GEOLOGICAL SURVEY OF CANADA
CURRENT RESEARCH 1995-G

GEOLOGICAL SURVEY OF CANADA RADIOCARBON DATES XXXII

Collated by

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1995

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This Date List (GSC XXXII) is the first to be published in the Geological Survey of Canada's Current Research series; previous date lists were published in the GSC Paper series. Lists GSC I to GSC XI were published first in the journal *Radiocarbon* and were reprinted as GSC Papers. Lists GSC I to VI (1963 to 1971) were given new pagination, whereas lists VII to XI (1968 to 1971) were reprinted with the same pagination. Note: the pagination in this pdf version differs from that in the printed version.

GEOLOGICAL SURVEY OF CANADA
RADIOCARBON DATES XXXII

Abstract

This list presents 239 radiocarbon age determinations made by the Radiocarbon dating Laboratory, Geological Survey of Canada on 230 samples, plus 17 dates by Beta Analytical Inc. (Beta), 15 dates by IsoTrace Laboratory (TO), 6 dates by Livermore Laboratory (CAMS), 1 date by Alberta Environmental Centre at Vegreville (AECV), and 1 date by Brock University (BGS). All samples dated prior to 1991 have now been reported in date lists. The total number (270) of samples from various areas are as follows: Newfoundland (19); Nova Scotia (32); New Brunswick (9); Québec (22); Ontario (3); Manitoba (3); British Columbia (38); Yukon Territory, (2); Northwest Territories, mainland (15); Northwest Territories, Arctic Archipelago (121); and including six (6) IAEA crosscheck samples. ***Tables 1*** *and* ***2*** *summarize the details of background and standard counts for the 2 L and 5 L counters during the period from January to December, 1992.*

Résumé

Ce rapport présente les résultats de 239 datations effectuées par le laboratoire de datation au radiocarbone de la Commission géologique du Canada sur 230 échantillons, ainsi que 17 datations dffectués par Beta Analytical Inc. (Beta), 15 par IsoTrace Laboratory (TO), 6 par Livermore Laboratory (CAMS), 1 par Alberta Environmental Centre à Vegreville (AECV), et 1 par Brock University (BGS). Tous les résultats des datations faites avant 1991 ont maintenant été présentés sous forme de listes de datations. Les échantillons datés, au nombre de 270, proviennent des régions suivantes: Terre-Neuve (19); Nouvelle-Écosse (32); Nouveau-Brunswick (9); Québec (22); Ontario (3), Manitoba (3); Colombie-Britannique (38); Territoire du Yukon (2); Territoires du Nord-Ouest, continent (15); Territoires du Nord-Ouest, archipel arctique (121). Six (6) sont des échantillons de verification du IAEA. Les ***tableaux 1*** *et* ***2*** *résument les valeurs de bruit de fond et d'étalonnage des compteurs de 2 L et 5 L, pour la période de janvier à décembre, 1992.*

INTRODUCTION[1]

This publication includes all of the samples that have been dated prior to 1991 and not published in a "date list". The presentation of dates within each section or subsection of this text are ordered from east to west. All GSC dates, up to and including GSC-5200, are now accessible on a computer database. The 'Date Locator File' provides convenient, fast access to our dates by allowing the user to interactively select indexed parameters, such as laboratory number, submitter, locality, material, age range, to retrieve samples (McNeely, 1988). Supplementary information on this database is available from J-S. Vincent, Director, Terrain Sciences Division, Geological Survey of Canada.

Sample gas preparation and purification were carried out as described in Lowdon et al. (1977). Carbon dioxide gas proportional counting techniques have been discussed by Dyck (1967). For a review of laboratory operations the reader is referred to Lowdon (1985).

During the period from January 1992 through December 1992, both the 2 L counter (Dyck and Fyles, 1962) and the 5 L counter (Dyck et al., 1965a, b) were operated continuously except for the month of October. The 2 L counter was operated at 2 atmospheres (atm) throughout this period, and the 5 L counter was operated at 1 atmosphere.

On a monthly basis, the counting rates for backgrounds and standards were within statistical limits, except for marginal correspondence for March to April for the 2 L background counts and June to July for the 5 L counter backgrounds. The average background and oxalic acid standard counting rates, and the number of one-day counts used to determine the average are shown in **Tables 1** and **2**, respectively.

Age calculations during the report period are based on a ^{14}C half-life of 5568±30 years and 0.95 of the activity of the NBS oxalic acid standard. Ages are quoted in radiocarbon years before present (BP), where "present" is taken to be 1950. The error assigned to each age has been calculated using only the counting errors of sample, background, and standard, and the error in the half-life of ^{14}C (Lowdon and Blake, 1973). Nonfinite dates (i.e. greater than ages) are based on a 4 sigma criterion (99.9% probability), whereas finite dates are based on a 2 sigma criterion (95.5% probability) and, therefore, are unconventionally reported with an error term of ± 2 sigma. In addition, all GSC dates are rounded according to the following criteria:

Age (years BP)	Significant figures
0 - 99	1
100 - 999	2
1000 - 9999	3
>10 000	3
nonfinite	2

If $^{13}C/^{12}C$ ratios ($\delta^{13}C$) were available, a "correction" for isotopic fractionation was applied to the sample age, and the $\delta^{13}C$ value reported. For terrestrial and nonmarine organic materials, and bones (both terrestrial and marine) the ages are conventionally corrected to a $\delta^{13}C$ = -25.0‰ PDB, whereas, marine shell ages are unconventionally corrected to a $\delta^{13}C$ = 0.0‰ PDB; as well, freshwater shell ages are not corrected. All $\delta^{13}C$ determinations were made on aliquots of the sample gas used for age determinations. Since 1993, all $\delta^{13}C$ values have been determined by the GSC Stable Isotope Laboratory (B.E. Taylor). From 1989 to 1993 $\delta^{13}C$ values were determined under contract by the Ottawa Carleton Geoscience Centre (OCGC) Stable Isotope Facility, Ottawa, Ontario. From 1975 to 1989, the $\delta^{13}C$ were determined under contract by R.J. Drimmie of the Department of Earth Sciences, University of Waterloo, Waterloo, Ontario, or by Waterloo Isotope Analysts, Inc., Kitchener, Ontario (R.J. Drimmie, chief analyst) using the same equipment as at the University of Waterloo. Prior to that time some $\delta^{13}C$ determinations were done by the GSC Geochronology Section (R.K. Wanless, Head) and by Teledyne Isotopes, Westwood, New Jersey.

1. C. Herd assisted R. McNeely and D. Atkinson who compiled this date list from descriptions of samples and interpretations of age determinations provided by collectors and submitters.

Acknowledgments

Appreciation is expressed to S.M. Chartrand (1969 to 1976), J.E. Tremblay (1976 to 1980), A.M. Telka (1980 to 1986), L.M. Maillé (1986 to 1989 and 1991 to 1992) and M. Leflar (1990) for sample preparation and purification, and I.M. Robertson (1964 to 1989) and J. Brennan (1989 to 1995) for the counting and age determinations. Supervision of laboratory operations has been as follows: W. Dyck (1960 to 1965), J.A. Lowdon (1965 to 1981), and R. McNeely (1981 to present).

Identification of materials used for dating or associated with the dated material has been carried out by the following specialists:

Algae (marine):	R.K.S. Lee, and W.H. Adey
(freshwater):	J.P. Smol
Arthropods (fossil):	J.V. Matthews, Jr.
Barnacles:	C.G. Rodrigues
Diatoms:	S. Federovich and J.P. Smol
Macrofossils (plant):	J.V. Matthews, Jr., M. Kuc, and N.F. Alley
Molluscs:	A.H. Clarke, Jr., M.F.I. Smith, the late W.H. Dall, R.Hebda, F.J.E. Wagner, C.G. Rodrigues, and J.E. Dale
Mosses:	M. Kuc, J.A. Janssens, and W.A. Weber
Pollen:	R.J. Mott, S. Federovich, N.F. Alley, and J.E. Shepperd
Vertebrates:	C.R. Harington
Wood:	R.J. Mott, L.D. Wilson (née Farley-Gill), H. Jetté, and G. Argus

Ancillary Analyses:

AMS dating:	R.P. Beukens, IsoTrace Laboratory
Amino acid ratios:	I. Moffat (N.W. Rutter) Univ. of Alberta
X-ray diffraction: (on shell material)	A.C. Roberts and R.N. Delabio, Mineralogy Section, GSC.

The GSC clientele extend their sincere thanks to them.

M. Lanoix, R.J. Richardson, J.A. Snider, J.E. Dale, and K.E. Rolko, all former summer students or technical assistants, assisted in the processing and examination of samples prior to submission to the laboratory. Since 1986 the submitters have been responsible for the (physical) preparation of their sample materials, with supervision from laboratory personnel, prior to submission.

W. Spirito, L. Brouillette, and J. Cousineau were instrumental in the development of the 'Date Locator File', and D. Atkinson, C. Herd, P. Jorgensen, P. Merriam, S. McCuaig, L. Neville, M. Rejhon, S. Prinzen, and D. Russell have assisted in the preparation of GSC datelists over the years.

Radiocarbon Quality Assurance Program

At the 13th International Radiocarbon Conference in 1988 the need for additional reference materials for ^{14}C dating was discussed. In 1989 an outline for a ^{14}C Quality Assurance Program was formulated. The proposal was presented by the International Atomic Energy Agency (IAEA) and accepted at the Workshop on Intercomparison of ^{14}C Laboratories in Glasgow in 1990.

Five new intercomparison materials, representative of natural materials frequently dated in radiocarbon laboratories (carbonates, wood, and cellulose), were sampled and prepared by the staff at IAEA and several colleagues from the radiocarbon community. In addition the Australian National University (ANU) Sucrose secondary standard was included as sample IAEA-C6. Initially it was recommended that the samples be processed by the dating laboratories without pre-treatment. The GSC Laboratory processed all the samples without pre-treatment. Late in 1990 a recommendation was made to pre-treat two of the samples (namely C4 and C5) because of some perceived variability in these materials. The samples, ranging in age from modern to very old, were processed and then counted in the GSC Laboratory between August and December, 1990. The gas preparation for each sample was counted in both the 2 L and 5 L counters. The specific results for each count are noted below and summarized in **Table 3**.

Marble sample

Carrara marble (carbonate) from the quarry of Carcaraia, in the locality of Acquabianca, municipality of Gorfigliano, province of Lucca, Italy, was provided by the IMEG Company of Vareggio, and processed by IAEA staff. Sample IAEA-C1 was not pre-treated; 35.2 g yielded 8.36 L of CO_2 gas.

GSC-5078 2L IAEA-C1 > 39 000
$\delta^{13}C$= + 2.3‰

The age estimate is based on one count for 3520 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 0.020±0.028, 1.003±0.022, and 17.754±0.102 cpm, respectively.

GSC-5078 5L. IAEA-C1 > 41 000
$\delta^{13}C$= + 2.3‰

The age estimate is based on one count for 3945 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were -0.002±0.041, 2.172±0.034, and 28.328±0.234 cpm, respectively.

Travertine sample

A freshwater carbonate (travertine), deposited on gravels of the lower terrace of the Molasse Basin, Bavaria, about 50 km north of Munich, Federal Republic of Germany, was collected by members of the Institute of Hydrology, Neuherberg. The material was ground and homogenized by IAEA staff. Sample IAEA-C2 was not pre-treated; 32.0 g yielded 7.34 L of CO_2 gas.

GSC-5079 2L IAEA-C2 7150±100
$\delta^{13}C$= - 8.8‰

The age estimate is based on two counts for 2040 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 7.527±0.078, 1.003±0.022, and 17.754±0.102 cpm, respectively.

The uncorrected age is 6890±100.

GSC-5079 5L. IAEA-C2 7100±100
$\delta^{13}C$= - 8.8‰

The age estimate is based on two counts for 2000 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 12.086±0.091, 2.172±0.034, and 28.328±0.234 cpm, respectively.

The uncorrected age is 6840±100.

Cellulose sample

Wood cellulose from one season's (1989) harvest of about 40 year old trees was produced by a paper factory in Bergum, Netherlands. The material was acquired by W.G. Mook and J. van der Plicht. Sample IAEA-C3 was not pre-treated; 9.7 g yielded 7.70 L of CO_2 gas.

GSC-5064 2L IAEA-C3 modern
$\delta^{13}C$= -25.4‰

The age estimate is based on two counts for 3490 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 23.216±0.085, 1.049±0.019, and 17.851±0.099 cpm, respectively.

GSC-5064 5L. IAEA-C3 modern
$\delta^{13}C$= -25.4‰

The age estimate is based on two counts for 2200 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 37.222±0.150, 2.047±0.042, and 28.236±0.193 cpm, respectively.

Waikato wood sample

Kauri wood, excavated from peat bogs near Waikato on the north island of New Zealand, was collected and processed by A.G. Hogg and H.A. Polach in 1989. Sample IAEA-C4 was not pre-treated; 8.9 g yielded 8.90 L of CO_2 gas.

GSC-5063 2L IAEA-C4 > 40 000
$\delta^{13}C$= -24.4‰

The age estimate is based on one count for 2400 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 0.005±0.028, 1.049±0.019, and 17.851±0.099 cpm, respectively.

GSC-5063 5L. IAEA-C4 > 39 000
$\delta^{13}C$= -24.4‰

The age estimate is based on one count for 2990 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were -0.011±0.049, 2.047±0.042, and 28.236±0.193 cpm, respectively.

GSC-5063 2 HP. IAEA-C4 > 50 000
$\delta^{13}C$= -24.4‰

A second preparation of the *kauri* wood sample IAEA-C4 was not pre-treated; 30.43 g yielded 31.38 L of CO_2 gas. The age estimate is based on one count for 3140 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 0.052±0.037, 2.521±0.023, and 102.618±0.351 cpm, respectively.

'Two Creeks' Wood sample

Seven *Picea* logs from a single locality in the 'Two Creeks' buried forest bed in eastern Wisconsin, Lake Michigan, U.S.A., were collect-

ed by R.M. Kalin and S.W. Leavitt in 1989, and processed by IAEA staff. Sample IAEA-C5 was not pre-treated; 8.2 g yielded 7.81 L of CO_2 gas.

GSC-5068 2L IAEA-C5 11 800±120
$\delta^{13}C$= -25.5‰

The age estimate is based on two counts for 2600 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 4.108±0.048, 1.049±0.019, and 17.851±0.099 cpm, respectively.

The uncorrected age is 11 800±120.

GSC-5068 5L. IAEA-C5 11 800±120
$\delta^{13}C$= -25.5‰

The age estimate is based on three counts for 4000 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 6.538±0.073, 2.047±0.042, and 28.236±0.193 cpm, respectively.

The uncorrected age is 11 800±120.

ANU Sucrose

The ANU Sucrose Secondary Standard has been internationally calibrated against the NBS Oxalic Acid Standard and available to the ^{14}C community since the early 1980s.

SUC-2 2L IAEA-C6 modern
$\delta^{13}C$= -11.2‰

The age estimate is based on two counts for 2150 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 28.445±0.120, 1.223±0.023, and 18.286±0.110 cpm, respectively.

SUC-2 5L. IAEA-C6 modern
$\delta^{13}C$= -11.2‰

The age estimate is based on one counts for 1000 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 43.794±0.216, 2.172±0.023, and 28.129±0.128 cpm, respectively.

Figure 1 presents the raw data, analyzed by the Consultants' Group (Rozanski, 1991), for the 6 individual samples with the GSC data (↑) noted for the 2 L and 5 L counters on each of the frequency distributions.

Comments (**R. McNeely**): The results of this Quality Assurance program were presented at the 14th Radiocarbon Conference and published in Rozanski et al. (1992). As can be discerned from **Table 3**, the GSC Radiocarbon Dating Laboratory performed very well in this intercalibration study. All GSC data were within 2σ of the median (consensus) values and most were within 1σ, except for one datum on sample C3 (cellulose). The data from the 2 L counter were within 2σ, but the 5 L datum was outside an acceptable range.

All samples of geological interest (C1, C2, and C5) produced results in excellent agreement with the consensus values. Sample C1 is considered a background sample by the IAEA, with no measurable ^{14}C activity. The GSC Laboratory agrees with this assessment. The seven individual logs that comprise C5 were dated by the Arizona Laboratory and yielded an average age of 11 700±170 (cf. 11 800±120 and 11 700±110 for GSC). Additional data (Long and Kalin, 1990) indicate an age of 11 900±190.

Sample C4 (*Kauri* wood) created problems for the organizing committee; the material was considered to have a measurable age (i.e. 40 to 50 ka), but because of technical problems in processing and homogenizing of the sample, the material distributed was of variable composition, possibly because of modern wood contamination. Because of the large range of values generated by various laboratories, a 95% confidence interval is all that could be quoted as a consensus value for this sample – the GSC Laboratory judges this sample to be very old, possibly beyond the range of ^{14}C dating.

The recommended value for the ANU sucrose secondary standard is 150.8±0.2 pMC with an isotopic $\delta^{13}C$ composition of -10.4±1.5‰. The GSC Laboratory data agree with these values indicating that GSC dating techniques are capable of effectively processing and dating this type of material.

Crosschecks on Archival GSC Shell Samples

In the late 1980s, a number of Terrain Sciences Staff expressed a concern that some of the shell dates generated by the Laboratory in the 1960s were not consistent with new shell dates produced on material collected when sites were re-visited and shell material resampled. The new dates were often different by about 400 years, which was suspiciously close to the reservoir age assumed by GSC when shell dates are 'corrected' to 0.0‰ $\delta^{13}C$. This suggested that the data had been reported differently in the past than now.

Although there was no reason to suspect GSC shell dates (either then or now) it was decided to crosscheck some of B.G. Craig's original samples. A number of archival samples were located and where sufficient material was still available (although the quality of the some of the archived samples was poor) the sample was redated. Six samples ranging in age from about 2 to 9.5 ka that were processed between 1961 and 1966 were redated in 1990 and the new ages were compared with the original dates. Because the original samples did not have a $\delta^{13}C$ measured, the 'uncorrected' ages should be compared to ascertain whether there is any problem with GSC shell dates. **Table 4** indicates good agreement between the sample splits. All age differences were within 5% of the age, and half the differences were less than 1% of the age; all, but one, were within their combined errors.

EASTERN CANADA

Newfoundland (Fig. 2)

GSC-5126 Branscombes Pond 8010±90
$\delta^{13}C$= *-24.9‰*

The lake sediment (gyttja) was underlain by silty clay. Sample BP90A 274-279 is the basal gyttja (2.74-2.79 m) from a 3.00 m core. The core was collected by D.L. Butler and J.B. Macpherson on October 7, 1990 from Branscombes Pond, Mount Pearl, Newfoundland, adjacent to Blackmarsh Road (47° 31.63'N, 52° 47.00'W) at an elevation of 109 m; submitted by J.B. Macpherson and D.L. Butler.

The sample (106.4 g wet weight) was treated with hot acid and distilled water rinses; base treatment was omitted (noncalcareous). The treated sample (18.2 g) yielded 4.36 L of CO_2 gas. The age estimate is based on one count for 3760 minutes in the 2 L counter with a mixing ratio of 1.04. The count rates for the sample (net), and monthly backgrounds and standards (net) were 6.842±0.051, 1.094±0.019, and 18.531±0.106 cpm, respectively.

The uncorrected age is 8000± 90.

Comment (**J.B. Macpherson**): Pollen assemblages in the dated sediment indicate initial expansion of *Abies* and expanding *Picea*. The date is considered correct because initial expansion of *Picea* is dated 8570±90 (GSC-3618, Blake 1983; Kennys Pond) and 8370±130 (GSC-4015, Blake 1987; Golden Eye Pond) elsewhere on the northeast Avalon Peninsula; by interpolation *Abies* began to expand about 300 years later (Macpherson 1982). The date is young for a minimal deglacial date; previously the youngest acceptable date on basal gyttja was 8570±90 (GSC-3618) from the Kennys Pond kettle site (elevation 70 m). Branscombes Pond occupies a shallow depression in till; if this depression is also a kettle the absence of older organic sediment is explained.

GSC-5169 Fox Harbour 5150±80
$\delta^{13}C$= -27.7‰

The basal peat was underlain by glaciomarine diamicton and overlain by 16 cm peat; capped by 10-15 cm of loess. Sample FH-3 was collected by N. Catto on September 5, 1990, from Fox Harbour, Newfoundland (47° 19'N, 53° 56'W), at an elevation of 5 m; submitted by N. Catto.

The sample (106.8 g wet weight) was treated with cold base, hot acid, and distilled water rinses (noncalcareous). The treated sample (17.8 g) yielded 8.54 L of CO_2 gas. The age estimate is based on one count for 3000 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 9.648±0.063, 1.057±0.020, and 18.411±0.103 cpm, respectively.

The uncorrected age is 5190±80.

GSC-5158 Point Verde 6130±80
$\delta^{13}C$= -30.6‰

The basal peat was underlain by glaciofluvial gravel and overlain by 1.28 m peat; capped by loess. Sample PV-36 was collected by N. Catto on August 6, 1990, from Point Verde, Newfoundland (47° 14'N, 54° 4'W), at an elevation of 10.5 m; submitted by N. Catto.

The sample (208.8 g wet weight) was treated with cold base, hot acid, and distilled water rinses (noncalcareous). The treated sample (11.4 g) yielded 8.29 L of CO_2 gas. The age estimate is based on two counts for 1830 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 13.101±0.100, 2.233±0.035, and 28.426±0.139 cpm, respectively.

The uncorrected age is 6220±80.

Comment (**N. Catto**): These two dates provide minimum estimates of sea level changes along the eastern shore of Placentia Bay. Both peat units lie on erosional terraces cut into glaciogenic sediments, and represent terrestrial deposition at some distance from the shoreline. They therefore indicate that sea levels had dropped from the postglacial maximum position prior to 6.1 ka (Point Verde, 10.5 m), and prior to 5.1 ka (Fox Harbour, 5 m). The maximum elevation at Point Verde represents the highest known sea level position on the Placentia Bay shore of the Avalon Peninsula. The presence of these erosional terraces, however, indicates that sea levels subsequent to deglaciation were higher than at present along the Avalon Peninsula shoreline.

The peats are capped by loess at both localities, and similar loess caps are present at other localities along Placentia Bay. Late Holocene eolian activity is also indicated by dunal development at Point Lance, St. Marys Bay. Evaluation of ^{14}C dateable material from this exposure will enable an assessment of the regional significance of the eolian activity. Preliminary investigations suggest that the climate indicated by the peat deposits is boreal, similar to that proposed for the mid-Holocene in other parts of the Avalon Peninsula.

GSC-5008 Hermitage 12 600±130
$\delta^{13}C$= -18.8‰

The lake sediment, silty gyttja, sample AP-82-4 (290-296.5 cm) was collected by T.W. Anderson on August 20, 1982 from an unnamed lake about 1.5 km south of town of Hermitage, on the south coast of Newfoundland (47° 32'45"N, 55° 56'30"W), at an elevation of about 10.5 m; submitted by T.W. Anderson.

The sample (204 g wet weight) was treated with hot acid and distilled water rinses; base treatment was omitted (noncalcareous). The treated sample (49.1 g) yielded 4.67 L of CO_2 gas. The age estimate is based on one count for 3200 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net), and for monthly backgrounds and standards (net) were 3.798±0.047, 1.013±0.027, and 18.000±0.102 cpm, respectively.

The uncorrected age is 12 500±130.

Comment (**T.W. Anderson**): The sample occurs at the top of a gyttja unit below banded light grey silty clay. The overlying clay is correlated with the Younger Dryas cool interval of the North Atlantic Ocean. The sample dates gyttja deposition during a period of climatic improvement prior to the Younger Dryas episode.

Springdale Series

A series of marine shells samples from George Huxter Memorial Park, 2.5 km northwest of the town of Springdale, on the south side of Indian Brook, Newfoundland (49° 30.5'N, 56° 6.4'W), at an elevation of 12.45 m, was collected by S. Scott on July 2, 1990; submitted by J. Shaw.

GSC-5140 Springdale (I) 11 300±120
$\delta^{13}C$= + 0.6‰

The marine shell sample SS19 90071 (Biodatabase No. 90042; 45.9 g dry weight; *Balanus* and *Mya truncata*; identified by J. Shaw), enclosed in sand gravel, was treated with an acid leach to remove the outer 30% of the sample. The treated sample (32.3 g) yielded 7.39 L of CO_2 gas. The age estimate is based on one count for 4840 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 4.562±0.047, 1.150±0.032, and 18.513±0.124 cpm, respectively.

The uncorrected age is 11 300±120.

Comment (**J. Shaw** and **S. Scott**): The shells are from sand gravel deposits associated with the marine limit in the Halls Bay area. See GSC-5171 for further comments.

GSC-5171 Springdale (II) 11 700±110
$\delta^{13}C$= + 2.3‰

The marine shell sample SS19 90065 (Biodatabase No. 90043; 29.1 g dry weight; *Hiatella arctica* and *Mya truncata*; identified by J. Shaw), enclosed in sand gravel, was treated with an acid leach to remove the outer 20% of the sample. The treated sample (22.9 g) yielded 5.06 L of CO_2 gas. The age estimate is based on one count for 3960 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 4.314±0.044, 1.099±0.023, and 18.484±0.104 cpm, respectively.

The uncorrected age is 11 700±110.

Comment (**J. Shaw** and **S. Scott**): This date is on a shell sample from marine limit delta deposits in the Halls Bay area, in the same locality as GSC-5140. These dates are similar to previously reported dates in this area: GSC-1733 (Blake, 1983), on a sample from a terrace at Halls Bay, and GSC-2085 (Lowdon and Blake, 1975) on a sample from delta bottomset beds near South Brook.

Burgeo Series

A series of sediment samples from a lake about 21 km north of Burgeo, Newfoundland (47° 48′0″N, 57° 39′0″W), at an elevation of 220 m, was collected by T.W. Anderson on August 9, 1989; submitted by T.W. Anderson.

GSC-5051 Burgeo (I) 10 700±150
$\delta^{13}C$= -19.6‰

The lake sediment, gyttja sample AP-89-3, (389-391.4 cm; 197.1 g wet weight), was treated with hot acid and distilled water rinses; base treatment was omitted (noncalcareous). The treated sample (61.1 g) yielded 3.86 L of CO_2 gas. The age estimate is based on two counts for 2050 minutes in the 2 L counter with a mixing ratio of 1.17. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 4.765±0.067, 1.032±0.028, and 17.834±0.163 cpm, respectively.

The uncorrected age is 10 600±150.

Comment (**T.W. Anderson**): The sample occurs at the base of the upper gyttja unit overlying grey sandy clay containing scattered plant detritus. The sample dates a return to gyttja deposition and the onset of regional warming following the Younger Dryas cooling episode indicated by the clay unit.

GSC-5056 Burgeo (II) 11 900±150
$\delta^{13}C$= -21.2‰

The lake sediment, gyttja sample AP-89-3A (424-428.6 cm; 341.7 g wet weight), was treated with hot acid and distilled water rinses; base treatment was omitted (noncalcareous). The treated sample (106.0 g) yielded 4.53 L of CO_2 gas. The age estimate is based on two counts for 2680 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 4.109±0.066, 1.049±0.019, and 17.851±0.099 cpm, respectively.

The uncorrected age is 11 800±150.

Comment (**T.W. Anderson**): The sample is from one of several organic-rich bands within an interbedded detritus-clay sequence below the grey sandy clay. The sample dates the early deposition of gyttja during a pre-Younger Dryas warm interval. The overlying sandy clay unit is correlated with the Younger Dryas cooling of the North Atlantic Ocean.

GSC-5035 Western Brook 70±40
$\delta^{13}C$= -24.1‰

The wood was enclosed in sand. Sample 86-GS-29 was collected by D.R. Grant on September 18, 1986 at the mouth of Western Brook, on the Gulf of St. Lawrence coast, west coast of Newfoundland (49° 49.86′N, 57° 51.58′W), at an elevation of 2 m; submitted by D.R. Grant.

The sample (12.8 g dry weight) was treated with hot base, hot acid and distilled water rinses (noncalcareous). The treated sample (9.1 g) yielded 9.15 L of CO_2 gas. The age estimate is based on two counts for 3900 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net), and monthly backgrounds and standards (net) were 28.183±0.092, 2.080±0.026, and 28.377±0.129 cpm, respectively.

The uncorrected age is 60±40.

Comment (**D.R. Grant**): The dated material comes from the lower of two undulating 10-30 cm thick forest/peat horizons which cut across the high-angle eolian bedding of coastal dunes which have accumulated by onshore transport of beach sand. Like the similar date of 40±60 BP (GSC-4306, Blake, 1988) at nearby Stanford River, the vegetal horizons are surprisingly young and show that the dunes have stabilized twice in the last century such that the surface was degraded and became vegetated. Whether vegetation took hold because the sand supply was interrupted or because the climate became wetter cannot be ascertained from the available data.

Parsons Pond Series

A series of marine shell samples from the west side of highway 430, about 3 km north of Parsons Pond village, on the west coast of Newfoundland (50° 3.43′N, 57° 42.35′W), at an elevation of 3 m, was collected by D.R. Grant on July 18, 1980; submitted by D.R. Grant.

GSC-5025 Parsons Pond (I) 9720±100
$\delta^{13}C$= + 0.7‰

The marine shells sample 80-GS-55 (Paleontology Collection No. 101032; 50.3 g dry weight; *Mya truncata* and *M. truncata uddevalensis*; identified by D.R. Grant), enclosed in sand, were treated with an acid leach to remove the outer 30% of the sample. The treated sample (35.0 g) yielded 7.72 L of CO_2 gas. The age estimate is based on two counts for 1600 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 8.472±0.088, 2.080±0.026, and 28.377±0.129 cpm, respectively.

The uncorrected age is 9710±100.

Comment (**D.R. Grant**): The shells were juveniles and adults up to 5 cm long, mostly in life position. Although most were chalky and slightly pitted, some had periostracum. They were collected from a highway borrow pit that exposed the following sequence: 3+ m diamicton (till or glaciomarine drift), 20 cm of almost pure *Chlamys islandicus*, 5± m sand in which these shells occur suspended like an infauna. The sand grades laterally and vertically to gravel which forms a raised beach that crests at 8 m elevation. If the sand is coeval with the raised beach, the shells would appear to date a paleoshoreline at +8 m (or somewhat higher). When considered with nearby dates (GSC-1762 and -1768, Lowdon et al., 1977; GSC-4060, Blake, 1986; GSC-4304, Blake, 1988) having similar ages and stratigraphic context (8.3-9.3 ka, 5.2-11 m), the implication is that sea level fell below its present level shortly after 8 ka and has since recovered (Grant, 1994). The underlying *Chlamys* horizon is a deepwater deposit relating to an earlier higher sea level.

