RADIOCARBON DATE LIST IV: BAFFIN ISLAND, N.W.T., CANADA

Compiled by
G. H. Miller

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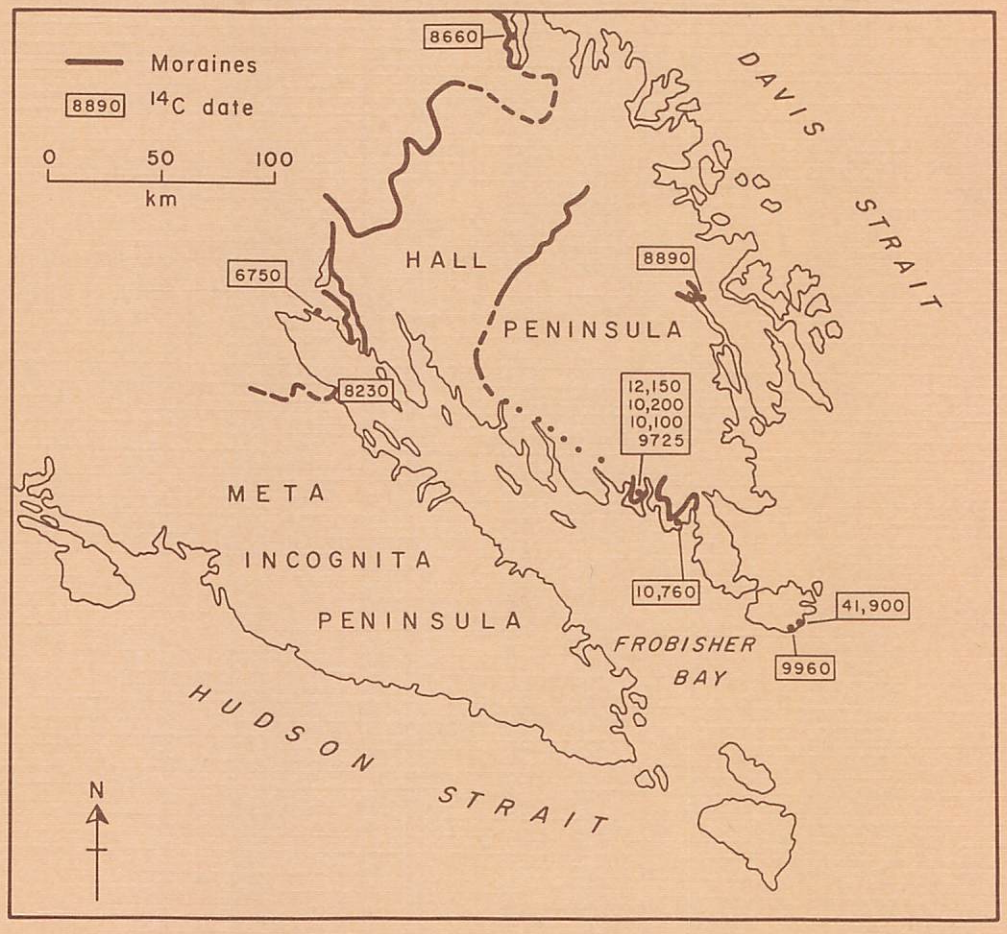

Occasional Paper No. 29

1979

INSTITUTE OF ARCTIC AND ALPINE RESEARCH • UNIVERSITY OF COLORADO

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University of Colorado

Occasional Paper 29

ISSN 0069-6145

INSTAAR/OP-29

Citation of this publication is Institute of Arctic and Alpine Research
University of Colorado, Occasional Paper No. 29, 1979.

PREFACE

It is now one decade since the Institute of Arctic and Alpine Research (INSTAAR) began a long-term research program to investigate the Quaternary history of Baffin Island, N.W.T., Canada. One of the activities of this program has been the systematic collection and dating of samples by the radiocarbon method. Dates obtained by INSTAAR personnel and associates are frequently processed at a large number of laboratories; hence, publication of these dates through the normal channel, Radiocarbon, would not be of immediate benefit to scientists interested in glacial and sea-level events on Baffin Island. It is for this reason that over the years we have produced individual date lists of all the radiocarbon dates that our faculty and graduate students have had assayed. This is the fifth such list. Its extent, the range of materials dated, and the spread of ages presented testify to the outstanding position of Baffin Island for Quaternary studies. These date lists provide ample evidence that the glacial and sea-level events of Baffin Island are associated with strata that contain materials that are suitable for ^{14}C dating and hence the establishment of a well-dated late Quaternary record. This publication, Occasional Paper No. 29, reports for the first time dates on sediments from marine and lake cores, it contains possibly the oldest date yet obtained on whale bone, and it documents some of the problems associated with dating peaty sediments of late Holocene age.

Jack D. Ives

Jack D. Ives
Director, INSTAAR
25 April 1979

ACKNOWLEDGEMENTS

The bulk of the dates reported in this list were derived from samples collected during the 1976, 1977 and 1978 field seasons. Financial support for the field programs came primarily from the National Science Foundation under grants EAR-74-01857 ("Amino acid, radiometric and relative dating of multiple tills and marine sediments $\geq$ 40,000 BP, eastern Canadian Arctic: A contribution to Quaternary chronology and climatic change") and EAR-77-24555 ("Recent glaciomarine sediments, late Quaternary marine and glacial environments, eastern Baffin Island, NWT, Canada") both from the Earth Sciences Division, with additional support from NSF grant ATM77-17549 ("Climatic reconstructions of late- and post-glacial environments: eastern Canadian Arctic"). Logistical support during the 1977 season was provided by a grant from the Arctic Petroleum Operators Association, Project 138 ("The coastal environment of southern Baffin Island and northern Labrador - Ungava"). Additional financial support was provided by lesser grants to individual students by the Arctic Institute of North America, the Explorer's Club, the American Alpine Club, Sigma Xi and the Geological Society of America Penrose Research Fund.

Dr. Minze Stuiver, Quaternary Research Center, University of Washington, supplied radiocarbon dates on several >40,000 BP samples with partial support from NSF under grants EAR-74-01857 and EAR-76-81598. Dr. R. Stuckenrath, Radiation Biology Laboratory, Smithsonian Institution, Washington, D.C. kindly dated several samples of compressed organic matter, and Dr. W. Blake, Jr., Geological Survey of Canada, has also generously dated numerous shell samples and plant remains. We are grateful for the careful handling of these samples by the dating laboratories and for their continued interest in the chronology of the eastern Canadian Arctic.

Many of the dated samples were processed by Mr. R. Kihl, INSTAAR Sedimentology Laboratory, and his painstaking attention to detail in both the preparation and data recording steps is greatly appreciated. In particular, his procedures for concentrating disseminated organic matter from bulk samples (Kihl, 1975) have been of considerable value in dating many of the organic-poor samples from both lake cores and excavated sites.

ABSTRACT

Site descriptions and locations are presented for 79 radiocarbon dated samples from Baffin Island, NWT, Canada that have not been reported in previous date lists (Andrews and Drapier, 1967; Andrews and Miller, 1972; Andrews, 1975; Andrews, 1976). The samples were collected from eastern and central Baffin Island between latitudes 62 and 72° N and longitudes 61 and 76° W. The largest percentages of dates are from sites on northern Cumberland Peninsula, Cumberland Sound and Frobisher Bay. The dates are nearly evenly divided between marine shells and plant remains, plus three dates on whale bone. Most of the shell dates fall between 8000 and 11,000 BP with an additional group between 44,000 and 51,000 BP, reflecting the predominance of marine deposits in these time ranges. The list includes multiple dates on successive leaches of a single shell collection, interlaboratory checks and organic/inorganic carbon comparisons. Dates on plant remains are more varied and range between 0 and 10,000 BP with an additional group between 38,000 and 50,000 BP.

The dates are presented by geographic location using the 1:250,000 Canadian NTS map series. Individual samples are located both by latitude and longitude as well as the 10 x 10 km UTMG grid system. In all cases, locations are based on the most recent issue of the 1:250,000 map series. Grid locations are given by a pair of three digit figures, the first referring to 10^2 m eastings, the latter to 10^2 m northings. A separate listing of dates in chronological order is also provided.

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INTRODUCTION

This date list reports the ^{14}C age determination on seventy-nine (79) samples from Baffin Island, NWT, Canada that have not been published previously in this form. Most samples were obtained during the 1976, 1977, and 1978 field seasons, but dates on a number of samples from earlier collections are also reported. Some of these represent new dates, whereas a few dates were obtained several years ago but have not been presented in this format, or are unpublished elsewhere.

The reported samples cover a wider geographic range than in previous lists, with twenty 1:250,000 map sheets represented. This expansion in range reflects a diversification of field investigations and a shift of research emphasis from the Cumberland Peninsula area, where INSTAAR has undertaken concentrated studies since the late 1960's, to the Clyde River area in the north and the Frobisher Bay region in the south.

The primary aims of research conducted on Baffin Island by INSTAAR personnel and associates has been focused on the glacial history and associated sea level fluctuations during the last 100,000 or so years and Holocene climatic fluctuations based on palynology and local glacier fluctuations. There has been a recent emphasis on deciphering events between 40,000 and 130,000 BP.

Roughly 40% of the dates were obtained from marine mollusks, whereas 55% were from plant remains, and the final 5% are bone dates.

Marine shell dates reported in this date list fall basically with two age categories:

TABLE I

Radiocarbon Laboratory Identification

DIC	Dicarb Corporation, U.S.A.
GIF	Gif-sur-Yvette, Centre des Faibles Radioactivités, France
GSC	Geological Survey of Canada, Ottawa
GX	Geochron
I	Isotopes
QC	Queens College, NY
QL	Quaternary Isotopes Laboratory, U. of Washington, U.S.A.
SI	Smithsonian Institution, Washington, D.C., U.S.A.

TABLE II

Types of Material Dated

Material	Number of dates	
	This list	Previous lists (INSTAAR)
Marine shell	32	69
organic-rich sediments (peat, soils & organic detrius)	44	97
wood	0	3
bone	3	7
Totals	79	176

1) 8000 to 11,000 BP : Shells in this age range generally date the deglaciation of a coastal site or a former relative sea level, frequently the maximum limit of Holocene emergence.

2) 35,000 to 50,000 BP : Shell collections suspected of being in excess of 35,000 BP are first processed through INSTAAR's Amino Acid Geochronology Laboratory where three valves are analysed for the extent of isoleucine epimerization in the free and total amino acid assemblages. Shells with the least epimerization above the Holocene level are equated with deposits of the mid Foxe glaciation (Miller et al., 1977; allo/iso $\leq$0.35 (free); <0.03 (total)), and may be ^{14}C dated to obtain a minimum age for the enclosing sediments. Previous studies by Stuiver, dating successive leaches on even the youngest pre-Holocene shells (based on the amino acid data) indicate that all shell dates >35,000 BP should be considered minimum estimates only.

Dates on peats, soils and organic detritus range between 0 and 10,000 BP and 35,000 to 51,000 BP. A number of dates on organic detritus in shallow marine facies in the 9000-10,000 BP range mark former sea levels. Younger dates on plant remains are generally associated with non-marine samples collected for pollen analyses. Although generally considered more reliable than carbonate dates, the older dates on plant remains also must be realistically considered limiting, rather than absolute ages. These interpretations are based on amino acid ratios in associated molluscan fossils or on specific paleoclimatic information (i.e. the samples are interglacial based on palynology and/or macrofossils).

PRESENTATION OF THE DATES

As in the last date list (Andrews, 1976), the dates in this list are ordered by 1:250,000 NTS topographic map sheets (Fig. 1) starting with the most southerly sheet and progressing northward west to east. Within each map sheet, the dates are ordered from oldest to youngest. Actual site locations are given by conventional latitude/longitude coordinates. However, the natural convergence of lines of longitude at high latitudes renders such coordinates awkward to use in this region. Consequently, we have also included the UTMG grid coordinates as a more readily utilized coordinate system. The UTMG grid is included on most 1:250,000 map sheets of the NTS series as 10 x 10 km grid squares. Sites are located to the nearest 100m by a pair of three-digit numbers and a two-letter prefix. For example LE 564 822, where LE is the primary (100 x 100 km) grid location, the first three-digit figure (564) is the distance in meters x 10^2 east of the 0 N/S grid line in the LE reference quadrangle (i.e. 56.4 km east) and the second three-digit figure is the distance in 10^2m north of the E/W line (82.2 km north).

