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

Compiled by
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RADIOCARBON DATE LIST II: LABRADOR AND NORTHERN QUEBEC, CANADA

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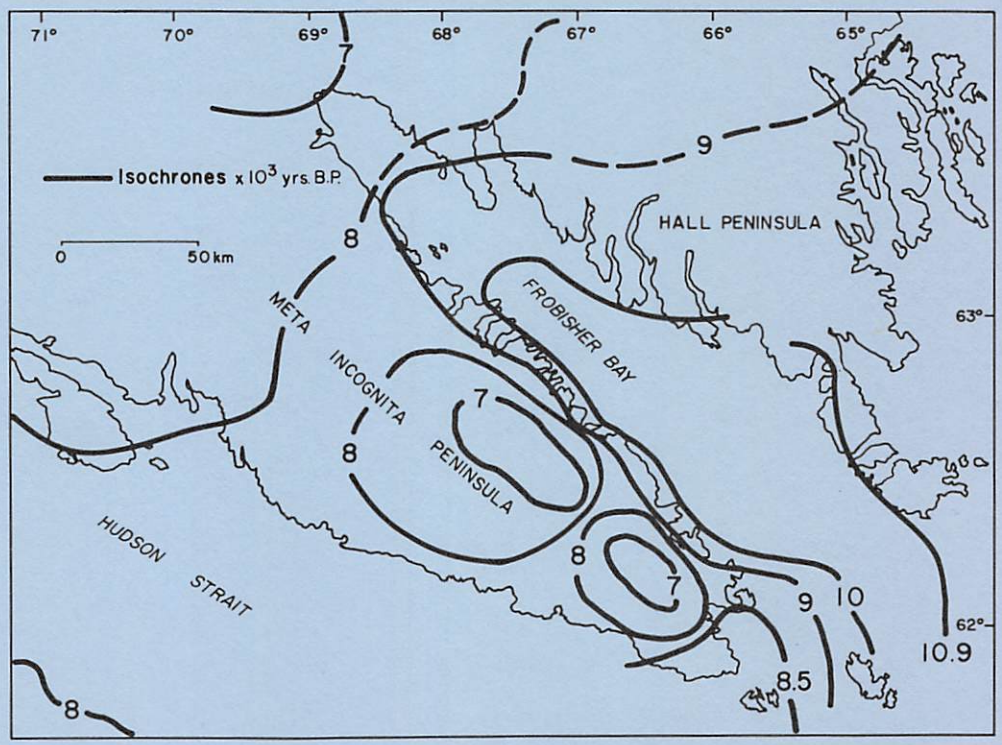

Occasional Paper No. 40
1983

INSTITUTE OF ARCTIC AND ALPINE RESEARCH • UNIVERSITY OF COLORADO

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RADIOCARBON DATE LIST II: LABRADOR AND NORTHERN QUEBEC, CANADA.

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1983

University of Colorado
Institute of Arctic and Alpine Research
Occasional Paper 40

INSTAAR/OP-40

ISSN 0069-6145

Citation of this publication is University of Colorado, Institute of Arctic and Alpine Research, Occasional Paper No. 40, 1983.

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PREFACE

This is the fourth Institute of Arctic and Alpine Research (INSTAAR) Occasional Paper principally devoted to listing radiocarbon dates from the eastern Canadian Arctic. The first two Occasional Papers, numbers 21 and 29, were concerned with Baffin Island; Occasional Paper No. 36 was concerned with Labrador-Ungava. Occasional Paper 40 lists and discusses new dates gathered by INSTAAR members and associates since the previous lists. It is presented in two distinct sections: Baffin Island and Labrador and Northern Quebec.

The Occasional Paper series is an ideal outlet for this material. Through the series, data which might otherwise be dispersed throughout the literature are gathered together by region and thus made more readily available to scientists concerned with the Quaternary history of the eastern Canadian Arctic.

Such compilations are labors of love and are like the proverbial iceberg; far more work was expended than can be seen in the completed product. Nevertheless, the effort will have been worthwhile, since our understanding of the Quaternary of the Eastern Arctic will profit from this investment.

Patrick J. Webber
Director, INSTAAR
October 1983

ABSTRACT

The two combined radiocarbon date lists for Baffin Island and Labrador include 100 samples: 81 are from Baffin Island; 16 from Labrador and three miscellaneous dates, two of which are from the Ottawa Islands, N.W.T. (Hudson Bay) and the third on marine carbon from the state of Maine. Most dates come from marine shells but significant numbers are also reported from peats, lake sediments, and marine sediments. The sites of the dated samples come from 17 1:250,000 NTS Map Sheets, although the largest concentrations of dates is from the Frobisher and Grinnell Glacier maps sheets of southern Baffin Island. Organic carbon dates from marine cores in nearshore troughs off the eastern coast of Baffin Island give basal dates of between 16,000 and 26,000 yr BP.

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

ACKNOWLEDGMENTS

I would like to thank all the contributors to Baffin Island Radiocarbon Date List V. In particular, I wish to express my sincere appreciation to Drs. R. Stuckenrath, Smithsonian Institution, and W. Blake, Jr., Geological Survey of Canada, for providing dates at no cost. The commercial laboratories that we use have also been helpful and concerned with the quality of their data reports. Many of the radiocarbon dates reported here have been purchased through grants from the National Science Foundation to John T. Andrews, Gifford H. Miller, and Lisa E. Osterman (grants ATM-7-17549, EAR-77-24555, EAR-79-26061, EAR-81-21296, EAR-80-23454, and DPP-81-116048.)

John D. Jacobs, University of Windsor and William N. Mode, University of Wisconsin-Oshkosh, have worked with us in our research program and have contributed material for this date list, funded through their own grants.

Charles Layman and Rolf Kihl are to be thanked for their efforts in checking the date list and for aspects of its organization. I would like to thank Rosella Chavez and Fatima Al-Rahim for typing and Karen Schneider for drafting the figures.

INTRODUCTION

Radiocarbon Date List V: Baffin Island, N.W.T., Canada continues the series that commenced in 1967 with the publication by Andrews and Drapier (1967) and includes Date Lists I-IV compiled by individuals from the University of Colorado (Andrews and Miller, 1972; Andrews, 1975; Andrews, 1976; Miller, 1979). In the present date list we include descriptions of the sites, nature of the material dated, and comments on the significance of the dates from 84 samples that have not yet been fully reported in the literature. Dates from some of these samples have not yet been published, while others have been reported in journal articles and/or theses (e.g. Osterman, 1982) but without documentation using a standard format to report specific site details. In addition to the dates from Baffin Island, the section entitled "Miscellaneous," reports assays from sites in Maine, U.S.A., and the Ottawa Islands, in the Hudson Bay, N.W.T., Canada.

Baffin Island Date List V includes samples from environments and materials previously studied from Baffin Island, but this report also includes radiocarbon dates from a series of marine cores from nearshore situations--this represents a new departure and, as the discussions emphasize, the interpretation of these dates is not always straightforward. All of the dates have been obtained to understand better the glacial and nonglacial events that have characterized Baffin Island over the last few thousand to few tens of thousands of years. Many of the dates on marine shells have been obtained in order to provide information on the timing of late Foxe (Holocene) deglaciation and/or on the rate of glacial isostatic emergence. Lake sediments and peats have been radiocarbon dated in order to provide a chronology for the study of palynological changes in the eastern Canadian Arctic over the last 10,000 yr (e.g., Mode, 1980; Davis, 1980; Andrews et al., 1981a; Short and Jacobs, 1982). Similarly, dates from marine piston cores have been used to interpret changes in the nearshore paleo-oceanographic regime

(Osterman, 1982).

Several radiocarbon laboratories have provided dates for us, either at commercial rates or on a no-fee basis. Table 1 lists the laboratories and their abbreviations that are used routinely in the radiocarbon literature.

In Table 2 we list the radiocarbon dates that were published in earlier date lists in frequency of dates per 1000 yr, up to 13,000 BP and in larger intervals up to greater than 50,000 BP. Our work in Frobisher Bay (Miller, 1980; Muller, 1980; Colvill, 1982; Short and Jacobs, 1982; Lind, 1983) has been largely concerned with the history of late Foxe Glaciation; only occasional deposits significantly older than 11,000 BP have been encountered. This situation contrasts with the research reported in previous date lists which focused on the stratigraphy of the wave-exposed Quaternary sediments of the large forelands of Baffin Island (e.g., Miller et al., 1977; Nelson, 1978; Mode, 1980).

Table 3 lists the radiocarbon dates reported in this list, in order of increasing age. Figure 1 is a frequency diagram of the current date list compared to the total of earlier date lists. Table 4 is a compilation of the number of dates obtained on different materials (such as peats, lake sediments, marine sediments, marine shells, and wood).

TABLE 1

Radiocarbon Laboratory Abbreviations

Abbreviation	Laboratory
Beta	Beta Analytic Inc., Coral Gables, Florida
GSC	Geological Survey of Canada, Ottawa, Canada
GX	Geochron Laboratories Division, Cambridge, Massachusetts
QC	Queens College, City University of New York
QL	Quaternary Isotopes Laboratory, University of Washington, Seattle
SI	Smithsonian Institution, Radiation Biology Laboratory, Washington, D.C.

TABLE 2

Numbers of Dates Listed in 1000-yr Intervals by Year, Baffin Island

Age Range (10^3 yr BP)	This list	1979	1976	1975	1972	1967	Total
0- 1	7	6	14	18	16	3	60
1-2	4	3	13	6	6	3	32
2-3	9	9	10	7	1	5	37
3-4	5	6	4	0	1	11	25
4-5	2	3	2	1	2	18	30
5-6	3	2	3	2	3	15	27
6-7	0	3	7	1	1	12	25
7-8	14	2	4	2	5	13	40
8-9	17	10	7	2	4	9	48
9-10	6	14	5	1	1	3	28
10-10.9	5	5	0	0	1	1	11
11-11.9	2	0	1	0	0	0	3
12-12.9	1	1	0	0	0	0	1
13-18.0	3	1	0	0	0	4	11
20-29	1	1	0	0	9	1	12
30-39	2	2	7	1	2	14	29
40-49	0	9	8	1	0	3	21
>50	0	2	1	0	0	2	5
Totals	81	79	86	42	52	117	439

TABLE 3

Radiocarbon Dates Listed Youngest to Oldest, Baffin Island

Date BP	Laboratory number	Map Sheet[a]
Modern	SI-4180	Grinnell Glacier
420 ± 125	GX-8382	Frobisher
475 ± 125	GX-8381	Frobisher
905 ± 130	GX-8383	Frobisher
905 ± 100	Beta 1086	Frobisher
955 ± 130	GX-8380	Frobisher
965 ± 145	QC-653	Clyde
1345 ± 135	GX-8384	Frobisher
1450 ± 105	QC-618	Cape Dyer
1460 ± 70	Beta-1622	Frobisher
1775 ± 210	GX-6371	Cape Dyer
2035 ± 70	Beta-1087	Frobisher
2560 ± 100	SI-2067	Pangnirtung
2565 ± 190	GX-6292	Clearwater Fiord
2575 ± 140	GX-8395	Frobisher
2745 ± 145	GX-7881	Grinnell Glacier
2760 ± 60	SI-2068	Pangnirtung
2800 ± 95	QC-1052	Clearwater Fiord
2920 ± 100	SI-2071	Pangnirtung
2940 ± 180	Beta-1705	Beekman Peninsula
3110 ± 100	QC-654	Clyde
3330 ± 75	SI-2069	Pangnirtung
3430 ± 135	GX-6835	Clyde
3650 ± 160	GX-6838	Clyde

TABLE 3
(Continued)

Date BP	Laboratory number	Map Sheet[a]
4000 ± 110	QC-619	Clyde
4190 ± 140	GX-6836	Clyde
4560 ± 180	GX-7091	Grinnell Glacier
5445 ± 110	SI-2070	Pangnirtung
5490 ± 180	QC-683B	Beekman Peninsula
5700 ± 240	GX-6293	Clearwater Fiord
7075 ± 215	QC-881	Grinnell Glacier
7080 ± 175	GX-8160	Frobisher
7140 ± 115	Beta-1871	Frobisher
7185 ± 120	QC-1138	Lake Harbour
7285 ± 200	GX-6603	Beekman Peninsula
7340 ± 135	QC-901	Frobisher
7380 ± 220	GSC-2771	Frobisher
7510 ± 320	QC-902	Frobisher
7595 ± 130	Beta 1872	Frobisher
7640 ± 125	Beta 2362	Home Bay
7800 ± 150	QC-905	Frobisher
7815 ± 120	QC-1137	Lake Harbour
7980 ± 175	SI-4181	Grinnell Glacier
7985 ± 130	QC-904	Frobisher
8000 ± 320	GX-6840	Clyde
8070 ± 250	GX-6839	Clyde
8135 ± 210	QC-883	Grinnell Glacier
8140 ± 250	QC-882	Grinnell Glacier

TABLE 3
(Continued)

Date BP	Laboratory number	Map Sheet[a]
8160 ± 145	QC-880	Grinnell Glacier
8220 ± 90	GSC-3404	Grinnell Glacier
8285 ± 285	GX-8755	Home Bay
8400 ± 160	QC-879	Grinnell Glacier
8450 ± 190	GX-8159	Frobisher
8480 ± 280	GSC-3015	Grinnell Glacier
8660 ± 175	SI-5173	Grinnell Glacier
8690 ± 120	GSC-3157	Frobisher
8790 ± 380	GSC-2991	Grinnell Glacier
8810 ± 205	GX-6837	Clyde
8820 ± 110	SI-4368	Grinnell Glacier
8845 ± 265	GX-8671	Grinnell Glacier
8950 ± 160	GSC-2982	Grinnell Glacier
9190 ± 195	GX-8194	Grinnell Glacier
9480 ± 565	GX-8751	Scott Inlet
9570 ± 370	GX-8753	Scott Inlet
9595 ± 90	SI-5170	Grinnell Glacier
9845 ± 175	SI-5272	Grinnell Glacier
9875 ± 130	QC-903	Frobisher
10,000 ± 200	GSC-2813	Loks Land
10,025 ± 225	GX-7882	Grinnell Glacier
10,200 ± 210	GSC-2778	Loks Land
10,685 ± 385	GX-6352	Grinnell Glacier
10,915 ± 600	GX-8754	Scott Inlet
11,770 ± 550	GX-6280	Cape Hewett