GSC-5026 Parsons Pond (II) 10 300±90
$\delta^{13}C$= + 0.8‰

The marine shells (sample 84-GS-25, Paleontology Collection No. 101043; 48.4 g dry weight; *Mya truncata uddevalensis*; identified by D.R. Grant), enclosed in sand, were treated with an acid leach to remove the outer 20% of the sample. The treated sample (39.3 g) yielded 8.52 L of CO_2 gas. The age estimate is based on two counts for 4160 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 7.878±0.059, 2.080±0.026, and 28.377±0.129 cpm, respectively.

The uncorrected age is 10 300±90.

Comment (**D.R. Grant**): The shells measured 3x4 cm, had periostracum, and were mostly intact and in life position. They were collected from a coastal cliff that exposed the following sequence: 7+ m till, 2 m brown (oxidized) sand with a layer of mixed shells at its base, 5 m gravel grading from pebbly at its base to bouldery at its top. The gravel forms a raised beach ridge cresting 18 m above sea level. The dated shells occurred in the lower part of the beach formation and thus do not relate directly to a sea level. This date, together with others nearby on littoral beds, is the basis for a postglacial paleosealevel recovery which began at 140 m 12.5 ka, fell below present level about 8 ka, and has subsequently risen (Grant, 1994).

GSC-5047 Red Barren Brook 12 700±150
$\delta^{13}C$= - 1.3‰

The marine shells (*Buccinum*? *tenue*, *Natica clausa*, *Nuculana pernula*, and *Mya arenaria*; identified by I.A. Brookes and D.R. Grant) were enclosed in grey silty clay. Sample 79-BHB-03 was collected by I.A. Brookes on August 19, 1979 from the southwest side of Red Barren Brook, a lower tributary of the Serpentine River, on the piedmont of Lewis Hills, about 35 km west of Corner Brook, Newfoundland (48º 55.65'N, 58º 28.44'W), at an elevation of about 40 m; submitted by D.R. Grant.

The sample (18.8 g dry weight) was treated with an acid leach to remove the outer 10% of the sample. The treated sample (16.8 g) yielded 3.85 L of CO_2 gas. The age estimate is based on one count for 3910 minutes in the 2 L counter with a mixing ratio of 1.17. The count rates for the sample (net), and monthly backgrounds and standards (net) were 3.669±0.050, 1.032±0.028, and 17.834±0.163 cpm, respectively.

The uncorrected age is 12 700±150.

Comment (**D.R. Grant**): The sample (composed of several species to produce a dateable quantity) consisted mostly of juveniles with nacreous interior derived from a 5+ m thick bed of silty clay representing the bottomset beds of a glaciomarine delta, the gravelly foreset beds of which have been aggraded on top up to the 56 m local marine limit. The date would appear to approximate the time of construction of this delta by a local valley glacier emanating from the Lewis Hills. However, a similar sample from the same stratum exposed in nearby Rope Cove Brook (GSC-2942; Lowdon and Blake, 1980) is 1000 years older, so, either this sample does not date the initial marine incursion because it does not derive from the earliest-formed bottomset layers, or it has been affected by local differences in carbonate geochemistry (as alluded to under GSC-5046, below).

GSC-5030 Romaines River 12 800±100
$\delta^{13}C$= + 1.0‰

The marine shells (*Hiatella arctica*; identified by D.R. Grant) were enclosed in silty mud. Sample 89-AP-09 was collected by T.W. Anderson on August 13, 1989 from 0.7 km west of the mouth of the Romaines River, on St. Georges Bay coast, Newfoundland (48º 33.22'N, 58º 41.02'W), at an elevation of 2 to 4 m; submitted by D.R. Grant.

The sample (37.6 g dry weight) was treated with an acid leach to remove the outer 20% of the sample. The treated sample (29.5 g) yielded 6.55 L of CO_2 gas. The age estimate is based on one count for 4440 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net), and monthly backgrounds and standards (net) were 5.791±0.049, 2.080±0.026, and 28.377±0.129 cpm, respectively.

The uncorrected age is 12 800±100.

Comment (**D.R. Grant**): This date supplements others pertaining to the long and complex glacial and marine sequence at this site (Grant, 1991; McNeely and Jorgensen, 1993). The dated shells occurred as juveniles (1x2 cm) and as adults (2x4 cm) mostly with intact paired valves, and partly with periostracum. The site is a coastal cliff composed of 20+ m of gravel interpreted to be a kame moraine, overlain by a pinkish till (the Robinsons Head Drift) over which is draped a deepwater marine mud containing these shells. The mud also contained a vertebra of a bowhead whale (*Balena mysticetus*) which dated 13 345±230 (S-3047; McNeely and Jorgensen, 1993). The mud is succeeded by offlap marine gravel (with shells that date 13 100±180; GSC-4095; Blake, 1988) which was deposited during regression from the 25 m local marine limit. The sediments apparently accumulated in a gradually deepening depression, which is either a kettle that formed by melting of buried glacial ice, or by solution of the underlying gypsum. Freshwater marl with plant debris dating 12 700±110 (GSC-4017; Blake, 1988) completes the sequence. The shell age would seem to confirm the bone age, but both are apparently somewhat too young compared to the overlying shells. Taken together (Grant, 1987), the dates show that the site was ice free before 13 ka and that paleosealevel fell below its present position by 12-13 ka (rather than at 9-10 ka according to Brookes et al., 1985), to perhaps 20 m or more before recovering.

GSC-5046 Benoit's Cove 11 200±150
$\delta^{13}C$= + 1.2‰

The marine shells (*Mya arenaria*; identified by I.A. Brookes and D.R. Grant) were enclosed in sandy, pebbly clay. Sample 72-BHB-04 was collected by I.A. Brookes on August 14, 1968 from the village of Benoit's Cove, south shore of Bay of Islands, western Newfoundland (49º 0.63'N, 58º 8.19'W), at an elevation of about 15 m; submitted by D.R. Grant.

The sample (22.1 g dry weight) was treated with an acid leach to remove the outer 10% of the sample. The treated sample (18.4 g) yielded 4.13 L of CO_2 gas. The age estimate is based on two counts for 2000 minutes in the 2 L counter with a mixing ratio of 1.08. The count rates for the sample (net), and monthly backgrounds and standards (net) were 4.449±0.063, 1.032±0.028, and 17.834±0.163 cpm, respectively.

The uncorrected age is 11 200±150.

Comment (**D.R. Grant**): The sample consisted of whole but disarticulated valves with chalky interior and intact periostracum. They come from a fresh exposure of the basal layers of a clayey mud blanket which underlies a sandy marine terrace and gravelly marine delta. The mud thus represents the deepwater sedimentation during the early stages of postglacial marine invasion of Humber Arm (Bay of Islands) following glacial retreat by calving. The date is somewhat younger than expected, considering that dates on beach and terrace gravels closer to marine limit at both head and mouth of the bay are up to 1000 years older. The discrepancy may lie in the fact that the surface water in a fjord with voluminous input of meltwater derived from a carbonate terrain will have considerable old carbon compared to inflowing bottom water of more "normal" geochemistry. This could be checked by comparing the apparent ages of modern littoral and pelagic infauna of a given species in fiords with a thick freshwater layer.

GSC-5045 Mine Brook 800±100
$\delta^{13}C$= + 1.4‰

The marine shells (*Mya truncata* and *M. truncata uddevalensis*; identified by D.R. Grant) were enclosed in silty sand. Sample 84-GS-51 was collected by D.R. Grant on July 19, 1984 from south side of Bay of Islands, east of mouth of Mine Brook, foot of Blow-me-Down Hills, western Newfoundland (49º 3.78'N, 58º 18.37'W), at an elevation of 0.5 m; submitted by D.R. Grant.

The sample (52.7 g dry weight) was treated with an acid leach to remove the outer 20% of the sample. The treated sample (39.7 g) yielded 8.68 L of CO_2 gas. The age estimate is based on one count for 3800 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net), and monthly backgrounds and standards (net) were 6.519±0.055, 2.074±0.027, and 28.244±0.132 cpm, respectively

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The uncorrected age is 11 800±100.

Comment (**D.R. Grant**): The sample consisted of whole but disarticulated valves with smooth interior and chalky exterior, associated with various other species (*Balanus crenatus*, *Macoma calcarea*, *Hiatella arctica*, *Mya pseudoarenaria*, and *Chlamys islandicus*). The dated level is the top metre of a thick stratum of silty marine sand that blankets the coast and in this area appears to underlie a small raised delta which relates to local marine limit of 45-50 m. The date was intended to resolve the discrepancy between dates of marine overlap at the mouth and the head of Humber Arm (Bay of Islands) and to perhaps derive rates of glacial retreat resulting from marine calving. It is, however, somewhat younger than expected, considering that the mouth was deglaciated at least by 12 000±320 (GSC-1462; Lowdon and Blake, 1973) and the head of the bay by 12 700±300 (GSC-4272; Blake, 1988). Perhaps the explanation lies in the fact that the date relates to the upper part of the deepwater unit, rather than the base. Together, the dates show that the bay was deglaciated by calving prior to 13 ka and that the duration of the 50 m regression from marine limit to present sea level was about 2 ka.

GSC-5044 Cape Ray 3980±60
$\delta^{13}C$= -23.9‰

The wood (*Picea*; identified by R.J. Mott (Wood Report No. 90-35)) was rooted in grus with peat above. Sample 80-GS-15 was collected by D.R. Grant on June 24, 1980 from 0.5 km east of Cape Ray lighthouse, on the shore of Cape Ray Cove, Cabot Strait, southwestern extremity of Newfoundland (47º 37.24'N, 59º 17.87'W), at a depth of 0.2 m; submitted by D.R. Grant.

The sample (12.1 g dry weight) was treated with hot base, hot acid and distilled water rinses (noncalcareous). The treated sample (9.0 g) yielded 7.37 L of CO_2 gas. The age estimate is based on two counts for 2060 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net), and monthly backgrounds and standards (net) were 17.255±0.101, 2.074±0.027, and 28.244±0.132 cpm, respectively.

The uncorrected age is 3960±60.

Comment (**D.R. Grant**): The dated sample is the outer 1 cm (10 rings) of a root of a 25 cm diameter tree stump that was rooted in grus (weathered granite bedrock) and overlain by 0.5-1.0 m of sphagnum peat. The date shows that sea level has risen in the last 4 ka, but by how much is unknown because the original position of the tree relative to sea level is unknown. Together with a similar date of 3520±50 BP (GSC-2179; Lowdon et al., 1977) on a nearby coastal bog, the date also shows that there has been a paludification sufficient to replace forest with bog (perhaps due to an increasingly wetter climate). The site is also interesting in that a layer of beach boulders and cobbles occurs in the top 20-30 cm of the peat layer. The disjunct layer resembles similar clastic layers in coastal peat bogs on southern Burin Peninsula of Newfoundland which are tentatively attributed to the tsunami which struck southern Newfoundland following the 1929 Grand Banks earthquake (A. Ruffman, personal communication, 1994), but, if so it probably relates to a much earlier tsunami because it lies beneath 30 cm of peat.

GSC-5052 Woody Cove 8650±90
$\delta^{13}C$= -24.6‰

The wood (*Picea*; identified by H. Jetté (unpublished GSC Wood Report No. 90-28)) was enclosed in peat. Sample 80-GS-22 was collected by D.R. Grant on June 24, 1980 from coast of Woody Cove, Cabot Strait, 2.9 km southeast of Codroy village wharf, southwest Newfoundland (47º 51.75'N, 59º 22.30'W), at an elevation of about 25 m; submitted by D.R. Grant.

The sample (12.1 g dry weight) was treated with hot base, hot acid and distilled water rinses (noncalcareous). The treated sample (8.9 g) yielded 9.22 L of CO2 gas. The age estimate is based on two counts for 2025 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net), and monthly backgrounds and standards (net) were 9.633±0.081, 2.074±0.027, and 28.244±0.132 cpm, respectively.

The uncorrected age is 8640±90.

Comment (**D.R. Grant**): The wood sample comes from a 1 to 3 m thick bed of peaty material - one of a variety of sediments which have accumulated in a solution depression in gypsum which has been deepening since 125 ka, as indicated by last-interglacial organic beds lower in the sequence (Brookes et al., 1985), and is still developing as evidenced by a sinkhole on the surface. This upper organic layer is sandwiched between Wisconsin till and 5+ m of surficial sandy gravel. The gravel was thought to be outwash, so the peat was expected to date from a lateglacial interstade in the period 14-10 ka. However, its early Holocene age cannot be explained and the surface gravel unit must be reinterpreted.

Port aux Basques Series

A series of lake sediment samples from an unnamed lake 7.5 km northwest of Port aux Basques, Newfoundland (47º 36'55"N, 59º 12'45"W), at an elevation of about 12 m, was collected by T.W. Anderson on August 14, 1989; submitted by T.W. Anderson.

GSC-5038 Port aux Basques (I) 10 900±170
$\delta^{13}C$= -26.0‰

The lake sediment, gyttja sample AP-89-10 (552-554 cm; 135.9 g wet weight), was treated with hot acid and distilled water rinses; base treatment omitted (noncalcareous). The treated sample (56.3 g) yielded 2.93 L of CO_2 gas. The age estimate is based on two counts for 2000 minutes in the 2 L counter with a mixing ratio of 1.55. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 4.555±0.081, 1.032±0.028, and 17.834±0.163 cpm, respectively.

The uncorrected age is 11 000±170.

Comment (**T.W. Anderson**): The sample occurs at the base of an upper gyttja unit overlying grey sandy clay containing moss fragments. The sample dates a return to regional warming following a cool period inferred by the underlying clay. The clay unit corresponds to the Younger Dryas cooling of the North Atlantic Ocean. The date is about 0.5 ka too old because of "hardwater error" based on a comparison with a more reliable date of 10.4 ka (GSC-4999, McNeely and Jorgensen, 1992) for post-Younger Dryas climatic improvement.

GSC-5039 Port aux Basques (II) 11 400±150
$\delta^{13}C$= -24.9‰

The lake sediment, gyttja sample AP-89-10A (574-576 cm; 124.4 g wet weight), was treated with hot acid and distilled water rinses; base treatment was omitted (noncalcareous). The treated sample (41.6 g) yielded 3.17 L of CO_2 gas. The age estimate is based on one count for 3200 minutes in the 2 L counter with a mixing ratio of 1.43. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 4.325±0.064, 1.032±0.028, and 17.834±0.163 cpm, respectively.

The uncorrected age is 11 400±150.

Comment (**T.W. Anderson**): The sample occurs at the top of the lower gyttja unit under grey sandy clay. The sample dates the termination of an early warm interval prior to the onset of the Younger Dryas cool period indicated by the clay unit.

Nova Scotia (Fig. 3)

Timber Lake Series

A series of lake sediment samples from Timber Lake, about 7 km northwest of Tarbot, Cape Breton Island, Nova Scotia (46º 22′ 46″N, 60º 39′ 55″W), at an elevation of about 386 m, was collected by R.J. Mott on July 6, 1990; submitted by R.J. Mott.

Timber Lake is a small, relatively shallow lake in an area of shallow drift over bedrock on the southern Cape Breton Highlands. Dark brown to black gyttja to 253 cm in the core overlies mottled clay to 273 cm, pink-grey clay to 278 cm and stiff grey silty clay to 284 cm below the mud/water interface. The corer could not penetrate below 284 cm depth.

Beta-66130 Timber Lake (I) 5930±110

A gyttja sample from a depth of 138-142 cm was selected by H. Jetté to confirm whether that zone of the core related to 6 ka time period.

GSC-5259 Timber Lake (II) 11 200±200
$\delta^{13}C$= -22.0‰

The basal clayey gyttja sample 90-MS-06 (245-248 cm; 91.7 g wet weight), overlain by brown gyttja and underlain by mottled clay, was treated with hot acid and distilled water rinses; base treatment was omitted (noncalcareous). The treated sample (23.5 g) yielded 2.36 L of CO_2 gas. The age estimate is based on two counts for 2260 minutes in the 2 L counter with a mixing ratio of 1.88. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 4.711±0.090, 1.224±0.025, and 18.875±0.273 cpm, respectively.

The uncorrected age is 11 100±200.

Comment (**R.J. Mott**): GSC-5259 is probably about 1000 years too old, but suitable terrestrial material for AMS dating could not be obtained from the basal sediments for corroboration. The lack of stratigraphic changes similar to those found in many areas of the Maritimes that are indicative of a late-glacial climatic oscillation correlative with the Allerød / Younger Dryas oscillation also suggests that this date is too old (Stea and Mott, 1989). Therefore, this area was probably covered by ice until about 10 ka or was an area of renewed glaciation during the Younger Dryas cold interval.

GSC-5185 Pembroke Lakes 10 700±190
$\delta^{13}C$= -24.6‰

The lake sediment, basal clayey gyttja, was enclosed in gyttja and clay. Sample 90-MS-07 (500-503 cm) was collected by R.J. Mott on July 7, 1990, from Pembroke Lakes, about 8 km northwest of Kingross, Cape Breton Island, Nova Scotia (46º 29′ 46″N, 60º 59′ 45″W), at an elevation of about 406 m; submitted by R.J. Mott.

The sample (105.7 g wet weight) was treated with hot acid and distilled water rinses; base treatment was omitted (noncalcareous). The treated sample (28.5 g) yielded 2.51 L of CO_2 gas. The age estimate is based on 2 counts for 2100 minutes in the 2 L counter with a mixing ratio of 1.77. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 4.967±0.089, 1.224±0.025, and 18.875±0.273 cpm, respectively.

The uncorrected age is 10 700±190.

Comment (**R.J. Mott**): Pembroke Lakes are small, irregular interconnected lakes along the western edge of the Cape Breton Highlands. The core was taken with a modified Livingstone corer in the deepest basin in 12 m of water. The coring penetrated to 6.0 m below the mud/water interface. The core shows stiff, pink banded clay and silt at the base to 563 cm overlain by 9 cm of pink clay. Banded pink and black slightly organic sediment to 526 cm is overlain by pinkish grey clay to 505 cm and then by dark brown gyttja to the surface.

The date of 10 700±190 at the contact with the upper organic sediments and underlying more mineral sediments is probably anomalously old by 700 years judging by the usual age of about 10 ka for this contact at many other sites. The mineral sediment below the dated interval overlies a more organic zone that is similar to, although not as prominent as, many sites throughout the Maritimes where the sequence has been interpreted as being correlative with the Allerød / Younger Dryas climatic oscillation (Mott et al., 1986; Stea and Mott, 1989). Corroboration of this interpretation awaits further dating and pollen analysis.

Collins Pond Series II

Dates from Collins Pond site were reported in a previous date list (McNeely and McCuaig, 1991). Three new dates have been obtained: one AMS date from the same exposure as the dates reported previously at the western end of the section and two from the exposure at the eastern end of the section.

Organic sediment (peat) overlying till and overlain by diamicton was exposed in a coastal section near Collins Pond, about 2 km southwest of St. Francis Harbour along the north coast of Chedabucto Bay, Nova Scotia (45º 25.8′N, 61º 20.3′W), (Stea and Mott, 1989). The western exposure showed a compressed peat bed bounded by thin layers of organic clay about 1-2 m above high tide level. The organic sediments rested on till and were covered by boulder gravel and diamicton in the bed of a small stream occupying the depression between drumlin ridges. The peat layer could be traced as a thin uneven seam (<10 cm thick) up the flank of the adjacent drumlin where it was overlain by up to 2 m of diamicton. At the eastern end of the section, distorted and irregular bodies of peat and organic silt overlie till and are overlain and incorporated into a gravelly diamicton. Collected by R.J. Mott and R.R. Stea September 4, 1986 and July 13, 1990; submitted by R.J. Mott.

Dates obtained previously are:
GSC-4475 10 900±100 (McNeely and McCuaig, 1991)
GSC-4367 11 800±100 (McNeely and McCuaig, 1991)
GSC-4474 12 700±130 (McNeely and McCuaig, 1991)

GSC-5273 Collins Pond (I) 11 100±110
$\delta^{13}C$= -30.1‰

The sample, peaty organics with willow twigs, 90-MS-13 (top 2 cm; 120.0 g wet weight) from the top of the eastern exposure, enclosed in diamicton and organic silt, was treated with cold base, hot acid, and distilled water rinses (noncalcareous). The treated sample (38.6 g) yielded 8.08 L of CO_2 gas. The age estimate is based on two counts for 2365 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 7.062±0.073, 2.196±0.038, and 28.279±0.131 cpm, respectively.

The uncorrected age is 11 100±110.

GSC-5230 Collins Pond (II) 11 400±100
$\delta^{13}C$= -26.8‰

The sample of organic silt and clay with willow twigs (90-MS-13 basal 2-3 cm; 154.9 g wet weight; *Salix* (willow) twigs are present according to R.J. Mott), enclosed in diamicton and organic silt, was treated with cold base, hot acid, and distilled water rinses (noncalcareous). The treated sample (76.5 g) yielded 8.17 L of CO_2 gas. The age estimate is based on one count for 3530 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 6.862±0.057, 2.055±0.028, and 28.334±0.123 cpm, respectively.

The uncorrected age is 11 400±100.

TO-3630 Collins Pond (III) 12 160±80

The sample of *Salix* (willow) twigs (MS-86-25 base: 39 mg dry weight) was obtained from near the base of the exposure from which GSC-4474 (12 700±130) was obtained.

Comment (**R.J. Mott**): The Collins Pond site has been interpreted by Stea and Mott (1989) as representing an interval following deglaciation when the climate ameliorated allowing vegetation to invade the area and organic sediments to accumulate, followed by climatic deterioration and renewed or revitalized glaciation of the area. Organic accumulation began after 12.1 ka rather than about 12.7 ka as indicated by the original basal date. Herb and shrub tundra-like vegetation characterized the site. This type of environment persisted until at least 11.8 ka (top 2 cm of peat bed), but this date may be somewhat anomalous judging by the basal AMS date and the new dates on the eastern exposure. The thin organic seam that dated 10.9 ka has a somewhat different but still treeless pollen spectrum. The overlying diamicton has a distinct fabric, indicating the deposit is till emplaced by ice flowing from the east-northeast, opposite to the northwest-southeast fabric of the till forming the drumlins.

The new dates from the eastern exposure show that the peat formed between 11.4 and 11.1 ka (assuming they are valid) and that the sediment was subsequently deformed and overlain by diamicton. This strengthens the interpretation of possible local glacial activity after 10.9 ka (Mott and Stea, 1993).

Hector Lake Series

A series of lake sediment samples from Hector Lake, 3.5 km north of Port Hawkesbury, Cape Breton Island, Nova Scotia (45° 39′ 8″N, 61° 21′ 45″W), at an elevation of 103 m, was collected by R.J. Mott on July 15, 1990; submitted by R.J. Mott.

Hector Lake is a small, narrow, shallow lake on the flank of the upland area north of Canso Strait. The core was taken in the area of maximum water depth of 4 m. A total of 479 cm of sediment was recovered. Brown gyttja extends from the mud/water interface to a depth of 383 cm. This overlies a lighter brown silty clay gyttja and brownish grey clayey gyttja to 421 cm. A black organic clay layer 3 cm thick separates the above from the underlying soft pink clay that becomes stiffer with more sand gravel particles towards the base of the core at 479 cm.

TO-3974 Hector lake (I) 9810±90

Sample 90-MS-15 consisted of small unidentified twigs (13.7 mg dry weight) which were enclosed in organic gyttja at a depth of 388 cm.

TO-3975 Hector Lake (II) 11 910±90

Sample 90-MS-15 (II) consisted of small unidentified twig fragments (16.5 mg dry weight) which were enclosed in clayey organic lake sediment at a depth of 417 cm.

GSC-5283 Hector Lake (III) 13 400±170
$\delta^{13}C$= -24.2‰

The lake sediment, basal clayey gyttja, sample 90-MS-15 (421-424 cm; 114.0 g wet weight), with gyttja above and pink clay below, was treated with hot acid and distilled water rinses; base treatment was omitted (noncalcareous). The treated sample (47.3 g) yielded 2.77 L of CO_2 gas. The age estimate is based on one count for 3710 minutes in the 2 L counter with a mixing ratio of 1.60. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 3.427±0.063, 1.216±0.026, and 18.122±0.101 cpm, respectively.

The uncorrected age is 13 400±170.

Comment (**R.J. Mott**): The basal date of 13.4 ka (GSC-5283) is shown to be anomalously old by about 1500 years by the AMS date on twigs of 11.9 ka (TO-3975) recovered from the sediment increment immediatley above the sediment dated by conventional bulk dating. Although the Younger Dryas cold interval is not represented by a prominent mineral zone as it is in many cores throughout the Maritimes (Mott et al., 1986; Stea and Mott, 1989), the date on the basal organic layer and the date of 9.8 ka (TO-3974) above suggest that the light brown silty clay gyttja layer probably represents the cold interval. Further studies of organic content and pollen analysis as well as more dating will be needed to corroborate this conclusion.

GSC-5138 Marie-Joseph 110±70
$\delta^{13}C$= -31.5‰

The peat was enclosed in gravel. Sample FBP 90 (Biodatabase No. 90041) was collected by J. Shaw and R.B. Taylor on December 11, 1990, from 40 km east of the town of Sheet Harbour, Fancy's Point, Nova Scotia (44° 58.0′N, 62° 3.18′W), at an elevation of 1.52 m; submitted by J. Shaw.

The sample (38g dry weight) was treated with cold base, hot acid, and distilled water rinses (noncalcareous). The treated sample (20.1 g) yielded 7.72 L of CO_2 gas. The age estimate is based on two counts for 1700 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 18.023±0.111, 1.150±0.032, and 18.513±0.124 cpm, respectively.

The uncorrected age is 220±70.

Comment (**J. Shaw** and **R.B. Taylor**): This sample was collected at high water mark on the shore of a back-barrier lagoon. It was from the lowest 20 mm of a layer of dark, well-humified, freshwater peat, 0.24 m thick, which overlies gravel beach ridges on a prograded gravel barrier which formed during a period of sea-level rise - the earliest (and lowest) beach ridges on the barrier are completely submerged in the lagoon at high tide. It was hoped that this sample would help estimate the age of the barrier. However, it probably postdates barrier emplacement by a considerable time.

Pye Lake Series

Pye Lake is on the east coast of Nova Scotia, about 0.75 km northwest of the town of Marie Joseph (44° 58′ 30″N, 62° 05′ 27″W), at an elevation of 5 m. The lake, with a maximum depth of 8 m, occupies a shallow bedrock basin in a glaciated terrain with some low drumlins. The core was obtained with a modified Livingstone corer by R.J. Mott and others on July 12, 1990 and totalled 606 cm of sediment. Dark brown gyttja to a depth of 513 cm overlay 22 cm of slightly organic clay over organic silty clay grading downwards to black and grey clay at 568 cm. Below 568 cm the grey clay and pink clay changes to stiff banded clay at 606 cm depth. Samples were submitted by R.J. Mott.

GSC-4684 Pye Lake (I) (85-90 cm) 1140±80
$\delta^{13}C$= -29.0‰

The dark brown gyttja (sample 90-MS-11; 63.2 g wet weight), enclosed in gyttja, was treated with hot acid and distilled water rinses; base treatment was omitted (noncalcareous). The treated sample (6.3 g) yielded 2.9 L of CO_2 gas. The age estimate is based on two counts for 2040 minutes in the 2 L counter with a mixing ratio of 1.48. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 15.590±0.124, 1.216±0.035, and 18.123±0.108 cpm, respectively.

The uncorrected age is 1210±80.

Comment (**R.J. Mott**): The date gives the age for a prominent birch decline and rise in spruce and fir seen near the top of the pollen diagram.

GSC-4683 Pye Lake (II) (323-327 cm) 4440±90 $\delta^{13}C$= -29.6‰

The dark brown gyttja (sample 90-MS-11; 70.0 g wet weight), enclosed in gyttja, was treated with hot acid and distilled water rinses; base treatment was omitted (noncalcareous). The treated sample (8.8 g) yielded 2.7 L of CO_2 gas. The age estimate is based on one count for 3470 minutes in the 2 L counter with a mixing ratio of 1.70. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 10.332±0.099, 1.216±0.035, and 18.123±0.108 cpm, respectively.

The uncorrected age is 4510±90.

Comment (**R.J. Mott**): The date provides an age for the prominent hemlock decline seen in the pollen diagram.

GSC-5552 Pye Lake (III) (423-427 cm) 8120±140 $\delta^{13}C$= -30.5‰

The dark brown gyttja (sample 90-MS-11; 71.60 g wet weight), enclosed in gyttja, was treated with hot acid and distilled water rinses; base treatment was omitted (noncalcareous). The treated sample (12.8 g) yielded 2.1 L of CO_2 gas. The age estimate is based on one count for 3731 minutes in the 2 L counter with a mixing ratio of 2.05. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 6.526±0.101, 1.216±0.035, and 18.123±0.108 cpm, respectively.

The uncorrected age is 8200±140.

Comment (**R.J. Mott**): The date provides an age for a prominent birch and spruce decline and rise in pine seen in the pollen diagram.

GSC-5249 Pye Lake (IV) (511-513 cm) 10 000±160 $\delta^{13}C$= -25.3‰

The somewhat silty brown gyttja (sample 90-MS-11; 96.0 g wet weight), with gyttja above and 22 cm of silty clay below, was treated with hot acid and distilled water rinses; base treatment omitted (noncalcareous). The treated sample (34.8 g) yielded 2.15 L of CO_2 gas. The age estimate is based on one count for 3530 minutes in the 2 L counter with a mixing ratio of 2.09. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 5.266±0.088, 1.110±0.028, and 18.388±0.133 cpm, respectively.

The uncorrected age is 10 000±160.

Comment (**R.J. Mott**): The sample dates the return to organic sedimentation following an interval of minerogenic sedimentation and the beginning of dominance of tree pollen as seen in the pollen profile.

GSC-5242 Pye Lake (V) (535-541 cm) 10 800±190 $\delta^{13}C$= -25.6‰

The clayey gyttja (sample 90-MS-11; 100.3 g wet weight), with 22 cm of clay above and organic sediment below, was treated with hot acid and distilled water rinses; base treatment was omitted (noncalcareous). The treated sample (12.1 g) yielded 1.69 L of CO_2 gas. The age estimate is based on one count for 3900 minutes in the 2 L counter with a mixing ratio of 2.61. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 4.765±0.102, 1.110±0.028, and 18.388±0.133 cpm, respectively.

The uncorrected age is 10 800±190.

Comment (**R.J. Mott**): The sample dates the change from organic to mineral dominated sedimentation and a change from shrub to herb pollen domination as seen in the pollen diagram.