Individual site localities are located by

1) Selection of appropriate 1:250,000 map sheet

2) Location of primary 100 km^2 reference grid based on the two letter prefix

3) Referring to the first three-digit figure, measure eastward from the 0 N/S line the appropriate distance

4) Repeat for the second three-digit figure, measuring north.

Resolution of this system is within 100m in either direction using the 1:250,000 series maps. Because the UTMG grid system is an equal

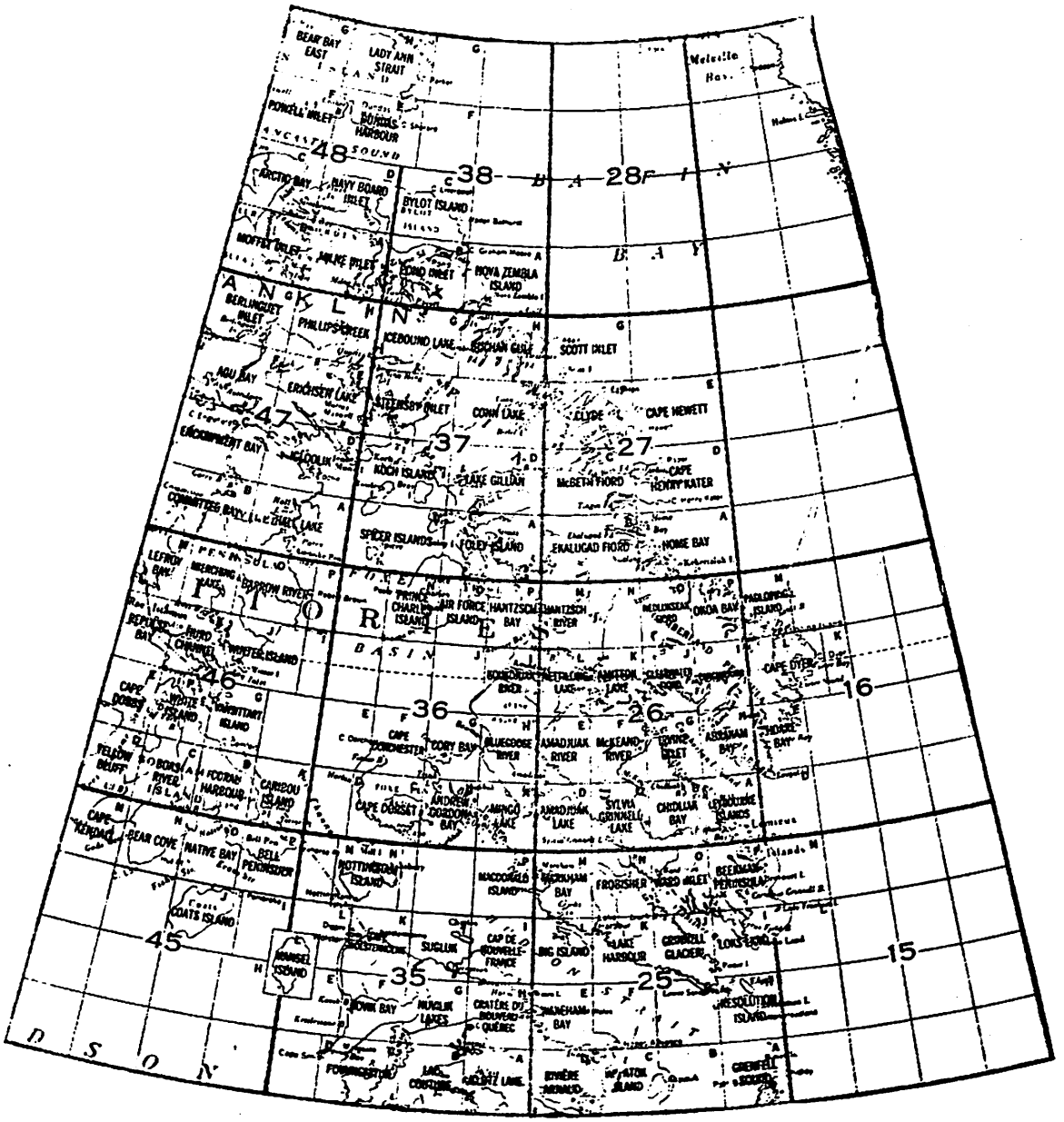

Figure 1. Location map for the 1:250,000 NTS map sheets.

area network, it is easier to use, less susceptible to error than conventional lat/long designations, and the precision does not change with latitude.

Descriptions of the sites follow the format in Radiocarbon. Factual data relating to the details of the collection site and sample handling are presented first, followed by a "comment" paragraph that contains interpretive information relating to the significance of the date.

The dates reported in this list have been obtained from eight different dating laboratories. Laboratory abbreviations are given in Table I. Some of the dates in this list are based on different portions of the same sample sent to more than one laboratory as a confirmation of interlaboratory reproducibility. Such test have all produced concordant results at the 2σ level.

Note that all dates are presented in uncorrected radiocarbon years BP (AD 1950) as reported to us by the dating laboratory. No attempt has been made to apply a correction factor for "old" seawater in arctic regions, for fractionation effects of the carbonate structure or variations in atmospheric ^{14}C production. In general, the "old" seawater effect is partially offset by a slight isotopic fractionation in favor of ^{14}C by seawater. Additionally, the changes in flow of Atlantic deep water in the Arctic during the glacial periods is not known. Consequently, confusion is minimized if uncorrected ages are reported. The dates reported by the Geological Survey of Canada laboratory have a $\delta^{13}C$ correction to $\delta^{13}C = 0.0$ o/oo. This correction factor seldom exceeds two or three decades difference in the final date. The GRL-identification listed below the radiocarbon lab ID refers to an INSTAAR master reference file maintained by R. Kihl and all samples processed through his laboratory are given GRL-numbers.

The materials dated in this and previous date lists are tabulated in Table II. In Table III dates in this list are arranged in increasing age with their respective lab ID and locations. These dates, and those from all preceding Baffin Island date lists, are

tabulated in Table IV in 1000 year intervals. A histogram of the frequency of dates in these intervals for dates <13,000 BP for this date list and all dates is shown in Figure 2. Although the current list shows a strong bias toward dates in the 8000-10,000 BP and 2000-4000 BP ranges, the total distribution of dates shows remarkably little bias toward any except the youngest 1000 year age range.

Table III. DATES ARRANGED BY AGE, LABORATORY ID, AND MAP SHEET

Date	Lab. I.D.	Map Sheet
102.2%	SI-3455	Pangnirtung
255±100	QC-561/2/3	Lake Harbour
770±135	GX-5777	Pangnirtung
830±60	SI-2949	Pangnirtung
880±80	GIF-4245	Okoa Bay
980±80	GIF-3864	Clearwater Fiord
1510±240	QC-479	Loks Land
1865±115	GX-5779	Pangnirtung
1900±110	GX-5778	Pangnirtung
2215±105	GX-5780	Pangnirtung
2290±170	GX-5527	Pangnirtung
2360±100	QL-976-1	McBeth Fiord
2575±75	SI-3456	Pangnirtung
2660±90	GIF-3865	Clearwater Fiord
2680±90	GIF-4243	Okoa Bay
2730^{+1290}_{-1540}	DIC-649	Pangnirtung
2825±65	SI-2950	Pangnirtung
2830±235	DIC-648	Pangnirtung
3010±80	GSC-2474	Chidliak Bay
3030±170	GX-5781	Pangnirtung
3170±100	GIF-3956	Ekalugad Fiord
3320±80	SI-3457	Pangnirtung
3525±60	SI-2951	Pangnirtung
3830±75	DIC-597	Okoa Bay
4285±90	QC-513	Clyde
4765±200	GX-5625	Clearwater Fiord
4830±120	I-2961	McBeth Fiord
5340±170	GSC-2199	Buchan Gulf
5370±130	GIF-5370	Clyde
6030±80	QC-501	Home Bay

Table III cont.

6320±130	SI-3678	Clyde
6520±150	I-2962	McBeth Fiord
7220±250	GX-5624	Clearwater Fiord
7750±135	I-2831	Clyde
8025±110	QC-452	Home Bay
8050±115	QC-457	Home Bay
8320±140	GSC-2506	Cape Henry Kater
8580±120	GSC-2684	Home Bay
8660±160	GSC-2466	Chidliak Bay
8680±140	GSC-2478	Abraham Bay
8730±120	GSC-2384	Cape Henry Kater
8750±100	GSC-2508	Irving Inlet
8815±275	GX-5623	Clearwater Fiord
8890±100	GSC-2568	Beckman Peninsula
9092±150	QC-454	Home Bay
9100±100	QC-499	Delano Bay
9230±100	GSC-2618	Beckman Peninsula
9240±80	GSC-2582	Beckman Peninsula
9280±120	FSC-2479	Okoa Bay
9370±140	QC-447	Loks Land
9395±100	QC-448	Ward Inlet
9510±90	GSC-2750	Beckman Peninsula
9600±100	GSC-2731	Home Bay
9725±130	QC-544	Loks Land
9725±120	QC-450	Loks Land
9935±165	QC-451	Home Bay
9950±185	QC-453	Okoa Bay
9960±230	GSC-2752	Loks Land
10,100±110	GSC-2725	Loks Land
10,510±70	QL-1174	Loks Land
10,720±140	QC-480A	Loks Land
10,760±150	QC-480C	Loks Land
10,790±70	QL-1173	Loks Land

Table III cont.

$12,150 \pm 140$	QC-543	Loks Land
$14,435 \pm 450$	GX-5319	Grinnell Glacier
$24,550^{+1825}_{-1485}$	GX-5318	Grinnell Glacier
$37,200 \pm 800$	QL-979	Cape Dyer
>38,000	GSC-2716	Okoa Bay
$41,900^{+7100}_{-3700}$	QC-446	Loks Land
$42,400 \pm 800$	QL-1180	Home Bay
$44,400 \pm 1000$	QL-974	Padloping Island
$45,800 \pm 1000$	QL-973	Clyde
$47,400^{+1400}_{-1200}$	QL-976-2	McBeth Fiord
$47,500 \pm 1200$	QL-973	Clyde
$47,500^{+1000}_{-1200}$	QL-1087	Conn Lake
$47,800^{+1300}_{-1100}$	QL-1181	Home Bay
$48,700^{+1400}_{-1000}$	QL-1086	Conn Lake
$50,700^{+2000}_{-1600}$	QL-1179	Home Bay
>52,000	QL-976-2	McBeth Fiord

Table IV. Dates arranged in 1000 year intervals

Age Range (yr. BP)	Number of dates					
	This list	1976	1975	1972	1967	Total
0-999	6	14	18	16	3	57
1000-1999	3	13	6	6	3	31
2000-2999	9	10	7	1	5	32
3000-3999	6	4	0	1	11	22
4000-4999	3	2	1	2	18	26
5000-5999	2	3	2	3	15	25
6000-6999	3	7	1	1	12	24
7000-7999	2	4	2	5	13	26
8000-8999	10	7	2	4	9	32
9000-9999	14	5	1	1	3	24
10,000-10,999	5	0	0	1	1	7
11,000-11,999	0	1	0	0	0	1
12,000-12,999	1	0	0	0	0	1
13,000-19,999	1	0	0	0	4	5
20,000-29,999	1	0	0	9	1	11
30,000-39,000	2	7	1	2	14	26
40,000-49,999	9	8	1	0	3	21
>50,000	2	1	0	0	2	5
Totals	79	86	42	52	117	376