TABLE 3
(Continued)

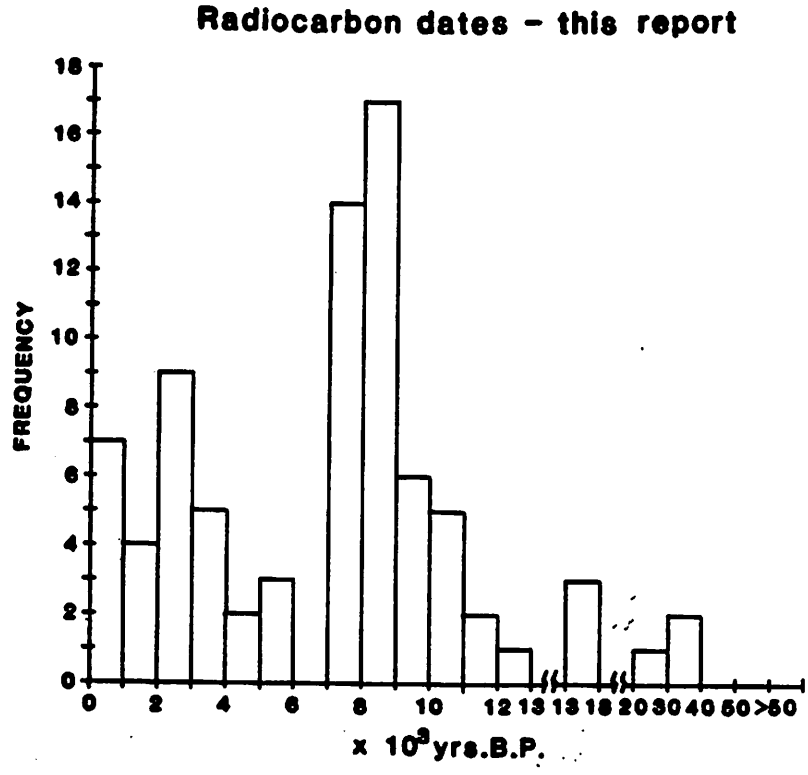
Date BP	Laboratory number	Map Sheet[a]
11,910 ± 380	GX-7119	Grinnell Glacier
12,035 ± 600	GX-8756	Home Bay
15,080 ± 620	GX-7880	Grinnell Glacier
16,360 ± 650	GX-6608	Home Bay
17,005 ± 720	GX-6607	Scott Inlet
27,255 ± 1250	GX-7883	Resolution Island
32,500 $\pm \frac{2600}{1800}$	GX-8591	Loks Land
>39,000	GSC-2797	Clyde

[a]See Figure 2, location map.

TABLE 4

Numbers of Radiocarbon Dates Associated with Different Sample Materials, Baffin Island

Material	Number
Peats	12
Lake Sediments	8
Marine shells	41
Marine sediments	17
Organic lenses/soils	9



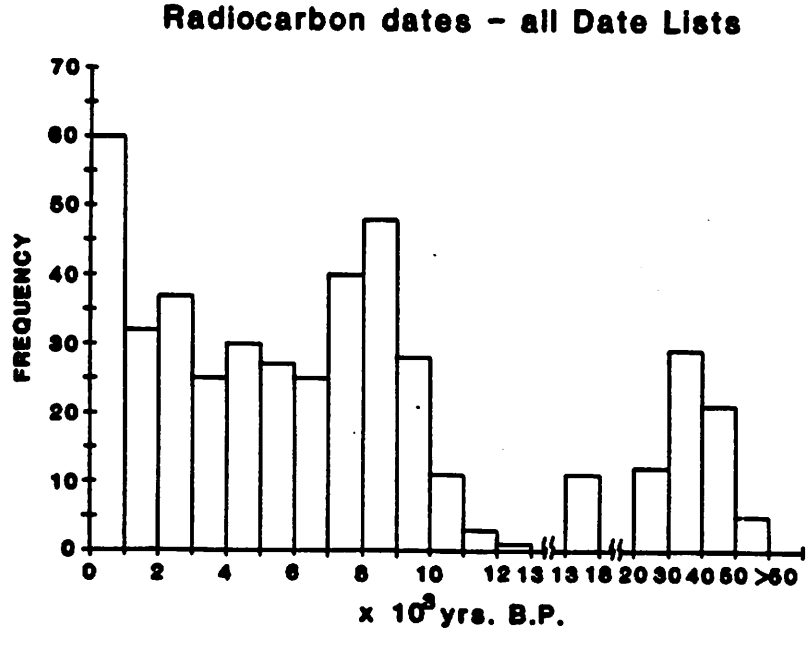


Figure 1: Frequency distribution of radiocarbon dates, Baffin Island.

PRESENTATION OF DATES

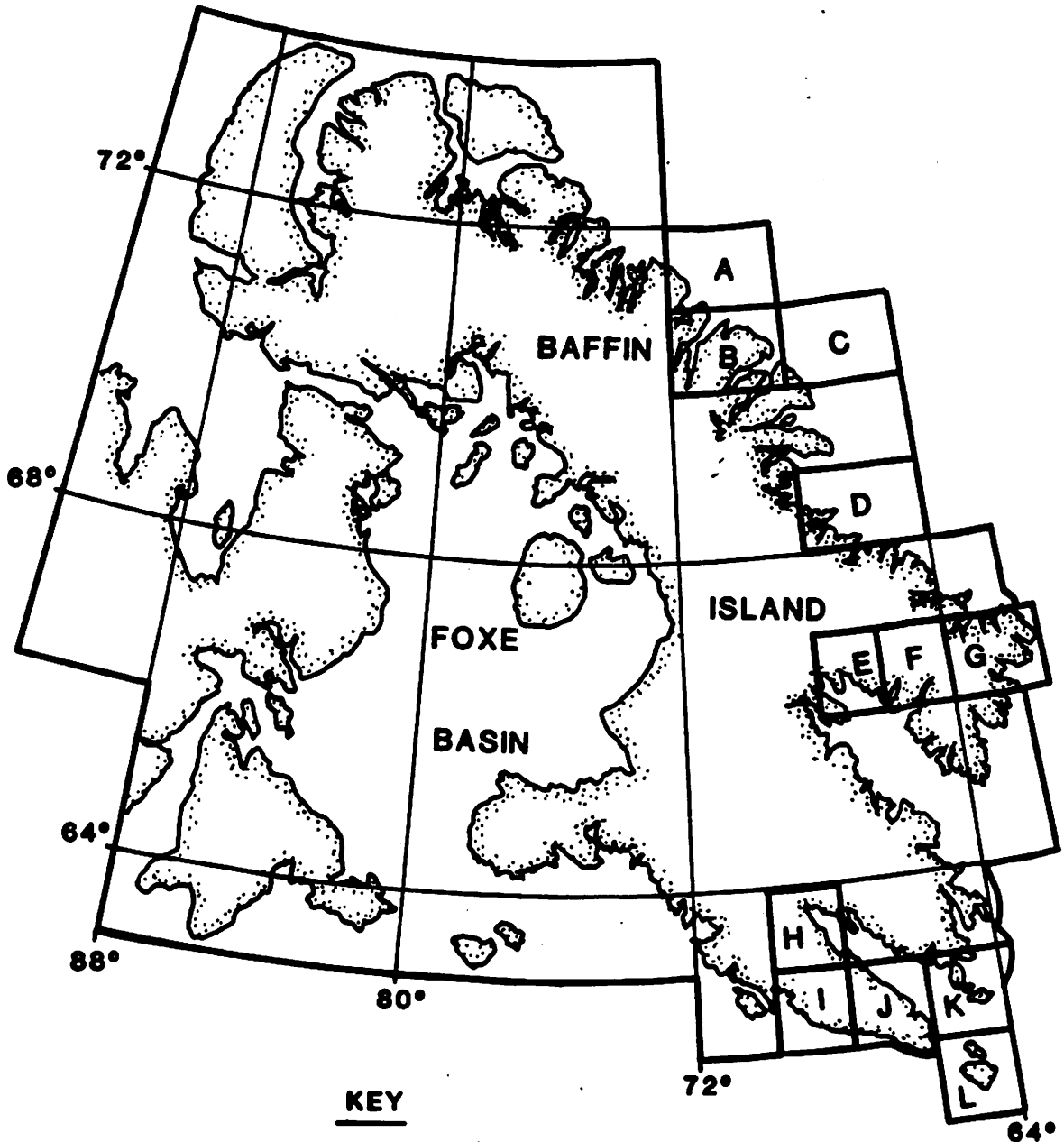
The dates in this current compilation are presented in terms of the appropriate 1:250,000 NTS topographic map series (Fig. 2). With the exception of those from three marine cores which are listed together, the dates are presented starting with the most northerly map sheet and proceeding southward. Along any one east-west transect the map sheet farthest east is discussed first.

Site locations are given by latitude and longitude, but in many cases we have also used the Universal Transverse Mercator Grid (UTMG) coordinate designation. The UTMG is included on the 1:250,000 NTS map sheets as a 10 km x 10 km grid. When using the UTMG system sites are located to the nearest 100 m by a pair of numbers and a two-letter prefix; for example LE 564 822, where LE is the primary 100 x 100 km grid, 564 is the distance in meters x 10^2 east of the zero (0) north/south grid line in the LE grid, and 822 x 10^2 is the distance north of the zero east/west line. Resolution of this system is better than 100 m in either direction.

The format used in this and earlier Baffin Island Radiocarbon Date lists generally follows that used in Radiocarbon, with some exceptions. On the left hand side of each heading is the radiocarbon laboratory number for the sample. Below that we list our own laboratory number, for example GRL-415-S or GRL-316-O, where S stands for shell and O refers to an organic sample.

The dates reported in this compilation are presented strictly as reported to us by the dating laboratory in years B.P. Some laboratories, such as the Geological Survey of Canada, routinely measure the $^{13}C/^{12}C$ ratio of marine shells and correct the reported radiocarbon date according to a standard of $^{13}C/^{12}C = 0.0°/_{oo}$.

Each date, or series of dates has a "Comment" which has been provided by the individual or group of individuals concerned with the collection and interpretation of the site.



KEY

A- Scott Inlet 27G
B- Clyde 27F
C- Cape Hewett 27E
D- Home Bay 27A
E- Clearwater Fiord 26J
F- Pangnirtung 26I
G- Cape Dyer 16L&K
H- Frobisher 25N
I- Lake Harbour 25K
J- Grinell Glacier 25J
K- Loks Land 25I
L- Resolution Island 25H

Figure 2: Location of the 1:250,000 NTS Map Sheets, Baffin Island.

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

CLYDE CLIFFS PEAT SECTION

QC-653 (GRL-402-00)	68-71 cm depth	965±145
QC-654 (GRL-403-0)	202-205 cm	3110±100
QC-619 (GRL-398-0)	267-271 cm	4000±110

The coarse fraction (greater than 125 μm) of leaves and twigs was dated in each case; care was taken to separate modern rootlets from the samples. A 271-cm thick peat monolith, composed of interbedded peat and nivoeolian sand, was collected for pollen analysis from the top of a coastal cliff exposure (28.7-31.4 m a.s.l.) on the Clyde foreland (Section 90: Mode, 1980). Section 90 is located about 1 km northwest of the Kuvinilk River mouth (70°37'N, 68°37'W). Underlying the base of the peat is a paleosol developed in regressive marine gravelly sand of pre-Holocene age. Collected July 1978 by W.N. Mode and C. Mode. Comment (W.N.M.): The basal date is somewhat later than that suggested for initiation of nivoeolian deposition along the cliffs (Scott Inlet Eolian Sands, ca. 4500 BP, Miller et al., 1977). The top of the section is probably contemporary, based on the age versus depth plot of these dates, and this is somewhat unusual because the late Holocene parts of other nivoeolian section in Baffin Island often cease to be organic-rich (Andrews et al., 1979). An increased sand to organics ratio in the upper part of the Clyde cliffs peat probably reflects a correlative environmental change.

HEWETT LAKE SEDIMENT CORE

GX-6838 (GRL-458-0)	4-10 cm depth	3650±160
GX-6839 (GRL-459-0)	40-50 cm	8070±250
GX-6840	60-77 cm	8000±320

The coarse and fine fractions were dated (except GRL-458-0, which contained no coarse organic matter). Two 77-cm-long cores were raised using a Livingstone corer from adjacent sites in Hewett Lake (unofficial name), which is on the foreland that is south of Clyde Inlet, Baffin Island (elev. ca. 100 m a.s.l.; 70°4'N, 68°08'W;). Samples for dating were combined from both cores; one core was sampled for pollen analysis. Collected by W.N. Mode and C. Mode, June 1978. Comment (W.N.M.): It is most probable that the core is composed entirely of Holocene-age lake sediments, but which date(s) should be considered correct is unknown. Preliminary pollen analysis suggests the pollen assemblages cannot be correlated with the Patricia Bay Lake pollen stratigraphy, which is more reliably dated.