GSC-5543 Pye lake (VI) (549.5-553 cm) 12 200±220 $\delta^{13}C$= -23.3‰

The basal clayey gyttja (sample 90-MS-11; 97.60 g wet weight), enclosed in clayey gyttja, was treated with hot acid and distilled water rinses; base treatment was omitted (noncalcareous). The treated sample (41.4 g) yielded 1.6 L of CO_2 gas. The age estimate is based on one count for 3915 minutes in the 2 L counter with a mixing ratio of 2.81. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 4.003±0.100, 1.214±0.024, and 18.297±0.145 cpm, respectively.

The uncorrected age is 12 200±220.

Comment (**R.J. Mott**): The sample provides an minimum age for deglaciation of the site and for the beginning of organic deposition.

General Comment (**R.J. Mott**): Pye Lake is one of a number of sites along the eastern seaboard of Nova Scotia that indicates that the region was deglaciated relatively early, i.e. prior to 12.0 ka. The site also records sedimentation changes in the basal sediments characteristic of a late-glacial climatic oscillation that has been correlated with the Allerød / Younger Dryas climatic event of Europe (Mott et al., 1986). Pollen analysis corroborates this interpretation with changes to herb from shrub domination that is dated in the core at 10.8 ka. Organic sedimentation resumed after the cool interval dated at 10.0 ka when pollen analysis shows a reversion to shrub vegetation and then the migration of trees into the area. By about 8.0 ka, white pine began to increase at the expense of birch and spruce. Hemlock followed but crashed prior to 4.4 ka and birch proliferated. Declining birch and increasing balsam fir and spruce culminated about 1.1 ka with the dominance of these latter taxa.

Piper Lake Series

A series of wood and small twigs samples from Piper Lake, about 15 km southeast of Hopewell, Pictou County, Nova Scotia (45° 20′ 50″N, 62° 39′ 38″W), at an elevation of 175 m, was collected by R.J. Mott on July 14, 1990; submitted by R.J. Mott.

TO-3973 Piper Lake (I) (478-484 cm) 10 890±80

The wood and small twigs comprising sample 90-MS-14 (0.022 g dry weight) were enclosed in silty-clayey gyttja.

GSC-5252 Piper Lake (II) (486-489 cm) 12 300±200 $\delta^{13}C$= -23.8‰

The lake sediment, basal clayey gyttja sample 90-MS-14 (61.2 g wet weight), overlain by grey / brown silty gyttja and underlain by clay, was treated with hot acid and distilled water rinses; base treatment was omitted (noncalcareous). The treated sample (24.5 g) yielded 2.22 L of CO_2 gas. The age estimate is based on two counts for 2340 minutes in the 2 L counter with a mixing ratio of 2.02. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 3.982±0.087, 1.213±0.021, and 18.379±0.137 cpm, respectively.

The uncorrected age is 12 300±200.

Comment (**R.J. Mott**): A core extending 518 cm below the mud/water interface shows brown gyttja with some coarse detritus grading to mottled grey/brown gyttja that becomes more silty and clayey to a depth of 471 cm. Below 471 cm, a 3 cm thick clay layer overlies darker slity/clayey gyttja to 489 cm and stiff grey/brown sandy clay to 518 cm. The interval from which the small twigs used for AMS dating (TO-3973) were taken is only 2 cm above the the interval used for the bulk conventional date (GSC-5252). The difference of 1400 years in the two dates suggests that the lower age is probably anomalous. The AMS date indicates that organic accumulation began at the site just before onset of the Younger Dryas cold interval and little time had elapsed since deglaciation of the area. This is one of several sites where the pre-Younger Dryas interval appears to be very short in contrast to numerous sites throughout the Maritimes where this interval is recorded by a much longer and better defined sedimentary interval (Mott et al., 1986; Stea and Mott, 1989).

Hirtles Beach Series

The Hirtles Beach site is located along Hartling Bay on the south coast of Nova Scotia, southwest of Lunenburg (44º 16'N, 64º 16'W), at an elevation of 3-4 m. Coastal erosion has exposed 20 cm of woody and matted peat over 20 cm of silty clay with organic seams and twigs that overlies a bouldery diamicton; the entire sequence is overlain by sand. The exposure was originally sampled by R. Addison for R.B. Taylor on July 16, 1986 and resampled by R.B. Taylor and R.R. Stea in May 1990; samples submitted by R.J. Mott.

GSC-5248 Hirtles Beach (I) 11 700±110
$\delta^{13}C$= -27.9‰

The peat sample 90-PL-26 (TU-1-86) from top 2 cm of matted peat (30.4 g wet weight), enclosed in peat and clay, was treated with cold base, hot acid, and distilled water rinses (noncalcareous). The treated sample (9.3 g) yielded 6.50 L of CO_2 gas. The age estimate is based on one count for 2345 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 6.565±0.067, 2.055±0.028, and 28.334±0.123 cpm, respectively.

The uncorrected age is 11 700±110.

TO-3628 Hirtles Beach (II) 12 270±90

The willow (*Salix* sp.; identified by R.J. Mott) twig sample 90-PL-26 (TU-1-86) from layer of abundant twigs and/or roots at base of grey silty clay above the diamicton weighed 150 mg (dry weight).

GSC-5247 Hirtles Beach (III) 12 300±150
$\delta^{13}C$= -28.0‰

The basal peat sample 90-PL-26 (TU-1-86) from 2 cm below matted peat at top of grey silty clay with peat stingers (35.0 g wet weight) was treated with cold base, hot acid, and distilled water rinses (noncalcareous). The treated sample (9.3 g) yielded 3.83 L of CO_2 gas. The age estimate is based on one count for 2545 minutes in the 2 L counter with a mixing ratio of 1.18. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 3.961±0.059, 1.110±0.028, and 18.388±0.133 cpm, respectively.

The uncorrected age is 12 300±150.

Comment (**R.J. Mott**): Plants were present at the site at least 12 300 years ago as indicated by the AMS date TO-3628 and the conventional date GSC-5247 meaning that the area had been deglaciated prior to that time. Willow shrubs and other herbaceous plants growing in a depression on the eroding drumlin flank had twigs and roots incorporated in the accumulating grey silty clay. Increased organic production formed stingers in the clay and eventually a matted peat with abundant twigs accumulated for several hundred years. The two identical lower dates suggest that the clay accumulated rapidly or the conventional date may be somewhat anomalous. However organic accumulation lasted until at least 11.7 ka when the peat was covered by sand. Preliminary pollen analysis indicates that shrubs and herbs comprised the vegetation cover; no trees were present in the area. This site is similar to many throughout the Maritimes that indicate the vegetation was migrating into the area as the climate warmed following deglaciation. Cooling after about 11.0 ka led to the sites being covered by mineral sediments. This event has been correlated with the Allerød / Younger Dryas event of Europe (Mott et al., 1986; Stea and Mott, 1990).

GSC-5391 Blomidon Site 11 200±100
$\delta^{13}C$= -27.5‰

The peat was enclosed in organic silt/sand peat. Sample 89-MS-16 (28 cm) was collected by R.J. Mott on July 22, 1989, from the Blomidon Site at Blomidon on southeast coast of Blomidon Peninsula, North Mountain, about 15 km north of Wolfville, Nova Scotia (45º 13.5'N, 64º 22.56'W), at an elevation of about 23 m; submitted by R.J. Mott.

The sample (49.8 g wet weight) was treated with cold base, hot acid, and distilled water rinses (noncalcareous). The treated sample (12.2 g) yielded 8.0 L of CO_2 gas. The age estimate is based on one count for 3710 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 7.011±0.057, 2.234±0.029, and 28.421±0.132 cpm, respectively.

The uncorrected age is 11 200±100.

Comment (**R.J. Mott**): A roadside ditch exposure revealed 35 cm of compact fibrous peat with abundant twigs buried by up to 1.7 m of red, sandy/silty diamicton. Several centimetres of grey silty sand with minor organic seams occur beneath the peat and above the underlying till. Grey, clayey silt with organic seams (10 cm thick) overlies the peat.

Palynological results indicate that at about 11.7 ka sparse vegetation dominated by sedges (Cyperaceae) and various other herbaceous taxa characterized the area. Soon after, willow (*Salix*) shrubs were abundant bordering the depression where peat began to accumulate. Shrub birch (*Betula*) may have been present. Shrub birch became abundant as vegetation developed. Spruce (*Picea*) also began to invade the area about the same time and by 11.2 ka had formed an open spruce woodland. Shortly after 11.2 ka, probably at about 10.8 ka judging by other sites in Nova Scotia, climatic deterioration caused profound vegetation changes in the region. Spruce trees were decimated to be replaced by shrub birch and then willow as the climate continued to cool. By 10.6 ka, increased solifluction and other mass-wasting processes caused the organic sediments to be inundated by mineral sedimentation that eventually buried the site (Stea et al., 1992). This climatic oscillation has been correlated with the Allerød / Younger Dryas event of Europe (Mott et al., 1986).

GSC-5049 Tupper Lake 12 800±200
$\delta^{13}C$= -18.2‰

The basal organic lake sediment was enclosed in pink clay and gyttja. Sample 90-MS-15 (616-620 cm) was collected by H. Jetté on July 22, 1990, from Tupper Lake, on South Mountain, about 10 km southwest of Kentville, Nova Scotia (45º 1'N, 64º 35.3'W), at an elevation of about 200 m; submitted by R.J. Mott.

The sample (87.4 g wet weight) was treated with hot acid and distilled water rinses; base treatment was omitted (noncalcareous). The treated sample (33.7 g) yielded 2.25 L of CO_2 gas. The age estimate is based on one count for 3300 minutes in the 2 L counter with a mixing ratio of 1.98. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 3.679±0.080, 1.032±0.028, and 17.834±0.163 cpm, respectively.

The uncorrected age is 12 700±200.

Comment (**R.J. Mott**): The core from Tupper Lake (totalling 670 cm) shows medium to coarse grey/brown sand below 574 cm with seams and bands of clay at the base. Above 574 cm the silt and clay content increases to 553 cm where an orange silty clay band several centimetres thick is overlain by a similar thickness of a laminated dark brown to black silty organic layer to 541 cm depth. Above 541 cm there is coarsely banded, somewhat organic silt with mica flakes with increasing organic content to about 490 cm and then a lower organic content to about 420 cm depth. Light brown, faintly banded silty gyttja occurs to about 325 cm where a transition occurs from 420 cm to dark brown gyttja which continues to the top of the core (Dyck and Fyles, 1963). The bulk sediment date at 534-536 cm depth seems to be exceptionally old for the area, and the core does not show a prominent sediment change indicative of the Allerød/ Younger Dryas climatic oscillation seen at many other sites throughout the Maritimes (Mott et al., 1986; Stea and Mott, 1989). Not

enough terrestrial organic remains suitable for AMS dating could be found in the basal part of the core for comparison with the conventional date. Therefore, the validity of the basal date must await further dating and pollen analysis is required to show the presence or absence of a climatic oscillation which is not readily apparent (Mott, 1994).

Silver Lake Series

A series of lake sediment samples from Silver Lake at Lakeville, about 9 km northwest of Kentville, Nova Scotia (45º 6.81'N, 64º 35.67'W), at an elevation of 22 m, was collected by H. Jetté on July 21, 1989; submitted by R.J. Mott.

Silver Lake is a small kettle lake in outwash terrain in the Annapolis Valley. Coring was done in the central part of the lake in about 14 m of water. The preliminary coring penetrated 426 cm of sediment below the sediment / water interface. A nearby duplicate coring reached 435 cm depth. Both cores have similar stratigraphy but with slightly different unit increments. The primary core shows dark brown to black gyttja to 255 cm that is finely laminated at the base, overlying reddish brown fine to coarse sand with some fine gravel layers toward the base of the core. A clayey interval in the sand between 413 to 425 cm contains some organic matter content that reaches about 15% in the central part of the interval. Small twigs, including one identified as willow (*Salix* sp.) and used for AMS dating, occur in this zone. The twig used for AMS dating was from the duplicate core at a depth of 425 cm which is stratigraphically just below the interval 413-416 cm used for the conventional date.

GSC-5054 Silver Lake (I) (253-255 cm) — 10 700±180, $\delta^{13}C$= -29.8‰

The gyttja sample 89-MS-14, (45.1 g wet weight), enclosed in gyttja and silty sand, was treated with hot acid and distilled water rinses; base treatment was omitted (noncalcareous). The treated sample (14.8 g) yielded 2.31 L of CO_2 gas. The age estimate is based on two counts for 2200 minutes in the 2 L counter with a mixing ratio of 1.92. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 4.687±0.093, 1.032±0.028, and 17.834±0.163 cpm, respectively.

The uncorrected age is 10 700±180.

GSC-5053 Silver Lake (II) (413-416 cm) — 12 600±280, $\delta^{13}C$= -30.8‰

The silty gyttja sample 89-MS-14, (28.9 g wet weight), enclosed in silty gyttja and silty sand, was treated with hot acid and distilled water rinses; base treatment was omitted (noncalcareous). The treated sample (8.2 g) yielded 2.00 L of CO_2 gas. The age estimate is based on two counts for 2760 minutes in the 2 L counter with a mixing ratio of 2.29. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 3.674±0.120, 1.032±0.028, and 17.834±0.163 cpm, respectively.

The uncorrected age is 12 700±280.

Beta-61400
CAMS-5809 Silver Lake (III) (425 cm) — 11 350±60

The small twig sample 89-MS-14, (21 mg dry weight of *Salix* sp. (willow), identified by R.J. Mott), enclosed in silty gyttja and silty sand, was treated with acid and alkali prior to gas preparation.

Comment (**R.J. Mott**): Comparison of the AMS and conventional date indicates that the latter is anomalous. Carbonates in the basal part of the core suggest that hardwater error is the contaminating factor. The conventional bulk sediment date from 253-255 cm depth at the base of the upper organic sediments is also considered anomalous for the same reason. The organic interval in the sand is somewhat equivocal. Does it represent the pre-Younger Dryas interval as the age would indicate, or is it reworked pre-Younger Dryas organic material that was deposited with sand during the Younger Dryas cold interval? The nebulous character of this organic interval contrasts with more prominent late-glacial organic intervals at lake sites throughout the Maritimes (Mott et al., 1986; Stea and Mott, 1989) and thick late-glacial buried organic deposits bordering the Annapolis Valley (Mott and Stea, 1993) suggesting that the latter interpretation is a distinct possibility.

GSC-5048 Youngs Lake — 12 500±220, $\delta^{13}C$= -20.0‰

The basal organic lake sediment was enclosed in clay and gyttja. Sample 89-MS-12 (305-307 cm) was collected by H. Jetté on July 19, 1989, from Youngs Lake on North Mountain, about 12.5 km west of Bridgetown, Nova Scotia (44º 49.14'N, 65º 26.44'W), at an elevation of about 210 m; submitted by R.J. Mott.

The sample (103.8 g wet weight) was treated with hot acid and distilled water rinses; base treatment was omitted (noncalcareous). The treated sample (41.0 g) yielded 1.74 L of CO_2 gas. The age estimate is based on three counts for 4000 minutes in the 2 L counter with a mixing ratio of 2.59. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 3.790±0.097, 1.049±0.019, and 17.851±0.099 cpm, respectively.

The uncorrected age is 12 400±220.

Comment (**R.J. Mott**): Youngs Lake occupies a small bedrock basin in basalt terrane of the North Mountain. The core taken in the central part of the lake shows dark brown, coarse detritus gyttja that contains less detritus toward a depth of 279 cm below the mud/water interface. This overlies a lighter yellowish brown gyttja of lower organic content and then darker and more clayey gyttja to 295 cm depth. Below is pinkish grey clay to a depth of 328 cm and fine gravel and pinkish clay with gravel to the base of the core at 377 cm depth.

This site does not have a prominent late-glacial reversion to minerogenic sediment seen at many sites throughout the Maritimes that has been correlated with the Allerød / Younger Dryas climatic oscillation (Mott et al., 1986; Stea and Mott, 1989). The lighter coloured, more mineral sediment between about 280 and 293 cm depth may represent the Younger Dryas interval, but pollen analysis will be required to clarify the record. However, the basal date of 12.5 ka is considered to be anomalously old when compared to other reliable dates in the region.

Bower Lake Series

A series of lake sediment samples from Bower Lake, just west of East Kemptville, and about 15.5 km northeast of Carleton, Nova Scotia (44º 5.24'N, 65º 46.56'W), at an elevation of about 73 m, was collected by R.J. Mott on July 17, 1989; samples submitted for conventional dating by R.J. Mott.

Bower Lake is a small lake on granite terrane covered by glacial deposits. The lake has an irregular bottom with a maximum depth of 4 m. The coring penetrated to a depth of 680 cm below the mud/water interface. Basal, soft grey clay was encountered at 660 cm above which a transition zone of dark grey clay with organic streaks graded into olive, slightly silty gyttja. The latter changes to dark brown silty gyttja to 632 cm. From 632 to 612 cm the sediment becomes a dark grey brown colour and consists of more silty gyttja with pebbles and blebs of lighter sediment. Above this is dark grey brown gyttja that becomes dark brown algal gyttja to the surface.

Beta-66129 Bower Lake (I) (369-371 cm) 5930±110

A brown silty gyttja sample (99 g wet weight) from a depth of 369-371 cm in core 89-MS-09 was submitted by H. Jetté to ascertain the depth related to 6 ka.

GSC-5022 Bower Lake (II) (609-611 cm) 9820±160 $\delta^{13}C$= -25.8‰

The brown silty gyttja sample 89-MS-09 (85.7 g wet weight), enclosed in silty gyttja, was treated with hot acid and distilled water rinses; base treatment was omitted (noncalcareous). The treated sample (19.1 g) yielded 1.98 L of CO_2 gas. The age estimate is based on one count for 3900 minutes in the 2 L counter with a mixing ratio of 2.24. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 5.229±0.094, 0.990±0.030, and 17.773±0.104 cpm, respectively.

The uncorrected age is 9830±160.

GSC-5023 Bower Lake (III) (632.5-634.5 cm) 10 700±170 $\delta^{13}C$= -26.1‰

The brown silty gyttja sample 89-MS-09 (104.5 g wet weight), enclosed in silty gyttja, was treated with hot acid and distilled water rinses; base treatment was omitted (noncalcareous). The treated sample (19.8 g) yielded 2.59 L of CO_2 gas. The age estimate is based on two counts for 2000 minutes in the 2 L counter with a mixing ratio of 1.72. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 4.677±0.090, 0.990±0.030, and 17.773±0.104 cpm, respectively.

The uncorrected age is 10 700±170.

GSC-5024 Bower Lake (IV) (653-656 cm) 12 400±220 $\delta^{13}C$= -23.3‰

The basal silty gyttja sample 89-MS-09 (116.9 g wet weight), with grey clay below and silty gyttja above, was treated with hot acid and distilled water rinses; base treatment was omitted (noncalcareous). The treated sample (52.2 g) yielded 2.35 L of CO_2 gas. The age estimate is based on two counts for 2000 minutes in the 2 L counter with a mixing ratio of 1.91. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 3.789±0.094, 0.990±0.030, and 17.773±0.104 cpm, respectively.

The uncorrected age is 12 400±220.

Comment (**R.J. Mott**): All the ages appear to be reliable although there is the possibility that the basal date on organic poor sediment in the recently deglaciated terrain may be somewhat anomalous. If valid the date provides a minimum age for deglaciation. The dates of 10.7 ka (GSC-5023) and 9.8 ka (GSC-5022) bracket an interval of greater mineral content that relates in many areas in the Maritimes to a cold interval correlated with the Younger Dryas (Mott et al., 1986; Stea and Mott, 1989). Beta-66129 relates to the pollen profile around 6 ka.

GSC-5040 St. Mary Bay 970±70 $\delta^{13}C$= -23.5‰

The wood (*Picea*; identified by H. Jetté (unpublished GSC Wood Report No. 90-26)) had till below and tidal clay above. Sample 79-GS-174 was collected by D.R. Grant on July 31, 1974 from the head of St. Mary Bay (Bay of Fundy), about 10 km south of town of Digby, Nova Scotia (44º 34.94'N, 65º 51.49'W), at a depth of 1.3 m; submitted by D.R. Grant.

The sample (13.4 g dry weight) was treated with hot base, hot acid and distilled water rinses (noncalcareous). The treated sample (9.1 g) yielded 8.79 L of CO_2 gas. The age estimate is based on two counts for 2000 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net), and monthly backgrounds and standards (net) were 25.113±0.167, 2.074±0.027, and 28.244±0.132 cpm, respectively.

The uncorrected age is 940±70.

Comment (**D.R. Grant**): The dated material comes from the inner third of a root of a 10 cm diameter tree stump that is rooted in till 1.30 m below mean higher high water and overlain by tidal marsh mud which has been aggrading because of rising sea level. Together with the age of 2090±70 BP (GSC-2911; Blake, 1983) on a nearby stump at -2.55 m, this date shows that sea level in upper St. Mary Bay has been rising relatively steadily at about 12-13 cm per century for the past two millenia. This compares with an average rate of 30 cm per century for the Bay of Fundy region over the past 4 ka (Grant, 1970).

New Brunswick (Fig. 4)

Harrigan Lake Series

A series of lake sediment samples from Harrigan Lake, Rockwood Park, 5 km southeast of Saint John, New Brunswick (45° 19'N, 66° 4'W), at an elevation of 51 m, was collected by A. McAslan, H. Black, and D.J. Rawlence on August 15, 1989; submitted by D.J. Rawlence.

GSC-5005 Harrigan Lake (I) (215-220 cm) 2120±100 $\delta^{13}C$= -30.8‰

The lake sediment sample H.L.C.1; S.1 (98.8 g wet weight), enclosed in lake sediment and mud, was treated with hot acid and distilled water rinses; base treatment was omitted (noncalcareous). The treated sample (5.9 g) yielded 2.56 L of CO_2 gas. The age estimate is based on three counts for 3000 minutes in the 2 L counter with a mixing ratio of 1.74. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 13.669±0.152, 1.013±0.027, and 18.000±0.102 cpm, respectively.

The uncorrected age is 2210±100.

GSC-5007 Harrigan Lake (II) (397-402.5 cm) 4410±100 $\delta^{13}C$= -34.2‰

The lake sediment sample H.L.C.1; S.2 (95.0 g wet weight), enclosed in mud and clay, was treated with hot acid and distilled water rinses; base treatment was omitted (noncalcareous). The treated sample (5.3 g) yielded 3.02 L of CO_2 gas. The age estimate is based on two counts for 2000 minutes in the 2 L counter with a mixing ratio of 1.48. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 10.208±0.101, 1.013±0.027, and 18.000±0.102 cpm, respectively.

The uncorrected age is 4560±100.

GSC-5009 Harrigan Lake (III) (670-675 cm) 10 800±130 $\delta^{13}C$= -33.3‰

The lake sediment sample H.L.C.1; S.3 (98.0 g wet weight), enclosed in mud and clay, was treated with hot acid and distilled water rinses; base treatment was omitted (noncalcareous). The treated sample (10.5 g) yielded 4.83 L of CO_2 gas. The age estimate is based on two counts for 2000 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 4.605±0.060, 1.013±0.027, and 18.000±0.102 cpm, respectively.

The uncorrected age is 11 000±130.

GSC-5011 Harrigan Lake (IV) (700-705 cm) 11 700±120 $\delta^{13}C$= -30.0‰

The lake sediment sample H.L.C.1; S.4 (89.7 g wet weight), enclosed in mud, was treated with hot acid and distilled water rinses; base treatment was omitted (noncalcareous). The treated sample (13.7 g) yielded 3.85 L of CO_2 gas. The age estimate is based on one count for 3900 minutes in the 2 L counter with a mixing ratio of 1.16. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 4.160±0.051, 1.013±0.027, and 18.000±0.102 cpm, respectively.

The uncorrected age is 11 800±120.

GSC-5013 Connor's Lake 5180±70 $\delta^{13}C$= -29.0‰

The lake sediment was enclosed in mud. Sample C.L. S1 was collected by R.J. Mott and D.J. Rawlence in August 1986, from Connor's Lake, 1 km south of Highway 1, 5 km northwest of Lorneville, 2 km southwest of Ludgate Lake, Saint John County, New Brunswick (45° 11'N, 66° 14'W), at an elevation of 70 m; submitted by D.J. Rawlence.

The sample (55.0 g wet weight) was treated with hot acid and distilled water rinses; base treatment was omitted (noncalcareous). The treated sample (14.8 g) yielded 6.69 L of CO_2 gas. The age estimate is based on two counts for 2000 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 14.741±0.095, 2.095±0.026, and 28.326±0.128 cpm, respectively.

The uncorrected age is 5250±70.

Bacon Lake Series

A series of lake sediment samples was collected by H. Jetté on July 13, 1989, from Bacon Lake, about 1.75 km north of Greenwich Centre, northwest side of Long Reach, north of Saint John, New Brunswick (45° 31.57'N, 66° 27.4'W), at an elevation of about 90 m; submitted by R.J. Mott.

Bacon Lake is a small shallow lake in a depression between uplands at the north end of Long Reach at the southern end of the Saint John River valley. Maximum water depth is about 2 m. The area was deglaciated relatively early as the ice retreated up the Saint John Valley.

The core from the central part of the lake showed 500 cm of dark brown gyttja overlying a lighter brown clayey sediment to 568 cm below the mud/water interface. Below this, a black clayey gyttja to 576 cm overlies a pinkish brown clay to about 595 cm which in turn overlies a coarsely banded, brown clayey gyttja to about 613 cm. Brownish grey clay extends below to the base of the core at 662 cm depth.

GSC-5641 Bacon Lake (I) (308-312 cm) 5120±140 $\delta^{13}C$= -22.5‰

The lake sediment, gyttja sample 89-MS-05 (42.5 g wet weight), enclosed in light clayey gyttja, was treated with hot acid and distilled water rinses; base treatment was omitted (noncalcareous). The treated sample (4.5 g) yielded 1.47 L of CO_2 gas. The age estimate is based on two counts for 2135 minutes in the 2 L counter with a mixing ratio of 2.97. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 9.678±0.151, 1.284±0.021, and 18.219±0.103 cpm, respectively.

The uncorrected age is 5080±140.

GSC-5032 Bacon Lake (II) (501-503 cm) 8890±150 $\delta^{13}C$= -26.7‰

The gyttja sample 89-MS-05 (79.0 g wet weight), enclosed in light clayey gyttja, was treated with hot acid and distilled water rinses; base treatment was omitted (noncalcareous). The treated sample (13.3 g) yielded 2.77 L of CO_2 gas. The age estimate is based on two counts for 2060 minutes in the 2 L counter with a mixing ratio of 1.63. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 5.875±0.090, 1.032±0.028, and 17.834±0.163 cpm, respectively.

The uncorrected age is 8920±150.

GSC-5033 Bacon Lake (III) 11 300±240 $\delta^{13}C$= -26.8‰

The black gyttja sample 89-MS-05 (568-570 cm; 72.6 g wet weight), enclosed in clay (pink) and light clayey gyttja, was treated with hot acid and distilled water rinses; base treatment was omitted (noncalcareous). The treated sample (18.1 g) yielded 2.72 L of CO_2 gas. The age estimate is based on two counts for 3925 minutes in the 2 L counter with a mixing ratio of 1.65. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 4.345±0.120, 1.032±0.028, and 17.834±0.163 cpm, respectively.

The uncorrected age is 11 300±240.

GSC-5034 Bacon Lake (IV) 13 700±210
$\delta^{13}C$= -29.2‰

The clayey gyttja sample 89-MS-05 (603-605 cm; 98.3 g wet weight), above clay, was treated with hot acid and distilled water rinses; base treatment was omitted (noncalcareous). The treated sample (36.6 g) yielded 3.05 L of CO_2 gas. The age estimate is based on two counts for 2025 minutes in the 2 L counter with a mixing ratio of 1.49. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 3.226±0.072, 1.032±0.028, and 17.834±0.163 cpm, respectively.

The uncorrected age is 13 700±210.

Comment (**R.J. Mott**): GSC-5641 was dated to verify the core depth related to 6 ka and thus provide a chronological control for the pollen assemblage at this site. The dates of 8.9 ka (GSC-5032) and 11.3 ka (GSC-5033) bracket the clayey gyttja layer that has been referred to the Younger Dryas cold interval of similar age at numerous sites throughout the Maritimes (Mott et al., 1986; Stea and Mott, 1989). Although this area was deglaciated relatively early, the basal date of 13.7 ka (GSC-5034) is probably somewhat anomalously old as is often the case with low organic content sediments in recently deglaciated areas.

Quebec (Fig. 5)

GSC-5021 Anticosti Island modern
$\delta^{13}C$= +1.86‰

The marine shells (*Chlamys islandica*; identified by C.G. Rodrigues) were enclosed in sand gravel. Sample 89-007-080 was collected by C.G. Rodrigues on May 27, 1989 from southeast of Anticosti Island, Gulf of St. Lawrence, Quebec (49° 18.78'N, 61° 0.82'W), in a water depth of 70 m; submitted by C.G. Rodrigues.

The sample (21.0 g dry weight) was treated with an acid leach to remove the outer 10% of the sample. The treated sample (18.8 g) yielded 4.27 L of CO_2 gas. The age estimate is based on two counts for 2000 minutes in the 2 L counter with a mixing ratio of 1.10. The count rates for the sample (net), and monthly backgrounds and standards (net) were 18.399±0.105, 1.049±0.019, and 17.851±0.099 cpm, respectively.

GSC-5145 Chaleur Bay 12 500±280
$\delta^{13}C$= + 3.0‰

The marine shells (*Mya*; identified by C.G. Rodrigues) were enclosed in sandy mud. Sample 90-031-027PC-(816-820 cm) was collected by C.G. Rodrigues on November 24, 1990 from Chaleur Bay, Gulf of St. Lawrence, Quebec (48° 19.48'N, 64° 23.54'W), in a water depth of 109 m; submitted by C.G. Rodrigues.

The sample (7.3 g dry weight) was not pre-treated. The sample (7.3 g) yielded 1.44 L of CO_2 gas. The age estimate is based on one count for 3720 minutes in the 2 L counter with a mixing ratio of 3.20. The count rates for the sample (net), and monthly backgrounds and standards (net) were 3.945±0.130, 1.150±0.032, and 18.513±0.124 cpm, respectively.

The uncorrected age is 12 400±280.

lac à Raymond Series

A series of lake sediment samples from lac à Raymond, 6 km north of New Richmond, Gaspésie, Quebec (48° 14'03"N, 65° 50'58"W), at an elevation of 50 m, was collected by H. Jetté, P. Richard, and R.J. Mott on July 7, 1989; submitted by H. Jetté.