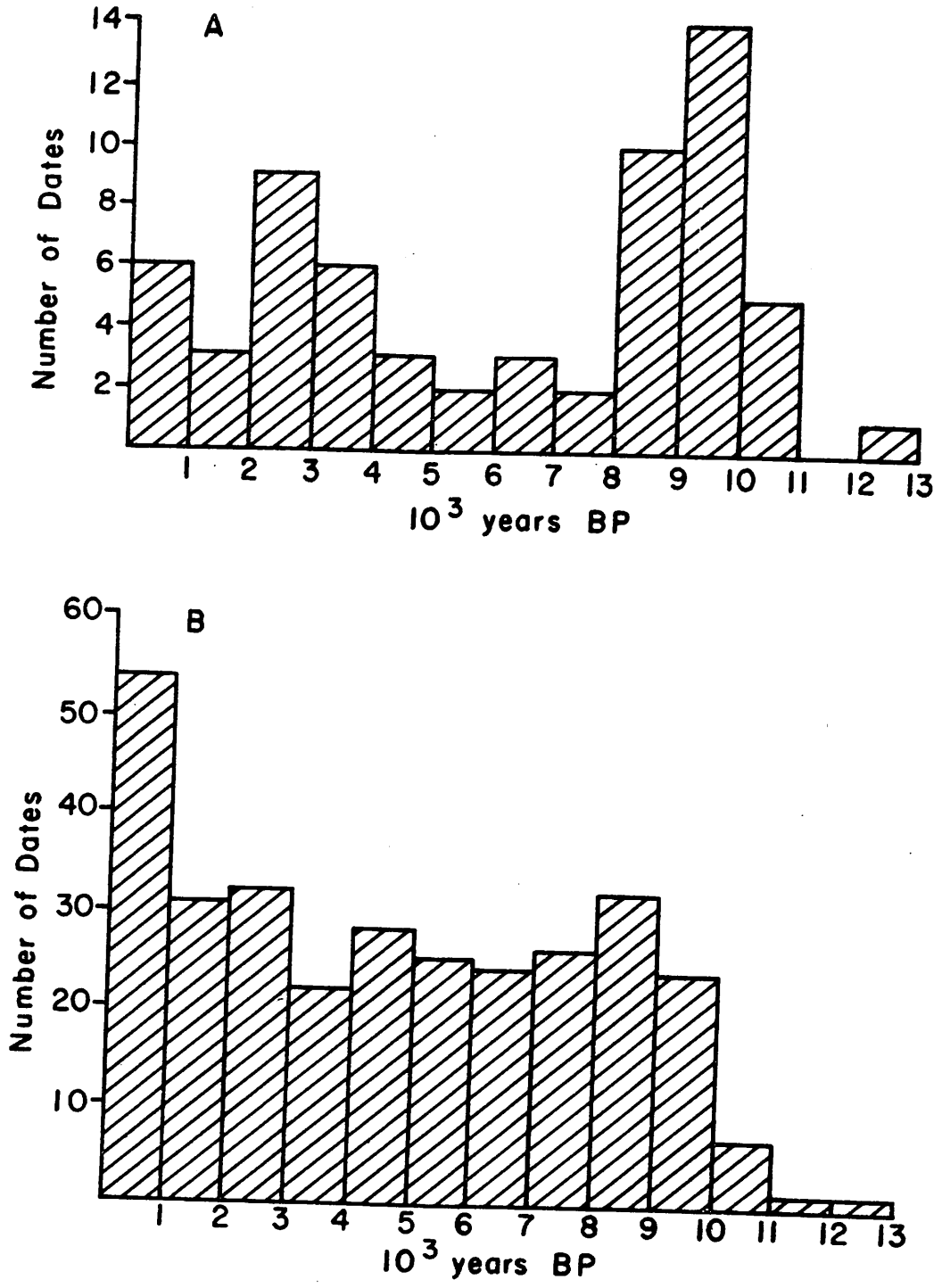

Figure 2. Frequency distribution of ^{14}C dates in 1000 year intervals from this date list (A) and for this and all preceding date lists (B).

RADIOCARBON DATES BY 1:250,000 NTS MAP SHEET, FROM SOUTH TO NORTH

1. LAKE HARBOUR (Map Sheet No. 25K. 62-63°N, 68-70°W)

QC 561/2/3 (GRL-379-0) TALAGUAK, LAKE HARBOUR 255 ± 100

Base of sandy, medium brown fibrous peat overlying sand at Talaguak, near Lake Harbour. Collected 1977 by Dr. J.D. Jacobs, University of Windsor from 62°44'N; 69°31'W at 40-50m asl. Comment. (J.D.J. and J.T.A.): Date from the base of a 38-40.5 cm peat monolith. Sample treated with 20% HCl. Both fine and coarse fractions were dated because of the small amount of organic material (weight after pretreatment 90 g; estimated carbon about 2.5 g). Date appears to suggest peat growth started during the middle of the 18th century. However, problems with obtaining a "true" date in the age range 0 to 500 BP (Stuiver, 1978) must be noted.

2. GRINNELL GLACIER (Map Sheet No. 25-J. 62-63°N; 66-68°W)

GX-5318 FROBISHER BAY CORE SERIES $24,550 \begin{smallmatrix} + 1825 \\ - 1485 \end{smallmatrix}$

Sample of piston core HU77-157 (62°38.4'N, 66°35.9'W) (FV 232 470) collected in 1977 by D. Fillon south side, Frobisher Bay. The core was taken in 497 m water depth. The sample included 40 g of grey colored sediment with scattered shell fragments taken from 40 - 43 cm depth in the core. Submitted by J.T. Andrews.

GX-5319 $14,435 \pm 450$

Sample of piston core HU77-159 (62°50.5N, 67°02.4'W) (EV 997 692) collected in 1977 by D. Fillon. The core was taken in 570 m water depth. The sample includes 80 g of grey colored sediment from 490-496 cm depth in the core, and one bivalve shell from 496 cm depth. Submitted by J.T. Andrews. Comment: (G.H.M. and L.O.): Bulk core samples were dated without any pretreatment. The carbonate content of these sections of core are 40% and 30% respectively (determined by Chittik apparatus) much of which is derived from Paleozoic limestone outcrops on the floor of the bay. The relative proportions of dead and contemporaneous carbon cannot be easily evaluated, hence these dates require additional confirmation before they can be reliably used. The ^{14}C apparent ages may, in fact, be somewhat older than the actual deposition of the dated portions of the cores.

QC-449 DELANO BAY 9100 ± 100
(GRL-514-S)

Shells excavated from face of a delta at head of Delano Bay, southeastern Frobisher Bay (62°40.5'N; 67°05.5'W; UTMG: EV 998 512). Shells collected from a matrix of coarse silty pebbly sand with ca 10% cobbles about half-way up the delta face (ca 18 m aht). Delta lip 36 m aht, grading to prominent terrace at 45 m aht. Abundant paired valves noted, although many were crushed by postdepositional sediment movement. Shells considered in situ. 58 g of M. truncata submitted for date.

Collected August, 1977 by G.H. Miller. Comment (G.H.M.): Shells date a relative sea level 45 m aht. Higher well-defined terrace or delta remnants occur at 67, 81, 86 and 93 m aht. The 86 m level is the most extensive higher terrace level. At 140 m aht, the stream flowing into the head of the bay has incised 10 m into the local bedrock. Shell fauna included M. truncata, H. arctica, C. islandicus, Acmaea sp. and Balanus sp.

3. LOKS LAND (Map Sheet No. 25-I and 15-L. 62-63°N; 64-66°W)

QC-446	LOKS LAND	41,900 $^{+\ 7100}_{-\ 3700}$
(GRL-542-S)		

Primarily paired valves of Macoma calcara excavated from well-sorted sands in large bay south of Osborn Bay, eastern Loks Land (62°24'N; 64°39'W; UTMG: ME 235 195). Shells collected ca 2 m aht, top of feature 5 m aht. Only M. calcarea submitted to lab for date; dilute HCl pretreatment on 65 g shell material (ca. 5% leach). Collected August, 1977 by G.H. Miller. Comment (G.H.M.): Shells were collected from a complex sequence of raised marine sediments. The sediment from which these shells were collected showed no indication of glacial overriding hence the date would imply that late Foxe ice did not reach this site. The date is to be considered a minimum age for the deposit as it is within a century of being at the limits of the QC lab's capability (R. Pardi, written commun.) and the potential for carbonate exchange in shells of this age is well documented.

COUNTESS OF WARWICK SERIES

QC-480 A	High Delta Level	10,720 ± 140
QC-480 C		10,760 ± 150
QL-1173 (Shell carbonate)		10,790 ± 70
QL-1174 (Periostracum)		10,510 ± 70
(GRL-536-S)		

Massive, robust, paired valves of Mya truncata, many articulated and in growth position with symphons extended, collected from excavation into sandy strata in an eroded delta remnant on the west side of Countess of Warwick Sound, northeast side outer Frobisher Bay (62°49.7'N; 65°31'W; UTMG: LE 724 690). Shells collected 60 to 62 m aht, surface of deposit 63 m aht, apex of delta lies 75 m aht. Maximum elevation of washing limit in the same area is 79 m aht. Limestone common in the deltaic sediments. Collected August, 1977, by G.H. Miller. Dates are as follows: the QC lab processed 500 g of shell treated with H_3PO_4. 60 liters of CO_2 were released of which the first 15 L were discarded, QC-480 A was based on

the second 15 L, QC-480 B was accidentally contaminated in the lab (the third 15 L) whereas QC-480 C was based on the final 15 L fraction. Of the 1000 g sent to the QL lab, QL-1173 is a carbonate date based on the inner 35 to 40% (by weight) of the shells, whereas QL-1174 is an organic carbon date based on 20 g of syphon and periostracum removed from the shells. Comment (G.H.M.): An advance of a glacier filling Frobisher Bay that extended just beyond Countess of Warwick Sound constructed a lateral moraine above the collection site of GRL-536-S that dammed the preexisting drainage pattern creating an extensive moraine-dammed lake. The lake eventually overflowed, at which time the outlet eroded rapidly through the unconsolidated morainal debris, depositing the reworked sediment as a very coarse delta into the sea level of that time (ca 75 m above present). The time involved between deglaciation and deposition of the delta was not long as the marine limit as defined by the washing limit and wave-eroded notches in till is nowhere more than 79 m aht. Temporally, the moraine dam was probably breached no more than one to two hundred years after deglaciation, and may have existed for as little as a decade or so based on observations that the washing limit generally marks the high tide limit, whereas delta surfaces are generally associated with the mid tide level. The current tidal range at this site is ca 6 m. Thus the date is considered to be a close estimate for deglaciation and dates a relative sea level of 75 to 79 m aht. Date is the oldest in situ shell date to be obtained from the eastern Canadian Arctic. Lower (younger) marine levels were found at 28, 22 and 16 m asl. See also QC-447, this date list.

The close agreement between inner and outer carbonate fractions (QC-480 A and C) and between lab carbonate dates (QC-480 and QL-1173) is encouraging, and reaffirms the reliability of radiocarbon shell dates less than 10 to 15,000 years old, and interlaboratory calibration accuracy. The organic carbon date (QL-1174) is statistically slightly younger than the carbonate dates, but modern rootlets did penetrate the shell bed and were separated from the syphon material only with difficulty. It is possible that some modern rootlets remained in the sample, which resulted in a ^{14}C age slightly too young.

QC-447 Lower Terrace 9370 ± 140
(GRL-538-S)

Shells collected from heterogeneous sandy silt matrix in wave-eroded face of low-level terrace at northeast end of broad valley on northwest side of outer Countess of Warwick Sound, northeastern Frobisher Bay (62°50.1'N; 65°28'W; UTMG: LE 745 693). Shell stratum located 5 m aht, top of feature 12 m aht, sloping to 16 m aht. Local marine limit 75 to 79 m aht. Many paired valves, although enclosing sediment is currently soliflucting and some fragmentation of the shells has occurred. Collected August, 1977 by G.H. Miller. Dilute HCl pretreatment (ca. 10% leach), on 58 g of M. truncata submitted for the date. Comment (G.H.M.): Shells are considered to date the 16 m level, although other prominent wave-eroded notches lie at 22 and 28 m as well as the 16 m level a few km southeast. Fauna includes most abundantly M. truncata, but also H. arctica, Macoma cf calcarea, Balanus sp, C. islandicus and Astarte sp.