CLYDE FORELAND

GSC-2797
(GRL-701-S) >39,000 yr BP
$\delta^{13}C$ + 1.5°/₀₀

Fragments and whole valves of Astarte borealis and A. elliptica from moderately sorted marine sand at head of Patricia Bay, near Clyde River Settlement, Baffin Island (70°28'N, 68°34'W; UTMG: 19W EJ 15 18). Shells collected from distal foreset beds associated with a shoreline at 25 m a.s.l. by W.N. Mode and C. Mode. Comment (W.N.M.): Amino acid ratios belong to the Koaglu aminozone (Mode, 1980). The shoreline truncates the youngest moraines on the Clyde Foreland; therefore, glacial ice has not reached the outer coast for >39,000 years. The shell collection contains a diverse fauna, including Mya pseudoarenaria, indicating warmer marine conditions that at present.

CLYDE RIVER

PATRICIA BAY LAKE SEDIMENT CORE

GX-6835 (GRL-455-0)	24-30 cm depth	3430±135
GX-6836 (GRL-456-0)	48-54 cm	4190±140
GX-6837 (GRL-457-0)	84-90 cm	8810±205

The organic content of the coarse and fine fractions of the lake sediment was dated. The sediment core was collected with a modified Livingstone piston corer from Patricia Bay Lake (unofficial name), which is located ca. 3 km east of the hamlet of Clyde River, Baffin Island, N.W.T. (70°28'N, 68°30'W; UTMG: EJ 180 175). The latitude of the mudwater interface is ca. 11 m a.s.l., and the core penetrated 119 cm of lake sediment underlain by 65 cm of littoral sand and 6 cm of diamicton (till). The lake sediments have been analyzed for pollen and a pollen diagram has been made (Mode, 1980). Collected June 1978 by W.N. Mode and C. Mode. Comment (W.N.M.): A date of 6320±130 BP (SI-3678) was previously obtained (see Miller, 1979) for the interval 105-108 cm (corrected depth) in the core. This level directly overlies the littoral sands which reach an elevation of 10 m a.s.l., and therefore represents a minimum date of glacioisostatic emergence of the site. The validity of this date is supported by a date of 6110±170 BP (SI-2613) from a marine delta at 9 m a.s.l. in the Kogalu River Valley, ca. 30 km to the northwest on the Clyde foreland (Miller et al., 1977). If the date of ca. 6300 BP is correct, then the ca. 8800 BP date from overlying sediment must be rejected. A possible source of contamination is old, reworked organics in the fine fraction of GX-6837. The sample SI-3678 was composed of coarse moss fragments only, so it was not subject to this potential source of contamination.

HOME BAY (Map Sheet No. 27A. 69-70°N, 64-68°W)

CAPE HOOPER

Beta-2362
(GRL-316-S) 7640±125

Marine shells collected from raised marine sediments at 16-20 m a.s.l. from fossiliferous marine stratum near top of a delta and close to the Cape Hooper DEW Line runway (Fox-4) (68°26'N, 66°46'W; UTMG: EF 836 923). Dated shells included Mya truncata and Hiatella arctica. Collected 1966 by J.T. Andrews. Comment (J.T.A.): This sample had been dated previously at 7960±140 BP (Y-1833) and 8050±115 BP (QC-457) (Andrews, in Miller, 1979, p. 48). Beta-2362 does overlap with the two previous age calculations at the 95% confidence level, although the reported average difference in age of nearly 400 years is disturbing.

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

KANGETOKJUAK

QC-618	1450±105
GX-6371 (GRL-396-0)	1775±210

The sample consisted of organic-rich lenses buried at a depth of 50-60 cm in bedded sand and gravel. The material was collected at an elevation of 250 m a.s.l. on a sandy beach located on the north side of a broad glacial trough on the east side of Kangetokjuak, the large fiord due south of Padloping Island (66°39'44"N, 62°45'00"W; UTMG:20W NJ 11 87). The sample site is inside and below a prominent lateral moraine. A bedrock dike allowed terrestrial material washing down the valley side to collect at this location. Pollen in the sediment was entirely Lycopodium (clubmoss) (W.N. Mode, pers. comm.). Collected by F.F. Hawkins and T.L. Brown, 1978. Comment (F.F.H.): The position of the sample relative to the nearby lateral moraine suggested that this sample would provide a minimum age of deglaciation of the lower valley, ca. 8000-10,000 years BP (Hawkins, 1980). The sample submitted to QC was not pretreated; therefore, since the date obtained was so young, a small remaining portion of the original sample was submitted to GX for pretreatment and dating. The age thus obtained was not significantly older than the QC date. These dates correspond to similar dates obtained near Kangetokjuak by G.H. Miller (Andrews, 1975; Miller, 1975), which apparently represented an interstadial period within the Illusion Stade (Hawkins, 1980).

PANGNIRTUNG (map sheet No. 26-I. 66-67°N, 64-66°W)

PANGNIRTUNG PASS SERIES

The dates below are discussed in detail by Stuckenrath et al. (1979) which should be read for details of location.

Original dates from 1973 collections

Section and number	Date (BP)	Comments
Section 1		
GRL-149-0 SI-1692	Modern	Sample from 1.5 m below present. Date too young.
GRL-148-0 SI-1691	2355 ±145	Basal organic-rich sediment in 4.3 m stream-cut. Date on all fractions.
Section 2		
GRL-147-0 SI-1690	7365±410	Basal organic-rich sands overlying oxidized till. Depth 93 cm. Date on all fractions.
Section 3		
GRL-145-0 SI-1689	2160 ±115	Organic-rich buried soil overlain by 86 cm of outwash. Date younger than expected.

Dates on various fractions and pretreatment procedures from the same sites. Samples collected 1974.

	Fraction greater than 125 µm				Fraction less than 125 µm			
	NaOH-insoluble		NaOH-soluble		NaOH-insoluble		NaOH-soluble	
Section and number	SI	INSTAAR	SI	INSTAAR	SI	INSTAAR	SI	INSTAAR
Section 1								
GRL-199-0 SI-2068	2760±60		1945±60*		2190±75		2890±70	
GRL-198-0 SI-2067	2560±100	2725±90	2825±70	1985±80*	2640±70	2765±135	580±115*	1580±75*
Section 2								
GRL-201-0 SI-2069	3330±75*		4020±100		3765±75		2815±70*	
GRL-200-0 SI-2070	5445±110*	6000±90	6035±55	5690±75	5980±95	5990±75	6020±65	5995±70
Section 3								
GRL-197-0 SI-2071	2920±100*		2715±75*		3835±85		3810±85	

Dates are given in years BP.

Section 1: Superimposed samples collected from 4.5-m vertical exposure through laminated sandy silts typically with organic partings separating laminae at northern Pangnirtung Pass, in front of Glacier No. 46204M-185. The section becomes increasingly organic-rich toward the base, which consists of 20±30 cm of particularly organic-rich silty sand overlying washed till. GRL-149-0 was collected at 1.5 m below the surface of this exposure; GRL-199-0 between 1.50 and 1.65 m below the surface from a noticeably more organic-rich portion of the exposure; GRL-148-0 and GRL-198-0 were from the basal 30 cm of the section.

Section 2: Peaty sand exposed in river-cut section and overlying oxidized till at the head of North Pangnirtung Fiord. Sample GRL-147-0 and recollection GRL-200-0 were obtained from the lowermost peaty sand that immediately overlay the till at a depth of 95 cm below the surface. GRL-201-0 came from the undisturbed organic-rich bedded sands at 30 cm depth overlying the main peat section. The peat from this site is called "Pass Head Peat" (Short and Andrews, 1980).

Section 3: Organic-bearing sandy silt exposed in stream-eroded section through a late Foxe moraine fronting Glacier No. 46204M-119 in central Pangnirtung Pass. Extensive slumping between the 1973 and 1974 field observations prohibited sampling of the identical beds in both years, but both collections (GRL-145-0 and GRL-197-0) were from the lowermost post-till organic-bearing sediments.

Comment (G.H.M.): Organic-bearing niveolian sands were collected from the Pangnirtung and Kingnait passes of Cumberland Peninsula in 1973 by G.H. Miller and J.T. Andrews. Our initial dates on these deposits (first list) suggested that some of the samples must have been seriously contaminated as the dates were considerably younger than the stratigraphic relationship could accommodate. In order to isolate the source of contamination, Miller recollected large (3-kg) samples at three sites in 1974. The raw samples were then split evenly between the INSTAAR (GRL) and Smithsonian

Institution (SI) laboratories for pretreatment. Radiocarbon datings were undertaken for coarse (> 125 μm) and soluble/insoluble fractions processed at both laboratories. The results have been presented by Stuckenrath et al. (1979). Despite the variations in ^{14}C ages, no statistically significant trends could be isolated. Nevertheless we recommend dating the < 125 μm organic fraction that is insoluble in NaOH.

The overall interpretation of these dates is that the early Holocene represented a period of environmental stability, whereas a middle to late Holocene climatic change resulted in widespread eolian deposition and cessation of peat accumulation after 3500 to 2500 BP (see e.g. Dyke et al., 1982).

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

IGLUTALIK LAKE SEDIMENTS

GX-6292 (GRL-400-0) 2565±190

GX-6293 (GRL-401-0) 5700±240

Lacustrine sediment core, 290 cm length, collected from Iglutalik Lake, 110 m a.s.l., 5 km northwest of mouth of Pangnirtung Fiord. Cumberland Sound (66°08'07"N, 66°05'W; UTMG: LJ 621 382), Clearwater 1:250,000 map sheet. Detrital organic fine fraction (<125 μm) from 31-60 cm and 161-200 cm was dated 2565 + 190 and 5700±240 BP, respectively (Davis, 1980). Detrital organics were physically concentrated by a settling method (Kihl, 1975). Samples were then pretreated with hot dilute HCl. Collected June 1976, by P.T. Davis and P.S. Marshall. Comments (P.T.D.): The samples were collected with Livingstone piston corer (5 cm diameter), and unusually long sections of sediment core (30-40 cm lengths) were sent for dating because of low organic content. Both radiocarbon age determinations fall into proper stratigraphic sequence with three previous radiocarbon ages determined for samples from the same core (Davis, 1980). Iglutalik Lake lies well above late Foxe marine limit and there is no evidence of glacial ice at this site during late Foxe time (Davis, 1980). The sediment core from Iglutalik Lake was stopped by impenetrable coarse sand and gravel. Because the lake basin is not within a local late Foxe glacial drainage basin, coarse sand and gravel are probably local flood deposits rather than glacial outwash (Davis, in Miller, 1979, p. 32). Sediments were analyzed for pollen, organic carbon, stable isotopes (^{13}C), trace metals, and grain size.

7 KM SOUTH OF PENNY ICE CAP

QC-1052 (GRL-207-0; ASD-74-07) 2800±95

A 4-cm thick fibrous peat layer, 200-204 cm beneath the surface exposed in a small stream-cut bank in one of the large valleys draining south from the Penny Ice Cap (66°47'N, 66°17'25"W; UTMG: 19W FE 19 10). Sediments exposed in the bank were (a) compact fibrous peat interbedded with fine sand, 0-60 cm depth; (b) horizontally bedded sand with minor detrital plant remains, 60-164 cm depth; and (c) fibrous peat interbedded with sand 164-219 cm depth. Collected 5 August 1974 by A.S. Dyke.
Comment (A.S.D.): A similar buried peat layer from a site only 1 km from the margin of the Penny Ice Cap was dated at 6800±600 BP (Qu-299, Andrews, 1976, p. 8). Accumulation of the peat dated here occurred later than was expected from the depth of burial.

FROBISHER (Map Sheet No. 25-N. 63-64°N, 68-70°W)

PUGH ISLAND

QC-903 (GRL-779-S) 9875±130

Marine bivalves collected from an old tidal platform above a bay on the northwest coast of Pugh Island (63°15.5'N, 68°10.6'W; UTMG: EA 414 143). Shells were collected from the surface of small mudflows along the bank of a small stream cutting down actively into the raised tidal platform about 3 m below the platform surface. The sediment was a silty fine sand. The sample was not in situ. Elevation of the collection site was 24.4-27.4 m a.s.l. Collected August 1979 by M. Algus. Comment (J.T.A.): This date suggests very rapid deglaciation of Frobisher Bay shortly after the deposition of the Hall moraines (Miller, 1980; Colvill, 1982).

EGGLESTON BAY

GSC-3157 (GRL-793-S) 8690±120

Whole shells and fragments of marine molluscs collected in float on the western shore of the first lake directly northwest of Eggleston Bay, Frobisher Bay (63°13'N, 68°13'W; UTMG: 19V EA 386 103). Most shells are worn, lacking good external ornamentation, yet retain internal luster. Shells were collected at 82 m a.h.t; marine limit is 104 m a.h.t. Shells collected August 1980 by E.K. Lind. 19.3 g Hiatella arctica submitted for date; 10% leach. Comment (E.K.L.): Shells were collected from lake level, but probably come from the silt/fine sand deposit 22 m above it. The surface of the deposit is gullied and slopes to lake level. No shells were found in situ in the lake sands or in the 104 m silt/fine sands. Shell abundance increased near the silt/fine sand outcrop. The marine limit on Pugh Island (ca. 6 km northeast) is at 119 m, with decreasing elevations both up- and down-bay. These shells represent the highest datable marine limit thus far observed in inner Frobisher Bay.