GSC-5276 lac à Raymond (I) (288-291 cm) 3140±100
$\delta^{13}C$= -29.0‰

The lake sediment, gyttja sample MS-89-02 (68.0 g wet weight), enclosed in gyttja, was treated with hot acid and distilled water rinses; base treatment was omitted (noncalcareous). The treated sample (5.0 g) yielded 2.40 L of CO_2 gas. The age estimate is based on two counts for 2000 minutes in the 2 L counter with a mixing ratio of 1.87. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 12.163±0.126, 1.216±0.026, and 18.122±0.101 cpm, respectively.

The uncorrected age is 3200±100.

GSC-5279 lac à Raymond (II) (759-761 cm) 6470±110
$\delta^{13}C$= -29.7‰

The lake sediment, gyttja sample MS-89-02 (58.2 g wet weight), enclosed in gyttja, was treated with hot acid and distilled water rinses; base treatment was omitted (noncalcareous). The treated sample (12.0 g) yielded 2.72 L of CO_2 gas. The age estimate is based on two counts for 2220 minutes in the 2 L counter with a mixing ratio of 1.63. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 8.025±0.095, 1.216±0.026, and 18.122±0.101 cpm, respectively.

The uncorrected age is 6540±110.

Comments (**H. Jetté**): Two of three dates on bulk sediment for lac à Raymond have been redone on selected terrestrial material using AMS technology. GSC-4922 (McNeely and Jorgensen, 1993), a conventional date on gyttja, yielded an age of 12 000±240 while TO-1613 (McNeely and Jorgensen, 1993), an AMS date on terrestrial remains, returned an age of 10 150±220 (a difference of 1850 years). GSC-5279, a conventional date on gyttja, yielded an age of 6470±110 while TO-2694, an AMS date on terrestrial remains, returned an age of 5990±60 (a difference of 480 years). Sediment submitted for GSC-4922 contained 15% calcium carbonate and the sediment submitted for GSC-5279 contained 13.3% calcuim carbonate. The difference between conventional (bulk) and accelerator dates (on terrestrial remains), for this series, is attributed to the hardwater effect. A calcium carbonate equivalence of 10.5%, for GSC-5276, would suggest the possibility of contamination by hardwater effect at that level as well.

GSC-5855 rivière du Calumet 940±80
$\delta^{13}C$= -25.7‰

The wood (*Abies*, identified by H. Jetté (unpublished GSC Wood Report No. 94-88)), was overlain by detrital organic material and peat clay and underlain by 6 m of sand gravel. Sample VH-93-03 was collected by J-S. Vincent in July 1993 from a bluff at the mouth of rivière du Calumet, 10.2 km south-southwest of Pointe-aux-Anglais, on the north shore of the Gulf of St. Lawrence, Quebec (49° 35.8'N, 67° 13.3'W), at an elevation of 1-2 m; submitted by J-S. Vincent.

The sample (12.5 g dry weight) was treated with hot base, hot acid, and distilled water rinses (noncalcareous). The treated sample (5.1 g) yielded 4.95 L of CO_2 gas. The age estimate is based on two counts for 2090 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 16.408±0.094, 1.228±0.021, and 18.462±0.140 cpm, respectively.

The uncorrected age is 950±80.

Comment (**J-S. Vincent**): The date is too young for the Mitis shoreline (Dionne, 1992). However it seems correct for the level mentioned. Wood fragments and organic debris unconformably lying on Goldwait Sea fossiliferous clays and left at high tide level were probably buried by sand gravel brought by a storm or by a freshet of the rivière du Calmet. However, along the south shore of the St. Lawrence estuary, about 10 dates ranging from 0.6 to 0.9 ka have been acquired on wood and shells for the level just above the highest high tide level. A piece of wood from an emergent beach ridge, at the eastern tip of Île aux Coudres, yielded a date of 150±60 (UL-447) while a beach ridge with *Mytilus edulis* (Lumachelle), situated above the high tide level on an islet of the Mingan archipelago, was dated at 50±70 (QU-830; Dionne, pers. comm., 1995).

GSC-5133 St-Bernard-sur-mer 9580±80
$\delta^{13}C$= + 0.6‰

The marine shells (*Balanus hameri*; identified by P. LaSalle) were enclosed in stony marine clay. Sample 90-1 was collected by P. LaSalle on September 10, 1989 from 3 km southeast of St-Bernard-sur-mer, Quebec (47° 24' 30"N, 70° 20' 30"W), at an elevation of 35 m; submitted by P. LaSalle.

The sample (46.7 g dry weight) was treated with an acid leach to remove the outer 20% of the sample. The treated sample (32.1 g) yielded 7.26 L of CO_2 gas. The age estimate is based on one count for 3750 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net), and monthly backgrounds and standards (net) were 8.544±0.060, 2.149±0.028, and 28.117±0.107 cpm, respectively.

The uncorrected age is 9570±80.

Comment (**P. LaSalle**): This result is younger than the dates obtained on *Balanus hameri* shells collected in the Champlain Sea sediments in the Quebec City area and farther west, which cluster around 10.9-11.0 ka. However, as the high salinity waters migrated eastward as the Goldthwait sea was shoaling, one should also expect the migration of the high salinity fauna eastward. Accordingly, GSC-1533 at 12.5 ka, (Lowdon and Blake, 1973) appears quite reasonable especially since the collection site is located 100 km east of Quebec City.

GSC-5080 Petite-Rivière > 39 000
$\delta^{13}C$= -25.5‰

The wood (coniferous; identified by R.J. Mott (unpublished GSC Wood Report No. 90-36)) was enclosed in a sand pocket in modified clay. Sample PR-1-90 was collected by J-C. Dionne on July 12, 1990, from Petite-Rivière, Charlevoix, Quebec (47° 18.55'N, 70° 33.32'W), at an elevation of about 5 m; submitted by J-C. Dionne.

The sample (11.7 g dry weight) was treated with hot base, hot acid, and distilled water rinses (noncalcareous). The treated sample (8.2 g) yielded 9.50 L of CO_2 gas. The age estimate is based on one count for 2200 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 0.002±0.031, 1.003±0.022, and 17.754±0.102 cpm, respectively.

Comment (**J-C. Dionne**): The date is in agreement with other dates from organic debris from the same locality (Beta-45279: >39 390) and from îles-aux-Coudres (GSC-4252: >39 000; McNeely and McCuaig, 1991). Older dates were also obtained from the same locality on organic debris in lacustrine silt enclosed in a till deposit overlying varves (TO-3424: 52 900±1560) and a Th/U date from GEOTOP (60 000 to 70 000±5000) on a calcareous concretion, in situ, in varves underlying till. These dates clearly indicate the existence of a lacustrine event before the Laurentide Ice Sheet occupied the valley of the middle St. Lawrence estuary.

GSC-5135 Wakeham River 6760±90
$\delta^{13}C$= + 1.5‰

The marine shells (*Hiatella arctica* and *Mya truncata*; identified by R.A. Daigneault) were enclosed in coarse sand. Sample 90-DKA-31.5 was collected by R.A. Daigneault on June 27, 1990 from about 100 m south of the Wakeham River, 18 km west of the Kangiqsujuak on the east bank of a small river flowing toward the Wakeham River, Ungava Peninsula, Nouveau-Quebec (61° 33' 10"N, 72° 15' 50"W), at an elevation of 29 m; submitted by R.A. Daigneault.

The sample (26.1 g dry weight) was treated with an acid leach to remove the outer 20% of the sample. The treated sample (20.6 g) yielded 4.58 L of CO_2 gas. The age estimate is based on two counts for 2050 minutes in the 2 L counter with a mixing ratio of 1.00. The count rate for the sample (net), and monthly backgrounds and standards (net) were 7.988±0.069, 1.094±0.019, and 18.531±0.106 cpm, respectively.

The uncorrected age is 6760±90.

Comment (**R.A. Daigneault**): Broken shells in a prodeltaic sequence (alternating layers of silt and sand, shells in the coarser layers) on top of a massive clay unit. GSC-5135 provides a minimum age for the deglaciation of the Wakeham River valley.

GSC-5200 Promontoire de Martigny 3720±90
$\delta^{13}C$= + 1.9‰

The marine shells (*Mya truncata*; identified by D. Bruneau) were enclosed in sand. Sample PM-89-2 was collected by J.T. Gray and D. Bruneau on July 29, 1989 from west of the Promontoire de Martigny, Ungava, Nouveau-Quebec (62° 6'N, 72° 47'W), at an elevation of 14 m; submitted by D. Bruneau.

The sample (24.8 g dry weight) was treated with an acid leach to remove the outer 20% of the sample. The treated sample (21.5 g) yielded 4.62 L of CO_2 gas. The age estimate is based on one count for 3585 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net), and monthly backgrounds and standards (net) were 11.509±0.064, 1.087±0.025, and 18.225±0.161 cpm, respectively.

The uncorrected age is 3690±90.

Rivière Jacquère Series

GSC-5192 Rivière Jacquère (I) 4080±100
$\delta^{13}C$= + 1.9‰

The marine shells (*Mya truncata*; identified by D. Bruneau) were enclosed in marine silty sand. Sample RJ-IC was collected by J.T. Gray and D. Bruneau before 1991 from the first major tributary of rivière Jacquère, about 1 km upstream from the mouth of the river, Ungava Peninsula, Quebec (62° 7'N, 72° 57'W), at an elevation of 2.2 m; submitted by D. Bruneau.

The sample (24.4 g dry weight) was treated with an acid leach to remove the outer 20% of the sample. The treated sample (19.4 g) yielded 4.10 L of CO_2 gas. The age estimate is based on two counts for 1800 minutes in the 2 L counter with a mixing ratio of 1.09. The count rates for the sample (net), and monthly backgrounds and standards (net) were 11.013±0.091, 1.087±0.025, and 18.225±0.161 cpm, respectively.

The uncorrected age is 4050±100.

Comment (**D. Bruneau**): Sample RJ-IC overlies a detritus bed that was dated at 4.2 ka (Sample RJ-ID; Beta-34766, below). The AMS date for the detritus is probably too old because the sample was situated less than a metre above the high water mark; GSC-5192 will confirm the AMS date.

Beta-34766 Rivière Jacquère (II) 4240±130

Sample RJ-ID, taken from a detritus bed and overlain by sample RJ-IC (GSC-5192), was submitted to Beta Analytic, Inc. for dating by D. Bruneau.

GSC-5165 Rivière Jacquère (III) 5540±100
$\delta^{13}C$= + 1.5‰

The marine shells (*Hiatella arctica*; identified by D. Bruneau) were enclosed in silty sand. Sample LT-5 was collected by J.T. Gray and D. Bruneau on July 16, 1989 from 1 km upstream along the rivière Jacquère, at the head of lac Tasialujjuaq, Ungava Peninsula, Quebec (62° 4'N, 73° 11'W), at an elevation of 13 m; submitted by D. Bruneau.

The sample (47.6 g dry weight) was treated with an acid leach to remove the outer 20% of the sample. The treated sample (32.5 g) yielded 7.12 L of CO_2 gas. The age estimate is based on two counts for 1800 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net), and monthly backgrounds and standards (net) were 9.301±0.100, 1.099±0.023, and 18.484±0.104 cpm, respectively.

The uncorrected age is 5520±100.

Comment (**D. Bruneau**): The age of this sample should date the delta feature and provide more information for the emergence curve in this area.

GSC-5178 Foul Bay 4550±100
$\delta^{13}C$= + 2.9‰

The marine shells (*Mya truncata*; identified by D. Bruneau) were enclosed in silty clay. Sample LT-4A was collected by J.T. Gray on July 14, 1989 from 7 km to the northeast of lac Tasialujjuaq, on the

shore of Foul Bay, Hudson Strait, Quebec (62° 10'N, 72° 59'W), at an elevation of 11 m; submitted by D. Bruneau.

The sample (28.4 g dry weight) was treated with an acid leach to remove the outer 20% of the sample. The treated sample (22.8 g) yielded 2.77 L of CO_2 gas (some gas lost during sample preparation). The age estimate is based on one count for 3247 minutes in the 2 L counter with a mixing ratio of 1.59. The count rates for the sample (net), and monthly backgrounds and standards (net) were 10.408±0.087, 1.087±0.025, and 18.225±0.161 cpm, respectively.

The uncorrected age is 4500±100.

Comment (**J.T. Gray** and **D. Bruneau**): This is the second in a series of two dates from the exposure. The date is in excellent conformity with the age of 4240±130 (Beta-34766) obtained for organic detritus immediately below the presently dated shell bed, which is probably infra-littoral. Contemporary sea-level was probably situated higher than the summit of the terrace at 4 m.

GSC-5134 Mont St. Hilaire 11 000±120
$\delta^{13}C$= - 2.3‰

The marine shells (*Mya truncata*; identified by V.K. Prest) were enclosed in sand. Sample PC11a/75 (c) was collected by V.K. Prest and J.V. Matthews, Jr. on June 16, 1975 from a borrow pit on south side of Mont St. Hilaire, Quebec (45° 31.8'N, 73° 8.5'W), at an elevation of 43±2 m; submitted by V.K. Prest.

The sample (28.3 g dry weight) was treated with an acid leach to remove the outer 20% of the sample. The treated sample (22.4 g) yielded 4.97 L of CO_2 gas. The age estimate is based on one count for 3920 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net), and monthly backgrounds and standards (net) were 4.671±0.050, 1.150±0.032, and 18.513±0.124 cpm, respectively.

The uncorrected age is 11 100±120.

Comment (**V.K. Prest**): (1) Shells (*Mya truncata*) in growth position in and on the vegetal debris were dated at 10 800±100 (GSC-2195, Lowdon and Blake, 1979); (2) Tiny pieces of wood were also present, one 6.3 x 1.8 cm piece was dated at 10 100±150 (GSC-2200, Lowdon and Blake, 1979); (3) The vegetal layer also contains abundant needles of spruce and larch, and one spruce cone; and (4) Remains of numerous beetles, as well as wasps and ants were present (details are presented in the unpublished GSC Fossil Arthropod Report No. 76-11, and Plant Macrofossil Report No. 76-9, J.V. Matthews, Jr.). Conclusion: The wood and shells from the vegetal layer should be redated. Other information both supports and contradicts the age discrepancy.

GSC-5352 Gatineau Park 4340±110
$\delta^{13}C$= -23.2‰

The wood, charcoal (unidentifiable; R.J. Mott (unpublished GSC Wood Report No. 91-55)) was enclosed in sand. Sample (80-90 cm) was collected by B. Lauriol on July 5, 1991, from a mine cave in Gatineau Park, Quebec (45° 28'N, 75° 55'W), at an elevation of 200 m; submitted by H. Jetté and B. Lauriol.

The sample (4.0 g dry weight) was treated with hot base, hot acid, and distilled water rinses (noncalcareous). The treated sample (2.1 g) yielded 2.27 L of CO_2 gas. The age estimate is based on two counts for 2000 minutes in the 2 L counter with a mixing ratio of 1.94. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 10.599±0.125, 1.238±0.028, and 18.133±0.104 cpm, respectively.

The uncorrected age is 4310±110.

Comment (**H. Jetté** and **B. Lauriol**): This date is part of a series which includes two other dates so far: UQ-1958 (50 cm; 2850±200 BP) and UQ-1652 (110 cm; 3147±120 BP). The whole sequence seems to cover the complete Holocene and results of pollen analysis indicate an age of approximately 7700 at a depth of 190 cm. This seems to indicate that one of the dates, UQ-1652, could be too young, possibly because of reworking or contamination of material prior to dating.

lac Dana Series

A series of peat samples from lac Dana, Quebec (50° 54' 10"N, 77° 20' 35"W), at an elevation of 244 m, was collected by P. Buteau on August 21, 1989; submitted by J.J. Veillette.

GSC-5017 lac Dana (I) 4380±60
$\delta^{13}C$= -27.8‰

The peat sample 7215 (220.0 g wet weight; *Kalmia* or *Ledum*; identified by R.J. Mott (unpublished GSC Wood Report No. 91-07)), was treated with cold base, hot acid, and distilled water rinses (noncalcareous). The treated sample (9.0 g) yielded 8.94 L of CO_2 gas. The age estimate is based on two counts for 2000 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 16.360±0.099, 2.080±0.026, and 28.377±0.129 cpm, respectively.

The uncorrected age is 4420±60.

Comment (**J.J. Veillette**): The date is on a thin (2 mm) slice of fine organic material obtained at 1.66 m depth from a 2.26 m section of peat along the eroded shoreline of the lake. This sample dates the passage from fen to bog in the area.

GSC-5015 lac Dana (II) 6700±70
$\delta^{13}C$= -26.7‰

The basal peat sample 7215 (449.9 g wet weight), underlain by clay, was treated with hot base, hot acid, and distilled water rinses (noncalcareous). The treated sample (27.2 g) yielded 11.27 L of CO_2 gas. The age estimate is based on one count for 3900 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 12.257±0.066, 2.095±0.026, and 28.326±0.128 cpm, respectively.

The uncorrected age is 6730±70.

Comment (**J.J. Veillette**): The date is on a thin (2 mm) slice of organics obtained at 2.26 m depth at the base of a peat section along the eroded shoreline of the lake. Provides a minimum age for the onset of paludification in the area.

Rupert River Series

A series of peat samples (7224) from Rupert River area, James Bay, Quebec (51° 21' 40"N, 78° 26' 0"W), at an elevation of 46 m, was collected by P. Buteau on August 23, 1989; submitted by J.J. Veillette.

GSC-5018 Rupert River (I) (1.16 m) 5370±70
$\delta^{13}C$= -26.6‰

The peat (72.9 g wet weight), was treated with cold base, hot acid, and distilled water rinses (noncalcareous). The treated sample (8.0 g) yielded 8.00 L of CO_2 gas. The age estimate is based on two counts for 2000 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 14.490±0.095, 2.080±0.026, and 28.377±0.129 cpm, respectively.

The uncorrected age is 5400±70.

Comment (**J.J. Veillette**): The date is on a thin (2 mm) slice of fine organic material obtained at 1.16 m depth in the fen to bog transition zone. This sample dates the passage from fen to bog in the area.

GSC-5019 Rupert River (II) 5830±70
(1.84 m) $\delta^{13}C$= -26.8‰

The peat (95.1 g wet weight) was treated with cold base, hot acid, and distilled water rinses (noncalcareous). The treated sample (9.1 g) yielded 6.60 L of CO_2 gas. The age estimate is based on two counts for 2000 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 13.678±0.092, 2.080±0.026, and 28.377±0.129 cpm, respectively.

The uncorrected age is 5860±70.

Comment (**J.J. Veillette**): The date is on a thin (2 mm) slice of organic material obtained at the 1.84 m level, 3 cm above the clay substrate. This date is a better estimate than GSC-5016 for the onset of paludification at this site, because the lowermost 3 cm of the peat sequence had been disturbed (cf. GSC-5016).

GSC-5016 Rupert River (III) 5350±60
(1.87 m) $\delta^{13}C$= -26.6‰

The basal peat (490.6 g wet weight), underlain by clay, was treated with cold base, hot acid, and distilled water rinses (noncalcareous). The treated sample (26.8 g) yielded 6.33 L of CO_2 gas. The age estimate is based on one count for 3200 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 14.504±0.077, 2.095±0.026, and 28.326±0.128 cpm, respectively.

The uncorrected age is 5380±60.

Comment (**J.J. Veillette**): The date is on a thin (2mm) slice of organic material obtained at the base of a 1.87 m section of peat resting on clay along the bank of the Rupert River. P. Buteau had warned that there was a possibility of disturbance in the lowermost part of the section (cf. GSC-5019).

GSC-5020 Cape Jones 270±70
$\delta^{13}C$= -27.4‰

The basal peat sample 7226 (34 cm), overlying a clayey silt, was collected by P. Buteau on August 24, 1989 from south of Cape Jones, Roggan River area, Quebec (54° 23' 0"N, 78° 28' 30"W), at an elevation of 11 m; submitted by J.J. Veillette.

The sample (204.1 g wet weight) was treated with cold base, hot acid and distilled water rinses (noncalcareous). The treated sample (12.7 g) yielded 5.14 L of CO_2 gas. The age estimate is based on two counts for 2000 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net), and monthly backgrounds and standards (net) were 17.102±0.100, 0.990±0.030, and 17.773±0.104 cpm, respectively.

The uncorrected age is 310±70.

Comment (**J.J. Veillette**): This sample is from the base of a shallow (34 cm) pit on the site of a degraded palsa. A thin (2 mm) slice of organics mixed with silty clay was collected at the base of the sequence to estimate the age of the earliest organic accumulation at the site.

GSC-5070 HP Nottaway River > 48 000
$\delta^{13}C$= -24.0‰

The wood (*Picea*; identified by R.J. Mott (unpublished GSC Wood Report No. 87-45)) was enclosed in clay. Sample VH-87-17 was collected by J.J. Veillette on June 30, 1987 from southwest bank of Nottaway River, 5 km downstream from Île d'Herbomez, Quebec (51° 8.6'N, 78° 48.4'W), at an elevation of about 18 m; submitted by J.J. Veillette.

The sample (50.7 g wet weight) was treated with hot base, hot acid and distilled water rinses (noncalcareous). The treated sample (28.1 g) yielded 27.89 L of CO_2 gas. The age estimate is based on one count for 5130 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net), and monthly backgrounds and standards (net) were 0.083±0.041, 2.741±0.034, and 99.955±0.788 cpm, respectively.

Comment (**J.J. Veillette**): The sample is from an organic-rich horizon of probable interglacial age in the base of the section. It is overlain by clay-silt rythmites, and a capping of till.

Ontario (Fig. 6)

McKay Lake Series

A series of lake sediment samples from McKay (Hemlock) Lake, about 2.25 km northeast of Rideau Falls, Rockcliffe Park (Ottawa), Ontario (45° 27.2'N, 75° 17.9'W), at an elevation of about 46 m, were collected by R. McNeely on March 24, 1987; submitted by R. McNeely.

GSC-5065 McKay Lake (I) (429-430 cm) 8190±120 $\delta^{13}C$= -32.6‰

The basal 1-cm of gyttja (90-MIB-1 ML: 87.03.24 429-430 cm; 29.4 g dry weight), overlain by gyttja and underlain by clay, was treated with hot acid, and distilled water rinses; base treatment was omitted (noncalcareous). The treated sample (13.2 g) yielded 2.18 L of CO_2 gas. The age estimate is based on one count for 3970 minutes in the 2 L counter with a mixing ratio of 2.07. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 6.345±0.077, 1.049±0.019, 17.851±0.099 cpm, respectively.

The uncorrected age is 8310±120.

TO-2445 McKay Lake (II) 7430±140

A fossil male winged ant (12 mg dry weight; *Camponotus*?; identified by J.V. Matthews, Jr.), enclosed in the gyttja processed for GSC-5065, was recovered by M. Leflar during a detailed examination of the freeze-dried sediment.

Comment (**R. McNeely**): Sediment cores were taken through the ice in 10.5 m of water on March 24, 1987 in the southern end of the deep basin of McKay Lake. The material was stored in the dark at 4°C until extruded, lyophlized and treated in July 1987. These dates are part of a more extensive suite of samples of McKay Lake sediment that were dated to ascertain whether this calcareous lake was prone to "hardwater" error, and to determine the magnitude of any errors detected.

The limnology of the lake has been described in Haffner and McNeely (1989) and a detailed discussion of the sedimentary column is in preparation. The dated sediment was from the base of a 4.3-m organic section. An earlier date on this basal sediment (GSC-621) is reported in Lowdon et al. (1971) and is corroborated and refined by a more recent date (GSC-4059; McNeely and McCuaig, 1991). The two dates reported here and the earlier dates provide an indication of the "hardwater" error in the basal sediments of McKay Lake. The conventional dates on bulk sediment are between 0.6 and 0.8 ka too old, with best comparison being between GSC-5065 and TO-2445, which were dated on equivalent material and suggest a "hardwater" error of 0.76 ka. A discussion of all the dates in relation to the "hardwater" effect is in preparation.

GSC-5071 HP Missinaibi River > 50 000 $\delta^{13}C$= -24.2‰

The wood (*Picea*; identified by R.J. Mott (unpublished GSC Wood Report No. 90-38)) was enclosed in peat. Sample 90TCA-26M-W-11 was collected by L.H. Thorleifson and A.V. Morgan on August 5, 1990 from the southeast bank of the Missinaibi River, 2 km downstream from the Soweska River confluence, Ontario (50° 23.4'N, 82° 35.5'W), at an elevation of 90 m; submitted by L.H. Thorleifson and A.V. Morgan.

The sample (44.84 g dry weight) was treated with hot acid, hot base, and distilled water rinses. The treated sample (30.61 g) yielded 29.53 L of CO_2 gas. The age estimate is based on three counts for 3800 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net), and monthly backgrounds and standards (net) were 0.035±0.039, 2.505±0.029, and 101.52±0.473 cpm, respectively.

Comment (**L.H. Thorleifson**): The determination confirms that this deposit, near the type locality of the Missinaibi Formation, is of an age beyond the range of radiocarbon dating.

WESTERN CANADA

Manitoba (Fig. 7)

GSC-683 2 Twin Lakes 2240±80
$\delta^{13}C = 2.87‰$

The marine shells (*Mytilus edulis*; identified by A.S. Dyke) were enclosed in sandy gravel. Sample CD/24/60 was collected by B.G. Craig in 1966, from ditch on Twin Lakes road, 20.3 km east-southeast of CNR station, Churchill, Manitoba (58° 42′ 10″N, 93° 50′ 35″W), at an elevation of 27 m; submitted by R. McNeely.

The sample (22.2 g dry weight) was treated with no treatment. The treated sample (21.9 g) yielded 5.0 L of CO_2 gas. The age estimate is based on two counts for 2160 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 13.802±0.087, 1.227±0.024, and 18.146±0.137 cpm, respectively.

The uncorrected age is 2200±80.

For comments see discussion on **Crosschecks** in the "Introduction" section. Original date was published in Lowdon et al. (1971).

Wheatcroft Lake Series

A series of moss and wood (twigs) samples from Wheatcroft Lake, 55 km southwest of Leaf Rapids, Manitoba (56° 12′N, 100° 42′W), at an elevation of 253 m, was collected by J. Danko in January 1990; submitted by R.N.W. DiLabio and C.A. Kaszycki.

GSC-5114 Wheatcroft Lake (I) 340±100
(17.5-18 m) $\delta^{13}C = -26.7‰$

The moss and wood (twigs) sample WL-90-26, (7.6 g dry weight), enclosed in silt, was treated with cold base, hot acid, and distilled water rinses (noncalcareous). The treated sample (6.5 g) yielded 2.24 L of CO_2 gas. The age estimate is based on one count for 1000 minutes in the 2 L counter with a mixing ratio of 2.10. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 17.698±0.209, 1.094±0.019, and 18.531±0.106 cpm, respectively.

The uncorrected age is 370±100.

Comment (**R.N.W. DiLabio** and **C.A. Kaszycki**): The age is much younger than was anticipated. The organic materials may have been slumped into the lake bottom, and were probably not as deeply buried as originally estimated by the collector (also see GSC-5125).

GSC-5125 Wheatcroft Lake (II) 5540±80
(4-4.3 m) $\delta^{13}C = -25.0‰$

The lake sediment, silty with mosses sample WL-90-20, (377.8 g dry weight), enclosed in silt, was treated with hot acid and distilled water rinses; base treatment was omitted (noncalcareous). The treated sample (124.0 g) yielded 3.30 L of CO_2 gas. The age estimate is based on one count for 3930 minutes in the 2 L counter with a mixing ratio of 1.36. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 9.295±0.066, 1.094±0.019, and 18.531±0.106 cpm, respectively.

The uncorrected age is 5540±80.

Comment (**R.N.W. DiLabio** and **C.A. Kaszycki**): The sample has a post-Lake Agassiz age, but is younger than expected. The organic materials seem to be part of the normal Holocene lake sediment sequence in Wheatcroft Lake. They are younger than basal peat in the same region (cf. GSC-2759, 6 ka, Lowdon and Blake, 1979).

British Columbia (Fig. 8 and Fig. 9)

Meadow Creek Series

A series of wood samples from the Meadow Creek site on the road to a borrow pit for Duncan Dam, 9 km north of the north end of Kootenay Lake, British Columbia (50^0 15′ 5″N, 116^0 59′ 0″W), at an elevation of 590 m, was collected by R.J. Fulton on August 20, 1989; submitted by R.J. Fulton.

GSC-5113 HP Meadow Creek (I) 43 400±600
$\delta^{13}C$= -25.9‰

The wood sample FldX-89-B (44.3 g dry weight; *Picea*; identified by R.J. Mott (unpublished GSC Wood Report No. 90-32)), from a woody peat unit enclosed in silt and fine-grained sand, was treated with hot acid, hot base, and distilled water rinses (noncalcareous). The treated sample (30.0 g) yielded 32.3 L of CO_2 gas. The age estimate is based on one count for 6381 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net), and monthly backgrounds and standards (net) were 0.463±0.032, 2.521±0.023, and 102.618±0.351 cpm, respectively.

The uncorrected age is 43 400±600.

GSC-5043 HP Meadow Creek (II) 43 500±600
$\delta^{13}C$= -25.9‰

The wood (42.5 g dry weight; *Picea*; identified by R.J. Mott (unpublished GSC Wood Report No. 90-32)) was part of a stump in growth position within a woody peat which in turn was enclosed in silt and fine-grained sand. Sample FldX-89-A was treated with hot acid, hot base, and distilled water rinses. The treated sample (37.5 g) yielded 36.6 L of CO_2 gas. The age estimate is based on one count for 5620 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net), and monthly backgrounds and standards (net) were 0.454± 0.031, 2.477±0.021, and 102.221±0.494 cpm, respectively.

The uncorrected age is 43 500±600.

Comment (**R.J. Fulton**): GSC-5043 and GSC-5113 are from a single exposure in the well-dated Meadow Creek site which was originally opened during construction of the Duncan Dam (Fulton, 1968; Alley et al., 1986; Fulton and Warner, 1990). The floodplain sediments exposed at the site had earlier given ages ranging from 32 700±800 (GSC-493; Lowdon and Blake, 1968) to 43 800±800 (GSC-740; Lowdon and Blake, 1968). The new dating was conducted so that ages would be available for beds which are being examined as part of renewed paleoenvironmental studies. GSC-5043 agrees closely with GSC-1017 2 (43 600±700; Lowdon et al., 1971) a peat sample which is thought to have been collected from the same bed. GSC-5043 was collected from 2.6 m below GSC-5113 and is the oldest age at this locale on organic material that is definitely autochthonous.

GSC-2 Port Mann Bridge uncorrected 7600±150

The silty peat was enclosed in silt. Sample B6 No. 8 was collected by R.A. Spence and W.H. Mathews in 1959 from about 305 m east along the CNR track from the site of the (then) proposed Port Mann Bridge, near New Westminster, British Columbia (49^{0}13′N, 122^{0}48′W), at a depth of about 10 m; submitted by W.H. Mathews.