GOLD COVE SERIES

QC-543 80 m level 12,150 ± 140
(GRL-527-S)

Fragments of the marine bivalve Mya truncata collected from a pit excavated in silty sediment on a small terrace 79 m aht near the head of Gold Cove (62°52.8'N; 65°52.5'W; UTMG: LE 544 826). Local marine limit in the vicinity is 69 to 74 m aht. Enclosing sediment ranges from an unstratified heterogeneous fine sand to cobble matrix to poorly stratified silty sand, with shells distributed throughout the pit. Dated shells collected 10 to 30 cm below ground surface. 13% pretreatment leach. Collected August, 1977 by G.H. Miller. Comment (G.H.M.): Heterogeneous sediment and elevation of collection site above the marine limit imply shells deposited by glacier during an advance over the site. If the date is correct, it indicates ice was up-bay from Gold Cove 12,150 BP and advanced across the site at a later date. Shells were robust, but fragmented and no paired valves were seen, although indi-

vidual fragments were unabraded and fragmented edges were angular. Deposit was located by shells on the surface of a silty frost boil and frost churning may have broken the shells. QC-543 is the oldest late Foxe date yet obtained from the eastern Canadian Arctic. Shells considered to have been deposited during the marine limit phase at Gold Cove have been dated at 10,100 $\pm$ 110 (GSC-2725) (this date list). Additional samples from this locality are being dated to provide a check on this date.

GSC-2725 (GRL-582-5) — Marine Limit Shells — 10,100 ± 110; $\delta^{13}C$ o/oo: + 1.4

Marine shells excavated 73 m aht in main valley due east of the head of Gold Cove, NE Frobisher Bay (62°57'N; 65°50'W; UTMG: LE 564 822). This collection consisted exclusively of paired valves of Mya truncata excavated between 10 and 40 cm depth. Enclosing sediment was primarily crudely stratified, ranging from coarse sand to sandy silt. Shells locally abundant and include H. arctica and Balanus cf balanus. Dated sample was a single robust right valve (23 g) that was given a 10% pretreatment leach. Shells were not worn or abraded. Collected August, 1978 by G.H. Miller. Comment (G.H.M.): Deposit from which shells were collected is considered to represent the local marine limit (74 m aht), but is 5 m above a prominent washing limit only 6 km south of this site. Similar robust valves of M. truncata were located at several sites in the same valley at or slightly lower than the 73 m aht level. At one other site the deposit contained numerous robust unabraded paired valves of both M. truncata and H. arctica. The shell-bearing beds are interpreted as intertidal deposits formed at the marine limit immediately upon deglaciation.

QC-450 (GRL-523-S) — Bottomset Stony Silt — 9725 ± 120

Shells collected from horizontally laminated sandy silt with interspersed pebbles and cobbles exposed in wave-eroded cliff face at the head of Gold Cove, northeastern Frobisher Bay (62°56.3'N; 65°52'W; UTMG: LE 544 819). Shells were common, and many paired valves were noted; shells considered in situ. Shell-bearing strata were 21 m aht, top of unit was 23 m aht grading to a prominent level 26 m aht. Local marine limit lies 69 to 74 m aht. Collected August, 1977 by G.H. Miller. Shells given dilute HCl pretreatment (ca 10% leach). Comment (G.H.M.): There are several prominent marine levels between the collection site and the marine limit, with strong levels at 26, 28 to 30 and 37 m aht. Although it is not possible to unequivically relate the bottomset shell unit to a former marine plane, they must have been deposited after the

marine limit phase (dated 10,100 ± 110 GSC-2725) and above the 23 m level. It is possible that the shells relate to the 37 m level. Shell fauna is diverse and includes H. arctica, M. truncata, M. calcarea, Astarte cf striata, C. islandicus and B. cf balanus. The early appearance of C. islandicus suggests subarctic marine waters reached the Frobisher Bay area nearly a millenium earlier than in Cumberland Sound and 1500 years before reaching the northern Cumberland Peninsula coast. 89 g of H. arctica and Balanus cf balanus submitted for date.

QC-544 High-level Till 9725 + 130
(GRL-528-S)

Seventeen fragmented valves (45 g) of Mya truncata collected from the surface of frost boils in till between 180 and 190 m aht, Gold Cove (62°56.8'N; 65°51.5'W; UTMG: LE 550 828) Frobisher Bay. Shells worn and moderately abraded; limestone abundant in the till matrix; 9% pretreatment leach. Collected August, 1977 by G.H. Miller. Comment (G.H.M.): Shelly-till of similar character extends to 250 m aht. Date is anomalously young given deglaciation date of 10,100 ± 110 (GSC-2725) and 12,150 ± 140 (QC-543) date on shells above the marine limit, but below this site. As this collection was from the surface, shells may have experienced greater contamination due to atmospheric carbon exchange. Significance of the date remains unclear, and redating of similar collections is in progress.

GSC-2752 LOKS LAND 9960 ± 230
(GRL-540-S) OSBORN BAY $\delta^{13}C$ o/oo:+ 2.4

Fragmented valves of Mya truncata collected from the surface of silty frost boils 19 m aht, just west of the outlet of a prominent lake on the north side of the first large bay south of Osborn Bay, eastern Loks Land, outermost Frobisher Bay (62°26'N; 64°26'W; UTMG: ME 263 232). Robust fragments of Mya truncata submitted to lab for date. Local marine limit defined by well-developed washing limit was 20 m aht. Collected 17 August, 1977 by G.H. Miller. Comment (G.H.M.): Shells were collected immediately below a prominent washing limit developed on till. Date

provides a minimum age for deglaciation. Till is of fresh appearance, and includes perched boulders, and abundant limestone erratics. Other than M. truncata only occasional robust fragments of Hiatella arctica were present. This date is somewhat younger than expected, given the date on deglaciation from Countess of Warwick Sound of ca 10,760 some 70 km up bay from this site. If the Loks Land till is of late Foxe age, then the maximum transgression of the sea must have occurred a minimum of 500 and perhaps 1000 or more years after deglaciation of outermost Frobisher Bay.

QC-479 SHARKO PEAT 1510 ± 240

Peaty sand collected from the head of Sabine Bay, Sharko Peninsula, northeast side outer Frobisher Bay (62°42.9'N; 65°19'W; UTMG: LE 811 538). Sample was the uppermost 3 cm of a 30 cm thick salt marsh peat section, not currently vegetated, the surface of which was ca 0.5 m below current mean high tide. Collected August, 1977 by G.H. Miller. Sample contained only 4 g carbon after acid pretreatment. Mixed with dead gas for counting. Comment (G.H.M.): Evidence for recent relative sea level rise is widespread in outer Frobisher Bay. At Sabine Bay, the salt marsh peat growing in abundance at the head of the bay is being transgressed by beach sediments and eroded by wave action. In some areas and sandy-cobbly beach berm has recently migrated across a peat surface, and remnants of the peat, barren of living plants outcrop on the seaward side of the berm. Similarly situated deposits farther north on Baffin Island generally date between 600 and 1000 BP. This sample is the oldest date yet obtained for the onset of the transgression.

4. WARD INLET (Map Sheet No. 25-0. 63-64°N; 66-68°W)

QC-448 (GRL-521-S) HAMLEN BAY 9395 ± 100

Marine shells collected from pit excavated into terrace comprised of poorly sorted silt/cobble matrix in small bay on southeast side of Hamlen Bay, east-central Frobisher Bay (63°04.4'N; 66°27.5'W; UTMG: FV 290 962). Shells collected from 20 m aht, traceable in the sediment to 25 m aht, terrace lip at 28 m aht, back notch at 29 m aht. Higher marine terraces at 78, 46 and 39 m aht. Dilute HCl pretreatment leach (ca 10%). Collected August, 1977 by G.H. Miller and H. Moulton. Comment (G.H.M.): This site contained a complex record of low-elevation moraines, marine deltas and colluvial marine terraces all formed during late Foxe time. The marine limit, as determined by exceptionally well defined washing limits at the mouth of Hamlen Bay, is 81 m aht, above which occurs unwashed till with abundant limestone erratics. The highest deltaic sediments in the vicinity of the QC-448 were a series of delta remnants between 76 and 78 m aht formed by the breaching of a moraine-dammed lake shortly after deglaciation. Shells of QC-448 were collected from what appears to be a colluvial terrace derived from a series of low-elevation lateral moraines trending along the bay. The most prominent marine levels in the coastal stretch above the shell localities are a terrace at 44 to 46 m aht, and a lower level at 28 to 29 m aht. The shell date refers to a relative sea level at least 28 m aht and probably refers to the 44 to 46 m level. There is no suggestion that the shells date the marine limit/deglaciation phase, which is considered to lie between 9500 to 10,100 BP. Shell sample included many whole, unabraded valves, but none paired, primarily of H. arctica, but also C. islandicus among others. 82 g H. arctica submitted for date.

5. BEEKMAN PENINSULA (Map Sheet No. 25-P and 15-M. 63-64°N; 66-66°W)

GSC-2750 (GRL-573-S) — PETER FORCE SOUND — 9510 ± 90; $\delta^{13}C$ o/oo: +1.8

Mostly whole (commonly paired) valves of marine pelecypods excavated from pit at 16 m aht in cut face of marine delta at the NE end of Peter Force Sound; outer Frobisher Bay (63°02.5'N; 65°48'W; UTMG: LE 573 931). Shells, enclosed in sandy silts, were thin-walled and considerably less robust than the higher-elevation shells in Gold Cove, a few km to the SE. Delta consists of foreset beds of medium to coarse sand grading to a terrace level of 40 m aht. Shells collected 4 August 1978 by G.H. Miller and J.D. Jacobs. Only whole valves of Mya truncata submitted to lab for date. Comment (G.H.M.): Shell bed is considered to relate to the 40 m level. Based on observations of modern deltas, the marine level to which the delta relates may be three to four meters higher than the delta surface (high tide level). Occasional limestone pebbles were encountered in the delta. Shell collection contained in addition to M. truncata (most abundant), Hiatella arctica, Macoma calcarea, Chlamys islandicus, Balanus cf balanus, Astarte sp. This date indicates sea level fell from ca 75 m aht 10,100 BP to 40 to 44 m aht by 9500 BP.

GSC-2582 (GRL-546-S) — CYRUS FIELD BAY — 9240 + 80; $\delta^{13}C$ o/oo: +1.8

Whole and paired valves of marine shells collected from extensive raised marine complex at the head of Frechman Cove, Cyrus Field Bay, eastern Hall Peninsula (63°02.7'N; 65°19.5'W; UTMG: LE 830 927). Shells collected primarily at 5 m aht, but some collected up to 9 m aht, from a grayish silty sand unit. Top of deposit 11 m aht. Collected August, 1977 by G.H. Miller. 46.7 g H. arctica submitted for date, 20% pretreatment leach. Comment (G.H.M.): Raised marine complex in Frechman Cove extends many km inland and contains numerous

marine levels. The uppermost water-laid deposits were located 103 m aht and consisted of well-sorted stratified fine sand to gravel. Lower prominent terrace levels were located at 40, 28 and 14 m aht. Dated shells relate at least to the 14 m level. All higher levels were barren of shells. Maximum late Foxe transgression may have reached the 28 m level. Most shells were paired, and were clearly in situ. Sample contained in addition to H. arctica, M. truncata, Balanus sp, Astarte cf striata, and a brachiopod. Sample probably dates the 14 m level. If late Foxe ice was present in this valley, it was a considerable distance up-valley at the time these shells were living.

GSC-2618	ALLEN ISLAND	9230 ± 100
(GRL-556-S)	CORNELIUS GRINNELL BAY	$\delta^{13}C$ o/oo: +0.9

Whole valves of Hiatella arctica collected from wave-eroded bank in a sandy marine terrace near outpost camp on Allen Island (63°29.7'N; 64°58'W; UTMG: MF 017 426). Numerous paired valves indicate shells were in situ. Collection made at 2 to 6 m aht, terrace surface to which shells relate is 15 m aht. Collected August, 1977 by G.H. Miller. 20% leach. Comment (G.H.M.): Terrace from which these shells were collected represents the maximum late Foxe marine transgression. Sediments were derived by reworking of older, higher ice-contact glaciomarine sediments in the vacinity. Amino acid ratios in shells from the higher sediments indicate a mid Foxe age (0.06, 0.03 combined and free allo/iso ratios respectively). 15 m terrace level occurs at several places in the immediate vicinity of this collection. There is no evidence for late Foxe ice reaching this locality.