LEWIS BAY

GX-8159
(WIN-810-1)

8450±190
$\delta^{13}C$ ‰: + 0.8

Whole valves (some paired) and fragments of marine mollusc shells collected from a stream-cut raised delta complex on the east side of Lewis Bay at the head (63°38'N, 68°06'W; UTMG: 19V EA 442 568). Abundant shells found in bottomset, sandy-silt stratum approximately 3-5 m below the delta surface. Altimeter elevation for the delta surface 42 m a.h.t. or 46.4 m a.s.l. (corrected to local chart datum). Collected 23 July 1981 by W.N. Mode, C. Mode, and J.D. Jacobs. Comment (W.N.M., J.D.I.): Field relations suggest that this delta formed from proglacial sediments of the outermost position of the "Frobisher Bay moraine" (so-called by Miller, 1980) mapped by Blake (1966). The date supports this correlation (Blake's date for the outermost Frobisher Bay moraine on the south side of the bay near Cape Rammelsberg is 8230±240 BP [GSC-462]). The marine limit in Lewis Bay, on the distal side of the moraine, appears to be 119 m a.h.t., an elevation similar to that of the marine limit on the distal side of the moraine at Cape Rammelsberg (120 m a.s.l.).

PETERHEAD INLET

GX-8160
(WIN-810-2)

7080±175
$\delta^{13}C$ ‰: + 1.1

Several whole, paired valves (Mya truncata) from silty fine sand bed and scattered shell fragments recovered mainly from eroded slope cutting the sand bed and from adjacent stream. Sands underlie a narrow, wave-cut terrace on the east side of Peterhead Inlet at the base of Davidson Point (63° 44.5'N, 68°36'W; UTMG: 19V EA 21 69). Elevation of terrace hand-levelled at 16 m a.h.t. or 20.3 m a.s.l. Collected 29 July 1981 by W.N. Mode and J.D. Jacobs. Comment (W.N.M., J.D.J.): The most important implication of this date is that it provides a new minimum date for deglaciatin of the head of Frobisher Bay. The previous date for this event was Blake's (1966) date of 6750±170 BP (GSC-464). It is unclear whether the terrace is a cut- or a fill-terrace. If it is a fill-terrace, then relative sea level was at 16 m a.h.t. ca. 7080 years BP. However, if the 16 m a.h.t.

bench is an erosional feature cut into older deposits, the date may correspond at or near the time when the local marine limit was formed. This feature occurs as a washing limit within 2 km of the dated site and its elevation is 29 m a.h.t.

PETERSHEAD INLET DELTA

GX-8381 (GRL-540-0)	62-68 cm	475±125
GX-8380 (GRL-529-0)	88-90 cm	955±130

Organic sand samples from a delta exposure in Peterhead Inlet (63°46'N, 68°42'W) at an elevation of 17 m a.h.t. The section consists of 88 cm eolian sands with weak organic banding overlying 2 cm of organic sands at interface with marine deposits. The sample from 62-68 cm represents the principal organic band in the main section, and this sample along with the basal organic sandy layer were collected in bulk for radiocarbon dating. This site was resampled in July 1981 by J.D. Jacobs, because samples submitted to another laboratory in 1980 were too small to date. Comment (S.K.S., J.D.J.): The dates suggest a short episode of peat growth in the late Holocene, a period of general peat cessation in much of the Eastern Canadian Arctic. The date is similar, however, to that recorded in the left bank section of the Burton Bay site (see below), and indicates a period when local conditions in the Frobisher Bay area were suitable for peat growth.

BURTON BAY

QC-902 (GRL-782-S)	7510±320

Marine bivalves collected from site above the head of Burton Bay. (63°41.7'N, 68°14.3'W; UTMG: EA 377 631). The shells were located 33.5 m a.s.l. (levelled). Collected August 1979 by M. Algus.

BURTON BAY

QC-901 (GRL-780-S)	7340±135

Marine bivalves collected from riverside bluff upstream from the head

of Burton Bay (63°42.7'N, 68°17.8'W; UTMG: EA 348 648). Shells were excavated from laminated fine-medium sands with thin silty laminae. The shells, which were in situ in the active layer, were located 3.8 m above the river level, 12.8 m a.s.l. Collected August 1979 by M. Algus and A.J. Colvill. Comment (M.A.): The sediments were possibly tidal deposits, similar to contemporary deltaic deposits near the high tide line.

BURTON BAY

QC-905 (GRL-783-S) 7800±150

Marine bivalves collected from a small river bank at the head of Burton Bay (63°41.6'N, 68°15.5W; UTMG: EA 367 628). Part of the sample was found in situ in the active layer at 5 m a.s.l. The sediment was sandy silt. The remainder of the sample was collected from the surface of the small bluff at the same location. Collected August 1979 by M. Algus and A.J. Colvill. Comment (M.A.): The sediments were probably low tidal or subtidal deposits. They may have underlain the bedded sands from which QC-901 was collected. The slightly older age may suggest a regressive sequence.

BURTON BAY

GSC 2771 7380±220

GRL-591-S Burton #7

Thirty-eight assorted shell fragments of Mya truncata and Mya sp. from stream cut in Burton Bay (63°43'N, 68°15'W; UMTG: 19V EA 36 67) collected in 1978. Shells were not pitted and some had internal lustre intact. Collected (by L.E.O.) from an exposed cut in a 13.7-m terrace persumed to be deltaic bottom set beds. Shell fragments (8.5 g) were given a 10% leach, and 7.5 g of CO_2 mixed with dead gas were given two 1-day counts in a 21 counter.

CAPE RAMMELSBERG

Beta-1872 (GRL-792-S) 7595±130

Whole valves of Hiatella arctica and Macoma calcarea collected from

the surface of a 15-m raised marine terrace approximately 4 km northwest of Cape Rammelsberg, Frobisher Bay (63°26'10"N, 68°30'W; UTMG: 19V EA 250 344). Similar to GRL-788-S, shells were found within the uppermost centimeter; no shells were found at depth. The shells are concentrated on the surface by frost-action. Collected August 1980 by E.K. Lind. Comment (E.K.L.): The terrace from which these shells were collected is composed primarily of medium sand overlain by ca. 0.5 to 1.5 m of silt/fine sand. In the outer terrace sections, sliding of the sediment on a water film at the active layer/permafrost interface is relatively common. Shells were not collected from these areas. The 15 m terrace is the lowermost in a sequence of silt/fine sand terraces adjacent to Cape Rammelsberg. The highest terrace (marine limit) in the vicinity is 88 m. No silt/fine sand terraces or shells were found northwest along the coast to the Bay of Two Rivers (ca. 25 km), though ice-contact deltas and terraces are present.

CAPE RAMMELSBERG

Beta-1871 (GRL-788-S) 7140±115

Whole valves of Portlandia arctica and fragments of Mya truncata collected from the surface of a massive silt/fine sand terrace approximately 2 km southwest of Cape Rammelsberg, Frobisher Bay (63°25'N, 63°27'W; UTMG: 19V EA 280 319). Shells found within the uppermost centimeter; only rare oxidized fragments found at depth. Terrace elevation is 14 m a.h.t.; marine limit is 88 m a.h.t. Collected August 1980 by E.K. Lind. Comment (E.K.L.): Paired valves of P. arctica with intact periostracum indicate that the shells are indigenous to the marine terrace, though not strictly in situ. The shells are presumably concentrated on the surface by freeze-thaw action. Terraces of similar elevation occur in the vicinity of Cape Rammelsberg, both up- and down-bay from the Frobisher Bay (late Foxe) moraine system.

FROBISHER, BURTON BAY - TATSIUJARJUALAQKUNGA RIVER

Cliff Section - Right Bank

Beta 1086 (GRL-475-0)	60-63.5 cm	905±100
Beta 1622 (GRL-480-0)	75-78 cm	1460±70
Beta 1087 (GRL-476-0)	81-86 cm	2035±70

Sandy peat section in Burton Bay (63°41'N, 68°16'W; UTMG: EA 342 643). The river has exposed some 2 km of cliffs, which reach 30 m in elevation, in glacial fluvial and marine sediments filling the lower part of the valley. Throughout these cliffs a 1-m section of banded peaty soils is exposed just below the modern surface, which is a well-vegetated sandy soil. A 40-cm-thick section containing the peat was taken from a point on the right bank of the river. Collected July 1979 by J.D. Jacobs. Comment (J.D.J., S.K.S.): A thicker organic section was observed but not sampled near the top cliffs of the left bank of the river above a marine section containing marine bivalves collected and reported by L.E. Osterman. Pollen analyses (Short and Jacobs, 1982) have been completed for the right bank section. These suggest an episode of warmer climate between the base of 1750 or 1800 BP, followed by colder conditions to the top of the section.

BURTON BAY - TATSIUJARJUALAQKUNGA RIVER

Cliff Section - Left Bank

GX-8382 (GRL-541-0)	75-80 cm	420±125
GX-8383 (GRL-542-0)	102-108 cm	905±130
GX-8384 (GRL-543-0)	123-125 cm	1345±135
GX-8385 (GRL-544-0)	135-138 cm	2575±140

Sandy peat section from left (east) bank of Tatsiujarjualaqkunga River (63°42'N, 68°16'W; UTMG: EA 342 643). The river has exposed ca. 2 km of cliffs, which reach 30 m in elevation, in glacial fluvial and marine sediments filling the lower part of the valley. Throughout these cliffs a 1-m section of banded peaty sands is exposed just below the modern surface; dates from a 40-cm-thick section on the right bank of the river collected by J.D. Jacobs in 1979 were reported on in a previous date list (Miller, 1979), and pollen analyses have been carried out on that section (Short and Jacobs, 1982).

The left-bank section was collected by Jacobs in July 1981. From the surface to 75 cm, the section is eolian sand and was sampled for pollen analysis at 10-cm intervals. From 75 to 137.5 cm, the section consists of peaty sands and sandy peats and was sampled at 2.5-cm intervals. Larger samples were collected for radiocarbon dating at four levels. Comment (S.K.S., J.D.J.): This section is deeper than the right bank section and extends the record 500 years back into the Holocene to the 2575 BP. The top date of 420 BP, however, is also 500 years more recent than the top-most organic material in the right bank. The sand layer covering the peat is not uncommon in Baffin Island, and over much of the eastern island, early- to mid-Holocene peat deposits are topped by eolian sands indicative of a deteriorating climate and increasing aridity. This deteriorating climate was recorded in an impoverished pollen spectra from ca. 1650 to 900 BP in the section on the right bank (Short and Jacobs, 1982). Pollen analyses are also planned for this section, and will aid in evaluating the longer record here.

JAYNES INLET

QC-904 (GRL-781-S) 7985±130

Marine bivalves collected from a delta located inland southwest of Jaynes Inlet (63°15.3'N, 68°16.9'W; UTMG: EA 361 139). The elevation of the delta surface was 46 m and the shells were located in situ in the active layer at 32 m a.s.l. Collected August 1979 by M. Algus and A.J. Colvill.

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

GOLD COVE SERIES

Low-Level Till

GSC 2778
(GRL-586-S)

10,200±210
$\delta^{13}C$ °/.. +2.1

Single right valve of M. truncata collected form excavation in frost boils on a narrow terrace 78 m a.h.t. immediately west from the head of Gold Cove, outer Frobisher Bay (62°56'N, 65°52'W; UTMG: 20V LE 55 82). Shell is one of several large angular fragments collected in unsorted to crudely stratified sediment between 10 and 50 cm below the ground surface. 10% leach; sample mixed with dead gas for counting. Shell collected 8 August 1978 by G.H. Miller. Comment (G.H.M.): A previous (1977) collection from the same terrace was dated at 12,150±140 BP (QC-543), but consisted of 12 fragmented valves of M. truncata. The essentially unstratified nature of the enclosing sediment, lack of whole paired valves, and elevation above the local marine limit all indicate transportation of the shells to their present location by glacial ice. Note that in situ paired valves of M. truncata from 73 m a.s.l. collected ca. 5 km east of this site gave a ^{14}C age of 10,100±110 BP (GSC-2725, Miller, 1979), statistically identical with this sample.

High-Level Till

GSC-2813
(GRL-587-S)

10,000±200
$\delta^{13}C$ °/..: + 1.0

Abundant robust shell fragments collected from thin till cover between 219 and 232 m a.h.t. immediately northwest from the head of Gold Cove, outer Frobisher Bay. Shells mostly collected from surface of frost boils in till. Till locally contains abundant limestone erratics and a carbonate content in the fine fraction between 10 and 20%. Single large fragment of right valve of Mya truncata, weighing 8.0 g used for dating. 10% leach; sample mixed with dead gas for counting. Collected 8 August 1978 by G.H. Miller. Comment (G.H.M.): A previous collection consisting of 17 fragmented valves of M. truncata collected from till slightly lower on the same hillslope gave an apparent age of 9725±130 BP (QC-544; Miller, 1979). This new data on a single robust valve is considered more reliable and supercedes QC-544.

Comment on Gold Cove series (G.H.M.): These two dates, combined with the four dates from this locality reported by Miller (1979), provide a framework for the deglaciation of Gold Cove. The two dates from shelly till (GSC-2778 and GSC-2813) and from in situ shells at the marine limit (GSC-2725) are all statistically identical (10,100±100 BP) suggesting the cove was ice-free at this time, followed by a glacial advance into the cove transporting the shells to their position in the till up to 230 m a.h.t. The glacial event must have been short-lived as shells from marine silt at the head of the cove date 9725±120 BP (QC-450).

LOKS LAND NONGLACIAL

GX-8591
(GRL-543-S) $32,500^{+2400}_{-1800}$

Whole and fragmented valves of Hiatella arctica collected from non-glacial marine sediments in an unnamed bay on southeastern Loks Land, outer Frobisher Bay (62°24'N, 64°26'W; UTMG: 20V ME 28 19) Shells were from a marine unit (ME 235 195) correlative to one that had been dated previously at $41,900^{+7100}_{-3700}$ (QC-446; Miller, 1979). Shells collected between 0 and 5 m a.h.t., relate to a sea level 5 m above present. Collected August 1977 by G.H. Miller and H. Moulton. This sample was counted two separate times, each indicating a slight ^{14}C activity. Sample age is considered a minimum estimate. Comment (G.H.M.): The original collection was expected to be of early Holocene age, and the entire collection was used in dating, leaving no material for amino acid analysis. This collection was dated to confirm the original determination, with portions of several of the valves retained for amino acid analyses. The date does confirm a middle Wisconsin or older age for this unit; alle/Ile ratios (Miller, unpublished) are substantially lower than ratios in Kogalu marine sediments elsewhere at Clyde and suggest a correlation with Iron Strand unit on Labrador.