The sample (36.1 g dry weight) was treated with hot acid and distilled water rinses; base treatment was omitted. The treated sample (24.0 g) yielded 12.5 L of CO_2 gas.

Comment (**W.H. Mathews**): The sample was taken from a peat layer about 10 m below mean sea level, located at a depth of about 13 m below the Fraser River floodplain, south of the river. The sample was overlain by flood plain silt and underlain by silt of similar texture (likewise floodplain?). The peaty bed has been traced about 700 m along a north-south axis and extends east-west at least the same distance parallel to the river. It has also been found north of the river, occupying an area of at least 2 acres. The peat is detrital and contains small pieces wood as well as pollen of a Hemlock/Douglas fir forest and the remains of diatoms characteristic of large lakes. The peat layer appears to be an overbank deposit of the Fraser River rather than a filling on the floor of an abandoned channel of the river (this is based chiefly on the overall shape of the peat deposit), and on this basis is inferred to record a sea level stand about 12 m below present sea level. The sample was recovered using a Shelby tube sampler from a borehole.

GSC-5179 Serpentine River 2120±70
$\delta^{13}C$= -24.8‰

The wood (a single piece of *Picea*; identified by R.J. Mott (unpublished GSC Wood Report No. 90-56)) was enclosed in peat. Sample CIA-90-143-14 was collected by A. Blais on August 2, 1990 from Serpentine River, 14 km south-southeast of New Westminster, British Columbia (49^0 5.3′N, 122^0 50.4′W), at an elevation of 0 m (msl); submitted by J.J. Clague.

The sample (9.2 g dry weight) was treated with hot base, hot acid and distilled water rinses (noncalcareous). The treated sample (8.0 g) yielded 7.76 L of CO_2 gas. The age estimate is based on two counts for 2000 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net), and monthly backgrounds and standards (net) were 14.138±0.089, 1.057±0.020, and 18.411±0.103 cpm, respectively.

The uncorrected age is 2120±70.

Comment (**J.J. Clague**): The dated sample is part of a log enclosed in peat. This peat is exposed in the bank of the lower, tidal portion of the Serpentine River. It extends below present sea level and was deposited at a time when sea level was lower relative to the land than today. The peat unit at this site also is cut by sand dykes and sills which record a liquefaction event, probably related to an earthquake (Clague et al., 1992). The dated sample is about 40 cm below the top of the peat unit and about 2 m above its base.

Burns Bog Series

GSC-5196 Burns Bog (I) 3880±100
$\delta^{13}C$= -27.8‰

The plant detritus was enclosed in sand. Sample CIA-90-104-1 was collected by J.J. Clague on May 30, 1990 from Burns Bog, 10 km south of New Westminster, British Columbia (49^0 6.8′N, 122^0 56.3′W), at a depth of 4 m (msl); submitted by J.J. Clague.

The sample (4.8 g dry weight) was treated with cold base, hot acid and distilled water rinses (noncalcareous). The treated sample (3.6 g) yielded 2.70 L of CO_2 gas. The age estimate is based on one count for 3730 minutes in the 2 L counter with a mixing ratio of 1.65. The count rates for the sample (net), and monthly backgrounds and standards (net) were 11.174±0.086, 1.087±0.025, and 18.225±0.161 cpm, respectively.

The uncorrected age is 3930±100.

Comment (J.J. Clague): The dated sample is from a woody layer about 5 m below the surface of Burns Bog. This woody layer occurs within a sequence of interbedded silt and sand (probably floodplain and/or intertidal deposits) which underlies peat and overlies thick, distributary channel sand.

GSC-5184 Burns Bog (II) 4170±80
$\delta^{13}C$= -28.9‰

The dated peat was overlain by peat and underlain by mud. Sample CIA-90-102-3 was collected by J.J. Clague on May 28, 1990

from Burns Bog, 10 km south-southwest of New Westminster, British Columbia (49^0 6.8'N, 122^0 57.3'W), at a depth of 1 m (msl); submitted by J.J. Clague.

The sample (99.4 g wet weight) was treated with cold base, hot acid and distilled water rinses (noncalcareous). The treated sample (11.3 g) yielded 8.56 L of CO_2 gas. The age estimate is based on two counts for 2070 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net), and monthly backgrounds and standards (net) were 16.817±0.103, 2.107±0.038, and 28.490±0.183 cpm, respectively.

The uncorrected age is 4240±80.

Comment (**J.J. Clague**): The dated sample is from the lower part of a 31-cm-thick silty peat bed which is overlain and underlain by intertidal or floodplain mud. The mud above the peat bed is organic rich and grades up into peat 3 m below the land surface (about 50 cm above the dated sample). The organic-rich sediments at this site record the formation and evolution of a domed peat bog (Burns Bog). GSC-5184 approximates the time that organic sedimentation first began; the main phase of bog formation, however, is younger. GSC-5184 is in agreement with GSC-5161 from the same stratigraphic position at another site in the bog.

GSC-5161 Burns Bog (III) 4290±100
$\delta^{13}C$= -28.6‰

The peat was enclosed in mud. Sample CIA-90-101-7 was collected by J.J. Clague on May 28, 1990 from Burns Bog, 10 km south-southwest of New Westminster, British Columbia (49^0 6.9'N, 122^0 57.5'W), at a depth of 1 m (msl); submitted by J.J. Clague.

The sample (107.4 g wet weight) was treated with cold base, hot acid and distilled water rinses (noncalcareous). The treated sample (6.9 g) yielded 5.66 L of CO_2 gas. The age estimate is based on two counts for 2070 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net), and monthly backgrounds and standards (net) were 10.759±0.109, 1.099±0.023, and 18.484±0.104 cpm, respectively.

The uncorrected age is 4350±100.

Comment (**J.J. Clague**): The dated sample is from a 17-cm-thick peat bed which is overlain and underlain by intertidal or floodplain mud. The mud above the peat bed is organic-rich and grades up into peat 3 m below the land surface (about 1 m above the dated sample). This latter peat is continuous to the surface. The organic rich sediments at this site record the formation and evolution of a domed peat bog (Burns Bog); GSC-5161 approximates the time that organic sedimentation first began; the main phase of bog formation, however, is younger.

Seymour Valley Series

A series of wood, peat, and charcoal samples was collected from sites in the lower Seymour Valley, southwestern British Columbia between 49^0 21.2'N, 123^0 00'W, and 49^0 24.4'N, 123^0 1.8'W. All the samples were collected by O.B. Lian between January 1990 and May 1991, and were submitted for dating by O.B. Lian and E.J. Hickin. The samples submitted to Beta Analytic Inc. were treated with hot acid, and alkali solutions prior to synthesizing benzene for counting. A detailed description of the sample sites and elevations can be found in Lian and Hickin (1993).

Beta-46052 Seymour Valley (I) 4980±60

The wood sample 5-18-1 (30 g dry weight), enclosed in silt and sand, was collected by O.B. Lian on May 18, 1991 at an elevation of 113 m.

Beta-40688 Seymour Valley (II) 5300±70

The wood sample 10-10-1 (19 g dry weight), enclosed in silt and sand, was collected by O.B. Lian on October 10, 1990, at an elevation of 113 m.

Note: The laboratory number for the age 5300±70 (Beta-40688) is *incorrectly* quoted in Lian and Hickin (1993) as Beta-40686.

Comment (**O.B. Lian**): The wood samples Beta-40688 and -46052 were both collected from an aggradational terrace. Beta-46052 was located about 50 cm above Beta-40688 and both were enclosed in sand silt. These ages suggest that the present vertical position of Seymour River was attained shortly before 5 ka.

Beta-40690 Seymour Valley (III) 9700±170

The charcoal fragments of sample 10-10-4 (9 g dry weight), enclosed in organic-rich alluvial apron gravel, were collected by O.B. Lian on October 10, 1990, at an elevation of 189 m.

Beta-38911 Seymour Valley (IV) 10 120±60

The wood sample 7-10-1 (36 g dry weight), enclosed in organic-rich silt and sand, was collected by O.B. Lian on July 10, 1990, at an elevation of 175 m.

Beta-38912 Seymour Valley (V) 10 350±60

The wood sample 7-10-2 (more than 20 g dry weight), enclosed in organic-rich silt and sand, was collected by O.B. Lian on July 10, 1990, at an elevation of 175 m.

Beta-40687 Seymour Valley (VI) 11 420±110

The charcoal fragments of sample 9-21-2 (7 g dry weight), enclosed in organic-rich alluvial fan sand, were collected by O.B. Lian on September 9, 1990, at an elevation of 179 m.

Note: The elevation for Beta-40690 was *incorrectly* reported as 166 m in Lian and Hickin (1993).

Comment (**O.B. Lian**): Beta-40690, Beta-38911, Beta-38912, and Beta-40687 date early postglacial (paraglacial) sedimentation in Seymour Valley. The charcoal samples Beta-40687 and Beta-40690 were collected from organic-rich sand beds contained within alluvial fan and alluvial apron gravel, respectively. The wood samples Beta-38912 and -38911 were both collected from an organic-rich silt and sand unit that likely represents a channel fill; these two ages are supportive (i.e. they were both collected from the the same stratum). Beta-40687 is also a minimum age for deglaciation of the valley.

Beta-38907 Seymour Valley (VII) 17 600±130

The wood sample 5-24-2 (55 g dry weight), enclosed in clayey silt, was collected by O.B. Lian on May 21, 1990, at an elevation of 171 m.

Beta-40689 Seymour Valley (VIII) 17 910±100

The wood sample 10-10-2 (25 g dry weight), enclosed in clayey silt, was collected by O.B. Lian on October 10, 1990, at an elevation of 172 m.

Beta-38908 Seymour Valley (IX) 18 490±90

The wood sample 5-29-1 (more than 20 g dry weight), enclosed in clayey silt, was collected by O.B. Lian on May 29, 1990, at an elevation of 176 m.

Comment (**O.B. Lian**): The wood samples Beta-38907, Beta-40689, and Beta-38908 date the Port Moody interstade in the Seymour Valley, a nonglacial period separating the Coquitlam and Vashon stades of the Fraser Glaciation. All of these samples were

enclosed in glaciolacustrine clayey silt. Each sample comes from a different site, the sites spanning a distance of about 2 km along the Seymour River. All were found above an organic-rich bed that likely represents a soil that formed during the Port Moody interstade and was subsequently reworked during the onset of the Vashon Stade.

Beta-38909 Seymour Valley (X) 22 040±130

The wood sample 5-19-2 (more than 20 g dry weight), enclosed in clayey silt and sand, was collected by O.B. Lian on September 26, 1990, at an elevation of 142 m.

Beta-40686 Seymour Valley (XI) 22 320±130

The wood sample 9-12-1 (330 g dry weight), enclosed in clayey silt and sand, was collected by O.B. Lian on September 21, 1990, at an elevation of 141 m.

Comment (**O.B. Lian**): The wood samples Beta-38909 and Beta-40686 date the first arrival of Fraser Glaciation ice (Coquitlam Stade) in Seymour Valley. Both samples were collected from the same lithostratigraphic unit. The enclosing sediments were ice-contact (glaciolacustrine) clayey silt and sand.

Beta-46053 Seymour Valley (XII) 29 440±300

The peat sample 6-27-1 (more than 100 g dry weight), enclosed in fine sand/silt, was collected by O.B. Lian on June 13, 1990, at an elevation of 102 m.

GSC-5069 HP Seymour Valley (XIII) 35 700±320
$\delta^{13}C$= -24.7‰

The wood sample S1-1 (45.81 g dry weight; *Picea*; identified by R.J. Mott (unpublished GSC Wood Report No. 90-41)), enclosed in fine sand/silt, was treated with hot acid, hot base, and distilled water rinses. The treated sample (30.36 g) yielded 30.29 L of CO_2 gas. The age estimate is based on one count for 6070 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 1.190±0.039, 2.505±0.029, and 101.52±0.473 cpm, respectively.

The uncorrected age is 35 700±320.

GSC-5069 2L Seymour Valley (XIII) 37 600±1610
$\delta^{13}C$= -24.7‰

The age estimate is based on one count for 3700 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 0.169±0.333, 1.129±0.028, and 18.121±0.154 cpm, respectively.

The uncorrected age is 37 600±1610.

Laboratory comment: Because GSC-5069 HP dated finite and less than 40 ka, the same gas preparation was recounted in the 2 L counter at normal operating pressure to compare the counter system at GSC. The two age determinations are in acceptable agreement.

GSC-5121 HP Seymour Valley (XIV) 37 100 ±340
$\delta^{13}C$= -23.3‰

The wood sample SVP2-W (43.0 g dry weight; *Abies*; identified by R.J. Mott (unpublished GSC Wood Report No. 90-74)), enclosed in fine sand/silt, was treated with hot acid, hot base, and distilled water rinses (noncalcareous). The treated sample (28.8 g) yielded 28.0 L of CO_2 gas. The age estimate is based on one count for 5400 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 1.015±0.034, 2.521±0.023, and 102.618±0.351 cpm, respectively.

The uncorrected age is 37 100±340.

Comment (**O.B. Lian**): GSC-5121 HP and GSC-5069 HP, and Beta-46053 were all collected from an aggradation unit of sand, gravel, and peat. The wood samples were collected from within peat beds. This unit represents the Olympia nonglacial interval in the Seymour Valley. An older peat bed (SVMS7-3) is now exposed below the location of GSC-5121 HP and has been submitted for dating. Beta-46053 likely dates the end of the Olympia in the Seymour Valley. It was collected 2 m above the wood sample SVP2-W (GSC-5121 HP). Sediments extracted from within the peat layer gave a thermoluminescence (TL) age of 41±7 ka (SVP1). The TL analysis was performed at Simon Fraser University by O.B. Lian. A detailed discussion of the TL analysis can be found in Lian (1991), and a discussion of the stratigraphy and chronology is presented in Lian and Hickin (1993).

Beta-38910 Seymour Valley (XV) > 43 500

The wood sample 7-6-1 (20 g dry weight), enclosed in till, was collected by O.B. Lian on July 6, 1990 at an elevation of 175 m.

Comment (**O.B. Lian**): The wood sample was collected from a till unit (Vashon Stade) that overlies units that have been dated younger. Beta-38910 is therefore anomalously old. This is supported by the fact that the fragments were rounded and polished suggesting that they had been reworked by ice.

General Comment (**O.B. Lian**): The Seymour Valley contains some of the best exposures of Middle and Late Wisconsinian sediments in southwestern British Columbia. Lithostratigraphic units representing the period from the Olympia nonglacial interval to the Holocene are exposed in the valley fill. In addition, there are rare exposures of sediments representing the Coquitlam Stade and Port Moody interstade of the Fraser Glaciation.

Cheekye River Series

A series of wood charcoal samples from beneath power lines, 5 km north of Brackendale, Cheekye River, British Columbia (49^0 47.8'N, 123^0 6.0'W), at an elevation of 310 m, was collected by S.G. Evans on June 17, 1989; submitted by S.G. Evans.

GSC-5100 Cheekye River (I) 1550±80
$\delta^{13}C$= -26.1‰

The wood charcoal sample EN-89-17JN9C (12.3 g dry weight; unidentifiable (unpublished GSC Wood Report No. 90-49)), enclosed in debris avalanche diamicton, was treated with hot base, hot acid, and distilled water rinses (noncalcareous). The treated sample (7.9 g) yielded 9.63 L of CO_2 gas. The age estimate is based on two counts for 1800 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 23.303±0.125, 2.172±0.034, and 28.328±0.234 cpm, respectively.

The uncorrected age is 1570±80.

GSC-5101 Cheekye River (II) 2190±140
$\delta^{13}C$= -25.7‰

The wood charcoal sample EN-89-17JN9B (2.3 g dry weight; unidentifiable; cf. R.J. Mott (unpublished GSC Wood Report No. 90-50)), enclosed in debris avalanche diamicton, was treated with cold base, hot acid, and distilled water rinses (noncalcareous). The treated sample (1.55 g) yielded 1.30 L of CO_2 gas. The age estimate is based on two counts for 1705 minutes in the 2 L counter with a mixing ratio of 3.46. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 14.074±0.221, 1.150±0.032, and 18.513±0.124 cpm, respectively.

The uncorrected age is 2200±140.

Richmond Series

A series of wood samples from Richmond, British Columbia (49^0 10.5'N, 123^0 7.5'W) was collected by J.J. Clague and E. Naesgaard on September 23 and October 12, 1990; submitted by J.J. Clague.

GSC-5153 Richmond (I) 3540±90
$\delta^{13}C$= -26.6‰

The wood sample CIA-90-166-3 (5.2 g dry weight), enclosed in mud at an elevation of 0 m (msl), was treated with hot base, hot acid, and distilled water rinses (noncalcareous). The treated sample (4.2 g) yielded 4.17 L of CO_2 gas. The age estimate is based on one count for 2200 minutes in the 2 L counter with a mixing ratio of 1.07. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 12.001±0.084, 1.101±0.023, and 18.696±0.163 cpm, respectively.

The uncorrected age is 3560±90.

GSC-5124 Richmond (II) 3660±140
$\delta^{13}C$= -24.1‰

The single piece of wood, sample CIA-90-166 (3.1 g dry weight; *Picea*; identified by R.J. Mott (unpublished GSC Wood Report No. 90-63)), enclosed in mud at an elevation of 1 m (msl), was treated with hot base, hot acid, and distilled water rinses (noncalcareous). The treated sample (2.6 g) yielded 2.66 L of CO_2 gas. The age estimate is based on two counts for 2470 minutes in the 2 L counter with a mixing ratio of 1.69. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 11.501±0.127, 1.092±0.024, and 18.125±0.241 cpm, respectively.

The uncorrected age is 3650±140.

GSC-5144 Richmond (III) 3680±130
$\delta^{13}C$= -28.1‰

The unidentifiable deciduous wood sample (CIA-90-166-5, 2.7 g dry weight), enclosed in mud at an elevation of 0 m (msl), was treated with hot base, hot acid, and distilled water rinses (noncalcareous). The treated sample (2.3 g) yielded 1.74 L of CO_2 gas. The age estimate is based on two counts for 2000 minutes in the 2 L counter with a mixing ratio of 2.60. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 11.752±0.150, 1.101±0.023, and 18.696±0.163 cpm, respectively.

The uncorrected age is 3730±130.

GSC-5111 Richmond (IV) 3880±80
$\delta^{13}C$= -24.8‰

The poorly preserved, single piece of wood, sample CIA-90-166-2 (12.4 g dry weight; *Picea* or *Larix*; identified by R.J. Mott (unpublished GSC Wood Report No. 90-73)) enclosed in sand at a depth of 1 m (msl), was treated with hot base, hot acid, and distilled water rinses (noncalcareous). The treated sample (9.1 g) yielded 9.50 L of CO_2 gas. The age estimate is based on two counts for 2270 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 17.482±0.099, 2.172±0.034, and 28.328±0.234 cpm, respectively.

The uncorrected age is 3880±80.

Comment (**J.J. Clague**): Four radiocarbon ages were obtained from the walls of an excavation at this site. The oldest (GSC-5111) is from a piece of wood collected from distributary channel or intertidal sand about 3 m below the land surface. This sand is overlain by intertidal or floodplain mud which extends to the surface. The latter unit yielded three overlapping radiocarbon ages centred on 3.6 ka (GSC-5124, -5144, -5153). This unit, in turn, is cut by sand dykes rooted in the underlying sand unit. The sand dykes and related sand boils are the products of liquefaction thought to have been triggered by an earthquake (Clague et al., 1992). The radiocarbon ages at this site indicate that this event is younger than 3.6 ka.

GSC-5105 Turbid Creek 180±100
$\delta^{13}C$= -24.2‰

The wood (*Thuja plicata*; identified by R.J. Mott (unpublished GSC Wood Report No. 90-57)) was enclosed in debris avalanche diamicton. Sample EN-89-30J14 was collected by S.G. Evans on June 30, 1989 from Turbid Creek, west of Mount Cayley, British Columbia (50^0 4'N, 123^0 20'W), at an elevation of 245 m; submitted by S.G. Evans.

The sample (17.6 g dry weight) was treated with hot base, hot acid, and distilled water rinses (noncalcareous). The treated sample (7.6 g) yielded 7.53 L of CO_2 gas. The age estimate is based on two counts for 1890 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net), and monthly backgrounds and standards (net) were 27.834±0.321, 2.233±0.035, and 28.426±0.139 cpm, respectively.

The uncorrected age is 170±100.

GSC-5190 Lillooet River 2300±90
$\delta^{13}C$= -24.4‰

The wood was enclosed in pyroclastic (landslide?) debris. Sample EN-89-22JN7F was collected by S.G. Evans on June 22, 1989 from northeast bank of Lillooet River, 6.5 km upstream of Meager River, British Columbia (50^0 40'N, 123^0 27'W), at an elevation of 487 m; submitted by S.G. Evans.

The sample (7.8 g dry weight) was treated with hot base, hot acid, and distilled water rinses (noncalcareous). The treated sample (7.3 g) yielded 7.56 L of CO_2 gas. The age estimate is based on two counts for 1800 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net), and monthly backgrounds and standards (net) were 13.705±0.095, 1.087±0.025, and 18.225±0.161 cpm, respectively.

The uncorrected age is 2290±90.

Esquimalt Lagoon Series

A series of wood samples from the Esquimalt Lagoon, 2 km southeast of Colwood, British Columbia (48^{0}25.1'N, 123^{0}28.2'W), was collected by J.J. Clague and P.T. Bobrowsky on July 28, 1990; submitted by J.J. Clague.

GSC-5159 Esquimalt Lagoon (I) 780±60
$\delta^{13}C$= -23.4‰

The single piece of wood from an elevation of 0 m, (CIA-90-131-16, 9.7 g dry weight; *Thuja plicata*; identified by R.J. Mott (unpublished GSC Wood Report No. 90-54)), enclosed in muddy peat, was treated with hot base, hot acid, and distilled water rinses (noncalcareous). The treated sample (8.4 g) yielded 8.70 L of CO_2 gas. The age estimate is based on one count for 2000 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 25.996±0.124, 2.255±0.036, and 28.572±0.180 cpm, respectively.

The uncorrected age is 760±60.

TO-2131 Esquimalt Lagoon (II) 3730±60

The wood sample (CIA-90-131-15) was enclosed in peat at a depth of 1 m (msl) near the base of the peat unit and 40 cm below GSC-5159.

Comment (**J.J. Clague**): The peat dated by GSC-5159 underlies a gravelly spit enclosing Esquimalt Lagoon. The peat probably was deposited when sea level was slightly lower relative to the land than today.

Port Alberni Series

A series of wood samples from Port Alberni, British Columbia (49^0 15.2'N, 124^0 49.6'W) was collected by J.J. Clague and P.T. Bobrowsky on July 29, 1990; submitted by J.J. Clague.

GSC-5174 Port Alberni (I) 360±50
$\delta^{13}C$= -25.7‰

The single piece wood, sample CIA-90-132-1 (9.2 g dry weight; *Picea*; identified by R.J. Mott (unpublished GSC Wood Report No. 90-59)), enclosed in sand at an elevation of 0 m, was treated with hot base, hot acid, and distilled water rinses (noncalcareous). The treated sample (7.5 g) yielded 7.23 L of CO_2 gas. The age estimate is based on one count for 3160 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 27.122±0.103, 2.233±0.035, and 28.426±0.139 cpm, respectively.

The uncorrected age is 380±50.

Comment (**J.J. Clague**): The dated wood was collected from a thin sheet of sand within an intertidal mud and peat succession at the head of Alberni Inlet. This sand sheet is interpreted to have been deposited by a tsunami; the radiocarbon age suggests this event occurred sometime after 360 BP (note: the wood is detrital, thus the date is a maximum for the age of the enclosing sediments). A similar sand sheet near the top of the succession and about 60 cm above the dated layer was emplaced by the destructive tsunami generated by the 1964 Alaskan earthquake.

GSC-5182 Port Alberni (II) 1570±70
$\delta^{13}C$= -30.0‰

The single piece wood, sample CIA-90-132-8 (4.9 g dry weight; *Abies*; identified by R.J. Mott (unpublished GSC Wood Report No. 90-61)), enclosed in silt and sand at a depth of 1 m, was treated with hot base, hot acid, and distilled water rinses (noncalcareous). The treated sample (4.9 g) yielded 4.33 L of CO_2 gas. The age estimate is based on two counts for 1760 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 14.994±0.098, 1.057±0.020, and 18.411±0.103 cpm, respectively.

The uncorrected age is 1650±70.

Comment (**J.J. Clague**): The dated sample was collected from a sandy mud or muddy fine sand of probable intertidal origin. These sediments are overlain by three sheets of sand, the lowermost of which has a gravelly base. The sand sheets are interpreted to be tsunami deposits, and GSC-5182 indicates that all three are younger than 1570 BP. The lowest sand sheet was deposited between 1570 and 360 BP (GSC-5174); the middle sheet is younger than 360 BP; and the uppermost sheet was deposited by a tsunami in 1964 that was triggered by a great earthquake in Alaska.

GSC-5127 Grice Bay 5280±70
$\delta^{13}C$= + 0.1‰

The marine shells were enclosed in sand. Sample CIA-90-115-9 was collected by J.J. Clague on July 13, 1990 from Grice Bay, 14 km southeast of Tofino, British Columbia (49^0 4.6'N, 125^0 44.8'W), at a depth of 1 m (msl); submitted by J.J. Clague.

The sample (54.7 g dry weight) was treated with an acid leach to remove the outer 30% of the sample. The treated sample (37.9 g) yielded 8.61 L of CO_2 gas. The age estimate is based on two counts for 2070 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net), and monthly backgrounds and standards (net) were 14.578±0.094, 2.149±0.028, and 28.117±0.107 cpm, respectively.

The uncorrected age is 5280±70.

Comment (**J.J. Clague**): The dated sediments were probably deposited in an intertidal or shallow subtidal environment. Comparable environments in this area today are slightly lower than the level of the dated material. This suggests that sea level at about 5.2 ka was slightly higher relative to the land than at present.

Maltby Slough Series

A series of wood samples from Maltby Slough, 7 km south-southeast of Tofino, British Columbia (49^0 5.8'N, 125^0 50.9'W), at an elevation of about 0 m (msl), was collected by J.J. Clague and P.T. Bobrowsky on July 11, 1990.

AECV-1205C Maltby Slough (I) 7070±120
$\delta^{13}C$= -25.1‰

The wood, a single piece from a stump, sample PTB90-94-01 (*Abies*; identified by M-L. Florian) was enclosed in intertidal mud.

GSC-5106 Maltby Slough (II) 7900±100
$\delta^{13}C$= -23.3‰

The single piece wood, sample CIA-90-111 (18.0 g dry weight; *Picea*; identified by R.J. Mott (unpublished GSC Wood Report No. 90-55)) enclosed in mud, was treated with hot base, hot acid, and distilled water rinses (noncalcareous). The treated sample (7.1 g) yielded 7.04 L of CO_2 gas. The age estimate is based on two counts for 1733 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 10.637±0.093, 2.172±0.034, and 28.328±0.234 cpm, respectively.

The uncorrected age is 7870±100.

Comment (**J.J. Clague**): The wood dated by GSC-5106 comprises the outermost rings of a stump in growth position. This stump is one of several occurring within the present-day intertidal zone south-southeast of Tofino. This date and AECV-1205C show that sea level was lower relative to the land during the early Holocene than at present. This period of low sea levels was both preceded and followed by periods when sea level was higher than today (Bobrowsky and Clague, 1992).

NORTHERN CANADA (MAINLAND)

Yukon Territory (Fig. 10)

Volcano Mountain Series

A series of organic lake sediment samples was collected from an unnamed lake 3.5 km southwest of Volcano Mountain and 8 km northwest of Pelly Ranch, Yukon Territory (62º 53'N, 137º 24'W), at an elevation of 2300 m, by L. Cwynar on July 7, 1989; submitted by L.E. Jackson, Jr.

GSC-5143 Volcano Mountain (I) 3210±70
$\delta^{13}C$= -27.5‰

The organic lake sediment sample 070789 RC 1B (TSE-2; 87.8 g wet weight), enclosed in silty organic mud, was treated with hot acid and distilled water rinses; base treatment was omitted. The treated sample (54.2 g) yielded 5.49 L of CO_2 gas. The age estimate is based on two counts for 2090 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 12.333±0.084, 1.099±0.023, and 18.484±0.104 cpm, respectively.

The uncorrected age is 3250±70.

GSC-5141 Volcano Mountain (II) 4210±90
$\delta^{13}C$= -28.2‰

The organic lake sediment sample 070789 RC 1A (TSE-1; 102.0 g wet weight), enclosed in silty organic mud, was treated with hot acid and distilled water rinses; base treatment was omitted (noncalcareous). The treated sample (73.5 g) yielded 7.44 L of CO_2 gas. The age estimate is based on two counts for 2130 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 10.892±0.086, 1.150±0.032, and 18.513±0.124 cpm, respectively.

The uncorrected age is 4260±90.

Comment (**L.E. Jackson, Jr.**): Samples TSE-2 (GSC-5143) and TSE-1 (GSC-5141) provide minimum ages for the latest eruption of Volcano Mountain.

Northwest Territories (mainland) (Fig. 11)

GSC-47 2 Arrowsmith River 8730±80
$\delta^{13}C$= 0.33‰

The marine shells were enclosed in marine silt. Sample CD/TJ/224f/60 was collected by M. Tremblay in 1960, from Arrowsmith River, District of Keewatin, Northwest Territories (68º 5'N, 90º9'W), at an elevation of 171 m; submitted by R. McNeely.

The sample (29.8 g dry weight) was treated with no treatment. The treated sample (29.8 g) yielded 6.89 L of CO_2 gas. The age estimate is based on one count for 5230 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 9.567±0.058, 2.233±0.034, and 28.337±0.129 cpm, respectively.

The uncorrected age is 8720±80.

For comments see discussion on **Crosschecks** in the "Introduction" section. Original date published in Dyck and Fyles (1963).

GSC-5234 Kinga Lake 6800±120
$\delta^{13}C$= + 1.9‰

The marine shells (*Hiatella arctica*; identified by A.S. Dyke) were enclosed in surface collection and underlain by till. Sample D.E.C. Green 01 was collected by D.E.C. Green on August 4, 1990 from 10 km east of the former Hudson Bay Company Post (Padlei), Kinga Lake, central District of Keewatin, Northwest Territories (61º 56'N, 96º 27'55"W), at an elevation of 110 m; submitted by A.S. Dyke.

The sample (17.4 g dry weight) was treated with an acid leach to remove the outer 10% of the sample. The treated sample (15.8 g) yielded 3.53 L of CO_2 gas. The age estimate is based on two counts for 2480 minutes in the 2 L counter with a mixing ratio of 1.29. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 7.913±0.103, 1.110±0.028, and 18.388±0.133 cpm, respectively.