GSC-2568	HEAD	8890 ± 100
(GRL-552-S)	CORNELIUS GRINNELL BAY	$\delta^{13}C$ o/oo: +1.2

Whole valves and fragments of marine shells collected from a stream-cut bank incised into a raised marine complex at the mouth of the first main west-side valley down from the head of Cornelius Grinnell Bay, eastern Hall Peninsula (63°43.8'N; 65°04'W; UTMG: LF 973 684). Shells were rare and most were collected as fragments in float on the cut bank surface, 7 m or more above the level of the stream. Top of cut ca 20 m aht, marine limit 24 m aht. Shells collected August, 1977 by G.H. Miller. 26.3 g Mya truncata submitted to lab for date; 20% pretreatment leach. Comment (G.H.M.): Shells were collected between 8 and 14 m asl, and although not strictly in situ, they are considered to be indigenous to the marine complex and to date the marine limit phase. A second cut bank, 100 m or so north of this locality revealed paired thin-walled valves of H. arctica at the same general elevation, but in a different stratum. Sediment in the delta complex is considered to have been derived from nearby glacial run off streams, with fiord ice either in contact or only slightly up fiord at the time of shell deposition. Several clearly ice-contact deltas at similar elevations flank the fiord between this deposit and the fiord head, but shells were not located in any of these features. West of the shell-bearing deltaic complex are innumerable ice-stagnation features that were formed during either late or mid Foxe time. This site is considered to lie very close to or at the maximum limit of late Foxe ice extent in Grinnell Bay. See also GSC-2618.

6. CHIDLIAK BAY (Map Sheet No. 26-B. 64-65°N; 66-68°W)

GSC-2474 (GRL-321-S) PTARMIGAN FIORD 3010 ± 80
$\delta^{13}C$o/oo: +2.3

Fragmented valves of marine shells found as surfical float and excavated from silty frost boils below small delta remnant in west side of middle reaches of the longer branch of Ptarmigan Fiord, southern Cumberland Sound (64°46.5'N; 66°18'W; UTMG: No grid on map sheet). Shells collected at 13 m aht, silts extend to 17 m aht. Probable ice-marginal delta adjacent to silts extends to 30 m aht. Collected August, 1976 by G.H. Miller. 10.3 g Mya truncata used for date; 10% leach. Comment (G.H.M.): Shell locality lies within projected extent of Cockburn-age moraines, and delta above shell locality has an oxidation profile 20 cm in depth, typical of other late Foxe sandy deposits. Shells must relate to a sea level ≥ 13 m aht, probably at least to the upper limit of silts at 17 m, but no higher than the delta surface at 30 m. The projected age of a relative sea level stand between 13 and 30 m above present would be 6000 to 9000 BP, in conflict with the radiocarbon age of 3010 BP. No ready explanation for this discrepancy is available, and the date can only be considered unreasonable. By 3000 BP in this area of Cumberland Sound, sea level should have been close to (or below) its present level. In addition to M. truncata, the sample contained fragments of Macoma sp, C. ciliatum, Chlamys sp and H. arctica.

GSC-2466 (GRL-317-S) CHIDLIAK BAY 8660 ± 160

Marine bivalves collected from massively-bedded blocky silts in prominent valley 5 km from fiord head on west side of inner Chidliak Bay (64°47'N; 66°42'W; UTMG: No grid on map sheet). Shells were sparsely distributed throughout the silt unit, and shells collected by excavation were combined with those collected as float to provide sufficient material for a date. Most excavated shells were paired, some with periostracum intact. Shells collected between 10 and 15 m aht, July,

1976 by G.H. Miller. 10% pretreatment leach on 9.0 g Hiatella arctica valves. Comment (G.H.M.): A prominent terminal moraine loop crosses the mouth of this valley ca 2 km west of the collection site and is associated with an extensive ice-contact deltaic deposit. The blocky silts from which these shells were collected contained interspersed angular rock fragments up to 30 cm and greater long axis dimension. The silt unit is interpreted as bottom-set silts deposited as a distal glaciomarine facies, penecontemporaneously with the main ice-contact delta, and the associated angular fragments are most likely dropstones. Hence, the date on shells from these silts provides a close estimate for the period of moraine formation. Relative sea level at this time stood 46 to 54 m aht, although the silts extend only to 21 m aht. Sample includes paired valves of H. arctica, M. truncata, P. arctica and Astarte sp.

The moraine system associated with the terminal loop up-valley from the collection site can be traced northeastward with only intermittant lapses to the head of Cumberland Sound. It almost certainly is equivalent with the Ranger Moraine of Dyke (1979). ^{13}C sample inadvertently lost by the laboratory.

7. IRVINE INLET (Map Sheet No. 26-G. 65-66°N; 66-68°W)

GSC-2508	KIPISA	8750 ± 100
(GRL-310-S)	WINTER CAMP	$\delta^{13}C$ o/oo: +1.9

Marine shells collected from portage immediately west of the Kipisa outpost camp (winter camp), Cumberland Sound (65°27'N; 66°57'W; UTMG: EC 958 320). Shells excavated in cryoturbated silty sand, after locating deposit by shells on the surface of the frost boil. Sample collected 39 m aht; highest marine (?) terrace in the immediate vicinity was 44 m aht. No paired valves found, but numerous unabraded whole valves were collected, and sample is considered indigenous. Other shelly deposits nearby to a maximum elevation of 40 m aht. 26.6 g H. arctica used for date. 20% pretreatment leach. Collected July, 1976 by G.H. Miller and M.T. Anderson. Comment (G.H.M.): Collection contains M. truncata, C. islandicus, Astarte sp, Balanus sp and a brachiopod in addition to H. arctica. The subarctic water-mass indicator species C. islandicus has only been found in collections younger than 8400 BP along northern Cumberland Peninsula, suggesting that the incursion of relatively warm marine waters along eastern Baffin Island penetrated Cumberland Sound a few centuries before reaching the northern Cumberland Peninsula coast. Relative sea level at the time these shells were deposited cannot be precisely determined, but was probably ≥ 44 m aht. Moraines of Cockburn age occur up fiord from this locality, but it is uncertain whether an earlier late Foxe advance covered the site.

8. ABRAHAM BAY (Map Sheet No. 26-H. 66-66°N; 64-66°W)

GSC-2478	MOUTH, KINGNAIT FIORD	8680 ± 140
(GRL-308-S)	(SE Side)	$\delta^{13}C$ o/oo: +2.2

Marine shells collected from wave-eroded face in low delta at head of first small inlet immediately southeast from the mouth of Kingnait Fiord (65°47.2'N; 65°23.4'W; UTMG: LH 909 978). Shells were located ca 200 m east of the main river mouth at the inlet head, in a limited deposit of sandy silt, 5 m aht. Top of the feature and inferred relative sea level at the time the shells were living is 12 m aht. Only Mya truncata used for dating. Small sample (10.4 g) required mixing with dead gas for counting. 10% pretreatment HCl leach. Collected July, 1976 by G.H. Miller. Comment (G.H.M.): Shells locally common, but fragmented, and fauna is typical of early Holocene shell samples elsewhere on Baffin Island, including Hiatella arctica, Mya truncata, Astarte sp, Balanus sp and the brachiopod Hemithyris psittacea. Higher marine planes were identified above the 12 m (Holocene) level, with strong levels at 46, 84 m aht but none contained molluskan fossils. The reported date is similar to other dates in Cumberland Sound on the maximum limit of Holocene marine submergence (e.g. GSC-2083; GSC-2466).

9. CLEARWATER FIORD (Map Sheet No. 26-J. 66-67°N; 66-68°W)

GX-5625	IGLUTALIK LAKE SEDIMENTS	4765 ± 200
(GRL-373-0)		
GX-5624		7220 ± 250
(GRL-374-0)		
GX-5623		8815 ± 275
(GRL-375-376-0)		

Lacustrine sediment core, 290 cm length, collected from Iglutalik Lake, 110 m asl, 5 km NW of mouth of Pangnirtung Fiord, Cumberland Sound (66°08'7"N; 66°05'W; UTMG: LJ 621 382), Clearwater Fiord 1:250,000 map sheet. Detrital organic fine fraction (<125μ) from 75-105 cm, 161-200 cm, and 248-290 cm depths dated 4765 ± 200, 7220 ± 250, and 8815 ± 275, respectively. Collected June, 1976 by P.T. Davis. Samples pre-treated with hot dilute HCl. Comments (P.T.D.): Samples collected with Livingstone corer (5 cm diameter); unusually long sections of sediment core (30-42 cm lengths) sent for dating because of low organic content. Iglutalik Lake well above late Foxe marine limit. No evidence of glacial ice at this site during late Foxe time. Sediment core from Iglutalik Lake stopped by impenetrable coarse sand and gravel. Because lake basin is not within a late Foxe glacial drainage basin, coarse sand and gravel probably a local flood deposit rather than glacial outwash. Sediments undergoing analysis for pollen (including exotic tree pollen from Labrador), stable isotopes (^{13}C), organic carbon, trace metals, and grain size.

GIF-3864	CUMBERLAND PEAT	980 ± 80
(GRL-277-0) 19-21 cm		
GIF-3865		2660 ± 90
(GRL-278-0) 49-51 cm		

Peat and sediment section, 50 cm thick, collected from marine terrace, 20 m asl, 4 km NW of mouth of Pangnirtung Fiord, Cumberland

Sound (66°07'30"N; 66°03'20"W; UTMG: LJ 625 375), Clearwater Fiord 1:250,000 map sheet. Detrital organic fraction (<125μ) from two 2 cm increment peat samples centered at 20 cm (GIF-3824, 980 ± 80) and 50 cm (GIF-3865, 2660 ± 90) depths dated. Collected 1977 by P.T. Davis. Comments (P.T.D.): Coarse sand at base (50 cm depth) of peat section. Age of peat similar to other peat sections dated from Baffin Island. Peat samples undergoing pollen analysis for comparison with lacustrine sediment pollen record from Iglutalik Lake, about 1 km away.

10. PANGNIRTUNG (Map Sheet No. 26-I. 66-67°N; 64-66°W)

DIC-648 (GRL-289-0) — OWL RIVER PEAT, PANGNIRTUNG PASS — 2830 ± 235

Unhumified to partly humified compressed organic matter collected as part of a large peat monolith from the cut bank of the Owl River, northern Pangnirtung Pass, Cumberland Peninsula (66°45'N; 64°42'W; UTMG: MK 242 045). This horizon from a depth of 176 to 178 cm. Sample contains *in situ* *Salix* macrofossils plus detrital organic matter. Sample produced only 0.5 g C. Hot NaOH pretreatment. Collected August, 1973 by G.H. Miller, submitted by J.T. Andrews. *Comment* (G.H.M. and J.T.A.): Sample dated is *ca* 15 to 17 cm below the top of the main peat monolith, which is overlain by *ca* 160 cm of eolian sand. Date suggests that the peat may have accumulated during a relatively mild interval within the Neoglacial (Miller, 1973). Ice lenses were common in the peat profile (up to 30 cm thick). Previous dates were obtained from 155-160 cm level (1870 ± 90, GIF - 3493) and 289-294 km level (2660 ± 100, GIF - 3494) (Andrews, 1976).

DIC-649 (GRL-289-0) — 2730^{+1290}_{-1540}

Compressed organic fragments (8% by weight) in fine sand matrix collected from exposure in cut bank of Own River, northern Pangnirtung Pass, Cumberland Peninsula (66°45'N; 64°42'W; UTMG: MK 242 045). Collected from a depth of 280 to 282 cm. Very small sample produced only 0.06 g C after acid and base pretreatment, hence large error term. Dr. I. Stehli (written commun.) regards the date as an indicator only, and that the sample was too small to be reliable. Collected August, 1973 by G.H. Miller, submitted by J.T. Andrews. *Comment*, (G.H.M. and J.T.A.): Sample collected from lowest portion of the peat monolith which extends below river level. Date cannot be used with any confidence, but suggests DIC-648 be correct.

SI-2949 (GRL)-322-0)	45 to 50 cm	830 ± 60
SI-2950 (GRL-323-0)	126 to 130 cm	2825 ± 65
SI-2951 (GRL-324-0)	215 to 220 cm	3525 ± 60

WINDY LAKE PEAT SECTION
PANGNIRTUNG PASS

Windy Lake peat section, sampled to 225 cm depth for pollen analysis. Located in Pangnirtung Pass, 91 ± 5 m asl, 13 km N of head of Pangnirtung Fiord (66°31'N; 65°28'W ; UTMG: LG 893 789). Detrital organic fraction (<125μ and >125μ) dated. Collected 1976 by P.T. Davis.