The marine delta from which these shells were collected stratigraphically overlies a broad glaciomarine plane that is related to the last glacial event to reach the island. The undisturbed delta-surface of the delta indicates no subsequent glacial overriding since deposition implying no actively eroding glacial ice reached Loks Land during late Foxe time.

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

FROBISHER BAY CORE SERIES

GX-7119 HU-159-890 cm 11,910±380
GRL-470-0

Sample of piston core HU77-159 (62°50.5'N, 67°02.4'W; UTMG: EV 997 692). This sample consisted of 0.3 g of concentrated organic matter from six 50-cc vials (135.3 g) of sediment sampled from 860, 870, 880, 890, 910, and 920 cm. Comment (L.E.O.): These five dates on core HU77-159 on the NaOH insoluble fraction <125 µm, provide evidence of continuous sedimentation for the last 12,000 years. These pretreated dates provide internally consistent results in contrast to date GX-5319 (HU77-159, 496 cm; 14,435±450 BP) reported in Radiocarbon Date List IV. GX 5319 was not pretreated before dating and we believe that "old" carbon concentration can account for this anomolous date.

GX 6352 HU77-159 525 cm 10,685±385
GRL-416-0

Sample of piston core HU77-159 (62°50.5'N, 67°02.4'W; UTMG: EV 997 692). This sample consisted of 1.0 g of concentrated organic matter from five 50-cc vials (133.7 g) of sediment sampled from 500, 510, 520, 530, 540, and 550 cm.

GX-7882 HU77-159 420 cm 10,025±225
GRL-513-0
GRL-514-0

Sample of piston core HU77-159 (62°50.5'N, 67°02.4'W; UMTG: EV 997 692). This sample consisted of two samples of concentrated organic matter (1.48 and 1.06 g) sampled from 410-420 cm (289.6 g) and 420-430 cm (255.4 g).

GX-7091 HU77-159 275 cm 4560±180
GRL-469-0

Sample of piston core HU77-159 (62°50.5'N, 67°02.4'W; UTMG: EV 997 692). This sample consisted of 0.5 g of concentrated organic matter from four 50 cc vials (69.2 g) of sediment sampled from 260, 270, 280, and 290 cm.

GX-7881 HU77-159 140 cm 2745±145
GRL-510-0
GRL-511-0

Sample of piston core HU77-159 (62°50.5'N, 67°02.4'W; UTMG: EV 997 692). This sample consisted of two samples of concentrated organic matter (1.42 g and 1.71 g) sampled from 130-140 cm (143.2 g) and 140-150 cm (152.8 g), respectively.

GX-7880 HU77-157 46 cm 15,080±620
GRL-508-0

Sample of piston core HU77-157 (62°38.4'N, 66°35.9'W; UTMG: FV 232 470). This sample consisted of 0.4 g of concentrated organic matter collected from 43-50 cm (102.1 g) in both the working and archive halves of HU77-157. Comments (L.E.O.): This core has been dated twice at this depth. The first date GX 5318 (HU77-157 42 cm; $24,550^{+1825}_{-1485}$) reported in Radiocarbon Date List IV (Miller, 1979) was on nonpretreated bulk sediment. Removal of the carbonate in GX-7880 has lowered the date by 9000 years. However, the foraminiferal zonation of this core in comparison to the dated foram zonation of HU77-159 suggests that GX-7880 is still 5000 years too old. Further work remains to be done before any core date can be used without additional supporting evidence.

META INCOGNITA PENINSULA

Shell Valley

GSC-2982 8950±160
(GRL-757-S)

Broken and whole valves found in solifluct between large boulders at the foot of steep north-facing bedrock cliff, one valley south of York Sound (62°25'N, 66°25'W; UTMG: 19V FV 33 23). Shells collected from fine silt 30 m a.h.t. Valley is floored by a marine plane. Small shell fragments were found elsewhere in frost boils at about the same elevation in this valley. Marine terraces of 36 m a.h.t. and 47 m a.h.t. are present in the valley. The shells collected could not be related to either level. Shells had a dilute HCl pretreatment (10%). Shells collected 14 July 1979 by D.S. Muller and E. Friedman. Comment (D.S.M.): This date indicates that Frobisher Bay ice and local ice had receded from this location by 8950 BP. The primary species present was Balanus balanus, and the date was obtained from 12.0 g of this species. Other species present include Macoma (sp?), Mya truncata, and Hiatella arctica. This date is the oldest obtained thus far from the York Sound area.

YORK SOUND

SI-4368 (GRL-776-S) 8820±110

Broken and whole valves obtained from the south side of York Sound (62°24'50"N, 66°26'W; UTMG: 19V FV 30 23). Shells were taken from the silty clay fraction of a glaciomarine diamict at 7 m a.h.t. in an inclined cliff face. The diamict is stratigraphically above a till (presumably late Foxe--the amino acid ratios of shells from the till are similar to those from this sample). The shells in the till (AAL-1328, GRL-775-S) had ratios x = .0766±.0577 (free), x = .026±.0052 (total). The shells from the glaciomarine diamict at this level had ratios of x = .1003 ± 0.147 (free) and x = .026±.0078 (total). The till overlies polished and striated bedrock. The marine sediments extended to 22 m a.h.t., where they grade into rounded fluvial gravels. By 29 m a.h.t. the sediment package is 100% deltaic gravels matrix with the delta surface remnant at 38 m a.h.t. Shells collected 8 August 1979 by D.S. Muller. Comment (D.S.M.): This date is very similar to dates obtained by Blake (1966) from the foreset beds of the delta just southwest of this site (GSC-463, 8840±190 BP). These dates are consistent with the view that the Meta Incognita Peninsula side of outer Frobisher Bay was not deglaciated until ca. 9000 BP, whereas dates obtained by Miller (1979, 1980) demonstrate an

earlier deglaciation for outer Hall Peninsula. This interpretation is supported by ice-flow indicators which suggest substantial ice-sculpting by ice flowing off the Meta Incognita Peninsula (or across it?). This date also indicates that the delta had not prograded this far east by this time, and that the 38 m a.h.t. level is somewhat younger than ca. 8800 BP.

YORK SOUND

GSC-2991 (GRL-758-S) 8790±380

Broken fragments, primarily Hiatella arctica, found in the silty clay fraction of a marine diamict on the north side of a washed bedrock knob on the north side of the York River near its mouth (62°25'N, 66°30'W; UTMG: 19V FV 27 24). Shells collected from partially frost-heaved, partially snow-covered site 55 m a.h.t. The shells were found in a small, 340°-trending valley below the extensively washed bedrock knob. The knob is west of the 22 m a.h.t. delta level on the north side of the river. The 84 m a.h.t. summit of the knob has no remnant glacial deposits. The marine limit on the valley side just to the north of the collection site is ca. 85 m a.h.t. 10% HCl pretreatment leach. Shells collected 20 July 1979 by D.S. Muller and E. Friedman. Comment (D.S.M.): The date of 8790 BP obtained from shells at this elevation on this side of the bay supports the interpretation that the coast of the Meta Incognita Peninsula bordering Frobisher Bay was deglaciated later than outer Hall Peninsula. Ice flowing off of the Meta Incognita Peninsula appears to have occupied the York Sound area until ca. 9000 BP. Mya sp. fragments were also found at this site. The date was obtained from 5.0 g of thin shell fragments.

YORK SOUND

SI-5173 (GRL-777-S) 8660±175

Balanus sp. and other miscellaneous fragments obtained from the silt fraction of a glaciomarine diamict 25 m a.h.t., south side of York Sound (62°22'N, 66°20'W; UTMG: 19V FV 30 23). Shells were largely float washing out of a fresh gully exposure. This site is 12 m above the highest limit of the irregular boundary between till and glaciomarine diamict, and

several meters below the alluvial gravel/glaciomarine diamict boundary. Shells collected 9 August 1979, by D.S. Muller. Comment (D.S.M.): This date indicates that progradation of the sandy topset beds of York Delta reached this point shortly after 8660 BP. Roughly 18 m of glaciomarine sediments were deposited at this locality between ca. 8820 BP (SI-4368) and 8660 BP. Other related dates are GSC-463 and GSC-463-2 (Blake, 1966).

JACKMAN SOUND

SI-5172
(GRL-759-S) 9845±175

Hiatella arctica, Balanus sp., and other species, including paired in situ Macoma sp. (growth position) found in silty clay at 24.6 m a.h.t. on the west side of southern end of Jackman Sound (62°18'N, 66°15'S; UTMG: 19V FV 39 06). The shells were obtained from 5 to 14 cm beneath the surface of the water-saturated substrate. The valves were well-preserved, some were clearly in growth position, and a few were slightly abraded. The locality is somewhat sheltered to the west by 350°-170° trending streamlined forms. The snout of Terra Nivea outlet glacier I-28 is not more than a few hundred meters west of the sample locality. The weathering of the intervening bedrock supports the interpretation that this outlet has not been much more extensive than at present since the early Holocene or late Pleistocene. Shells collected 24 July 1979, by D.S. Muller and E. Friedman. Comment (D.S.M.): This date is the oldest of the Jackman Sound series by over 800 years. It indicates withdrawal of ice from this region by 9845 BP. The proximity of this locality to the snout of Terra Nivea outlet glacier I-28, in conjunction with the evidence for extensive early Holocene and Neoglacial activity for Terra Nivea outlet glacier I-28, is dramatic evidence for significant local variation in glacial budget for Terra Nivea during the Holocene.

JACKMAN SOUND

GSC-3015
(GRL-762-S) 8480±280

Fragments of Macoma calcarea valves found within a glaciomarine diamict on the west side of the southern end of Jackman Sound (62°18'N,

66°15'W; UTMG: 19V FV 39 06). Shells collected from the silt fraction of the diamict, at an elevation of -3 m a.h.t. The sample site is stratigraphically below a shell-bearing sand which is overlain by alluvial gravels. The terrace at the crest of this site is 3.5 m a.h.t. 20% leach pretreatment. Shells collected 24 July 1981 by D.S. Muller and E. Friedman. Comment (D.S.M): The terrace at 3.7 m a.h.t. is interpreted as having been cut from gravels deposited at the time of jökulhlaup activity responsible for the delta 100 m to the north. The northern edge of the jökulhlaup delta is 49 m a.h.t., the southern edge is 40 m a.h.t. The date obtained is interpreted as a maximum age for the deposition of the delta gravels. The higher elevation at the northern margin of the delta supports the interpretation that an early Holocene readvance of Terra Nivea outlet glacier I-29 followed the withdrawal of regional ice from this area. Ice-flow indicators in southern Jackman Sound and along the axis of the sound support a 350° transport direction for the major ice flow near present sea level during the last Foxe glacial advance in the area. Evidence supporting an early Holocene readvance of ancestral Terra Nivea outlet, the existence of at least one submerged moraine ridge toward the middle of Jackman Sound (oriented parallel to the long axis of the sound), and the indication from other dates that withdrawl of Frobisher Bay based ice from the area had occurred by at least 9000 BP (e.g., GSC-1903). QC-882 and QC-883 (8140 ±250 and 8135±210 BP, respectively) demonstrate that the ice had withdrawn from its maximum extent associated with this readvance by ca. 8150 BP. Formation of the jökulhlaup delta was completed by that time. It is interesting to note that there is no evidence that Terra Nivea outlet glacier I-28 has been much more extensive than present since the departure of regional ice from the area in the early Holocene.

JACKMAN SOUND

QC-879 8400±160
(GRL-763-S)

Shells collected from 20 cm behind stream cut face at 45 m a.h.t. in silty portion of marine sediments containing dropstones (including limestone) on the west side Jackman Sound (62°18'N, 66°20'W; UTMG: 19V FV 36 01). Shells submitted to Queens College include abundant whole valves of Hiatella arctica, Mya truncata, and Macoma sp. Other species

present included Astarte borealis, Balanus sp. Clinocardium ciliatum. Acid rinsed in dilute HCl in ultrasonic cleaner. Samples collected 26 July 1979 by D.S. Muller and E. Friedman. Comment (D.S.M.): The unit from which these shells were obtained is stratigraphically below a sand/gravel bar extending from 7.5-11 m a.h.t. There is no evidence, however, that this date related directly to that bar. This date provides a minimum for the deglaciaton of this part of Jackman Sound. Evidence found for the marine limit in Jackman Sound was sparse, where it was identified the marine limit was at levels similar to those seen in the York Delta area (75-85 m a.h.t.).

JACKMAN SOUND

QC-880 8160±145
(GRL-765-S)

Shells collected from frost-heaved marine veneer silts, at approximately the same location as QC-879, on the west side of Jackman Sound (62°18'N, 66°20'W; UTMG: 19V FV 36 01). 148 g of Hiatella arctica, 8.4 g of Mya truncata, and more than 25 g of miscellaneous fragments were submitted to Queens College for dating from this location. This site is in a similar substrate to QC-779, and was collected from 4.4 m a.h.t. The major difference between these two samples is that all of the valves submitted for QC-779 were demonstrably from the same stratigraphic level, whereas this sample was collected from the surface nearby. Acid rinsed in dilute HCl in ultrasonic cleaner. Samples collected 26 July 1979 by D.S. Muller and E. Friedman. Comment (D.S.M.): The significance of this date is the same as that ascribed to QC-879. The two dates are in the same range.

