound. The marine channels between Bylot and Baffin islands, as well as Lancaster Sound, were completely filled by grounded glacier ice when Bylot Island was so covered.
3. Some time after the inundation of Bylot Island by foreign ice, Bylot glaciers advanced 10 to 15 km beyond their present limits.
4. The channels between Bylot and Baffin islands have not been occupied by grounded glacier ice for at least 35 000 radiocarbon years.

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