Comments (P.T.D.): These three new ^{14}C age determinations are in accord with twelve previously obtained ^{14}C ages for the Windy Lake peat section (Andrews, Webber, and Nichols, 1979). Taken together, the fifteen ^{14}C age determinations are suggestive of a nearly linear sediment accumulation rate. Nevertheless, minor fluctuations in the peat accumulation rate, less than 200 years in magnitude, cannot be determined.

GX-5777 (GRL-391-0)	22-26 cm	770 ± 135
GX-5778 (GRL-392-0)	28-30 cm	1900 ± 110
GX-5779 (GRL-393-0)	42-46 cm	1865 ± 115
GX-5780 (GRL-394-0)	54-58 cm	2215 ± 105
GX-5527 (GRL-342-0)	60-66 cm	2290 ± 170
GX-5781 (GRL-395-0)	68-80 cm	3030 ± 170

SHADOW LAKE SERIES

Twenty-five replicate lacustrine sediment cores, up to 90 cm length, collected from Shadow Lake, 450 m asl, 3.5 km from SE side of Pangnirtung

Fiord, about 16 km NE of the hamlet of Pangnirtung (66°14'18"N; 65°27'00"W; UTMG: LJ 892 789). Detrital organic fraction (<125μ) from six levels of lacustrine silt obtained from 17 to 25 replicate cores dated. Collected 1977 by P.T. Davis. Comments (P.T.D.): Interbedded coarse sand and gravel layers (26-28, 30-42, 46-54, 58-60, and 66-68 cm depth) believed to be avalanche debris from nearby mountain slope. Sediments are being processed for grain size, organic carbon, and pollen analyses. Efforts to obtain longer sediment cores failed, probably because of coarse sand and gravel layers.

SI-3455 20.0 to 22.9 cm (GRL-314-0)	KINGNAIT PEAT SERIES	102.2% modern
SI-3456 71.8 to 75.0 cm (GRL-331-0)		2575 ± 75
SI-3457 78.0 to 81.0 cm (GRL-332-0)		3320 ± 80

Peat monolith collected from the intertidal zone at the head of Kingnait Fiord, northeastern Cumberland Sound (65°21'N; 64°25'W; UTMG: MJ 365 586). Described section consisted of a vegetated surface of saltmarsh grasses, inorganic sands between 0 and 20 cm depth, brown peat, containing only scattered clastic sediment from 20 to 75 cm, inorganic sand between 75 and 78 cm and black, humic sands from 78 to 81 cm depth. The surface of this section is 0.3 m below mean high tide. Radiocarbon samples were submitted from the top of the peat (SI-3455), the base of the peat (SI-3456) and from the basal humic sand horizon (SI-3457). Collected July, 1976 by G.H. Miller and P.T. Davis. The coarse (>125μ) and fine (<125μ) organic fractions from both SI-3455 and -3456 were combined for the date. Comment (G.H.M.): This terrestial organic matter accumulation has been submerged by a recent rise of relative sea level effecting the entire eastern Baffin Island coast (see also QC-479, this date list). The date on the top of the peat is surprisingly young, given its position nearly 0.5 m below the high tide level. The basal peat date indicates this site was above sea level at least 2600 years ago, and the humic sands suggest the site had

probably emerged prior to 3300 BP. Shells related to the limit of the late Foxe marine transgression (16 m aht) yielded a date of 8480 ± 270 (GSC-2083). Sea level fell from 16 m aht to below present sea level by 3300 BP, and at some later time this trend was reversed and the sea transgressed to its present level. Pollen analysis on the peat monolith is in progress.

11. CAPE DYER (Map Sheet No. 16-L and K. 66 -67° N; 61 -64° W)

QL-979 (GRL-166-S) CAPE DYER 37,200 ± 800

This sample was collected at an elevation of 14 m asl on the surface of a raised marine deposit at the mouth of the Uga't (a large inlet) ca 10 km NNW of the Cape Dyer DEW site (66°44'N, 61°27'W). The dated material was shell carbonate from single valves and fragments collected as float. Because no other source for the shells is likely, they are believed to have been reworked upwards, by frost-stirring from a coarse facies (regressive?) immediately beneath the surface. No species identification was undertaken on the valves in this sample, however similar samples consisted mainly of Astarte borealis var. placenta Mya truncata, and Hiatella arctica, with minor occurances of Chlamys islandicus, Portlandia arctica, Macoma calcarea, Musculus cf. niger, and Astarte cf. striata. Collected by W.W. and C.W. Locke. Comment(W.W.L.): By comparison with glacial chronologies established elsewhere on Cumberland Peninsula, the marine deposit is believed to have been formed concurrent with a major glacial maximum ca 70,000 yr BP. The ^{14}C date, which was determined after a 70% leach, is thus believed to be a minimum age for the deposit, even though a finite age was recorded. Amino acid ratios, although inconclusive (Free=0.3, Hyd. = 0.04-0.06), also suggest that the ^{14}C date is a minimum, but that the deposit post-dates the last interglaciation.

12. OKOA BAY. (Map Sheet No. 26-P. 67 -68°N; 64 -66°W).

QIVITU FORELAND SERIES

GSC-2716 (GRL-354-0) — Qavig Member Organic Detritus — >38,000

13.5 g of organic detritus (>0.5mm) in 0.5 cm laminae in fine marine sand from Section 47-50 (Nelson, 1978) (67°59'N, 64°45'05"W) (UTMG: ML 278 417) at 6.6 m asl. Collected by A.R. Nelson and T.L. Brown, 1977. Comment (A.R.N.): Most of this organic material appears to be seaweed which was deposited in shallow water or on a beach by wave action (W. Blake, oral commun., 1978) at the top of the Qavig Member of the Qivitu Formation. No fossil pollen is present (W.M. Mode, pers. commun.), but the oxidized upper 20 cm of this sand unit suggest soil development. This date provides a minimum age for the regression of the end of the Ayr Lake stade on the Qivitu Peninsula.

QC-453 (GRL-356-0) — Kangaajuk Member Peat — 9950 ± 185

9.1 g of carbon in 31.5 g of fiberous peat (>0.25 mm) from Section 53-54 (Nelson, 1978) (67°57'5"N, 64°46'45"W) (UTMG: ML 263 392) at 8.2 m asl. Collected by A.R. Nelson and T.L. Brown, 1977. Comment (A.R.N.): This peat may be a combination of marine and terrestrial organic material deposited in alternating 1-2 cm layers with fine facies W sand in very shallow water. It occurs at the top of the lower beds of the Kangaajuk Member and contains little pollen. As with QC-451 and GSC-2731 in correlative sections, this date probably marks the approximate sea level position during the regression following the limited late Foxe ice advance represented by the lower beds of the Kangaajuk Member of the Qivitu Formation.

GSC-2479 (GRL-324-S) — Kangaajuk Member Shells — 9280 ± 120; $\delta^{13}C$ o/oo:+2.0

Whole valves and fragments of marine shells collected from wave-eroded cliffs at southeast end of forelands between Narpaing and Quajon

Fiord, northern Cumberland Peninsula (67°59.5'N; 64°46.2'W; UTMG: ML 264 428). Shells collected from a silty fine sand matrix with occasional pebbles 4.6 m asl, overlain by a coarse sand to cobble unit that extends to the cliff top at 7.3 m asl. Shell-bearing stratum is associated with detrital organic matter. Collected August, 1976 by G.H. Miller. 11.5 g M. truncata to lab for date; 10% pretreatment leach. Sample mixed with dead gas for counting. Comment (G.H.M. and A.R.N.): Paired valves of both M. truncata and Astarte cf. striata were collected from this site. Coarse sandy cobble unit overlying the shell stratum is expressed at the surface as well-preserved beach ridges, and this unit is interpreted as a regressive beach facies. Detrital organic matter associated with the shells (GRL-356-0) was collected a few tens of meters NW of this site and has a ^{14}C age of 9950 ± 185 (QC-453).

The shells were deposited in shallow water when sea level was >5 m probably during the regression following the limited late Foxe ice advance. The difference in ^{14}C age between this sample and others from the top of the lower beds of the Kangaajuk Member (QC-454, QC-451, QC-453, GSC-2731) suggests relative sea level may have fluctuated between 8 and 15 m during the period 9000-10,000 BP although some of this age difference is probably the result of the analysis of different materials by different dating laboratories.

DIC-597 BROUGHTON ISLAND 3830 ± 75
(GRL-261-0)

Buried soil/organics from near Broughton Island village exposed in streamcut in the main stream between the village and the north end of the runway. (67°32.8'N; 64°02.5'W; UTMG: MK 527 914). Site about 2 to 3 m asl. Material buried at 50 cm depth. Sample overlies gravelly silt and overlain by silty sands. Collected 1975 by J.T. Andrews. Comment (J.T.A.): Sample dated to see if it represented the contact between underlying sediments of possible Cape Broughton age and overlying Holocene sediments. The date indicates that this is not the case and marine shells and seaweed close to the site (see Andrews and

Miller, 1972, p. 274, and Andrews, 1975, p. 80-81) date between 9000 and 10,000 years old. Revisiting the site in 1978 suggested that the soil/organics had been overrun by a solifluction lobe. Pollen analysis of the sample is in progress. Less than 125μ fraction dated. Humic acids removed with 2N NaOH at 100°C for 30 min. Carbonate removed with 2N HCl for 24 hours at room temperature (I. Stehli, person. commun. 1976).

GIF-4243	BROUGHTON HARBOUR	2680 ± 90
(GRL-327-0)	SOLIFLUCTION LOBE	

Organic soil collected from a depth of 43 cm beneath a solifluction lobe 18 m asl, west coast Broughton Island (67°31'N; 64°06'W). The excavated solifluction lobe is 85 m from the shore; pit was 3 m from leading edge of the lobe. Collected 1976 by D.E. Sugden, submitted by J.T. Andrews. Comment (D.E.S. and G.H.M.): solifluction lobe has dimensions of 28 m long, 9 m wide and the front is 0.35 to 0.85 m high. It is one of many lobes separated by stone-filled depressions containing stones 15-120 cm long axes. The lobe is sparsely vegetated in the center with more abundant vegetation occurring on the sides and front edge. The lobe area is underlain by till, and could have been washed during an early Holocene high relative sea level. Overall hillslope at the site is 3°. Sample provides an estimate of the rate of movement for solifluction lobes. Area was not covered by late Foxe ice. Date suggests lobes are moving rather slowly: ca 1 mm yr^{-1}. Radiocarbon date was on the organic fraction <125μ.

GIF-4245	BROUGHTON HARBOUR	880 ± 80
(GRL-329-0)	SOLIFLUCTION LOBE	

Organic soil collected at the base of a solifluction lobe 21 m aht on western Broughton Island (67°31'N; 64°06'W). Sample was taken from a depth of 63 cm, 2.25 m back from leading edge of the lobe. Date is on the organic fraction >125μ. Collected 1976 by D.E. Sugden, submitted by J.T. Andrews. Comment (D.E.S. and G.H.M.): Lobe dimensions are 10 m

long, 6 m wide on a south-facing hillside sloping at an overall angle of 3°, 91 m from the shore. The lobe is sparsely vegetated near the center but has a more complete vegetation cover around its perimeters. The site is underlain by till and could have been washed by the sea in Holocene time. The date suggests a rate of solifluction lobe advance of 2 to 3 mm yr^{-1}, somewhat faster than at GRL-327-0 (GIF-4243) that indicated a rate of ca 1 mm yr^{-1}.