JACKMAN SOUND

QC-882 8140±250
(GRL-769-S)

Mya truncata, Astarte sp., Macoma sp. obtained from frost boils on surface of silt loam of marine veneer near southwest end of Jackman Sound (62°16'N, 66°15'W; UTMG: 19V FV 39 06). Location is 7.4 m a.h.t. just proximal (see also GSC-3015, SI-4181, and QC-883) to the large jökulhlaup

delta by this date. The abundance of dates obtained from Jackman Sound between 8100 and 8500 BP, in conjunction with QC-881 suggests that a massive sediment influx was occurring at this time, probably sourced largely from highly active Terra Nivea outlet glacier I-29.

JACKMAN SOUND

QC-883 (GRL-770-S) 8135±210

Shells collected from well-sorted medium-grained sand, the lowest shell-bearing unit in a sloping cliff section at the southwest end of Jackman Sound (62°16'N, 66°15'W; UTMG: 19V FV 39 06). This section is northwest of the large ice-contact outwash delta prominent at this end of the sound, SI-4181 was obtained higher in the section. Whole nonabraded valves of Macoma sp., Astarte sp., Mya truncata, and Balanus sp. were obtained from behind the natural face at 13 m a.h.t. Sediments were frozen at the time of sampling. Acid-rinsed in dilute HCl in ultrasonic cleaner, sample diluted with "dead" CO_2. Collected 3 August 1979 by D.S. Muller and E. Friedman. Comment (D.S.M.): These shells are demonstrably in situ, and, in conjunction with SI-4181 and QC-882, demonstrate ice-withdrawal from the north end of the ice-contact delta by this date. For further elaboration on this model, see the comments associated with SI-4181 and GSC-3015.

JACKMAN SOUND

SI-4180 (GRL-771-S) Modern

Unable to explain why this age was obtained on this sample of shells. It is stratigraphically below SI-4181, and stratigraphically above QC-883 (see above for location).

JACKMAN SOUND

SI-4181 (GRL-772-S) 7980±175

Broken and whole valves obtained greater than 35 cm behind the natural cliff face at the southwest end of Jackman Sound (62°18'N, 66°16'

W; UTMG: 19V FV 39 06). Shells obtained from sands in interbedded sand silt complex with abundant dropstones. Shells obtained at 16.8 m a.h.t. from 12° sloping surface facing N65E. This location is just north of the jökulhlaup delta which dominates this area. Shells collected 3 August 1979 by D.S. Muller and E. Friedman. Comment (D.S.M.): Species collected include Mya truncata, Astarte borealis, and Macoma balthica. The shells predate deposition of the gravel bar at 22.6 m a.h.t. farther up slope, and postdate the large outwash delta (see also QC-882, QC-883, and GSC-3015). These relationships indicate that a readvance of Terra Nivea outlet glacier I-29 during the Holocene was waning by this date.

JACKMAN SOUND

QC-881 (GRL-767-S) — 7075±215

Shells from glaciomarine diamicton lying directly on scoured striated bedrock northwest of Terra Nivea outlet glacier I-29 in Jackman Sound (62° 17'N, 66°17'W; UMTG: 16V FV 36 01). Sample contained abundant Astarte sp., Macoma sp., and several Hiatella arctica and Balanus balanoides valves. The locality was 4 m a.h.t., and the shells fragments collected were not very abraded. The unit was a diamicton, the fine grained fraction of which was a silty loam with some coarse sand. Limestone clasts were present in the coarser material. The shell-bearing fraction of this unit extended to 7 m a.h.t. An apparent marine terrace cut in limestone bearing till is present above this locality at 11 m a.h.t. Proceeding southeastward were from this outcrop toward outlet glacier I-29, glaciomarine sediments at this level give way to till at the same level. Acid-rinsed in dilute HCl in ultrasonic cleaner and diluted with "deep" CO_2. Collected 29 July 1979 by D.S. Muller and E. Friedman. Comment (D.S.M.): Bedrock striae in this area trend dominantly ca. 350°, though striae having that azimuth are apparently cut by younger striae trending 327° at this locality. The thick till cover in this area is attributed to the early Holocene readvance (see also GSC-3015, SI-4181, QC-882, and QC-883) of Terra Nivea outlet glacier I-29. This date suggests that ice was approximately this extensive until ca. 7000 BP. The marine terrace at 11 m a.h.t. and the withdrawal of ice from this site are thought to have a direct relationship to this date. Evidence for this are

the scoured/striated bedrock directly beneath the sampled horizon, and the interpreted juxtaposition of the shell-bearing diamicton on the limestone-bearing till into which the marine terrace has been eroded. The presence of limestone in the till can be ascribed to either limestone subcrop beneath Terra Nivea or redeposition of limestone scavenged from earlier glacial deposits which eroded limestone from down-dropped fault-blocks within the marine province (e.g. Frobisher Bay, Hudson Strait, and, quite conceivably, Jackman Sound). Regardless of the origin of the limestone, limestone is observed in the Neoglacial and modern moraines of Terra Nivea outlet glacier I-29 and other Terra Nivea outlet glaciers. Preliminary examination of the relationship of limestone clasts to Neoglacial moraines of Terra Nivea outlet glaciers suggests that the younger moraines have a smaller carbonate component.

NOBLE INLET NONGLACIAL

GSC-3404 8220±90
(M81-BSh32)

Whole valves, mostly paired, of Hiatella arctica exclusively excavated from sandy silt bottomset beds of a marine delta in Noble Inlet, southeastern Meta Incognita Peninsula, Baffin Island (62°08'N, 66°10'W; UTMG: FU 491 886). Shells collected 2 m a.h.t., delta surface at 9 m a.h.t., shells date the 9-m level. Local marine limit about 45 m a.h.t. 10% acid leach. Collected August 1981 by G.H. Miller, P. Hearty, and T. Best. Comment (G.H.M.): An ice-contact glaciomarine delta complex at this site extends to ca. 45 m a.s.l. contains abundant striated limestone clasts. After ice-recession up Noble Inlet (to the west), the ice-contact unit was dissected by fluvial erosion below present sea level, then back-filled by nonglacial marine sediment to 9 m a.h.t. by a subsequent marine transgression. This collection dates the transgression to the 9-m level. Shells collected from distal facies of the ice-proximal glaciomarine unit have yielded amino acid ratios suggesting a late Foxe (Wisconsin) age for the last glaciation of the site. Radiocarbon dating is in progress.

SOUTHEAST META INCOGNITA PENINSULA

GX-8194 9190±195
(M81 BSh65) $\delta^{13}C$: +1.6°/

Whole valves and fragmented whole valves excavated from fresh wave-cut face in a glaciomarine delta in an named fiord between East Bluff and Noble Inlet, southeasternmost Meta Incognita Peninsula (62°03'N, 66°05'W; UTMG: FU 537 788). Shells concentrated in sandy beds but also found in clayey silt with striated limestone clasts with long axis up to 1 m. Overlying beds also contained abundant limestone erratics and striated clasts. Shells freqeuntly paired; fauna dominated by Mya truncata with lesser amounts of H. arctica, Macoma calcarea, Chlamys islandicus, and Balanus sp. Shells are considered contemporaneous with delta formation at whichtime glacier ice occupied the fiord west of the site and was the primary sediment source. Shells collected 9 m a.h.t., delta lip 20 m a.h.t., delta apex 26 m a.h.t.; local marine limit ca. 28 to 30 m a.h.t. Collected 21 August 1981 by G.H. Miller, P. Hearty, and T. Best. 60% acid leach during preparation. Comment (G.H.M.): Shells are clearly contemporaneous with delta and lived at a time when an outlet glacier lay within 5 km to the east in the fiord during regional deglaciation. Occurrence of abundant limestone erractics document that the ice flowed out of Hudson Striat. Striae on the summit above the shell site are between N45E and N70E (205 m a.h.t.), but swing around to S80E at 160 m a.h.t. within the confines of the fiord proper. These suggest a northeast regional inflow with subsequent topographic channeling as the ice became confined to the fiords and valleys during deglaciation. Till contins 20% carbonate in the <2 mm fraction, further reinforcing the suggestion of ice flow out of Hudson Strait.

CHARLES FRANCIS HALL BAY

SI-5170 9595±90
GRL-813-5

In situ valves (mainly Mya truncata) and abraded shell fragments were collected from fine grained delta bottom set beds at 2 to 4.5 m a.h.t. The delta surface is at 13 m a.h.t. but this sample can not be related to a specific sea level. The deposit is located in a side arm of Charles

Francis Hall Bay (62°39'N, 66°45'W; UTMG: FV 140 475). Comment (J.S.): This unit was probably deposited shortly after deglaciation of the bay and suggests that local cirque glaciers may have retreated faster than Grinnell ice cap outlet glaciers. Sample collected by J. Stravers and L. Stravers in August 1981.

NORTH PROMOTORY BAY

GX-8671
GRL-810-S

8845±265

Whole valves of Mya truncata and Hiatella arctica were excavated from a glacial and marine stratigraphic sequence in a fiord fronting the central-northeastern part of Grinnell Glacier (62°35'N, 66°37'W; UTMG: FV 212 430). Sample was collected by J. Stravers and L. Stravers, August 1981. Shells were found at 8 to 9 m a.h.t. and were collected from a thin veneer of marine clay underlain by a clayey limestone bearing till (which may correlate to the Hall advance) and overlain by a sandy locally derived till. Comment (J.S.): The shells cannot be related to a specific sea level; however, the surface of this stratigraphic sequence forms a prominant 15-m a.h.t. wave-cut bench. Sixty-five grams of shell material were leached throughly with dilute HCl. The resultant analysis was ^{13}C corrected ($\delta\ ^{13}C$ PDB = +1.7°/..).

BEEKMAN PENINSULA (Map Sheet No. 25P & 15M. 63-64°N, 64-66°W)

GRINNELL BAY PEAT SECTION

This section (63°48'25"N, 65°15'W; UTMG: LF 882 763) is composed of three units from top to bottom:

Unit a) nivoeolian peat (Andrews et al., 1979), 0-310 cm depth;

Unit b) cross-bedded fluvial sand with several detrital organic interbeds, 310-600 cm depth; a cryoturbated, buried soil is developed in the upper 30-40 cm the basal bed of this sequence is an organic-rich gravel lag;

Unit c) marine deltaic foreset sand, 600-1200 cm (the base of the section is at sea level).

Stratigraphy and sample collection by G.H. Miller, July 1978; Pollen analyses by W.N. Mode.

Beta-1705 (GRL-481-0)	140 cm (Unit a)	2940±145

This date is from near the top of the organic-rich peat section which has been analyzed for pollen (110-310 cm depth). The overlying 110 cm is mostly inorganic eolian sand. The pollen spectrum at 140 cm is the only one dominated by an Artemisia-Ericaceae (sage or wormwood-heath) assemblage. The Artemisia peak may be the result of increased sand moveme because Artemisia often grows in area of sand dunes in the Arctic. This interpretation is supported by the change, beginning at about this level, predominantly sand deposition without peat accumulation.

QC-683B (GRL-430-0)	310 cm (Unit b)	5490±180

The fraction >125 µm of a buried A-horizon was dated. The cryoturbated soils are developed in cross-bedded sand (Unit b) and overlain by peat (Unit a). This date is comparable to others for the initiation of nivoeolian peat accumulation in Baffin Island.

GX-6603 (GRL-434-0)	600 cm (Unit b)	7285±200

The date is on the clay-humus fraction of detrital organics within the gravel lag at the base of the fluvial sand sequence (Unit b). It provides a close minimum estimate for the date of postglacial isostatic emergence of the site which is in good agreement with other similarly situated dates from Hall Peninsula (Miller, 1980). Date is also a minimum on deglaciation. Marine shells collected from ice-proximal deposits a few kilometers down-bay from this site gave a ^{14}C age of 8890±100 BP (GSC-2568; Miller, 1979).

RESOLUTION ISLAND (Map Sheet No. 25-H; 61-62° N, 64-66° W)

FROBISHER BAY CORE SERIES

GX-7883 HU77-156 198 cm 27,255±1250

GRL 515-0

Sample of piston core HU77-156 (61°51.5'N; 64°12.3'W; UTMG: MD 37 58). This sample consisted of 1.56 g of concentrated organic matter from both the working and archive half at 190-205 cm (393.1 g). Comment (L.E.O.): This date is by far the oldest of the Frobisher Bay core series. Foraminiferal zonation and estimated sedimentation rates suggest that this date is probably nearly correct. Oxygen isotope measurements on G. pachyderma from this core will be used for additional support (Osterman, 1982).

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

LAKE HARBOUR

QC-1137 (GRL-784-S) 7865±250

Shell fragments collected from the surface of a marble outcrop 1.5 km west of Lake Harbour (62°51'N; 69°54'W: UTMG DV 69 54) at an elevation of 75 m. Collected by P.U. Clark, August 1980. Comment (P.U.C.): This date is essentially identical to one reported by Blake (1966) for this area, although QC-1137 was collected at a higher elevation. This date thus most closely dates the marine limit in the area as well as deglaciation of Hudson Strait. The marine limit is not known with certainty, but may be around 90 m.

LAKE HARBOUR

QC-1138 (GRL-787-S) 7185±120

Whole valves and shell fragments collected from silty clay with abundant pebbles 0.8 km west of Lake Harbour (62°51'N; 69°53.5'W, UTMG DV 68 54) at an elevation between 50-60 m. Collected by P.U. Clark, August 1980. Comment (P.U.C.): Deposit may be strandflat mud or glaciomarine. A diverse fauna was sampled, including Balanus, Macoma balthica, Mya truncata, Hiatella arctica, and Hemithyris sp.