The uncorrected age is 6770±120.

Comment (**A.S. Dyke**): This sample consisted of *Hiatella arctica* valves only collected from the dry, depleted surface of till at about 110 m elevation, interpolated from a topographic map with a 10 m contour interval. Marine limit has been mapped in the area by Aylsworth et al. (1986) as lying between the 500 and 600 foot contours (about 170 m). Lake sediment from a nearby lake at 110 m elevation dated 5080±170 (GSC-2634; Blake, 1983), a minimum date on emergence of that level. According to the relative sea level curve for central Keewatin in Dyke and Dredge (1989), the 110 m level emerged about 6 ka. GSC-5234 provides a maximum date on emergence of the 110 m level and a minimum date on deglaciation of a site near the final position of the Keewatin Ice Divide.

GSC-5186 Pine Point 7210±100
$\delta^{13}C$= -27.2‰

The peat was enclosed in the base of a 95 cm thick peat bed and underlain by wave-washed till. Sample 90-LJA-017-01 was collected by D.S. Lemmen on June 16, 1990, from 0.4 km south of highway 6, 7 km southwest of the former townsite of Pine Point, District of Mackenzie, Northwest Territories (60º 47.5'N, 114º 36'W), at an elevation of about 230 m; submitted by D.S. Lemmen.

The sample (77.6 g dry weight) was treated with cold base, hot acid, and distilled water rinses (slightly calcareous). The treated sample (20.5 g) yielded 8.13 L of CO_2 gas. The age estimate is based on one count for 3500 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 7.396±0.055, 1.087±0.025, and 18.225±0.161 cpm, respectively.

The uncorrected age is 7240±100.

Comment (**D.S. Lemmen**): This sample provides a date for the initial paludification at the site on the Great Slave Plain. It also serves as a minimum estimate of the regression of glacial Lake McConnell across the 230 m a.s.l. shoreline. A comparison with Vanderburgh and Smith (1988) data suggests a period of at least 1.0 ka between shoreline regression and the initiation of peat growth.

GSC-39 2 Rae River 9490±80
$\delta^{13}C$= +1.83‰

The marine shell fragments (*Mya* and *Hiatella* mixed collection) were enclosed in marine clay. Sample CD/DA/194/59 was collected by W.L. Davidson in 1959, from Rae River, Coronation Gulf, District of Mackenzie, Northwest Territories (67º 57'N, 115º 38'W), at an elevation of 8 m; submitted by R. McNeely.

The sample (31.3 g dry weight) was treated with no treatment. The treated sample (31.3 g) yielded 7.1 L of CO_2 gas. The age estimate is based on one count for 3900 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 8.661±0.061, 2.197±0.031, and 28.117±0.130 cpm, respectively.

The uncorrected age is 9460±80.

For comments see discussion on **Crosschecks** in the "Introduction" section. Original date published in Dyck and Fyles (1963).

"Hornaday" lake Series

A series of wood and peat samples from the east shore of "Hornaday" lake (informal name), District of MacKenzie, Northwest Territories (68º 43'N, 120º 38'W), at an elevation of 515 m, was collected by S.C. Zoltai on July 26, 1990; submitted by S.C. Zoltai.

GSC-5194 "Hornaday" lake (I) 1680±90
$\delta^{13}C$= -29.3‰

The peat sample HP-2 (30-34 cm; 115.7 g wet weight), enclosed in peat, was treated with cold base, hot acid, and distilled water rinses (moderately calcareous). The treated sample (10.7 g) yielded 7.35 L of CO_2 gas. The age estimate is based on two counts for 2040 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 14.653±0.091, 1.087±0.025, and 18.225±0.161 cpm, respectively.

The uncorrected age is 1750±90.

Comment (**S.C. Zoltai**): The peat deposit occurs in a high centre polygon with bare, oxidizing peat surface. The sample was taken from beneath the rooting zone to avoid contamination. The date indicates the approximate cessation of peat accumulation, possibly due to the drainage of the peatland by the deepening polygon trenches.

GSC-5188 "Hornaday" lake (II) 3980±100
$\delta^{13}C$= -28.5‰

The peat sample HP-3 (115-117 cm; 100.9 g dry weight), enclosed in peat, was treated with cold base, hot acid, and distilled water rinses (noncalcareous). The treated sample (9.1 g) yielded 8.20 L of CO_2 gas. The age estimate is based on two counts for 1800 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 11.033±0.086, 1.087±0.025, and 18.225±0.161 cpm, respectively.

The uncorrected age is 4030±100.

Comment (**S.C. Zoltai**): The peat deposit occurs in a high centre polygon, dissected by eroding polygon trenches. The peat sample dates the initiation of peat deposition in an arctic environment. As the present rate of peat formation is very slow in the region, this date indicates a climate that was somewhat more favourable for the growth of peat-forming vegetation.

GSC-5129 "Hornaday" lake (III) >40 000
$\delta^{13}C$= -25.7‰

The wood sample HW-2 (14.2 g dry weight; *Larix*; identified by R.J. Mott (unpublished GSC Wood Report No. 91-01)), enclosed in surface collection on beach sand, was treated with hot base, hot acid, and distilled water rinses (noncalcareous). The treated sample (8.7 g) yielded 8.72 L of CO_2 gas. The age estimate is based on two counts for 1600 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were -0.086±0.045, 2.149±0.028, and 28.117±0.107 cpm, respectively.

GSC-5115 "Hornaday" lake (IV) > 41 000
$\delta^{13}C$= -25.9‰

The wood sample HW-1 (13.8 g dry weight; *Pinus strobus* type; identified by R.J. Mott (unpublished GSC Wood Report No. 91-02)), was treated with hot base, hot acid, and distilled water rinses (noncalcareous). The treated sample (8.6 g) yielded 8.67 L of CO_2 gas. The age estimate is based on one count for 3430 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were -0.015±0.042, 2.172±0.034, and 28.328±0.234 cpm, respectively.

Comment (**S.C. Zoltai**): The source of the wood was not found on land. The deposit is probably under the shallows of the lake and is being released through the degradation of permafrost. As the wood appears to be fresh, although blackened, and floats on water, it was assumed to be of Holocene age. However, the old date and the southern boreal pine species indicate an interglacial age. Other possible sources can be eliminated, as Tertiary deposits are not known to occur in the region, and the site lies far above Pleistocene marine limits.

GSC-5154 Fort Simpson 270±60

The sandy peat was enclosed in dune sand. Sample FS-1 was collected by C. Bégin and Y. Michaud on July 31, 1990, from 10 km west of Fort Simpson, District of Mackenzie, Northwest Territories (61° 53'N, 121° 30'W), at an elevation of 159 m; submitted by C. Bégin and Y. Michaud.

The sample (28.8 g dry weight) was treated with cold base, hot acid, and distilled water rinses (slightly calcareous). The treated sample (9.6 g) yielded 3.80 L of CO_2 gas. The age estimate is based on two counts for 5370 minutes in the 2 L counter with a mixing ratio of 1.18. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 17.870±0.079, 1.099±0.023, and 18.484±0.104 cpm, respectively.

Norman Wells Series

GSC-5131 Norman Wells (I) 17 600±180
$\delta^{13}C$= -30.2‰

The organic detritus was enclosed in sand. Sample DOA 16-90 was collected by A. Duk-Rodkin on August 12, 1990 from 80.4 km northwest of Norman Wells, District of Mackenzie, Northwest Territories (64° 58'N, 125° 27'W), at an elevation of 150 m; submitted by A. Duk-Rodkin and O.L. Hughes.

The sample (27.1 g dry weight) was treated with hot base, hot acid, and distilled water rinses (noncalcareous). The treated sample (23.3 g) yielded 8.07 L of CO_2 gas. The age estimate is based on two counts for 3400 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net), and monthly backgrounds and standards (net) were 3.124±0.056, 2.149±0.028, and 28.117±0.107 cpm, respectively.

The uncorrected age is 17 600±180.

Comment (**A. Duk-Rodkin**): The organic detritus was obtained from deltaic sediments south of Great Bear River and near the confluence with the Mackenzie River. These organic sediments presumably have been contaminated with coal. The purpose of dating this sample was to verify the 10.6 ka date obtained for GSC-2328 (Lowdon and Blake, 1979), but the age is anomalously old. Wood fragments and other identifiable organic matter should have been dated instead of the bulk sample.

GSC-5164 Norman Wells (II) 260±50
$\delta^{13}C$= -26.5‰

The wood detritus was enclosed in sand silt. Sample DOA 29-90 b was collected by A. Duk-Rodkin on August 22, 1990 from a bank 2 m above river level, at the confluence of the Keele River and a northern tributary, 141.6 km south-southwest of Norman Wells, District of Mackenzie, Northwest Territories (64°13'N, 125°30'W), at an elevation of 200 m; submitted by A. Duk-Rodkin.

The sample (17.9 g wet weight) was treated with hot base, hot acid, and distilled water rinses (noncalcareous). The treated sample (8.2 g) yielded 8.04 L of CO_2 gas. The age estimate is based on two counts for 1960 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net), and monthly backgrounds and standards (net) were 27.448±0.128, 2.233±0.035, and 28.426±0.139 cpm, respectively.

The uncorrected age is 280±50.

Comment (**A. Duk-Rodkin**): This date reflects a catastrophic flood that occurred about 300 years ago. The wood was obtained from flood deposits of two interfingering streams, the Keele River and a small tributary.

GSC-5092 Involuted Hill > 29 000
$\delta^{13}C$= -24.0‰

The wood (*Picea*; identified by R.J. Mott (unpublished GSC Wood Report No. 90-37)) was overlain by 7 m of sand, 16 m of massive ice and 4 m of diamicton. Sample DHA 1H882 2700 was collected by S.R. Dallimore on September 7, 1988 from Involuted Hill, 1.5 km northwest of village of Tuktoyaktuk, District of McKenzie, Northwest Territories (69° 28'N, 132° 38'W), at an elevation of about 0 m; submitted by S.R. Dallimore.

The sample (1.8 g dry weight) was treated with hot base, hot acid, and distilled water rinses (noncalcareous). The treated sample (1.5 g) yielded 1.62 L of CO_2 gas. The age estimate is based on one count for 3575 minutes in the 2 L counter with a mixing ratio of 2.74. The count rates for the sample (net), and monthly backgrounds and standards (net) were 0.137±0.082, 1.092±0.024, and 18.125±0.241 cpm, respectively.

Comment (**S.R. Dallimore**): The non-finite age confirms that the organic-rich sand in which the wood was contained is likely the Kidluit Formation (after Rampton, 1988).

GSC-5136 Eskimo Lake Peninsula 3430±100
$\delta^{13}C$= -27.6‰

The peat with twigs was enclosed in peat. Sample EL-3 was collected by C. Bégin and Y. Michaud on August 9, 1990, from 55 km north of Inuvik, Eskimo Lake Peninsula, District of Mackenzie,

Northwest Territories (68º 50'N, 133º 26'W), at an elevation of 50 m; submitted by C. Bégin and Y. Michaud.

The sample (57.1 g dry weight) was treated with cold base, hot acid, and distilled water rinses. The treated sample (11.9 g) yielded 8.36 L of CO_2 gas. The age estimate is based on two counts for 3200 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 12.084±0.122, 1.094±0.019, and 18.531±0.106 cpm, respectively.

The uncorrected age is 3440±100.

Hooper Island Series

A series of peat samples from the north side of Hooper Island, Mackenzie Delta, District of Mackenzie, Northwest Territories (69º 42'N, 134º 53'W), at an elevation of 15 m, was collected by P.A. Egginton on August 1, 1989; submitted by P.A. Egginton.

GSC-4979 Hooper Island (I) 1310±80
$\delta^{13}C$= -27.3‰

The peat sample EK89-1 (35.0 g wet weight), enclosed in fine sand, was treated with hot acid and distilled water rinses; base treatment was omitted (noncalcareous). The treated sample (7.2 g) yielded 3.25 L of CO_2 gas. The age estimate is based on two counts for 2010 minutes in the 2 L counter with a mixing ratio of 1.26. The count rates for the sample (net), and monthly backgrounds and standards (net) were 15.214±0.106, 1.013±0.022, and 17.992±0.133 cpm, respectively.

The uncorrected age is 1350±80.

GSC-4980 Hooper Island (II) 760±80
$\delta^{13}C$= -27.4‰

The peat sample EK89-1A (43.5 g wet weight), enclosed in sand, was treated with hot acid and distilled water rinses; base treatment was omitted (noncalcareous). The treated sample (10.4 g) yielded 4.78 L of CO_2 gas. The age estimate is based on two counts for 2000 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net), and monthly backgrounds and standards (net) were 16.281±0.096, 1.013±0.022, and 17.992±0.133 cpm, respectively.

The uncorrected age is 800±80.

Comment (**P.A. Egginton**): Two peat `balls' were found resting on top of a truncated ice wedge (i.e. a thaw unconformity). The dates indicate that the active layer was significantly deeper at this site about 760 to 1310 BP. This period is roughly coincident in time with the so-called medieval-warm period documented elsewhere in western Canada.

N. CANADA, ARCTIC ARCHIPELAGO (Fig. 12)

Arctic Islands (Eastern Zone) (Fig. 13)

Baffin Island (Fig. 13 and Fig. 14)

GSC-241 2 McBean Bay 9460±90
$\delta^{13}C$= + 1.4‰

The marine shells (*Hiatella arctica*; identified by A.S. Dyke) were collected from the surface on stony clay beach. Sample CD 25/63 was collected by B.G. Craig on July 5, 1963, from McBean Bay, Baffin Island, District of Franklin, Northwest Territories (72° 46'N, 89° 31'W), at an elevation of 81 m; submitted by R. McNeely.

The sample (35.9 g dry weight) was treated with an acid leach to remove the outer 20% of the sample. The treated sample (28.6 g) yielded 6.34 L of CO_2 gas. The age estimate is based on one count for 2460 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 8.776±0.073, 2.234±0.029, and 28.421±0.132 cpm, respectively.

The uncorrected age is 9440±90.

For comments see discussion on **Crosschecks** in the "Introduction" section. Original date was published in Dyck et al. (1965a, b).

GSC-390 2 "Magda river" 5990±110
$\delta^{13}C$= +1.68‰

The marine shells were collected from the surface on sand. Sample CD 129/65 was collected by B.G. Craig on August 13, 1963, from "Magda river" (unofficial name), Baffin Island, District of Franklin, Northwest Territories (71° 39'N, 84° 13'W), at an elevation of 39 m; submitted by R. McNeely.

The sample (22.1 g dry weight) was treated with a hand-leached and then an acid leach to remove the outer 10% of the sample. The treated sample (18.8 g) yielded 2.59 L of CO_2 gas. The age estimate is based on two counts for 225 minutes in the 2 L counter with a mixing ratio of 1.68. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 8.629±0.101, 1.238±0.028, and 18.133±0.104 cpm, respectively.

The uncorrected age is 5960±110.

For comments see discussion on **Crosschecks** in the "Introduction" section. Original date reported in Dyck et al. (1966).

GSC-392 2 Bourassa Bay 9250±90
Cape Kater $\delta^{13}C$= +0.73‰

The marine shells (*Hiatella arctica*; identified by A.S. Dyke) were collected from the surface of mudboils on stony silt. Sample CD 128/63 was collected by B.G. Craig on August 11, 1963, from top of knoll above highest distinct beach between Bourassa Bay and Cape Kater, southwest Brodeur Peninsula, Baffin Island, District of Franklin, Northwest Territories (71° 46'N, 89° 48'W), at an elevation of 95 m; submitted by R. McNeely.

The sample (42.4 g dry weight) was treated with a hand-leach then an acid leach to remove the outer 20% of the sample. The treated sample (33.9 g) yielded 7.60 L of CO_2 gas. The age estimate is based on two counts for 345 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 8.996±0.076, 2.234±0.029, and 28.421±0.132 cpm, respectively.

The uncorrected age is 9240±90.

For comments see discussion on **Crosschecks** in the "Introduction" section. Original date published in Dyck et al. (1966).

Countess of Warwick Sound Series

A series of marine shell samples from Countess of Warwick Sound, north side, outer Frobisher Bay, southeast Baffin Island, District of Franklin, Northwest Territories (62°49.7'N, 65°31'W), at an elevation of 63 m, was collected by G.H. Miller on August 12, 1977; submitted by G.H. Miller.

GSC-5036 5L Countess of Warwick Sound (I) 10 400±90
$\delta^{13}C$= + 0.4‰

The marine shells (sample M77 BSh26; 100.1 g dry weight; *Mya truncata*; identified by G.H. Miller), enclosed in marine sands, were treated with an acid leach to remove the outer 20% of the sample. The treated sample (36.9 g) yielded 8.20 L of CO_2 gas. The age estimate is based on one count for 3200 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 7.791±0.062, 2.074±0.027, and 28.244±0.132 cpm, respectively.

The uncorrected age is 10 300±90.

GSC-5036 2L Countess of Warwick Sound (II) 10 400±120
$\delta^{13}C$= +0.43‰

A second count was made in the 2L counter. The age estimate is based on three counts for 2970 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 4.911±0.059, 1.049±0.019, and 17.851±0.099 cpm, respectively.

The uncorrected age is 10 400±120.

GSC-5037 5L Countess of Warwick Sound (III) 10 200±100
$\delta^{13}C$= + 0.2‰

The marine shells (sample M77 BSh27; 117.3 g dry weight; *Mya truncata*; identified by G.H. Miller), enclosed in marine sands, were treated with an acid leach to remove the outer 30% of the sample. The treated sample (36.4 g) yielded 8.18 L of CO_2 gas. The age estimate is based on two counts for 2050 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 7.974±0.075, 2.074±0.027, and 28.244±0.132 cpm, respectively.

The uncorrected age is 10 200±100.

GSC-5037 2L Countess of Warwick Sound (IV) 10 200±120
$\delta^{13}C$= 0.26‰

A second count was made in the 2L counter. The age estimate is based on two counts for 3412 minutes in the 2 L counter. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 5.070±0.055, 1.020±0.024, and 18.094±0.144 cpm, respectively.

The uncorrected age is 10 200±120.

Comment (**D.S. Kaufman** and **G.H. Miller**): With the addition of these two dates, we now have six radiocarbon dates from four laboratories on paired shells from this site. The two new dates agree favourably with the previously determined dates. The deposit was originally interpreted as the distal facies of a delta formed at the marine limit by breaching of a moraine-dammed lake shortly after deglaciation from the Hall Moraines (Miller, 1980). More recent work (Miller and Kaufman, 1990), however, shows that the deposit was formed prior to the Gold Cove readvance; it was overrun by Gold Cove ice, but was not completely removed. The age of a shell fragment collected from carbonate-rich drift exposed in a bluff across the

river (10 375±80; AA-6303) is indistinguishable from the age of these shells, supporting our reinterpretation that this deposit predates the Gold Cove readvance. These dates were also reported in Kaufman and Williams (1992).

GSC-5050 "Tiger ice cap" 460±50
$\delta^{13}C$= -25.7‰

A surface collection of moss (organic material), sample GRL-799-0, was made by G.H. Miller and R.A. Klassen on July 22, 1981 from "Tiger ice cap" (unofficial name), Baffin Island, District of Franklin, Northwest Territories (71° 19'N, 78° 44'W), at an elevation of 580 m; submitted by G.H. Miller.

The sample (24.4 g dry weight) was treated with hot base, hot acid, and distilled water rinses (noncalcareous). The treated sample (11.6 g) yielded 9.59 L of CO_2 gas. The age estimate is based on two counts for 2000 minutes in the 5 L counter with a mixing ratio of 1.00. The count rate for the sample (net), and monthly backgrounds and standards (net) were 26.633±0.123, 2.074±0.027, and 28.244±0.132 cpm, respectively.

The uncorrected age is 470±50.

Comment (**G.H. Miller**): This sample of dead moss from undisturbed patterned ground emerging beneath the centre of the former ice cap, provides a close maximum date for the onset of the last Little Ice Age expansion. This sample is close to the center rather than near the margin, which was the only exposed area in 1963 when Falconer collected (Falconer, 1966; I-1204, 330±75). The radiocarbon age is slightly older, which coupled with a more precise determination provides a better calibrated age for the onset of the last build up of permanent snow over the north-central Baffin Island plateau.

GSC-5122 Brevoort Island 670±70
$\delta^{13}C$= -27.0‰

The peat sample, M90 BS2, was collected by G.H. Miller on July 22, 1990 from the west coast of Brevoort Island, southeast Hall Peninsula, Baffin Island, District of Franklin, Northwest Territories (63° 23'N, 64° 16'W), at an elevation of 1.5 m; submitted by G.H. Miller.

The sample (6.6 g dry weight) was treated with hot base, hot acid, and distilled water rinses (noncalcareous). The treated sample (4.3 g) yielded 3.90 L of CO_2 gas. The age estimate is based on two counts for 2070 minutes in the 2 L counter with a mixing ratio of 1.17. The count rate for the sample (net), and monthly backgrounds and standards (net) were 16.975±0.104, 1.094±0.019, and 18.531±0.106 cpm, respectively.

The uncorrected age is 700±70.

Comment (**G.H. Miller**): This date supports our earlier contention (summarized in Miller et al., 1977) that the outer southeast coast of Baffin Island is currently experiencing a relative sea level rise. The date is similar to several others from the region that fall between 0.5 and 2.0 ka. This date is also reported in Kaufman and Williams (1992).

GSC-5149 Newton Fiord 9410±100
$\delta^{13}C$= + 0.8‰

The marine shells (*Hiatella arctica* and *Mya truncata*; identified by G.H. Miller) were enclosed in sand. Sample M77 Bsh21 was collected by G.H. Miller on August 8, 1977 from the central reaches on the east side of Newton Fiord, northeast side of Frobisher Bay, southeast Baffin Island, District of Franklin, Northwest Territories (63° 7'N, 66° 13'W), at an elevation of 19 m; submitted by G.H. Miller.

The sample (51.5 g dry weight) was treated with an acid leach to remove the outer 30% of the sample. The treated sample (17.6 g) yielded 3.89 L of CO_2 gas. The age estimate is based on one count for 2600 minutes in the 5 L counter with a mixing ratio of 1.00. The count rate for the sample (net), and monthly backgrounds and standards (net) were 8.869±0.074, 2.255±0.036, and 28.572±0.180 cpm, respectively.

The uncorrected age is 9400±100.

Comment (**G.H. Miller**): This date supports the interpretation previously made on the basis of a single date from the head of the fiord that deglaciation was well underway by 9.5 ka, and that initial isostatic recovery was rapid. The Gold Cove readvance was at its maximum limit at 9.7 ka, and the regional marine limit in Newton Fiord is about 70 m asl, thereby indicating that sea level fell 30 m in about 200 radiocarbon years, or 15 m/century. The occurrence of prominent deltas below the marine limit at the fiord head at this site suggests either a brief halt in emergence, or a rapid pulse of sedimentation due to regional climate change. The rivers feeding these two valleys drain very different areas, thus the changes are unlikely to be related to local events in their catchments.

GSC-5163 Frenchman Cove 8690±90
$\delta^{13}C$= + 2.7‰

The marine shells (*Mya truncata*; identified by G.H. Miller) were enclosed in silty sand. Sample M77 Bsh 39 was collected by G.H. Miller on September 21, 1977 from Frenchman Cove, Inner Cyrus Field Bay, southeast Hall Peninsula, Baffin Island, District of Franklin, Northwest Territories (62° 58'N, 65° 16'W), at an elevation of 2 m; submitted by G.H. Miller.

The sample (32.2 g dry weight) was treated with an acid leach to remove the outer 20% of the sample. The treated sample (26.6 g) yielded 5.70 L of CO_2 gas. The age estimate is based on one count for 3870 minutes in the 2 L counter with a mixing ratio of 1.00. The count rate for the sample (net), and monthly backgrounds and standards (net) were 6.297±0.050, 1.099±0.023, and 18.484±0.104 cpm, respectively.

The uncorrected age is 8650±90.

Comment (**G.H. Miller**): The lack of evidence for ice nearby suggests that ice of the Cockburn readvance did not reach this site, although the abundance of sediment of Cockburn age suggests that there were glaciers farther up in the catchment. The region was covered by ice during the Gold Cove readvance, but apparently has been ice free since about 9.5 ka. This date is also reported in Kaufman and Williams (1992).

Southwestern Cumberland Peninsula Series

A series of lake sediment samples from four sites north of Panguirtung, Baffin Island, District of Franklin, Northwest Territories (66° 16'N, 65° 45'W), at elevations of 545 to 848 m, was collected by A.P. Wolfe in June 1991; samples submitted by A.P. Wolfe.

BGS-1472 Nauyak Lake 9500±150
$\delta^{13}C$= -28.9‰

The gyttja sample (NKL-190), enclosed in silty lake sediment, was taken from a depth of 28-36 cm in the core.

Tulugak Lake

GSC-5483 Tulugak Lake (I) 8870±100
(37.5-45.5 cm) $\delta^{13}C$= -22.5‰

The lake sediment with moss (sample TKL-191-a 37.5-45.5 cm; 22.9 g wet weight; *Drepanocladus exannulatus*; identified by

A.P. Wolfe), enclosed in silty gyttja, was treated with hot acid and distilled water rinses (base treament omitted; noncalcareous). The treated sample (20.8 g) yielded 4.11 L of CO_2 gas. The age estimate is based on one count for 3700 minutes in the 2 L counter with a mixing ratio of 1.08. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 6.076±0.052, 1.207±0.022, and 18.234±0.101 cpm, respectively.

The uncorrected age is 8830±100.

TO-3242 Tulugak Lake (II) (90-91 cm) 36 120±340

The bryophyte (moss) sample (TKL-191 90-91 cm; *Warnstorfia exannulata*; identified by A.P. Wolfe) was enclosed in silty gyttja.

Ukalik Lake

GSC-5496 Ukalik Lake (I) (22-28.5 cm) 3220±110 $\delta^{13}C$= -27.1‰

The dispersed organic material in lake sediment (sample UKL-L291-a 22-28.5 cm; 73.8 g wet weight), enclosed in silt and fine sand, was treated with hot acid and distilled water rinses; base treatment was omitted (noncalcareous). The treated sample (68.3 g) yielded 1.79 L of CO_2 gas. The age estimate is based on two counts for 2000 minutes in the 2 L counter with a mixing ratio of 2.44. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 12.220±0.155, 1.200±0.024, and 18.324±0.104 cpm, respectively.

The uncorrected age is 3250±110.

GSC-5492 Ukalik Lake (II) (66-73 cm) 6980±110 $\delta^{13}C$= -26.3‰

The plant and moss macrofossils sample (UKL-L291-b 66-73 cm; 91.7 g wet weight; *Drepanocladus exannulatus*; identified by A.P. Wolfe), enclosed in silt and fine sand, was treated with hot acid and distilled water rinses; base treatment was omitted (noncalcareous). The treated sample (86.0 g) yielded 2.34 L of CO_2 gas. The age estimate is based on one count for 3735 minutes in the 2 L counter with a mixing ratio of 1.89. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 7.668±0.084, 1.200±0.024, and 18.324±0.104 cpm, respectively.

The uncorrected age is 7000±110.

GSC-5486 Ukalik Lake (III) (89-95.5 cm) 9370±90 $\delta^{13}C$= -28.6‰

The gyttja sample (UKL-L291-c 89-95.5 cm; 31.2 g wet weight), enclosed in silty lake sediment, was treated with hot acid and distilled water rinses; base treatment was omitted (noncalcareous). The treated sample (27.9 g) yielded 5.38 L of CO_2 gas. The age estimate is based on one count for 6800 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 5.663±0.040, 1.200±0.024, and 18.324±0.104 cpm, respectively.

The uncorrected age is 9430±90.

TO-3241 Ukalik Lake (IV) (102-103 cm) 37 990±410

The bryophyte (moss) sample (UKL-L291 102-103 cm; *Warnstorfia exannulata*; identified by A.P. Wolfe) was enclosed in silty lake sediment.

Amarok Lake

CAMS-11335 Amarok Lake (I) (11-12 cm) modern

The *in situ* moss sample (AKL-191 11-12 cm; *Warnstorfia exannulata*; identified by A.P. Wolfe) was enclosed in gyttja.

CAMS-11125 Amarok Lake (II) (29.5-30.5 cm) 8380±60

The *in situ* moss sample (AKL-191 29.5-30.5 cm; *Warnstorfia exannulata*; identified by A.P. Wolfe), was enclosed in gyttja.

CAMS-11122 Amarok Lake (III) (37.0-37.5 cm) 8890±70

The in situ moss sample (AKL-191 37.0-37.5 cm; *Warnstorfia exannulata*; identified by A.P. Wolfe), was enclosed in gyttja.

GSC-5478 Amarok Lake (IV) (37-45 cm) 10 500±110 $\delta^{13}C$= -28.1‰

The lake sediment with moss (sample AKL-191-a 37-45 cm; 30.4 g wet weight; *Drepanocladus exannulatus*; identified by A.P. Wolfe), enclosed in silty gyttja, was treated with hot acid and distilled water rinses (base treament omitted; noncalcareous). The treated sample (25.4 g) yielded 4.60 L of CO_2 gas. The age estimate is based on one count for 2690 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 4.922±0.053, 1.207±0.022, and 18.234±0.101 cpm, respectively.

The uncorrected age is 10 500±110.

CAMS-11121 Amarok Lake (V) (44-45 cm) 12 860±90

The in situ moss sample (AKL-191 44-45 cm; *Warnstorfia exannulata*; identified by A.P. Wolfe) was enclosed in gyttja.

CAMS-12256 Amarok Lake (VI) (68-69 cm) 17 330±1200

The *in situ* moss sample (AKL-191 68-69 cm; *Warnstorfia exannulata*; identified by A.P. Wolfe) was enclosed in gyttja.

CAMS-11340 Amarok Lake (VII) (111-113 cm) 18 730±90

The *in situ* moss sample (AKL-191 111-113 cm; *Warnstorfia exannulata*; identified by A.P. Wolfe) was enclosed in gyttja.

TO-3243 Amarok Lake (VIII) (112-113 cm) 20 110±340

The i*n situ* moss sample (AKL-191 112-113 cm; *Warnstorfia exannulata*; identified by A.P. Wolfe) was enclosed in gyttja.

GSC-5497 Amarok Lake (IX) (110-117 cm) > 38 000 $\delta^{13}C$= -29.7‰

The dispersed organic material in lake sediment (sample AKL-191-b 110-117 cm; 42.2 g wet weight; very sparse bryophyte fragments), enclosed in silty gyttja, was treated with hot acid and distilled water rinses; base treatment was omitted (noncalcareous). The treated sample (42.2 g) yielded 4.19 L of CO_2 gas. The age estimate is based on one count for 5370 minutes in the 2 L counter with a mixing ratio of 1.06. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 0.037±0.030, 1.200±0.024, and 18.324±0.104 cpm, respectively.