13. PADLOPING ISLAND (Map Sheet No. 16-M. 67-68°N; 62-64°W)

QL-974 (GRL-99-S) EAST COAST, BROUGHTON ISLAND 44,400 ± 1000

Marine bivalves collected from low wave-eroded cliffs on the east coast of Broughton Island. (67°33'N; 63°46'W; UTMG: MK 671 929). Shells were excavated from a 2 m thick deposit of well-sorted, stratified medium to coarse sand containing some pebbles. The lack of silt in this stratum contrasts with the general silty nature of the exposed sediments in adjacent portions of the cliff face. Shell bed lies between 10 and 12 m asl, and is overlain by siltier sediments to the cliff top at ca 15 m asl. The enclosing sediment can be traced back into the cliffs beneath a boulder-silt unit. Collected July, 1973 by G.H. Miller and M.T. Anderson. Comment (G.H.M.): Many of the excavated shells were paired, and periostracum was still intact. Fauna includes the warm-indicator species Chlamys islandicus. Amino acid ratios determined on several valves of Hiatella arctica ranged between 0.035 and 0.050 (total) and 0.28 to 0.35 (free). These ratios are similar to ratios in the same species from mid Foxe deposits elsewhere on Baffin Island. It is possible that the true age of these shells is somewhat older and the radiocarbon age should be considered a limiting date.

14. EKALUGAD FIORD (Map Sheet No. 27-B. 68-69°N; 68-72°W)

GIF-3956 EKALUGAD PEAT 3170 ± 100

Well preserved sedge/sphagnum moss remains from top of organic-matter section at the head of Ekalugad Fiord, Home Bay, Baffin Island (68°51'36"; 69°31'20"W). Collected at an elevation of 38 ± 0.5 m asl from a depth of 1.6 m in August, 1967 by M. Church. Submitted by J.T. Andrews. Comments (M.C.): Peat is found in this stratigraphic position at several sites in Ekalugad Valley. At other sites, where the base of the peat is exposed, it overlies well oxidized gravels. The peat is thought to represent a cool period of stable fluviatile environment, during which mountaintop snowfields developed to an early Neoglacial climax. Overlying gravels represent the retreat phase of that state (T3, Church, 1978).

15. HOME BAY (Map Sheet No. 27-A. 68-69°N; 64-68°W)

QIVITU FORELAND SERIES
NORTHERN CUMBERLAND PENINSULA

QL-1179 (GRL-346-0) — Uivaruluk Member — 50,700 +2000 -1600

91.0 g of >125μ organic matter concentrated from 2.1 kg of silty sand from 60 m west of Section 34-2 (Nelson, 1978) 68°02'40"N; 64°58'35"W; UTMG: ML 180 488) at 10.8 m asl. Collected by A.R. Nelson and T.L. Brown, 1977. Comment (A.R.N.): This sample is the remains of peaty material deposited on nearshore or beach sands of the upper beds of the Uivaruluk Member of Qivitu Formation following regression at the end of the Cape Broughton Interstade. Mottling and oxidation in the upper part of this unit in other sections suggest soil development and high (20%) Betula percentages in the pollen assemblage from this sample may indicate a warmer terrestrial climate than present during this period (W.N. Mode, person. comm.). However, the organic material could be either a buried A horizon or have been deposited in very shallow marine water. Litho-stratigraphic correlations and allo/iso ratios on shells of 0.06-0.08 from other sections suggest this date is only a minimum age for the sample.

QL-1181 (GRL-472-S) — Quavig/Uivarvluk Member Shells — 47,800 + 1300 - 1100

400 g of Hiatella arctica valves (<10% paired, unabraded to moderately abraded) from facies W marine sands in Section 10-37 (Nelson, 1978) (66°02'45"N; 65°04'50"W; UTMG: ML 136 490) at 13.5 m asl. Collected by A.R. Nelson and T.L. Brown, 1977. Comment (A.R.N.): These shells were deposited in a nearshore environment during a period of relative sea level >15 m asl. A relatively diverse molluscan fauna at this locality including the subarctic species Chlamys islandicus and Colus spitzbergensis indicate warmer marine conditions than at present during

this period (J.T. Andrews). The moderate abrasion of the abundant Hiatella arctica valves suggests reworking of previously deposited shells. Allo/iso ratios on unabraded and abraded H. arctica are identical within the limits of error (0.50 free), but more detailed analyses of paired valves of several other species indicates shells of at least two ages are present (combined allo/iso of 0.04 and 0.08). The current interpretation of this 2.5 m thick unit is that the lower 2/3 is part of the middle beds of the Uivaruluk Member deposited during the Cape Broughton Interstade and the upper 1/3 is the lower beds of the Qavig Member deposited during the Ayr Lake stade. A significant unconformity occurs within this unit, and the shell faunas of both ages are mixed in the upper part of the unit, although this is not obvious at the exposure.

The apparent age increased with successive carbonate leaches on this sample (only the oldest date on the inner 1/3 reported) and the allo/iso ratios on these shells indicate this date is a minimum age estimate for both the Uivaruluk and Qavig Members of the Qivitu Formation.

QL-1180 (GRL-358-0) — Middle Uivarvluk Member Humus — 42,400 ± 800

194.9 g of clay/humus fraction concentrated from 2.2 kg of fine sand (carbon content estimated at 2% = 3.8 g C) from Section 16-9 (Nelson, 1978) (68°02'50"N; 65°03'20"W; UTMG: ML 148 492) at 13.3 m asl. Collected by A.R. Nelson and T.L. Brown, 1977. Comment (A.R.N.): This sample is the remains of peaty material deposited on marine sands of the middle beds of the Uivaruluk Member of the Qivitu Formation following regression at the end of the Cape Broughton Interstade. Mottling and oxidation in the upper 5 cm of this unit suggest soil development, but the pollen assemblage is difficult to interpret climatically (W.N. Mode, pers. commun.). The organic material could have been deposited either as an A horizon or in very shallow water. The pollen assemblage in correlative organic horizons may indicate a warmer terrestrial climate than present. Allo/iso ratios on shells of 0.06-0.08 from correlative units suggest this date is a minimum age of this sample.

QC-451 Kangaajuk Member Peat 9935 ± 165
GSC-2731 9600 ± 100
(GRL-330-0)

Two samples of 43.4 g (17.7 g carbon) and 26.7 g of 2-5 cm matted peat beds in sandy facies W silt from Section 37-24 (Nelson, 1978) (68°02'40"; 64°58'15"; UTMG: ML 185 485) at 9.5 m asl. Collected by A.R. Nelson, S.B. Mabee, and D.W. Westerberg, 1976. Comment (A.R.N.): This fiberous peat was deposited in alternating 2-5 cm layers with sandy silt in shallow water at the top of the lower beds of the lower beds of the Kangaajuk Member. It contains some marine organic material, but a pollen assemblage with 10% Betula may indicate terrestrial material deposited during a somewhat warmer period than present (W.N. Mode, pers. commun.). These dates probably mark the appropriate sea level position during a regression following the very limited late Foxe ice advance prior to 10,000 BP represented on the Qivitu Peninsula by the lower Kangaajuk beds. At the ± 2 σ level, the dates are concordant.

QC-454 Kangaajuk Member Organic Detritus 9092 ± 150
(GRL-350-0)

7.7 g of carbon in 62.2 g of coarse organic fragments (>0.25 mm) (Mya truncata syphons, willow) in silty facies W sands from 30 m east of Section 26-6 (68°02'55"N; 65°00'40"W; UTMG: ML 158 492) at 14.7 m asl. Collected by A.R. Nelson and T.L. Brown, 1977. Comment (A.R.N.): These coarse organic fragments and 1 cm peat lenses were deposited in discontinuous alternating layers in the upper 10 cm of a silty marine sand at the top of the lower beds of the Kangaajuk Member. Stems and coarse fragments of marine algae (seaweed) and bivalve syphons indicate deposition in a shallow marine environment inhabited by Mya truncata. The lack of pollen may also indicate marine deposition (W.N. Mode, per. commun.). As with QC-451, QC-453 and GSC-2731 in correlative sections, this date probably marks the approximate position of relative

sea level during the regression following the limited late Foxe ice advance represented by the lower beds of the Kangaajuk Member.

GSC-2684 (GRL-352-0) — Kangaajuk Member Seaweed — 8580 ± 120

4.4 g of large pieces of seaweed from a bed of matted marine algae interbedded with coarse stratified sands 60 m east of Section 41-16 (Nelson, 1978) (68°02'8"N; 64°56'25"W; UTMG: ML 198 477) at 3.9 m asl. Collected by A.R. Nelson and T.L. Brown, 1977. Comment (A.R.N.): This matted seaweed within the middle beds of the Kangaajuk Member may have been deposited on a beach by wave action (W. Blake, written commun., 1978) and thus indicates that sea level had fallen to approximately this elevation on the Qivitu Peninsula following its previous stand at 8-15 m about 9000 - 10,000 BP. Correlations of the middle beds of the Kangaajak Member which overlie this organic horizon with a series of beach ridges at 15 m suggest relative sea level subsequently rose to 15 m after this date.

QC-457 (GBL-316-66) — CAPE HOOPER — 8050 ± 115

Marine shells collected from raised marine sediments at 16-20 m asl from fossiliferous marine stratum near top of delta and close to the Cape Hooper DEW Line runway (Fox-4) (68°26'N; 66°46'W; UTMG: EF 836 923). Shells dated included Mya truncata and Hiatella arctica. Also present Mytilus edulis and Astarte sp. Collected 1966 by J.T. Andrews. Comment (J.T.A.): Shell dated as a check. Andrews and Drapier (1967, p. 153-154) report an age from the same shell collection of 7960 ± 140 BP (Y-1833). The two dates are statistically similar. The shells were rinsed in dilute HCl in an ultrasonic cleaner prior to dating.

QC-501	POSTGLACIAL PEAT	6030 ± 80
(GRL-348-0)		
QC-452		8025 ± 110
(GRL-349-0)		

22.2 g (QC-501) and 29.7 g (13 g of carbon, QC-452) of matted fiberous peat (>0.25 mm) in 1-2 cm beds interlayered with colluvial fine sand. Collected by A.R. Nelson and T.L. Brown 60 m south of Section 11-23 (Nelson, 1978)(68°02'48"N; 65°04'35"W; UTMG: ML 136 488) at 20.5 m asl (QC-501) and 19.4 m asl (QC-452) respectively. 100 x 10 x 15 cm monolith also collected for pollen sampling. Comment (A.R.N.): These samples were collected at the base and upper contact of the upper beds of the Kangaajuk Member at this locality. The lowest peat and sand layers (which overlie Qavig Member sediments) date the initial development of a large ravine formed by the melting of massive ground-ice in a thick silt unit probably as a response to the warm climate of the early Holocene (inferred for this area on the basis of pollen assemblages at other localities). Colluvial sand and peat were deposited on the upper slopes of the ravine during the period indicated by the ^{14}C dates. Peat deposition apparently ceased with the onset of cooler and/or moister conditions inferred from the soliflucted sandy marine silts which overlie the uppermost peat layer.

16. McBETH FIORD (Map Sheet No. 27-C. 69-70°N; 68-72°W)

QL-976-1	McBETH FIORD WHALE RIB		2360 ± 100
QL-976-2 (GRL-13-B)		47,000	$^{+1400}_{-1200}$ >52,000

Rib bone, probably from a bowhead-type whale excavated from a stream-cut face in a raised glacio-marine delta on the south side of outer McBeth Fiord, east-central Baffin Island (69°28.4'N; 67°33'W; UTMG: EH 569 076). Bone was protruding from foreset beds at an elevation of 65 m asl, ca 8 m below the surface of the deposit. An excavation revealed the bone was traceable to frozen ground and this sample was collected from the permafrost boundary. Paired valves, primarily M. truncata and S. groenlandicus were collected from an excavation 2 m below the bone collection site (ca 63 m asl). QL-976-1 is a date derived from a dialysis pretreatment. This date was anomalously young, and a second sample of the same bone (QL-976-2) was prepared by crushing, soaking in dilute (1-2% HCl) at room temperature for two weeks (changing the solution every day). The insoluble residue was rinsed and centrifuged in demineralized water until reaching a neutral pH. The residue was then boiled for two hours and dried slowly in the oven. The finite date ca 47,000 BP was attained initially, whereas the >52,000 BP date was counted several days later after the radon had been allowed to decay. The bone is considered to be "dead" as far as ^{14}C content is concerned and has an age in excess of 52,000 years. Collected August, 1974 by G.H. Miller and M.T. Anderson. Comment (G.H.M.): The raised marine deposit from which the bone was excavated consisted of gently-dipping foreset beds (seaward dip) of relatively well-sorted sand. In excavation, the whale rib could be traced into the bedding planes of the delta and is considered to be a close time correlative of the enclosing sediments. The foreset beds are capped by 1.5 m of a diamicton. Near this contact, the deltaic sediments become increasingly stoney. At the contact, the foreset beds are truncated (no topset beds) and there is a horizontal cobble layer of a few cm thickness, then 1.5 m of unstratified boulder-

silt that forms a hardpan unit at the surface and is clearly the protective agent for the preservation of the more easily eroded deltaic sands underneath. There is no evidence of distortion of the deltaic sands underlying the boulder-silt, nor of any temporal hiatus. For this reason, the deltaic sands are considered a distal glaciomarine facies, that reflect the encroaching ice margin by an increasing proportion of cobbles toward the top and were finally overlain by glaciomarine drift. The marine limit lies at an undetermined elevation above 73 m asl. The sediments enclosing GRL-13-B contain occasional cobbles, but distinctly fewer than at the top of the unit.