DATES FROM MARINE CORES

SCOTT INLET (Map Sheet no. 27-G, 71-72°N, 68-72°W)

GX-8751 (GRL-552-0) (GRL-553-0) (GRL-554-0) — HU76-26 33 cm — 9480±565

Sample of piston core HU 76-26 (71°25.0'N, 70°14.1'W; UTMG: 1 DK 56 26). This sample consisted of three samples of organic matter (GRL-552-0, 28-31 cm, (.08 g); GRL-553-0, 31-34 cm, (.01 g); GRL-554-0, 34-38 cm, (.10 g)), concentrated from bulk samples (44.4 g; 11.0 g; 61.1 g). Total weight of the pretreated and combined organic fraction was (0.19 g).

GX-6607 (GRL-445-0) (GRL-338-0) — HU76-26 131 cm — 17,005±720

Bulk sediment sample (313 g) of gray (2.5Y 5/2) silty clay from 119 to 144 cm in piston core HU76-023-26, collected by the CSS Hudson (R.K.H. Falconer, Bedford Institute of Oceanography) in the fall of 1976 of the mouth of Scott Inlet (71°25.0'N, 70°14.1'W; UTMG: DK 56 26) in approximately 500 m of water. The clay/humus fraction (109 g) concentrated from bulk sample (313 g), contained about 1 g of organic matter. Sample was dispersed and eluted in water and then treated with hot dilute HCl to remove carbonate. Sample yielded 0.52 g carbon for counting.

GX-8753 (GRL-558-0) — HU78-24 275 cm — 9570±370 BP

Sample of piston core HU78-24 (71°13.2'N, 70°45.6'W; UMTG: DK 38 04). This sample consisted of .37 g of organic matter concentrated from a bulk sample (93.7 g) collected from 270-280 cm depth. The entire sample was dispersed in water and the clays and organics were eluted by decantation. The organic fraction was treated with HCl, filtered, washed, dried, and roasted in oxygen to recover the CO_2 for the analysis.

GX-8754 (GRL-559-0) HU78-24 415 cm 10,915±600 BP

Sample of piston core HU78-24 (71°13.4'N, 70°45.6'W; UTMG: DK 38 04). This sample consisted of .38 g of organic matter concentrated from a bulk sample (119.8 g) collected from 410-420 cm depth. Pretreatment was the same as GX-8753.

CAPE HEWETT (Map Sheet No. 27E, 70-71°N, 64.68°W)

CAPE ASTON

HU78-36 65 cm

GX-6280 (DAN-01) 11,770±550
$\delta^{13}C = +0.65$ °/oo

Shell fragments of Astarte sp. and Mya truncata from a gray (2.5Y4/1) sand bed at 62 to 68 cm in vibracore HU78-029-36, collected by the CSS Hudson (B. McLean, Bedford Institute of Oceanography) on October 2, 1978 approximately 22 km off Cape Aston (70°8.8'N, 66°48.7'W; UTMG: EH 82 82) in 99 m of water. Surface layers of shell removed with HCl. Age ^{13}C-corrected. Supported by a Killam Postdoctoral Fellowship at Dalhousie University, Halifax, Nova Scotia.

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

NARPAING FIORD

GX-8755 (GRL-561-0) (GRL-562-0) (GRL-563-0) HU78-37 215 cm 8285±285 BP

Sample of piston core HU78-37 (68°15.5'N, 65°12.9'W; UTMG: ML 01 71). This sample consisted of three samples of organic matter (GRL-561-0, 207-215 cm, [.35 g]/GRL-562-0, 215-218 cm, [.06 g]/GRL-563-0, 220-223 cm, [0.01 g]) concentrated from three bulk samples with a combined weight of 108.1 g (66.8 g/16.8 g/24.5 g). The entire sample was dispersed in water and the organic fraction was eluted by decantation. The clay/organic fraction was treated with HCl, filtered, washed, dried, and roasted in oxygen to recover the Co_2 for the analysis.

GX-8756 (GRL-564-0) HU78-37 437 cm 12,035±600 BP

Sample of piston core HU78-37 (68°15.5'N, 65°12.9'W; UTMG: ML 01 71). This sample consisted of 0.39 g of organic matter concentrated from a bulk sample (146.5 g) collected from 430-440 cm core depth. Pretreatment was the same as GX-8755.

GX-6608 (GRL-446-0) (GRL-338-0) HU78-37 569 cm 16,360±650

Bulk sediment sample (516 g) of gray (2.5Y4/2) silty clay from 550 to 588 cm in piston core HU78-029-37, collected by the CSS Hudson (B. McLean, Bedford Institute of Oceanography) on October 4, 1978 off the mouth of Narpaing Fiord (68°15.5'N, 65°12.9'W; UTMG: ML 01 71) in 457 m of water. The clay/humus fraction (153 g) concentrated from the bulk sample (516 g) contained about 0.7 g organic matter. Sample was dispersed and eluted in water, then treated with hot dilute HCl to remove carbonate. Sample yielded about 0.45 g carbon for counting.

Comment on 3 marine core dates (A.R.N.): The lithologies of cores 026 and 037 are fairly uniform throughout, but there are distinct shifts in color hues (2.5Y to 5Y to 10YR) which can be used to correlate from core to core. Core 036 has similar hue changes, but the abrupt contacts between the coarse sandy units in the core and the shallow water depth suggest unconformities may be present. Of particular interest in these cores are two carbonate-rich beds in core 026 which appear to correlate with beds with 10YR hues in cores 036 and 037. Similar carbonate layers which may indicate periods of increased ice-rafting have been found in the upper zones of deep water cores in Baffin Bay by A.E. Aksu. Radiocarbon dates on bulk sediment from the base of cores 026 and 037 suggest both span the last 16,000 years--a longer record than we expected. The date on shells from a bed in the lower third of core 036 11,770±550 (GX-6280) suggests it also records much of the same period. Recently it has been shown that ^{14}C dates on organic sediment from shelf cores farther south are 30 to 100% older than ^{14}C dates on shells from the same unit in the same cores; thus our basal core dates may be suspect. However, assuming a constant sedimentation rate in cores 026 and 037 and that our dates are correct, the zones in cores 026

and 037 we correlate on the basis of sediment color changes with the 11,700 BP zone in 036 date from about 12,200 BP (core 026) and 9100 BP (core 037). This suggests unless the sedimentation rate in the lower part of the cores is more than three times that in the upper part our basal dates are approximately correct. It therefore appears that following a period of ice-rafting, possibly by local glaciers, indicated by pebbles and sand at the base of core 037, was a long period of gradually warming marine conditions (based on inferred percent organics due to sediment color). Relying on shell and foraminifera abundance and sediment organic content these warmer conditions may have peaked about 10-12 ka (raised marine sediments at Qivitu show a similar record for this period), but were also punctuated by two probable periods of ice-rafting from farther north. The browner color of the most recent sediments in the cores suggests lower organic contents and a possibly deteriorating marine climate.

Comments (L.E.O.): Five additional radiocarbon dates (GX-8751, 8753, 8754, 8755, 8756) have recently been completed which support the older dates reported by Nelson. These cores do appear to contain a long record of climatic change preserved in the nearshore marine record, but interpretation must rely on analyses that are still in progress at this time.

MISCELLANEOUS

OTTAWA ISLANDS, HUDSON BAY

QC-455 6215±90

QC-456 4310±95

Marine shells collected in 1966 from the Ottawa Islands by J.T. Andrews and G. Falconer. QC-455 was collected from deltaic foreset beds at 16 m which intersect topsets at 20 m a.s.l. QC-456 was collected from foreset beds dipping at 19° with the surface of the topset beds at 21 m a.s.l. Shells paired and in growth position. The Ottawa Islands are located in eastern Hudson Bay about 150 km west of the coast of Labrador-Ungava (59°50'N; 80°00'W). Comment (J.T.A.): The age and elevation of QC-456 compares favorably with a date of 3530±110 (I-2417) (Andrews and Falconer, 1969) which was collected from foreset beds at 9 m and associated with a delta surface at 21 m a.s.l. QC-455 is similar to two dates of about 6500 BP which were collected at 39 m and 33 m a.s.l. (I-2416 and GSC-1024). QC-456 does not support Walcott's claim (Walcott, 1980) that the form of the Ottawa Island's relative sea level curve is incorrect.

PRESUMPSCOT FORMATION, MAINE

GX-7458 (GRL-482-0) 17,065±665

Sample of fine-grained mud (0.8% sand, 30.8% silt, and 68.4% clay) from a bay near Look's Seafood Cannery (Rt 191) collected in 1980 by J.T. Andrews. Marine shells, Portlandia arctica, had been ^{14}C dated at 12,700 BP (Borns et al., 1980). Comment (J.T.A.): The sample was collected to add further information on the potential problems of obtaining radiocarbon dates on organic carbon from marine sediments. The ^{13}C PDB ratio for the sample was -35.5°/₀₀. The total sample weight used for preparing the sample was 1889 g from which an estimated 2 g of organic carbon was obtained. The date appears to be about 4300 years older than acceptable, if the ^{14}C dates on the shells are taken at face value. In the Canadian Arctic it appears that in some cases ^{14}C dates obtained on dispersed organic carbon are too old, whereas in other cases they appear quite reasonable (see dates in Frobisher Bay, this date list for further comments).

LABRADOR RADIOCARBON DATE LIST II: LABRADOR AND NORTHERN QUEBEC, CANADA

ACKNOWLEDGMENTS

The dates reported in this list were derived from samples collected by INSTAAR personnel during the 1978, 1979, and 1981 field seasons. National Science Foundation grants ATM-77-17549 to H. Nichols, J.T. Andrews, R.G. Barry, and J.D. Ives and DEB 78-05780 to D.L. Elliott and H. Nichols provided support for the 1978 and 1979 field seasons. Additional funds were provided by grants to individual students and investigators by Arctic Institute of North America, The Explorer's Club, American Alpine Club, and Sigma Xi.

Funds for obtaining the dates were provided by NSF grant DPP 79-26238 and Lawrence Livermore National Laboratory Subcontract 7011701. Dr. R. Stuckenrath, Radiation Biology Laboratory, Smithsonian Institution, Washington, D.C., provided several dates for Palsa Lake. Many of the samples were processed by Mr. R. Kihl, Sedimentology Laboratory, INSTAAR; we appreciate his detailed preparations and data recording. Peter U. Clark's dates were funded by NSF grant EAR 79-26061 to J.T. Andrews and G.H. Miller. The date list was typed by Fatima Al-Rahim and Rosella Chavez.

INTRODUCTION

The publication of the first radiocarbon date list for Labrador and Northern Quebec (Short, 1981) reported on the ^{14}C age determinations of 92 samples, primarily from lake and peat samples collected during four years of field work on the Labrador-Ungava peninsula. Two of the primary goals of this research were the development of a deglaciation chronology and the establishment of a detailed vegetational and climatic paleohistory through pollen analysis. This report reflects the continuation of these research goals, although on a reduced scale, with the publication of 16 additional ^{14}C dates.

Fourteen of the dates are on lake sediment samples; in all cases, the dates represent an attempt to extend the dating control on sites from which at least one date appeared in the first publication. Two of the dates reported on here on are shell collections from the northern Labrador coast; these also were submitted to reinvestigate dates reported on previously (Ives, 1977; Short, 1981). In general, the additional dates are useful in establishing a tighter chronology at various sites and in clearing up problems of regional pollen and stratigraphic chronology. Further work remains in completing pollen analyses for several of the sites reported on here.

PRESENTATION OF DATES

The dates presented in this list are ordered by the 1:250,000 NTS topographic map sheets (Fig. 3), starting with the most southerly sheets and progressing northward, east to west. Within each map site, sites are arranged south to north and from east to west; site locations are given by conventional latitude/longitude coordinates. Within each site, the dates are ordered from youngest to oldest.

Descriptions of the sites follow the format used in Radiocarbon. Data relating to the details of the collection site and sampling procedure are first presented, followed by a "comment" containing interpretive

information relating to the significance of the date. It is suggested that in citing material presented in this date list, the commentators (indicated by initials) be given credit.

The 16 Labrador-Ungava dates reported on here have been obtained from two laboratories: Geochron Laboratories, Cambridge, Massachusetts (GX) and the Radiation Biology Laboratory, Smithsonian Institution (SI). All dates are presented in uncorrected rdiocarbon years BP (AD 1950) as reported by the dating laboratory. The GRL indentification number listed below the radiocarbon laboratory identification refers to an INSTAAR master reference file maintained by R. Kihl, Sedimentology Laboratory.

The dates are summarized in Tables 5 to 6. Table 7 tabulates the dates in 1000-year intervals; although the sample size is small, a bias toward dates in the 2000 to 5000 BP range, also seen in the first date list, can be observed.