Comment (**A.P. Wolfe**): The four studied lakes are situated on a highly weathered, unglaciated, granitic upland (545-848 m) north of Pangnirtung. The recovery of pre-Holocene lake sediments, a major goal of this investigation, has been successful, although only Amarok Lake seems to preserve a continuous record. AMS dates of 36-38 ka (TO-3241, -3242) on bryophyte remains (principally *Warnstorfia exannulata*) from silty sediments in Ukalik and Tulugak lakes are

interpreted as redeposited old mosses. The base of the Amarok Lake core has finite AMS dates in the 18-20 ka range (TO-3243, CAMS-11340), but a nonfinite bulk date from the same interval (GSC-5497). This discrepancy is problematic due to the very different effects the same degrees of contamination by young and old carbon will have. For example, if we consider the AMS dates to be correct, the bulk sediment, to have an apparent age too old by >20 ka, would have to have incorporated around 90% dead carbon with respect to ^{14}C. Despite very slow rates of organic matter decomposition that may constitute a potential source of carbon with old ^{14}C signatures, this mechanism is unlikely capable of accounting for the observed discrepancies. On the other hand, contamination by as little as 10% modern carbon is sufficient to procure apparent ages of 20 ka from mosses twice that age. Indeed, this possibility, resulting for example from bacterial growth during core storage, can unfortunately not be eliminated. The modern result from 11-12 cm in the same core (CAMS-11335), which was expected to be in the 2-4 ka range, may support the possibility of potential contamination, although coring and/or transport artefacts are also possible.

As far as Holocene sediments, basal gyttja dates (BGS-1472, GSC-5486, -5483, -5478; see also CAMS-11121) suggest that the abrupt transition from inorganic to organic sediments is of similar age in three of the lakes (8.8-9.5 ka), but considerably older at the highest site, Amarok Lake. The integrity of the Amarok Lake bulk date from 37-45 cm (GSC-5478) is verified by the two AMS dates at 37-37.5 cm (CAMS-11122) and 44-45 cm (CAMS-11121). Linear interpolation of the latter two dates gives a result very similar to the bulk date, for the depth upon which it is centred (41 cm). The bulk dates from Holocene sediments at Ukalik Lake (GSC-5496, -5492, -5486) indicate a nearly linear depth-age relationship. However, AMS results from in situ moss horizons in Amarok Lake (CAMS-11121, -11122, -11125) suggest much lower sediment accumulation rates for the initial basal gyttja than that deposited after about 9 ka. Although none of the Holocene bulk dates are suspect analytically, these data underscore the finer resolution obtainable by AMS, if sufficient macrofossils are present and *in situ*. This is particularly relevant given the very low overall sediment accumulation rates observed. It must be recognized that the dating of arctic lake sediments continues to present challenges that demand critical interpretations of all ^{14}C results. For example, despite considerable effort, none of the basal core sections have been satisfactorily dated, although the results do persuasively indicate the existence of terrestrial and aquatic refugia of Wisconsinan age in the study area.

The radiocarbon dates from the lakes studied are tabulated below. The AMS dates (TO- and CAMS-) are age determinations on macrofossils (mainly *Warnstorfia exannulata*), whereas the conventional dates (GSC- and BGS-) are on bulk sediment.

Depth (cm)	Lab No.	Age (1±2d)
Nauyak Lake		
28-36	BGS-1472	9500±150
Tulugak Lake		
37.5-45.5	GSC-5483	8870±1001
90-91	TO-3242	36 120±340
Ukalik Lake		
22-28.5	GSC-5496	3220±1101
66-73	GSC-5492	6980±1101
89-95.5	GSC-5486	9370±901
102-103	TO-3241	37 990±410
Amarok Lake		
11-12	CAMS-11335	modern
29.5-30.5	CAMS-11125	8380±60
37-37.5	CAMS-11122	8890±70
37-45	GSC-5478	10 500±1101
44-45	CAMS-11121	12 860±90
68-69	CAMS-12256	17 330±1200
111-113	CAMS-11340	18 730±90
112-113	TO-3243	20 110±340
110-117	GSC-5497	> 38 000

All dates are conventionally corrected to a $\delta^{13}C$=-25.00‰ PDB, and are reported in uncalibrated radiocarbon years before present (BP).A more complete discussion of these sites appears in Wolfe (1994a, b, c).

GSC-5295 Point Kendall 5870±70
$\delta^{13}C$= -25.2‰

The driftwood (*Picea*; identified by H. Jetté (unpublished GSC Wood Report No. 91-61)) was enclosed in gravel. Sample 91-DCA-410 was collected by J. Hooper on July 11, 1991, from 7 km northwest of Point Kendall, Crown Prince Frederick Island, northwest Baffin Island, District of Franklin, Northwest Territories (70° 2'N, 86° 37'W), at an elevation of 68 m; submitted by A.S. Dyke.

The sample (16.1 g dry weight) was treated with hot base, hot acid, and distilled water rinses (noncalcareous). The treated sample (8.5 g) yielded 8.24 L of CO_2 gas. The age estimate is based on one count for 3760 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 13.650±0.076, 2.287±0.039, and 28.354±0.135 cpm, respectively.

The uncorrected age is 5870±70.

Comments (**J. Hooper**): The wood was wet when collected and was fissile with clay packed in the cracks and with some surficial green mould and lichens. The sample was partly cleaned and partly dried before shipping from the field. This sample was subject to a fire after being canned and before arriving in Ottawa. Some pieces of wood were charred and the plastic wrapper had melted onto the wood in places. Exterior wood was cut away before submission for dating. The small driftwood log was well embedded to a maximum depth of 18 cm in coarse beach gravel. Some clay was deposited around the wood after stranding. GSC-5295 provides a date on a 68 m relative sea level and on the chronology of driftwood penetration to Gulf of Boothia. The elevation is based on one altimeter measurement with 49 minutes between readings at sample site and at datum.

GSC-5294 Crown Prince Frederick 4220±70
$\delta^{13}C$= -24.3‰

The driftwood (*Picea*; identified by H. Jetté (unpublished GSC Wood Report No. 91-65)) was enclosed in gravel. Sample 91-DCA-401 was collected by J. Hooper on July 8, 1991, from the north side of Crown Prince Frederick Island, northwest Baffin Island, District of Franklin, Northwest Territories (70° 4'N, 86° 46'W), at an elevation of 34.5 m; submitted by A.S. Dyke.

The sample (16.6 g dry weight) was treated with hot base, hot acid, and distilled water rinses (noncalcareous). The treated sample (8.4 g) yielded 8.17 L of CO_2 gas. The age estimate is based on two counts for 1910 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 16.787±0.107, 2.287±0.039, and 28.354±0.135 cpm, respectively.

The uncorrected age is 4210±70.

Comments (**J. Hooper**): A two-metre long driftwood log was well embedded in coarse beach gravel. The top of the log was nearly flush with the beach surface and it was embedded to a maximum depth of 30 cm. The wood was wet when collected and was fissile with clay packed in the cracks. The weathered exterior of the wood had minor contamination by lichens. Exterior wood was removed prior to submission for dating. GSC-5294 provides a date on a 34.5 m relative sea level and on the chronology of driftwood penetration to Gulf of Boothia. The elevation is based on two altimeter measurements with 18 minutes between readings at sample site and at sea level.

GSC-5374 Whyte Inlet 3820±90
$\delta^{13}C$= + 1.9‰

The marine shells (*Mya truncata*; identified by J. Hooper) were enclosed in sandy mud. Sample 91-DCA-470 was collected by J. Hooper on August 12, 1991, from 1 km north of the head of Whyte Inlet, northwest Baffin Island, District of Franklin, Northwest Territories (70º 7'N, 84º 47'W), at an elevation of 23.5 m; submitted by A.S. Dyke.

The sample (31.95 g dry weight) was treated with an acid leach to remove the outer 10% of the sample. The treated sample (29.1 g) yielded 6.23 L of CO_2 gas. The age estimate is based on two counts for 2110 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 11.311±0.081, 1.249±0.025, and 18.139±0.145 cpm, respectively.

The uncorrected age is 3790±90.

Comments (**J. Hooper**): The sample consisted of paired whole valves of *Mya truncata* (dominant) and *Hiatella arctica*, many with intact periostraca and syphons. Six valves of *Mya truncata* were rinsed and scrubbed to remove sediment and loose periostraca and submitted for dating. The shells were collected from a 60 cm thick horizon about 2 m below the top of an extensive delta surface. The shells were enclosed in sand that contained numerous dropstones. GSC-5374 provides a date on a 23.5 m relative sea level. The elevation is based on two altimeter measurements with 12 minutes between readings at the sample site and at high tide line.

GSC-5345 Autridge Bay 5560±100
$\delta^{13}C$= + 2.1‰

The marine shells (*Mya truncata*; identified by J. Hooper) were enclosed in silt with dropstones. Sample 91-DCA-454 was collected by J. Hooper on August 3, 1991, from 26 km east-northeast of the head of Autridge Bay, northwest Baffin Island, District of Franklin, Northwest Territories (70º 7'N, 85º 12'W), at an elevation of 44.5 m; submitted by A.S. Dyke.

The sample (17.6 g dry weight) was treated with an acid leach to remove the outer 10% of the sample. The treated sample (16.4 g) yielded 3.57 L of CO_2 gas. The age estimate is based on two counts for 1980 minutes in the 2 L counter with a mixing ratio of 1.26. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 9.105±0.089, 1.312±0.025, and 18.119±0.128 cpm, respectively.

The uncorrected age is 5530±100.

Comments (**J. Hooper**): The sample is dominated by *Macoma calcarea* and *Mya truncata* with single valves of *Clinocardium ciliatum* and *Serripes groenlandicus* and a gastropod. *Mya truncata* valves were rinsed and scrubbed to remove sediment and periostraca and submitted for dating. The shells, mostly whole valves that included several intact pair, were eroding from a face cut in silt with dropstones. GSC-5345 provides a maximum date on a 44.5 m relative sea level. The elevation is based on one altimeter measurement with 42 minutes between readings at the sample site and at datum.

GSC-5395 Autridge Bay 5850±100
$\delta^{13}C$= +2.63‰

The marine shells (*Mya truncata*; identified by J. Hooper) were enclosed in sand. Sample 91-DCA-445 was collected by J. Hooper on July 30, 1991 from 24 km east-northeast of the head of Autridge Bay, northwest Baffin Island, District of Franklin, Northwest Territories (70º 7'N, 85º 15'W), at an elevation of 57.5 m; submitted by A.S. Dyke.

The sample (20.8 g dry weight) was treated with an acid leach to remove the outer 10% of the sample. The treated sample (18.7 g) yielded 4.10 L of CO_2 gas. The age estimate is based on two counts for 2000 minutes in the 2 L counter with a mixing ratio of 1.08. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 8.803±0.079, 1.249±0.025, and 18.139±0.145 cpm, respectively.

The uncorrected age is 5810±100.

Comments (**J. Hooper**): The sample submitted for dating consisted of six valves of *Mya truncata* rinsed and scrubbed to remove sediment and loose periostraca. Shells, mostly whole valves of *Mya truncata* and *Macoma calcarea*, many paired and with periostraca and syphons, were collected from a 50 cm thick horizon in deltaic sand with a few dropstones, interpreted as a former tidal flat, that is located 2 m below the top of the section. GSC-5331 provides a minimum date on a 57.5 m relative sea level. The elevation is based on two altimeter measurements with 25 minutes between readings at the sample site and at sea level.

GSC-5364 Autridge Bay 3390±60
$\delta^{13}C$= + 2.0‰

The marine shells (*Mya truncata*; identified by J. Hooper) were enclosed in mud. Sample 91-DCA-456 was collected by J. Hooper on August 4, 1991 from 22 km east of the head of Autridge Bay, northwest Baffin Island, District of Franklin, Northwest Territories (70º 7'N, 85º 17'W), at an elevation of 15.0 m; submitted by A.S. Dyke.

The sample (43.2 g dry weight) was treated with an acid leach to remove the outer 20% of the sample. The treated sample (37.1 g) yielded 7.46 L of CO_2 gas. The age estimate is based on two counts for 2000 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 18.562±0.108, 2.305±0.035, and 28.206±0.135 cpm, respectively.

The uncorrected age is 3360±60.

Comments (**J. Hooper**): This collection consists mainly of paired, whole valves, many with intact periostraca and syphons. The sample submitted for dating consists of whole valves of *Mya truncata* rinsed and scrubbed to remove sediment and loose periostraca. The shells, dominated by *Mya truncata* with minor *Serripes groenlandicus*, were collected from a 50 cm thick horizon in laminated sand mud with dropstones, located 1.5 m below the top of a section. The extensive surface at the top of the section is interpreted as a former tidal flat. GSC-5364 provides a maximum date on a 15.5 m relative sea level. The elevation is based on two altimeter measurements with 14 and 5 minutes between readings at the sample site and at sea level.

GSC-5087 Cape Appel 5930±100
$\delta^{13}C$= + 1.9‰

The marine shells (*Hiatella arctica*; identified by J. Hooper) were enclosed in silty clay. Sample 90-DCA-425 was collected by J. Hooper on July 17, 1990 from 5 km due east Cape Appel, Baffin Island, District of Franklin, Northwest Territories (70º 7'N, 86º 7'W), at an elevation of 65.5 m; submitted by A.S. Dyke.

The sample (28.3 g dry weight) was treated with an acid leach to remove the outer 10% of the sample. The treated sample (25.5 g) yielded 5.30 L of CO_2 gas. The age estimate is based on two counts for 1950 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 8.698±0.076, 1.029±0.028, and 18.121±0.154 cpm, respectively.

The uncorrected age is 5900±100.

Comments (**J. Hooper**): The sample consisted of whole valves and fragments of *Hiatella arctica* variably weathered and encrusted with secondary calcite, red silt, and grey and black lichens. A split of the better material was cleaned by cavitron to remove chalky and flaky material and calcite. The shells were collected from the surface of an extensive, eroding, raised marine sediment, 3 km south of a large marine-limit delta measured at 119 m elevation. GSC-5087 provides a maximum date on a 65 m relative sea level.

GSC-5331 Autridge Bay 6350±100
$\delta^{13}C$= +3.00‰

The marine shells (*Mya truncata*; identified by J. Hooper) were enclosed in sand. Sample 91-DCA-455 was collected by J. Hooper on August 4, 1991 from 22 km east-northeast of the head of Autridge Bay, northwest Baffin Island, District of Franklin, Northwest Territories (70º 8'N, 85º 16'W), at an elevation of 65.0 m; submitted by A.S. Dyke.

The sample (26.7 g dry weight) was treated with an acid leach to remove the outer 20% of the sample. The treated sample (22.5 g) yielded 3.96 L of CO_2 gas. The age estimate is based on two counts for 2080 minutes in the 2 L counter with a mixing ratio of 1.13. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 8.341±0.080, 1.288±0.028, and 18.276±0.111 cpm, respectively.

The uncorrected age is 6300±100.

Comments (**J. Hooper**): This collection consists of paired, whole valves, many with intact periostraca and syphons. The shells were collected from a 60 cm thick horizon 1 m below the top of a section in massive deltaic sand. A marine-limit delta above the sample site is at 118.5 m. The sample consists of *Mya truncata*, *Hiatella arctica*, *Macoma calcarea*, *Serripes groenlandicus*, *Clinocardium ciliatum*, and one valve of *Mya*-like shell without the truncated end, likely *Mya pseudoarenaria*. Valves of *Mya truncata*, rinsed and scrubbed to remove sediment and loose periostracum, were submitted for dating. GSC-5395 provides a maximum date on a 65 m relative sea level and a minimum age on deglaciation and marine limit. The elevation is based on 2 altimeter measurements with 32 minutes between readings at the sample site and sea level.

GSC-5372 Whyte Inlet 6310±80
$\delta^{13}C$= + 3.1‰

The marine shells (*Mya truncata*; identified by J. Hooper) were enclosed in muddy sand. Sample 91-DCA-461 was collected by J. Hooper on August 7, 1991 from 8 km north of the head of Whyte Inlet, northwest Baffin Island, District of Franklin, Northwest Territories (70º 11'N, 84º 41'W), at an elevation of 71.0 m; submitted by A.S. Dyke.

The sample (24.0 g dry weight) was treated with an acid leach to remove the outer 20% of the sample. The treated sample (19.2 g) yielded 4.44 L of CO_2 gas.The age estimate is based on one count for 3900 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 8.316±0.057, 1.238±0.028, and 18.133±0.104 cpm, respectively.

The uncorrected age is 6260±80.

Comments (**J. Hooper**): The shells of *Mya truncata* and *Hiatella arctica* were collected from a maximum depth of 30 cm in slumping wet sands in a thaw gully at the foot of a marine limit delta the terrace of which is at 114 m elevation. The sample includes several paired valves. Four whole valves of *Mya truncata*, rinsed and scrubbed to remove sediment and loose periostraca, were submitted for dating. GSC-5372 provides a maximum date on a 71 m relative sea level and a minimum date on marine limit (114 m) and on deglaciation. The elevation is based on two altimeter measurements with six minutes between readings at the sample site and datum.

GSC-5327 Cape Godfred Hansen 7670±130

The marine shells (*Hiatella arctica*; identified by J. Hooper) were collected from the surface of mudboils in stony silt. Sample 91-DCA-435 was collected by J. Hooper on July 25, 1991 from 10 km northeast of Cape Godfred Hansen, Agu Bay area, northwest Baffin Island, District of Franklin, Northwest Territories (70º 20'N, 86º 48'W), at an elevation of 95.5 m; submitted by A.S. Dyke.

The sample (19.7 g dry weight) was treated with an acid leach to remove the outer 10% of the sample. The treated sample (17.9 g) yielded 3.75 L of CO_2 gas. The age estimate is based on one count for 3490 minutes in the 2 L counter with a mixing ratio of 1.19. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 7.080±0.089, 1.188±0.059, and 18.396±0.155 cpm, respectively.

Comments (**J. Hooper**): This collection consisted of fragments and a few whole valves with some calcite encrustation and adhering black lichens. The shells, dominated by *Hiatella arctica* with minor *Mya truncata*, were collected from the surface of a raised beach. A delta terrace thought to mark marine limit 10 km to the north was measured at 138 m elevation. The cleanest whole valves of *Hiatella arctica* were cleaned by cavitron to remove chalky exterior layers and submitted for dating. GSC-5327 provides a minimum date on marine limit and on deglaciation and a maximum date on a 95.5 m relative sea level. The elevation is based on two altimeter measurements with 20 minutes between readings at the sample site and at high tide line.

GSC-5076 Foss Fiord 1140±80
$\delta^{13}C$= -24.9‰

The driftwood (*Picea*; identified by R.J. Mott (unpublished GSC Wood Report No. 90.42)) was collected from the surface underlain by gravel. Sample 90-DCA-404 was collected by J. Hooper on July 7, 1990 from 0.3 km west of west arm of Foss Fiord, Baffin Island, District of Franklin, Northwest Territories (70º 22'N, 87º 16'W), at an elevation of 3 m; submitted by A.S. Dyke.

The sample (12.8 g dry weight) was treated with hot base, hot acid, and distilled water rinses (noncalcareous). The treated sample (9.0 g) yielded 7.84 L of CO_2 gas. The age estimate is based on two counts for 2000 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 15.410±0.120, 1.003±0.022, and 17.754±0.102 cpm, respectively.

The uncorrected age is 1140±80.

Comment (**J. Hooper**): The driftwood was collected from the surface of washed till at 3 m altitude. It is one of very few collections of postglacial driftwood from northern Baffin Island. The surface of the wood was weathered grey and partly covered in grey lichens. Plant roots had found their way into the wood along cracks. The sample submitted for dating was cleaned by cutting away all surface wood and wood along cracks. GSC-5076 provides a date on a 3 m relative sea level and on driftwood penetration to southeastern Gulf of Boothia.

GSC-5077 Kimatko Peninsula 4680±80
$\delta^{13}C$= -24.0‰

The driftwood (*Larix*; identified by R.J. Mott (unpublished GSC Wood Report No. 90-43)) was enclosed in beach gravel. Sample 90-DCA-414 was collected by J. Hooper on July 11, 1990 from 9.5 km

north of the east end of Kimatko Peninsula, Foss Fiord area, Baffin Island, District of Franklin, Northwest Territories (70° 22'N, 87° 42'W), at an elevation of 36.5 m; submitted by A.S. Dyke.

The sample (13.0 g dry weight) was treated with hot base, hot acid, and distilled water rinses (noncalcareous). The treated sample (8.6 g) yielded 8.39 L of CO_2 gas. The age estimate is based on two counts for 1970 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 9.940±0.079, 1.003±0.022, and 17.754±0.102 cpm, respectively.

The uncorrected age is 4660±80.

Comments (**J. Hooper**): The driftwood was well embedded in raised beach gravel at 36.5 m altitude. It is one of very few collections of postglacial driftwood from northern Baffin Island. The sample was recovered from a large log. The wood is full of cracks, some of which have accumulated sediment but no obvious organic contaminants. The sample submitted for dating was cleaned by cutting away all surface wood and wood along cracks. This sample provides a date on a 36.5 m relative sea level and on driftwood penetration to southeastern Gulf of Boothia.

GSC-5373 Foss Fiord 3200±80
$\delta^{13}C = +2.7‰$

The marine shells (*Mya truncata*; identified by J. Hooper) were enclosed in sandy mud. Sample 91-DCA-430 was collected by J. Hooper on July 20, 1991 from 1 km east of the head of the southeast arm of Foss Fiord, northwest Baffin Island, District of Franklin, Northwest Territories (70° 23'N, 86° 44'W), at an elevation of 8 m; submitted by A.S. Dyke.

The sample (26.0 g dry weight) was treated with an acid leach to remove the outer 20% of the sample. The treated sample (21.0 g) yielded 4.58 L of CO_2 gas. The age estimate is based on one count for 2400 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 12.251±0.079, 1.249±0.025, and 18.139±0.145 cpm, respectively.

The uncorrected age is 3150±80.

Comments (**J. Hooper**): The sample is dominated by *Macoma calcarea* or *Astarte borealis* with subdominant *Mya truncata*. The *Mya* are friable but well preserved. The shells were collected from laminated greenish-grey mud about 4 m below the top of a section. The shells came from a 40-50 cm thick horizon. The mud is overlain by raised beach gravel. The sample consists of numerous paired valves of with intact periostraca. Whole valves of *Mya* were rinsed and scrubbed to remove sediment and loose periostraca and submitted for dating. GSC-5373 provides a maximum date on an 8 m relative sea level. The elevation is based on two altimeter measurements with 8 minutes between readings at the sample site and at high tide line.

GSC-5086 Navarana Lake 8540±100
$\delta^{13}C = +0.9‰$

The marine shells (*Hiatella arctica* and *Mya truncata*; identified by A.S. Dyke) were enclosed in stony silt. Sample 90-DCA-419 was collected by J. Hooper on July 13, 1990 from 3 km northwest of the south end of Navarana Lake, Foss Fiord, Baffin Island, District of Franklin, Northwest Territories (70° 29'N, 87° 11'W), at an elevation of 137.5 m; submitted by A.S. Dyke.

The sample (25.1 g dry weight) was treated with an acid leach to remove the outer 10% of the sample. The treated sample (22.6 g) yielded 5.16 L of CO_2 gas. The age estimate is based on one count for 5000 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 6.271±0.047, 1.029±0.028, and 18.121±0.154 cpm, respectively.

The uncorrected age is 8520±100.

Comments (**J. Hooper**): The shells were collected from the surface of stony silt. Raised beaches occur on the east side of a ridge below the collection site. These are the highest shells found in the area but they are not stratigraphically associated with a marine-limit feature. The sample consisted of whole valves and fragments of *Hiatella arctica* and *Mya truncata* variably weathered and encrusted with grey and black lichens. A split of the better material was cleaned by cavitron to remove chalky and flaky layers. GSC-5086 provides a minimum date on marine limit and on local deglaciation.

GSC-5090 Bernier Bay 7910±120
$\delta^{13}C = +1.5‰$

The marine shells (*Mya truncata* and *Hiatella arctica*; identified by A.S. Dyke) were collected from the surface of a slightly stony marine silt. Sample 90-DCA-491 was collected by J. Hooper on August 9, 1990 from 15 km north-northwest of head of Bernier Bay, Brodeur Peninsula, Baffin Island, District of Franklin, Northwest Territories (71° 8'N, 87° 5'W), at an elevation of 92.5 m; submitted by A.S. Dyke.

The sample (22.1 g dry weight) was treated with an acid leach to remove the outer 10% of the sample. The treated sample (19.9 g) yielded 4.54 L of CO_2 gas. The age estimate is based on two counts for 1710 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 6.790±0.074, 1.029±0.028, and 18.121±0.154 cpm, respectively.

The uncorrected age is 7880±120.

Comments (**J. Hooper**): The shells were collected from the surface of slightly stony marine silt adjacent to and immediately below the terrace of a large marine-limit delta at 111 m elevation. The sample consisted of fragments of *Hiatella arctica* and *Mya truncata* along with a few whole valves all variably weathered and encrusted with secondary calcite and lichens. A split of the better material was cleaned by cavitron to remove chalky and flaky material and calcite. GSC-5090 provides a minimum date on marine limit and on local deglaciation.

Berlinquet R. series

GSC-5089 Berlinguet River 6860±100
$\delta^{13}C = +1.1‰$

The marine shells (*Hiatella arctica* and *Mya truncata*; identified by J. Hooper and A.S. Dyke) were enclosed in pebbly clay. Sample 90-DCA-460 was collected by J. Hooper on August 1, 1990 from 11 km northwest of Berlinguet River mouth, Brodeur Peninsula, Baffin Island, District of Franklin, Northwest Territories (71° 10'N, 86° 25'W), at an elevation of 64 m; submitted by A.S. Dyke.

The sample (23.1 g dry weight) was treated with an acid leach to remove the outer 10% of the sample. The treated sample (20.8 g) yielded 4.74 L of CO_2 gas. The age estimate is based on one count for 3400 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 7.730±0.058, 1.029±0.028, and 18.121±0.154 cpm, respectively.

The uncorrected age is 6840±100.

Comments (**J. Hooper**): The shells were collected from the surface of a raised marine terrace on sandy silt with a pebble lag on the proximal (south) side of a large end moraine and about 47 m below a 111 m marine-limit delta. The delta occupies a gap in the moraine about 200 m north of the sample site. The sample consisted of frag-

ments of *Hiatella arctica* and *Mya truncata* along with many whole valves of *H. arctica* and a few of *Astarte borealis* variably weathered and encrusted with secondary calcite and lichens, but mostly fairly clean. A split of the better material was cleaned by cavitron to remove chalky and flaky material and calcite. GSC-5089 provides a minimum date on marine limit and on local deglaciation.

GSC-5088 Berlinguet River 6840±140
$\delta^{13}C$= + 1.0‰

The marine shells (*Hiatella arctica* and *Mya truncata*; identified by J. Hooper and A.S. Dyke) were enclosed in silty clay. Sample 90-DCA-459 was collected by J. Hooper on August 1, 1990 from 12 km northwest of Berlinguet River mouth, Brodeur Peninsula, Baffin Island, District of Franklin, Northwest Territories (71° 11'N, 86° 25'W), at an elevation of 68.5 m; submitted by A.S. Dyke.

The sample (22.4 g dry weight) was treated with an acid leach to remove the outer 10% of the sample. The treated sample (20.2 g) yielded 4.59 L of CO_2 gas. The age estimate is based on two counts for 1933 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 7.756±0.072, 1.092±0.024, and 18.125±0.241 cpm, respectively.

The uncorrected age is 6820±140.

Comments (**J. Hooper**): The shells were collected from the surface of a hummocky raised marine silt with a few dropstones on the distal (north) side of a large end moraine and about 42 m below the surface of a 111 m marine-limit delta. The delta occupies a gap in the moraine about 350 m southeast of the sample site. The sample consisted mostly of fragments of *Hiatella arctica* and *Mya truncata* along with a few whole valves of *H. arctica* and *Astarte borealis* variably weathered and encrusted with secondary calcite and lichens, but mostly fairly clean. A split of the better material was cleaned by cavitron to remove chalky and flaky material and calcite. GSC-5088 provides a minimum date on marine limit and on local deglaciation.

GSC-5091 Bernier Bay 7640±110
$\delta^{13}C$= + 1.8‰

The marine shells (*Mya truncata* and *Hiatella arctica*; identified by A.S. Dyke) were enclosed in gravel. Sample 90-DCA-500 was collected by J. Hooper on August 10, 1990 from 29 km northwest of head of Bernier Bay, Brodeur Peninsula, Baffin Island, District of Franklin, Northwest Territories (71° 12'N, 87° 29'W), at an elevation of 80.5 m; submitted by A.S. Dyke.

The sample (23.4 g dry weight) was treated with an acid leach to remove the outer 10% of the sample. The treated sample (20.6 g) yielded 4.71 L of CO_2 gas. The age estimate is based on two counts for 1960 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 7.021±0.070, 1.029±0.028, and 18.121±0.154 cpm, respectively.

The uncorrected age is 7620±110.

Comments (**J. Hooper**): The shells were collected from the surface of stony silt (likely washed till), about 4 to 5 m lower than the upper raised beaches on the side of a large end moraine to both east and west. The sample consisted of fragments of *Hiatella arctica* and *Mya truncata* along with a few whole valves all variably weathered and encrusted with secondary calcite and lichens. A split of the better material was cleaned by cavitron to remove chalky and flaky material and calcite. GSC-5091 provides a minimum date on marine limit and on local deglaciation.

GSC-5084 Jungersen Bay 2900±60
$\delta^{13}C$= +1.0‰

The marine shells (*Mya truncata*; identified by A.S. Dyke) were enclosed in sand silt. Sample 90-DCA-104 was collected by A.S. Dyke on July 22, 1990 from Jungersen Bay, Borden Peninsula, Baffin Island, District of Franklin, Northwest Territories (71° 30.5'N, 84° 31'W), at an elevation of 1 to 3 m; submitted by A.S. Dyke.

The sample (51.0 g dry weight) was treated with an acid leach to remove the outer 20% of the sample. The treated sample (36.3 g) yielded 8.13 L of CO_2 gas. The age estimate is based on two counts for 1800 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 19.740±0.117, 2.196±0.038, and 28.279±0.131 cpm, respectively.

The uncorrected age is 2890±60.