Shells associated with the bone were analysed for the amino acid ratios in the shell protein. The allo/iso ratios in Hiatella arctica (0.25 Free: 0.05 total) are similar to ratios in the same shell species in deposits ascribed to mid Foxe age elsewhere on east-central Baffin Island (Miller, et al., 1977). The estimated age of the mid Foxe sediments is between 40,000 and 70,000 BP.

A number of studies have been undertaken on the protein preserved in the bone of GRL-13-B (King, 1978; Tuross et al., unpublished). These studies suggest that the amino acid composition and concentrations of the collagen component are indistinguishable from those of modern bone, but that there has been some cleavage of peptide bonds and almost no very high molecular weight material remains. There is a suggestion of a small amount of leaching, but in general the protein perservation in a sample of this antiquity is remarkable. This is the oldest ^{14}C date yet obtained from Baffin Island, and may be the oldest bone date anywhere.

I-2962	OUTER INUGSUIN FIORD	6520 ± 150
(GBL-209-65)		
I-2961		4830 ± 120
(GBL-208-65)		

Detrital vegetation fragments collected from foreset deltaic beds in outer Inugsuin Fiord (69°55'N; 68°43'W; UTMG: EH 105 535). Collected 1965 by D.A. Harrison for O.H. Løken; dated 1967. Comment: Vegetation

collected at 4.4 m and traced to an elevation on 9.3 m asl. I-2962 treated by KOH on woody fragments and HCl wash. Samples differ statistically. Provide age estimate for sea level about 9.5 m + asl.

17. CAPE HENRY KATER (Map Sheet No. 27-D. 69-70°N; 64-68°W)

GSC-2384 PITCHFORTH FIORD 8730 ± 120

(GRL-367-S) HOME BAY δ^{13}Co/oo: +2.1

Fragments of M. truncata and H. arctica collected from stream bed cut into coarse marine sediments ca 6 km west of Arguyartu Point, north side, outer Pitchforth Fiord, Home Bay (69°01'N; 67°53'W;UTMG: EG 444 572). Shells collected between 32 and 42 m asl, marine limit lies at 55m asl. Collected by G. H. Miller, September, 1974. 12.7g M. truncata to lab for date, 10% pretreatment leach. Sample mixed with dead gas for counting. Comment: (G.H.M.): Highest marine sediments in this valley (ca. 1.5 km inland) consist of a thin veneer of crudely stratified coarse sand and gravel with scattered cobbles that extend to 55m asl. Above that elevation, the valley sides slope up steeply and consist of unsorted, unstratified angular colluvium. Although the shells were not in situ they are believed to have been washed down by the stream from deposits relating to the marine limit phase, thus the shells date the marine limit. Lack of a substantial volume of sediment at the marine limit and absense of "fresh" moraines indicates outlet glaciers of Laurentide ice did not reach this site during late Foxe time. An extensive fossiliferous delta at 20m asl is as yet undated, but represents a period of increased runoff and sediment transport during early Holocene time (probably sometime between 6000 and 8000 BP).

GSC-2506 CAPE HENRY KATER 8320 ± 140

δ^{13}Co/oo: +1.3

Paired whole valves and fragments of marine bivalves collected from excavation in cut bank 18 km WNW of Cape Henry Kater, Henry Kater Peninsula (69°12'N; 67°11'W; UTMG: EG 710 767). Shells thin-walled and fragile, not abundant, but sufficient paired valves located to suggest shells are indigenous to the deposit. Shells collected 17 m asl, marine limit somewhat obscured, but shell-bearing sands abut till at

24m asl, and this elevation is taken as the local marine limit. Collected September, 1974 by G.H. Miller, 10.0 g M. truncata and Mya sp. sent to lab, 10% pretreatment each. Sample mixed with dead gas for counting. Comment (G.H.M.): Shells are considered correlative with the marine limit phase at 24m asl. A lower marine plane, traceable for several km as an erosional notch lies at 13 m asl. Thick valves of H. arctica collected from till beneath the Holocene marine sediments yielded amino acid ratios of Mid Foxe age. Marine sediments above the late Foxe limit have also yielded mid Foxe amino acid ratios, suggesting deglaciation of Cape Henry Kater occurred during Mid Foxe time and that late Foxe ice did not reach the cape. The late Foxe marine sediments suggest marine and fluvial reworking of the pre-existing sediments, rather than an ice/meltwater derivation.

18. CONN LAKE (Map Sheet No. 37-E. 70-71°N; 72-76°W)

QL-1086	FILTAWAY LAKE	$48,700 \pm \frac{1400}{1000}$
QL-1087		$47,500 \pm \frac{1000}{1200}$

Peat from a small mound of peat capped with till within 1 km of the Barnes Ice Cap, central Baffin Island, at an elevation of 560m asl (70° 28'N; 74°47'W; UTMG: WP 031 139). Samples collected in 1963 and 1964 by J.T. Andrews and P.J. Webber respectively. Comment (J.T.A.): Site originally dated at 30,000 BP (I-1241) (Andrews and Drapier, 1967, p. 122; Terasmae et al 1966). Pollen analysis of the sample reported in Miller et al (1977). Macrofossils in the peat included scales of Betula nana. Additional studies of the beetle fauna is in progress by Dr. A. Morgan. The macrofossils, pollen and beetles indicate that the climate during deposition of the peat was of full interglacial character with a July temperature 3 to 4°C warmer than present. Thus the dates above are considered minimum ages for the deposit and a true age of ca 125,000BP (??) is suggested.

19. CLYDE (Map Sheet No. 27-F. 70-71°N; 68-79°W)

QL-973 (GRL-116-S) — CLYDE CLIFFS — 45,800 ± 1000; 47,500 ± 1200

Marine bivalves, primarily Hiatella arctica collected from the Clyde Cliffs in 1966 by Dr. R.W. Feyling-Hanssen, Aarhus University, Denmark. The shells were collected in and a little above fossiliferous clayey-silt, ca. 12m asl in his profile XXV(Feyling-Hanssen, 1976). The shells were collected from the surface of the cliff face. Comment (G.H.M. and J.T.A.): Amino acid ratios determined on H. arctica yielded allo/iso ratios of 0.17 (total) and 0.75(free), indicating that the enclosing sediments pre-date the Foxe Glaciation (Miller, et al, 1977). A ^{230}Th date on the same sample gave an age of 61,000 ± 7000. Both dates appear to be too young. The two dates were determined on two different preparations of the same collection with ca. 50% leach.

I-2831 (GBL-55-65) — OUTER INUGSUIN FIORD — 7750 ± 135

Marine shells in bedded sandy silts. Collected 1965 by J.H. England for O.H. Løken; dated 1967. Comment: Shells collected at 7.1m and beds traced to 11.99m asl. Nearly the same site as GSC-2283 (8290 ± 90). (70°02'N; 68°34'W; UTMG: EH 131 637).

SI-3678 (GRL-378-0) — PATRICIA BAY LAKE CORE #4 — 6320 ± 130

Peaty lake sediment from 113-116 depth (9m asl) in a core taken from Patricia Bay Lake (name not formally established), 3 km east of Clyde River hamlet (70°28'N; 68°30'W: UTMG: EJ 180 175). Sample is 11 cm above the basal lake sediments which overlie regressive marine sands. Collected by W. and C. Mode, July 7, 1977. Material dated

(0.8g.) is primarily moss fragments (Drepanocladus exannulatus (G.S.G.) Warnstorf., identified by Dr. W.A. Weber, University of Colorado Museum). No fine organic material from the clay/humus fraction (<125μ) could be concentrated for dating. Comment (W.N.M.): Pollen analysis of this lake core reveals a basal Betula zone in which high "absolute" numbers of Betula pollen suggest this shrub's presence in the Clyde area (Betula's present northern limit on Baffin Island is 400-450 km south of Clyde). This ^{14}C date comes from just above the base of the Betula zone, and also just above the top of marine sands; thereby providing a minimum date of the site's Holocene emergence above sea level.

GIF-3866 CLYDE CLIFFS PEAT 5370 ± 130
(GRL-279-0)

Basal few cm of 2m thick organic and eolian sand accumulation ca. 3 km southeast of the Kogalu River mouth, in the wave-eroded cliffs of the Clyde Foreland (exact location not recorded). The base of the unit was 28 m asl. Collected August, 1974 by G.H. Miller; submitted by J.T. Andrews. Comment (G.H.M.): Eolian/organic accumulation caps much of the coastal cliff section and at this locality overlies oxidized marine sediments. The base of the sampled unit is primarily an organic matter accumulation, that contains increasing proportions of eolian sand 50 cm above the base. This sample, taken from the base of the unit, dates a period of relatively mild climate prior to eolian deposition, and is the oldest date yet obtained for the base of the Scott Inlet eolian sands (Miller et al, 1977).

QC-513 PATRICIA BAY SHELLS 4285 ± 90
(GRL-561-S)

Marine mollusk shells collected from stream cut bank 2 km NE of Clyde River hamlet at head of Patricia Bay, Clyde foreland (70°28'N, 68°35'W: UTMG: EJ 165 192). Shells collected from thin-bedded; bluish-gray (10 BG 3/1) silt and fine sand at 1 m asl and 100-110 cm depth.

This sequence is overlain by regressive marine sand related to an extensive marine plane with its shoreline angle at 4.5m asl. Collected June 15, 1977 by W. and C. Mode. Pretreatment with an acid rinse in dilute HCl in ultrasonic cleaner. All species collected were used for dating (110g.) and most shells retained some periostracum. Comment (W.N.M.): Sample was faunally diverse, containing: Hiatella arctica, Mya truncata, Macoma calcarea, Astarte borealis cf. withami, Macoma balthica and Mytilus edulis. The last two species indicate subarctic marine conditions, which no longer extend as far north as Clyde (see: Andrews, 1972).

20. BUCHAN GULF Map Sheet No. 37-H. 71-72°N; 72-76°W)

GSC-2199	DEXTERITY ISLAND	5340 + 170
(GRL-368-S)	BUCHAN GULF	$\delta^{13}C$ o/oo: -0.43

Diverse assemblage of marine mollusks collected from stream-cut bank in extensive valley fill in the main valley on the north side of Dexterity Island, outer Dexterity Fiord, Buchan Gulf (71°38'N; 72°53'W: UTMG: WQ 742 501). Sample contained numerous paired valves from horizontally-bedded sandy to silty strata 10 to 12 m asl, 1.5 km inland from the coast. Top of the cut was 15 m asl, local marine limit considered to be ca 16 m asl. Collected August, 1974 by G.H. Miller. 26.7 g Mytilus edulis to lab for date, 20% leach. Sample mixed with dead gas for counting. Comment (G.H.M.): Alluvial fill in this valley on Dexterity Island is extensive and extends many km inland. Active glaciers still extant at valley head. Although local marine limit in the vicinity of shell collections was ca. 16 m asl, the true M.L. for the area may have been considerably higher as shell-bearing strata were horizontally bedded and terrace surface had gentle gradient increasing towards the interior. This date is several millenia younger than other marine limit dates in the area (see, for example, Hodgson and Haselton, 1974). Faunal assemblage included abundant whole, paired valved of H. arctica, M. truncata, M. edulis, C. ciliatum, Astarte sp., Acmaea sp., a gastropod and pieces of baleen. M. edulis valves were large and robust suggesting a favorable marine environment. The date lies within the Holocene marine optimum (Andrews, 1972). Date provides estimate of relative sea level ca. 16 m above present.

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