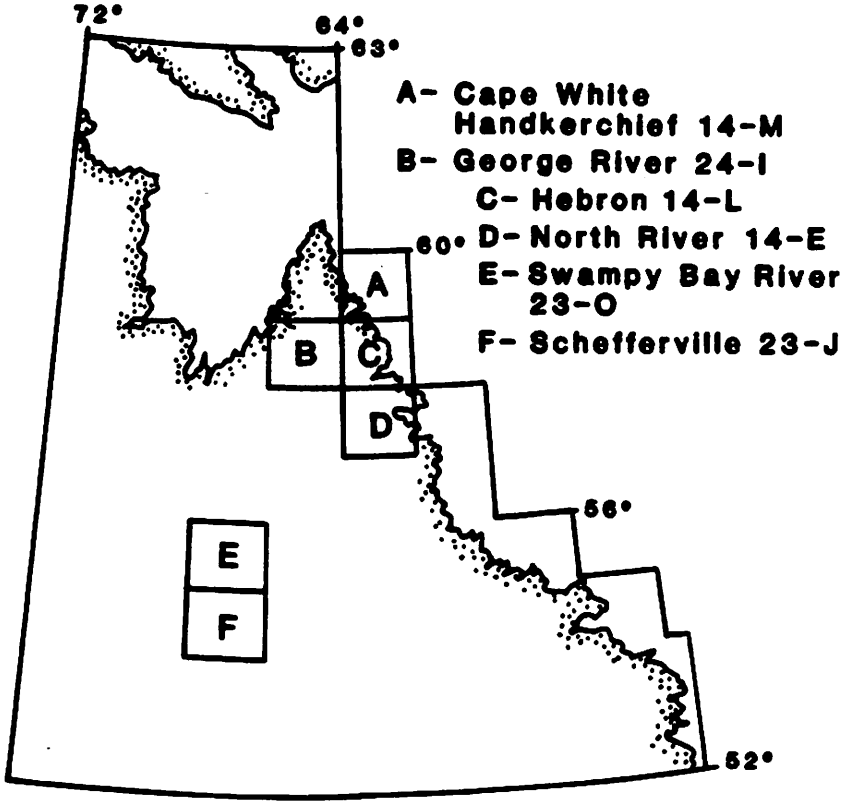


Figure 3. Location of 1:250,000 NTS Map Sheets, Labrador.

TABLE 5

Numbers of Radiocarbon Dates Associated with Different Sample Materials, Labrador

Material	Number
Marine shell (MS)	2
Peat (P)	0
Lake sediment (LS)	14
Wood (W)	0

TABLE 6

Numbers of Radiocarbon Dates, Listed in 1000-yr Intervals, Labrador

Age Range (yr BP)	Number
0-999	0
1000-1999	1
2000-2999	3
3000-3999	4
4000-4999	3
5000-5999	1
6000-6999	2
28,000-28,999	1
34,000-34,999	1
TOTAL	16

TABLE 7

Radiocarbon Dates Listed By Age, Laboratory Number, Material, Site, and Map Sheet, Labrador

Date	Lab No.	Material	Site	Map Name	Map No.
1940±150	GX-8899	LS	Tunturi Lake	Swampy Bay River	230
2225±155	GX-8939	LS	Loon Bay	Hebron	14L
2400±140	GX-8825	LS	Lac Hamard	Schefferville	23J
2745±160	GX-8826	LS	Palsa Lake	George River	24I
3175±150	SI-4752	LS	Palsa Lake	George River	24I
3420±160	GX-8897	LS	Napaktok Lake	North River	14E
3650±180	GX-8941	LS	Hebron Lake	Hebron	14L
3915±165	GX-8607	LS	Okak Lake	North River	14E
4150±170	GX-8898	LS	Napaktok Lake	North River	14E
4420±185	GX-8940	LS	Okak Lake	North River	14E
4840±200	SI-4755	LS	Palsa Lake	George River	24I
5825±235	SI-4757	LS	Palsa Lake	George River	24I
6220±220	GX-8608	LS	Okak Lake	North River	14E
6935±220	GX-8504	LS	Palsa Lake	George River	24I
$28,200^{+1200}_{-1000}$	GX-8241	MS	Iron Strand	Cape White Handkerchief	14M
$34,200^{+2100}_{-1600}$	GX-8240	MS	Iron Strand	Cape White Handkerchief	14M

SCHEFFERVILLE (Map Sheet No. 23J, 54-55°N, 66-68°W)

LAC HAMARD

GX-8825 (GRL-571-0)	50-60 cm	2400±140

Necron mud sample from a 107.5-cm core taken from Lac Hamard, Quebec (54°48'N, 67°30'W), located 40 km west of Schefferville at 564 m a.s.l. on granite bedrock in open spruce woodland. Collected by H. Nichols, July 1978. Comment (S.K.S.): Three dates have already been reported on for this site (Short, 1981; Stravers, 1981). Lac Hamard is one of a suite of lake sites in the center of the Labrador-Ungava peninsula with very old basal dates (16,975±1040 BP at 97.5-107.5 cm). A fourth sample was submitted to date the transition between Stravers's pollen zone IIc (shrub tundra) and IIIa (lichen woodland); based on extrapolation between two other dates, this transition was estimated at ca. 4850 BP. GX-8825 is considered too young for this transition based on the regional chronology and because there is an older date of 2840±210 BP (GX-7306) at 20-35 cm.

SWAMPY BAY RIVER (Map Sheet No. 230; 55-56°N, 66-68°W)

TUNTURI LAKE

GX-8899 (GRL-581-0)	25-35 cm	1940±150

Necron mud sample from a 140-cm core from Tunturi Lake (unofficial name), Quebec (55°01'N, 67°39'W), located 50 km northwest of Schefferville and 9 km west of Kivivic Lake at an altitude of 610 m a.s.l. at the lichen woodland/tundra ectone (altitudinal) boundary. Collected by H. Nichols, July 1978. Comments (S.K.S.): Three dates were previously submitted for chronological control for this site, but an upper sample from 15-25 cm was too small to date (Short, 1981). Therefore, GX-8899 was submitted to provide a date for the zone IIIa/IIIb transition of late Holocene cooling. The date of 1940±150 BP is close to the date of 2100 BP estimated by L.K. Stravers in her thesis for this transition (Stravers, 1981:Table 4-3).

NORTH RIVER (Map Sheet No. 14E; 57-58°N, 62-64°W)

OKAK LAKE

GX-8607 (GRL-567-0)	25-35 cm	3915±165
GX8940 (GRL-584-0)	50-60 cm	4240±185
GX-8608 (GRL-568-0)	105-115 cm	6220±220

Colloidal mud samples from a 205-cm core taken from Okak Lake (unofficial name), Labrador (57°23'N, 62°07'W), located 35 km southwest of Ublik Pond at an elevation of 105 m a.s.l. in spruce woodland. Collected by S.K. Short, D.L. Elliott, and L.K. Stravers, July 1979. Comment (S.K.S.): This site was collected in order to check on the pollen spectra recovered at Ublik Pond, especially the early birch-tundra episode dated 9000-6700 BP at that site. A basal date of 9005±285 (GX-7308) was reported in Short (1981), but at that time the core depth was reported as 245 cm. Subsequent laboratory analyses suggested an overlap between cores and supported a total depth of 205 cm. GX-8608 dates the initiation of alder-birch shrub tundra at this site; the date fits well with the regional chronology established by Short (1978) and supports the existence of a prolonged birch tundra episode at Okak Lake also. The date of 4420±185 (GX-8940) is consistent with other dates on the Labrador coast for the establishment of spruce woodland, and GX-8607 confirms the existence of spruce woodland at the site at this time.

NAPAKTOK LAKE

GX-8897 (GRL-579-0)	65-75 cm	3420±160
GX-8898 (GRL-580-0)	120-130 cm	4150±170

Colloidal mud samples from a 245-cm core taken from Napaktok Lake (unofficial name), Labrador (57°77'N, 62°34'W), located at an elevation of 143 m above Napaktok Bay, the northern limit of spruce woodland on the Labrador coast (Elliott, 1979; Elliott and Short, 1979). Dwarfed krummholz spruce were observed around the lake site also. Collected by H. Nichols, July 1978. Comment (S.K.S.): Three samples were previously reported by Short (1981). At that time, a date of 10,180±150 BP (Beta-1203) from 130-140 cm was rejected as too old to date the establishment of alder-brich shrub tundra at the site; this was confirmed by the lab because of dating problems. GX-8898 was submitted to date this episode; comparative dates for this period at other Labrador sites are 6000-6700 BP. Thus, this date appears significantly younger that at other sites, and suggests that the migration of dwarf birch and alder shrub onto the high, stressed plateau above Napaktok Bay may have been delayed due to its topographic position. GX-8897 dates the firm establishment of spruce in the area; again, the date of 3400 BP is later than that at other sites on the Labrador coast, supporting the interpretation that the position of the lake resulted in delayed plant migrations onto the plateau.

HEBRON (Map Sheet No. 14L, 58-59°N, 62-64°W)

HEBRON LAKE

GX-8941 (GRL-585-0) 70-80 cm 3650±180

Silty necron mud sample from a 169-cm core taken from Hebron Lake (unofficial name), Labrador (58°12'W, 63°04'W), located 5 km north of Hebron Fiord (Freytag Inlet and 33 km west of the abondoned settlement of Hebron at an elevation of 168 m a.s.l. The vegetation around the site is well-developed shrub tundra. Collected by H. Nichols, July 1978. Comment (S.K.S.): Three previous samples from this site were dated and reported in Short (1981). GX-8941 was submitted to provide additional dating control for the site. The date of 3650±180 BP is younger, however, than a date of 4300± 190 BP (Beta-1198) from 40-50 cm, and is rejected on the grounds that the latter accurately dates the establishment of spruce woodland to the south of the site.

LOON BAY

GX-8939 (GRL-583-0) 155-170 cm 2225±155

Silty neron mud sample from a 328.5-cm core from Loon Bay (unofficial name), Labrador (58°35'N, 63°45'W), located at the east end of an unnamed lake on Nakvak Brook at 242 m a.s.l. in sedge-shrub tundra. Collected by H. Nichols and S.K. Short, July, 1975. Comment (S.K.S.): Three dates were previously reported on in Short (1981), but there was some confusion over the accuracy of the upper two dates. The recent basal date [2690±230 BP (GX-6294) at 318.5-328.5 cm] is surprising for the unusual depth of sediment from the northern Labrador peninsula. But there was a reversal in the upper two dates from this section: 1445±160 BP (GX-5521) at 0-10 cm and 920±210 BP (GX-6378) at 127.5-132.5 cm. GX-8939 suggests that the latter date is too young and supports the hypothesis (Short, 1981) that the topmost date records a decrease in sedimentation in the late Holocene with only 10 cm of sediment accumulating in the last 1500 years.

GEORGE RIVER (map Sheet No. 24I; 58-59°N, 64-66° W)

PALSA LAKE

GX-8826 (GRL-572-0)	35-45 cm	2745±160
SI-4752 (GRL-485, 486, 487-0)	97.5-107.5 cm	3175±150
GX-8504	190-205 cm	6935±220
SI-4755 (GRL-488, 489-0)	218-223 cm	4840±200
SI-4757 (GRL-529, 530-0)	290-320 cm	5825±235

Colloidal mud and moss fragment samples from a 350-cm core from Palsa Lake (unofficial name), Quebec (58°28'N, 65°10'W), located in a dry lichen-heath tundra ca. 15 km south of the Koroc River in the Barnoin River drainage at 143 m a.s.l. Lichen woodland occupies both river valleys, Collected by H. Nichols, July 1978. Comment (S.K.S.): An "anomalously" old basal date of 16,800±2300 BP (GX-6387) (Short, 1981) stimulated interest in further analyses of Palsa Lake. Organic carbon analyses were run on the section and revealed that the basal 130 cm of the core contained less than 0.5% carbon. Between 220 and 200 cm, the organic content of the core rose to 4%; subsequently values fluctuated between 4 and 9% to the top of the section. The basal date is believed to be too old due to contamination with redeposited organic material of interglacial/ interstadial age because of the very low organic carbon content at the base. In addition, dates from basal sediments in western Ungava Bay (Gray et al., 1980) are closer to 7000 to 7500 BP. SI-4755 and SI-4757 were submitted from the low organic section to check the basal date; however, mid-Holocene dates of 4840± and 5825± are rejected on palynological grounds (Short, unpublished data). GX-8504 from the base of the organic-rich upper core is considered to be an accurate date because of the reliability of the laboratory and on palynological grounds. GX-8826 and SI-4752, both from the upper part of the core, are also accepted as accurate dates. The latter dates the arrival of spruce at the site at 3175± BP although the

pollen spectra suggests that spruce was nearby from 4300 BP on. The topmost date of 2745± BP dates the decrease in pollen productivity and sedimentation rate at this site and is comparable to other dates from the northern Labrador-Ungava peninsula (Short, 1978).

CAPE WHITE HANDKERCHIEF (Map Sheet No. 14M, 59-60°N; 62-64°W)

IRON STRAND

GX-8241
GRL-806-S)

$28,200^{+1200}_{-1000}$
$\delta^{13}C$ °/oo: + 0.4

GX-8240
(GRL-805-S)

$34,200^{+2100}_{-1600}$
$\delta^{13}C$ °/oo: + 0.4

Shells collected from low, wave-cut cliff previously described by Ives (1977). Site is 1.5 km southeast of the mouth of the Helga River along the Iron Strand coast of Labrador (59°33'N; 63°50'W). Shells were fragmented and included species of Balanus, Hiatella arctica, and Mya truncata. Collected by P.U. Clark, July 1981. Comment (P.U.C.): The site was reexamined because of its potential significance in recording a previously poorly defined mid-Wisconsin nonglacial interval. The stratigraphy was described as a lower, massive, nonfossiliferous sand unit overlain by a glaciomarine diamicton containing fossils of Balanus, with some Hiatella arctica and Mya truncata also present. GX-8240 dates this unit, and amino acid ratios average 0.16 ± Free and 0.026 ± Total. An undisturbed, fossiliferous marine sand unit overlies the diamicton. GX-8241 dates this unit, and amino acid ratios average 0.18 ± Free and 0.027 ± Total. Although these dates are at the limits of radiocarbon dating for shell material, the amino acid ratios, in comparison to the Baffin Island aminostratrigraphy, suggest the dates approximate "true" ages (cf. Andrews et al., 1981b). Consequently, the diamicton is interpreted as representing deglacition during the Middle Wisconsin, and the overlying undisturbed marine sands represent ice free conditions along theis part of the coast for the remainder of the Wisconsin. This is supported by detailed mapping of glacial deposits in surrounding regions (Clark, 1982).

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