Comments (**A.S. Dyke**): The shells were collected from a 2 m vertical interval in horizontally bedded sand silt with occasional dropstones. This deposit extends to 3.5 m above high tide line and is overlain by about 1 m of beach gravel, the whole forming a significant terrace at 4.5 m. The terrace appears to have formed as deltaic sediment was transported southward by longshore drift, thus causing the lower reach of the parent river to assume a course parallel to the present coastline for a distance of about 2 km (see airphoto A-16259-20). The dropstones are thought to have been deposited by sea ice rather than glacier ice. The sample submitted for dating was selected from a large collection of *Mya truncata* collected exclusively in growth position (paired valves in vertical positions with syphons extending upward). Periostraca and other soft tissue (syphon sheaths) were extensively preserved. Paired valves of *Mya* were cleaned by sandblaster and cavitron to remove periostraca and any chalky exterior layers prior to submission for dating. GSC-5084 provides a maximum date on a 4.5 m relative sea level.

GSC-5073 Jungersen Bay 6620±90
$\delta^{13}C$= + 0.7‰

The marine shells (*Mya truncata*; identified by A.S. Dyke) were enclosed in sand. Sample 90-DCA-69 was collected by A.S. Dyke on July 17, 1990 from Jungersen Bay, Borden Peninsula, Baffin Island, District of Franklin, Northwest Territories (71° 30.6'N, 84° 19.5'W), at an elevation of 60-66 m; submitted by A.S. Dyke.

The sample (50.4 g dry weight) was treated with an acid leach to remove the outer 20% of the sample. The treated sample (39.6 g) yielded 8.48 L of CO_2 gas. The age estimate is based on two counts for 2175 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 7.799±0.067, 1.003±0.022, and 17.754±0.102 cpm, respectively.

The uncorrected age is 6610±90.

Comments (**A.S. Dyke**): The shells were collected from horizontally bedded sand with dropstones up to 1 m across. The top of the sand at the collection site is at 68 m elevation but against the adjacent hill to the north the sand extends to 72 m. A large glaciomarine delta associated with a series of lateral meltwater channels to the south (same valley) lies at 72 m and records marine limit. The sample consisted mostly of large whole valves of *Mya truncata* and a few of *Serripes groenlandicus* and *Hiatella arctica*. Periostraca were common on the *Mya* valves. The subsample submitted for dating was cleaned by cavitron to remove chalky exterior layers. GSC-5073 provides a direct date on marine limit and deglaciation of a site near the head of Admiralty Inlet. The elevation is based on 1 altimeter measurement with 2 hours between sample site and sea level readings.

GSC-5173 Sunday Bay 6430±70
$\delta^{13}C$= + 0.4‰

The marine shells (*Mya truncata*; identified by A.S. Dyke) were enclosed in sand. Sample 90-DCA-154 was collected by A.S. Dyke on August 1, 1990 from Sunday Bay, Borden Peninsula, Baffin Island, District of Franklin, Northwest Territories (71° 40.6'N, 85° 9'W), at an elevation of 40-44 m; submitted by A.S. Dyke.

The sample (50.4 g dry weight) was treated with an acid leach to remove the outer 30% of the sample. The treated sample (40.3 g) yielded 8.04 L of CO_2 gas. The age estimate is based on one count for 3970 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 12.771±0.071, 2.233±0.035, and 28.426±0.139 cpm, respectively.

The uncorrected age is 6430±70.

Comments (**A.S. Dyke**): The shells were collected from 10 m section in deltaic sand extending to 49 m elevation directly above the sample site. This is the highest shell-rich deposit in the Sunday Bay area and it was laid down when relative sea level stood at or above 49 m. Many of the shells were paired and in growth position, particularly the *Mya truncata*. The sample also includes *Serripes groenlandicus* and *Hiatella arctica*, but *Mya truncata* is dominant. A bowhead whale maxillary bone is eroding from this section (not collected) and is higher than any other bowhead bone seen in this area. The shells submitted for dating were cleaned with a cavitron to remove any chalky or exfoliating outer shell layers. GSC-5173 provides a maximum date on a 49 m relative sea level. The elevation is based on two altimeter measurements with 13 minutes between top of section and high tide readings.

GSC-5082 Sunday Bay > 31 000
$\delta^{13}C$= - 0.9‰

The marine shells (*Hiatella arctica*; identified by A.S. Dyke) were enclosed in sand. Sample 90-DCA-126 was collected by A.S. Dyke on July 26, 1990 from Sunday Bay, Borden Peninsula, Baffin Island, District of Franklin, Northwest Territories (71° 49.7'N, 85° 22'W), at an elevation of 74 m; submitted by A.S. Dyke.

The sample (16.8 g dry weight) was treated with an acid leach to remove the outer 20% of the sample. The treated sample (13.4 g) yielded 3.40 L of CO_2 gas. The age estimate is based on two counts for 2200 minutes in the 2 L counter with a mixing ratio of 1.33. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 0.150±0.049, 1.029±0.028, and 18.121±0.154 cpm, respectively.

Comments (**A.S. Dyke**): The shells collected from a small stream bed and low sand bank in a marine-limit delta whose lip is at 88 m above high tide. These are the highest shells found in the delta but none were in growth position. Whole valves and fragments of *Hiatella arctica* without obvious contamination were cleaned by cavitron to remove chalky and flaky material. It was hoped that the sample would provide a minimum date on marine limit and on local deglaciation. However, in light of the age determination, it seems likely that the all or most of the shells were glacially transported and redeposited. The sample thus provides an indication of the minimum age of the nonglacial interval before the last Laurentide ice advance down Admiralty Inlet.

GSC-5214 Sunday Bay 30 400±660
$\delta^{13}C$= +0.67‰

The marine shells (*Hiatella arctica*; identified by A.S. Dyke) were collected from the surface of a stony silt. Sample 90-DCA-127 was collected by A.S. Dyke on July 26, 1990 from Sunday Bay, Borden Peninsula, Baffin Island, District of Franklin, Northwest Territories (71° 50.5'N, 85° 23'W), at an elevation of 76 m; submitted by A.S. Dyke.

The sample (50.6 g dry weight) was treated with an acid leach to remove the outer 20% of the sample. The treated sample (39.8 g) yielded 8.85 L of CO_2 gas. The age estimate is based on one count for 2600 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 0.646±0.051, 2.048±0.039, and 28.302±0.166 cpm, respectively.

The uncorrected age is 30 400±660.

Comments (**A.S. Dyke**): The shells were collected from the surface of mud boils on glaciomarine stony silt locally forming a veneer over till at 76 m in front of an ice contact marine-limit delta whose lip is at 88 m above high tide. Extensive areas of high level silts were searched for shells and this was the only site where shells were found. This collection consists of fragments and whole valves in highly variable condition, many seriously degraded by pitting and lichen growth. A split of the best material was cleaned by cavitron, removing as much of the outer shell layers as possible. The sample submitted for dating had little discolouration remaining on the shell surfaces. It was hoped that GSC-5214 would provide a minimum date on marine limit. In light of the age determination, however, it is likely that the shells were glacially transported and redeposited. Deglaciation of this stretch of the Admiralty Inlet coast occurred about 8 ka as reported in earlier date lists.

Comment (**R. McNeely**): Although the age quoted is finite, this sample should be considered old and the finite age used with caution. The other attempt to date the marine limit in this area also resulted in an unexpectedly old age determination (GSC-5082).

GSC-5289 Phillips Creek 5890±80
$\delta^{13}C$= + 1.2‰

The marine shells (*Hiatella arctica*; identified by A.S. Dyke) were enclosed in stony silt. Sample 91-DCA-009 was collected by A.S. Dyke on July 9, 1991 east of Phillips Creek, at the head of Milne Inlet, northwest Baffin Island, District of Franklin, Northwest Territories (71° 52'N, 80° 51'W), at an elevation of 32 m; submitted by A.S. Dyke.

The sample (50.2 g dry weight) was treated with an acid leach to remove the outer 20% of the sample. The treated sample (40.2 g) yielded 9.16 L of CO_2 gas. The age estimate is based on two counts for 2110 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 13.652±0.110, 2.287±0.039, and 28.354±0.135 cpm, respectively.

The uncorrected age is 5870±80.

Comments (**A.S. Dyke**): A large sample of shells, dominated by *Hiatella arctica* and *Macoma calcarea* with minor, generally small, *Mya truncata*, were collected from bare silt with a sprinkling of dropstones. Unvegetated, dropstone-rich silt forms low-angle slopes along the east side of the head of Milne Inlet. Dropstones cover 5% of the surface and are mostly less than 30 cm diameter. The shell sample came from the highest silt outcrop on the upper foreslope of a raised marine-limit delta and can be traced underneath the foreset sands of the delta. The marine-limit delta terrace here is 48 m above high tide and is underlain by medium gravel, 16 m above the collection site. The sample submitted for dating consisted of whole valves of *Hiatella arctica* cleaned by cavitron to remove sediment and chalky exterior shell. GSC-5289 provides a maximum date on a 32 m relative sea level and a closely limiting minimum date on 48 m marine limit. The elevation is based on one altimeter measurement with six minutes between readings at sample site and at high tide line. GSC-328 (Lowdon et al., 1967) gave an age estimate of 6.4 ka on shells

from an elevation of 46 m from a creek north of the mouth of Phillips Creek. The reported co-ordinates unfortunately place this site south of the mouth of Phillips Creek and at a location that is thought to have been deglaciated after the site of GSC-5289. This confusion more likely results from changes in geodetic control than from a morphostratigraphic reversal of ages of deglaciation.

GSC-5376 Phillips Creek 3250±70
$\delta^{13}C$= + 1.6‰

The marine shells (*Mya truncata*; identified by A.S. Dyke) were enclosed in muddy sand. Sample 91-DCA-030 was collected by A.S. Dyke on July 13, 1991 east of the mouth of Phillips Creek, at the head of Milne Inlet, northwest Baffin Island, District of Franklin, Northwest Territories (71° 53'N, 80° 54'W), at an elevation of 2.5 m; submitted by A.S. Dyke.

The sample (44.8 g dry weight) was treated with an acid leach to remove the outer 20% of the sample. The treated sample (36.1 g) yielded 7.51 L of CO_2 gas. The age estimate is based on two counts for 2100 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 18.884±0.124, 2.305±0.035, and 28.206±0.135 cpm, respectively.

The uncorrected age is 3220±70.

Comments (**A.S. Dyke**): A large sample of shells, exclusively paired valves of *Mya truncata* (strongly dominant but small), Hiatella arctica, and Macoma calcarea with few Serripes groenlandicus, were collected from a single bed of muddy sand in a sequence of sand foreset beds at the middle level of a low section. Foreset sands are overlain by 1 m of topset gravelly sand by 30 cm of beach gravel. The beaches occupy a narrow plain at 5 m above high tide, which appears to be an erosional marine bench cut into the main delta terrace at 10 m. The 10 m terrace is extensive, with a well preserved network of distributary channels. Whole valves of Mya truncata cleaned by cavitron to remove sediment, stains, periostraca and any chalky exterior layers were submitted for dating. The shells relate to a minimum relative sea level of 5 m and (more likely) to a maximum relative sea level of 10 m. The elevation is based on 3 altimeter measurements with 2 minutes between readings at the sample site and at high tide line.

GSC-5398 Koluktoo Bay 5490±90
$\delta^{13}C$= - 0.6‰

The marine shells (*Mytilus edulis*; identified by A.S. Dyke) were enclosed in stony clay. Sample 91-DCA-049 was collected by A.S. Dyke on July 17, 1991 from Koluktoo Bay, on the west side of Milne Inlet, northwest Baffin Island, District of Franklin, Northwest Territories (72° 4'N, 81° 9'W), at an elevation of 28-29 m; submitted by A.S. Dyke.

The sample (33.5 g dry weight) was treated with an acid leach to remove the outer 10% of the sample. The treated sample (30.4 g) yielded 6.43 L of CO_2 gas. The age estimate is based on one count for 2540 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 9.148±0.069, 1.249±0.025, and 18.139±0.145 cpm, respectively.

The uncorrected age is 5500±90.

Comments (**A.S. Dyke**): A large shell sample, exclusively paired valves of *Mya truncata* (small), *Hiatella arctica* (small), *Macoma calcarea* (very small), *Serripes groenlandicus*, *Mya pseudoarenaria*, *Portlandia arctica*, and *Mytilus edulis*, was collected from stony clay at base of a section through a small delta. The stony clay is overlain by 1.5 m of foreset sand, 1 m of topset sand 0.3 m of beach gravel. Section top (delta terrace) is at 29 m above high tide. Judging only by the nature of the sediment, the fossiliferous stony clay could represent bottomset material of the 29 m delta or it could be older glaciomarine sediment deposited when sea stood close to or at marine limit. However, the variety of species here, especially presence of *Mytilus edulis*, is greater than normally found in ice proximal facies or in marine-limit deltas. Sediment and most periostracum were removed from whole valves of *Mytilus edulis* by cavitron before submission for dating. GSC-5398 provides a maximum date on a 29 m relative sea level and a date on a range extension of *Mytilus edulis* amd *Mya pseudoarenaria*. These similar dates on dropstone-rich silts and clays show that sediment that might routinely be mapped as "glaciomarine" has continued to be deposited in the high arctic throughout postglacial time. The dropstones presumably are dispersed by normal sea ice. The elevation is based on 2 altimeter measurements with 4 minutes between the sample site and datum readings.

GSC-5290 Koluktoo Bay 7390±70
$\delta^{13}C$= + 1.7‰

The marine shells (*Hiatella arctica*; identified by A.S. Dyke) were enclosed in stony clay. Sample 91-DCA-052 was collected by A.S. Dyke on July 17, 1991 from the head of Koluktoo Bay, Milne Inlet, northwest Baffin Island, District of Franklin, Northwest Territories (72° 5'N, 81° 20'W), at an elevation of 50 m; submitted by A.S. Dyke.

The sample (40 g dry weight) was treated with an acid leach to remove the outer 20% of the sample. The treated sample (39.8 g) yielded 8.91 L of CO_2 gas. The age estimate is based on one count for 3930 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 11.335±0.070, 2.287±0.039, and 28.354±0.135 cpm, respectively.

The uncorrected age is 7360±70.

Comments (**A.S. Dyke**): The shells, mostly *Hiatella arctica* with minor *Mya truncata* and *Macoma calcarea*, were collected from stony clay bottomsets overlain by low-angle foreset sand gravelly sand by topset gravel forming a marine-limit delta abutting the distal side of a large end moraine loop. The delta has a single simple terrace at 61 m elevation in section directly above the sample site. The moraine marks the limit of a regionally significant readvance of Laurentide ice. The sample submitted for dating consisted of whole valves of *Hiatella arctica* cleaned by cavitron to remove any chalky exterior. GSC-5290 provides a direct date on marine limit and on a prominant Laurentide end moraine. The elevation is based on one altimeter measurement with 31 minutes between sample site and datum readings.

GSC-5466 Robertson River 5840±80
$\delta^{13}C$= + 2.9‰

The marine shells (*Hiatella arctica*; identified by A.S. Dyke) were collected from the surface of fine marine sediment. Sample 63-CD-133 was collected by B.G. Craig on August 13, 1963, from the southwest shore of a large lake north of Robertson River, 19 km west-northwest of the head of Koluktoo Bay, northwest Baffin Island, District of Franklin, Northwest Territories (72° 9'N, 81° 32'W), at an elevation of 30 m; submitted by A.S. Dyke.

The sample (18.9 g dry weight) was treated with an acid leach to remove the outer 10% of the sample. The treated sample (17.0 g) yielded 3.72 L of CO_2 gas. The age estimate is based on one count for 3965 minutes in the 2 L counter with a mixing ratio of 1.17. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 8.862±0.061, 1.207±0.022, and 18.234±0.101 cpm, respectively.

The uncorrected age is 5800±80.

Comments (**A.S. Dyke**): The shells were collected from the surface of an extensive deposit of fine marine sediment at an elevation of about 30 m. The site is located about 4 km beyond the lip of an ice-contact marine-limit delta at 70 m elevation as determined by altimetry by B.G. Craig. The marine-limit delta is associated with a series of lateral moraines that extend southward from the site and that were deposited by retreating Laurentide ice. The small sample collected in August 1992 consisted dominantly of *Hiatella arctica* and *Mya truncata*, mostly small to medium sized whole valves, with minor *Macoma calcarea*, whole valves, and *Mytilus edulis*, fragments only. F.J.E. Wagner (GSC, unpublished report Pl-3-64, 1964) noted these species in the sample as well as *Astarte montagui* var. *striata* (Leach). The shells are variously weathered and encrusted with secondary calcite and minor black lichen spots. The least encrusted *H. arctica* valves were selected and cleaned by cavitron to remove the exterior layers prior to submission for dating. GSC-5466 provides a minimum date on marine limit and deglaciation and a maximum date on a 30 m relative sea level. The species assemblage indicates a range extension of *Mytilus edulis* although there is too little of this shell for a direct conventional age determination.

GSC-5382 Beta River (I) 6500±80
$\delta^{13}C$= + 1.3‰

The marine shells (*Mya truncata*; identified by A.S. Dyke) were enclosed in stony silty clay. Sample 91-DCA-096 was collected by A.S. Dyke on July 27, 1991 from Beta River, inner Tremblay Sound, Borden Peninsula, northwest Baffin Island, District of Franklin, Northwest Territories (72º 16'N, 81º 17'W), at an elevation of 42 m; submitted by A.S. Dyke.

The sample (51.7 g dry weight) was treated with an acid leach to remove the outer 20% of the sample. The treated sample (41.3 g) yielded 8.10 L of CO_2 gas. The age estimate is based on two counts for 2025 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 12.590±0.092, 2.305±0.035, and 28.206±0.135 cpm, respectively.

The uncorrected age is 6480±80.

Comments (**A.S. Dyke**): Shells of *Mya truncata* and *Hiatella arctica* (dominant), *Macoma calcarea* (common), and *Clinocardium ciliatum* and *Serripes groenlandicus* (present) were collected from a highly fossiliferous gullied outcrop of bottomset silty clay with dropstones near the distal end of a large raised delta extending to marine limit at about 79 m elevation. The delta lies just behind a system of lateral moraines formed during separation of the Borden Peninsula Ice Cap and Laurentide ice in innermost Tremblay Sound. Whole valves of *Mya truncata* cleaned by sandblaster and cavitron to remove periostraca, stains and chalky exterior layers were submitted for dating. GSC-5382 provides a minimum date on marine limit and local deglaciation and a maximum date on a 42 m relative sea level. The elevations are based on altimetry. Four minutes elapsed between readings at the collection site and at sea level; 14 minutes elapsed between readings at marine limit and sea level.

GSC-5435 Beta River (II) 7690±100
$\delta^{13}C$= +1.70‰

The marine shells (*Hiatella arctica*; identified by A.S. Dyke) were enclosed in stony silty clay. Sample 91-DCA-095 was collected by A.S. Dyke on July 27, 1991 from Beta River, inner Tremblay Sound, Borden Peninsula, northwest Baffin Island, District of Franklin, Northwest Territories (72º 16.5'N, 81º 17'W), at an elevation of 48 m; submitted by A.S. Dyke.

The sample (19.80 g dry weight) was treated with an acid leach to remove the outer 10% of the sample. The treated sample (18.1 g) yielded 4.1 L of CO_2 gas. The age estimate is based on one count for 3385 minutes in the 2 L counter with a mixing ratio of 1.10. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 7.072±0.059, 1.214±0.025, and 18.357±0.145 cpm, respectively.

The uncorrected age is 7660±100.

Comments (**A.S. Dyke**): Shells of *Hiatella arctica*, *Mya truncata* and *Macoma calcarea* were collected from the gullied and wind eroded surface of bottomset silty clay with dropstones near the distal end of a large raised delta extending to marine limit at about 79 m elevation. The delta lies just behind a system of lateral moraines formed during separation of the Borden Peninsula Ice Cap and Laurentide ice in innermost Tremblay Sound. *Hiatella arctica*, cleaned by cavitron to remove any encrustations, stains or chalky exterior layers, were submitted for dating. GSC-5435 provides a minimum date on marine limit and deglaciation and a maximum date on a 48 m relative sea level. The elevations are based on altimetry. Eight minutes elapsed between readings at the collection site and at sea level; 14 minutes elapsed between readings at marine limit and sea level.

GSC-5329 Tremblay Sound 6820±100
$\delta^{13}C$= + 2.0‰

The marine shells (*Mya truncata*; identified by A.S. Dyke) were enclosed in stony silty clay on the lower foreslope of a large marine-limit delta. Sample 91-DCA-088 was collected by A.S. Dyke on July 24, 1991 from inner Tremblay Sound, Borden Peninsula, northwest Baffin Island, District of Franklin, Northwest Territories (72º 18'N, 81º 13'W), at an elevation of 24 m; submitted by A.S. Dyke.

The sample (20.7 g dry weight) was treated with an acid leach to remove the outer 10% of the sample. The treated sample (18.7 g) yielded 4.14 L of CO_2 gas. The age estimate is based on one count for 3320 minutes in the 2 L counter with a mixing ratio of 1.09. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 7.970±0.066, 1.261±0.033, and 18.546±0.156 cpm, respectively.

The uncorrected age is 6780±100.

Comments (**A.S. Dyke**): The shells, mostly whole valves (few paired) of *Macoma calcarea* and *Hiatella arctica* (dominant) with *Mya truncata* (subdominant) and *Clinocardium ciliatum*, were collected from a small outcrop of stony silty clay on the lower foreslope of a large marine-limit delta. The delta has a single terrace marking marine limit at 79 m above high tide. The terrace is underlain by gravel topsets and by thick sand gravelly sand foresets that are non-fossiliferous, resting on the fossiliferous silty clay. Shells are very abundant where several shell-rich beds are being eroded on the face of the outcrop. The rest of the bottomset sediment appears barren of shells at this locality. The delta was deposited by meltwater issuing from a retreating lobe of the Borden Peninsula Ice Cap following the retreat of coalescent Borden Peninsula and Laurentide ice from Tremblay Sound. Laurentide ice extended at least to the mouth of Tremblay Sound during the last glacial maximum. This is one of three deltas at the mouths of major river valleys formed during deglaciation of the west side of Tremblay Sound. The sample submitted for dating consisted of whole valves of *Mya truncata* cleaned by cavitron to remove sediment, stains, periostraca, and chalky exterior layers. GSC-5329 provides a minimum date on marine limit and on deglaciation and a maximum date on a 24 m relative sea level. The elevations are based on altimetry. Six minutes elapsed between readings at the collection site and at sea level; ten minutes elapsed between readings at marine limit and at sea level.

GSC-5434 Tremblay Sound 6660±70
$\delta^{13}C$= + 3.2‰

The marine shells (*Hiatella arctica*; identified by A.S. Dyke) were enclosed in stony silty clay. Sample 91-DCA-089 was collected by A.S. Dyke on July 24, 1991 from inner Tremblay Sound, Borden Peninsula, northwest Baffin Island, District of Franklin, Northwest Territories (72º 18'N, 81º 13'W), at an elevation of 34 m; submitted by A.S. Dyke.

The sample (49.8 g dry weight) was treated with an acid leach to remove the outer 20% of the sample. The treated sample (39.7 g) yielded 7.94 L of CO_2 gas. The age estimate is based on one count for 3940 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 12.426±0.066, 2.106±0.025, and 28.293±0.128 cpm, respectively.

The uncorrected age is 6610±70.

Comments (**A.S. Dyke**): The shells were cleaned by cavitron to remove any sediment, stain, encrustation, or chalky exterior layers and submitted for dating. The delta has a single terrace marking marine limit at 79 m above high tide. The terrace is underlain by gravel topsets and by thick sand gravelly sand foresets that are non-fossiliferous, resting on the fossiliferous silty clay. The delta was deposited by meltwater issuing from a retreating lobe of the Borden Peninsula Ice Cap following the retreat of coalescent Borden Peninsula and Laurentide ice from Tremblay Sound. Laurentide ice extended at least to the mouth of Tremblay Sound during the last glacial maximum. This is one of three deltas at the mouths of major river valleys formed during deglaciation of the west side of Tremblay Sound. The shells, mostly whole valves of *Hiatella arctica*, were preferentially collected from a small outcrop of stony, silty clay on the lower foreslope of a large marine-limit delta. GSC-5434 provides a minimum date on marine limit and deglaciation and a maximum date on a 34 m relative sea level. The elevations are based on altimetry. Seven minutes elapsed between readings at the collection site and sea level; 10 minutes elapsed between readings at marine limit and sea level.

GSC-5375 Tremblay Sound 3830±60
$\delta^{13}C$= - 0.1‰

The marine shells (*Macoma calcarea*; identified by A.S. Dyke) were enclosed in muddy gravel. Sample 91-DCA-090 was collected by A.S. Dyke on July 24, 1991 from inner Tremblay Sound, Borden Peninsula, northwest Baffin Island, District of Franklin, Northwest Territories (72º 18.5'N, 81º 12.5'W), at an elevation of 6 m; submitted by A.S. Dyke.

The sample (46.1 g dry weight) was treated with an acid leach to remove the outer 20% of the sample. The treated sample (37.0 g) yielded 8.22 L of CO_2 gas. The age estimate is based on two counts for 2100 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 17.512±0.103, 2.305±0.035, and 28.206±0.135 cpm, respectively.

The uncorrected age is 3830±60.

Comments (**A.S. Dyke**): The shells, exclusively paired valves of juvenile *Macoma calcarea*, were collected from a single bed of muddy gravel in a foreset sequence below 0.5 m of topset gravel forming a small raised delta terrace at 8 m above high tide line. The sample was situated 2 m below the terrace. The shell-rich bed is more than half shell in places. The sample includes a few pieces of *Mytilus edulis*, broken during collection. The latter may have been redeposited. The shells were cleaned by cavitron to remove sediment and periostraca before submitting them for dating. GSC-5375 dates a relative sea level of 8 m and a minimum date on a occurrence of *Mytilus edulis* at a site beyond its present range. The elevation is based on altimetry with two minutes between readings at the collection site and at high tide line.

GSC-5325 Alpha River 7680±70
$\delta^{13}C$= + 2.4‰

The marine shells (*Mya truncata*; identified by A.S. Dyke) were enclosed in stony silty clay. Sample 91-DCA-092 was collected by A.S. Dyke on July 26, 1991 from the Alpha River, inner Tremblay Sound, Borden Peninsula, northwest Baffin Island, District of Franklin, Northwest Territories (72º 21'N, 81º 10'W), at an elevation of 33 m; submitted by A.S. Dyke.

The sample (52.7 g dry weight) was treated with an acid leach to remove the outer 30% of the sample. The treated sample (36.7 g) yielded 8.22 L of CO_2 gas. The age estimate is based on one count for 3800 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 10.903±0.064, 2.107±0.027, and 28.215±0.129 cpm, respectively.

The uncorrected age is 7640±70.

Comments (**A.S. Dyke**): The sample submitted for dating consisted of whole valves of *Mya truncata* cleaned by sandblasting and cavitron to remove periostraca, sediment, stains, and chalky exterior layers. Whole valves, some paired and with syphons attached, of *Mya truncata*, *Hiatella arctica*, and *Macoma calcarea* (all abundant), and *Clinocardium ciliatum* (subordinate) were collected from silty clay bottomsets with dropstones of pebble to small boulder size. The outcrop is located directly in front of the marine-limit terrace of the large delta at the mouth of the Alpha River and there is no intervening terrace between the outcrop level and the marine limit. The marine-limit terrace is at 71 m above high tide. The delta was formed by meltwater from a retreating lobe of the Borden Peninsula Ice Cap following separation from Laurentide ice upon deglaciation of inner Tremblay Sound. The sample submitted for dating consisted of whole valves of *Mya truncata* cleaned by sandblasting and cavitron to remove periostraca, sediment, stains, and chalky exterior layers. GSC-5325 provides a date on marine limit and deglaciation. The elevations based on altimetry. Seven minutes elapsed between readings at the collection site and sea level; 14 minutes elapsed between readings at marine limit and sea level.

GSC-5085 Levasseur Inlet 6460±130
$\delta^{13}C$= + 1.2‰

The marine shells (*Mya truncata*; identified by A.S. Dyke) were enclosed in sand. Sample 90-DCA-183 was collected by A.S. Dyke on August 8, 1990 from 1.5 km inland of the head of Levasseur Inlet, Borden Peninsula, Baffin Island, District of Franklin, Northwest Territories (72º 34.6'N, 85º 24.5'W), at an elevation of 20-23 m; submitted by A.S. Dyke.

The sample (25.1 g dry weight) was treated with an acid leach to remove the outer 10% of the sample. The treated sample (22.5 g) yielded 5.08 L of CO_2 gas. The age estimate is based on one count for 2970 minutes in the 2 L counter with a mixing ratio of 1.09. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 8.127±0.064, 1.092±0.024, and 18.125±0.241 cpm, respectively.

The uncorrected age is 6440±130.

Comments (**A.S. Dyke**): The shells were collected from a fresh gully face exposing about 5 m of horizontally bedded red sand capped by 1-2 m of medium gravel forming the topset beds of an estuarine delta at 24 m above high tide. The shells are sparse but in good condition, typically paired and in growth position. The 24 m terrace is extensive and occurs along both sides of Levasseur River. The extent of the deposit and the coarseness of its more proximal parts (mostly gravel) suggest that it was deposited by meltwater. If so, glacier ice still occupied lower Levasseur valley until relative sea level had fallen to 24 m. An ice-contact marine limit delta right at the head of the inlet, farther down valley, is at 40 m elevation, but contains no shells. These shells have a diffuse red stain leached from the enclosing red sediment. The sample submitted for dating was cleaned by cavitron to remove chalky and exfoliating material. GSC-5085 provides a maximum date on a 24 m relative sea level and a closely limiting minimum date on deglaciation of lower Levasseur valley. The elevation is based on one altimeter measurement with 14 minutes between readings at high tide and the delta terrace.

GSC-5083 Eqalulik River 7210±110
$\delta^{13}C$= + 1.6‰

The marine shells (*Hiatella arctica*; identified by A.S. Dyke) were a surface collection on silty sand. Sample 90-DCA-170 was collected by A.S. Dyke on August 5, 1990 from 0.2 km north of Eqalulik River, Borden Peninsula, Baffin Island, District of Franklin, Northwest Territories (72° 39'N, 85° 39.5'W), at an elevation of 25 m; submitted by A.S. Dyke.

The sample (24.2 g dry weight) was treated with an acid leach to remove the outer 10% of the sample. The treated sample (21.8 g) yielded 4.95 L of CO_2 gas. The age estimate is based on two counts for 2000 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 7.412±0.071, 1.029±0.028, and 18.121±0.154 cpm, respectively.

The uncorrected age is 7180±110.

Comments (**A.S. Dyke**): This is a large collection of only juvenile *Hiatella arctica* valves that are very fragile and have minor red staining (Quaternary sediments are derived from red sandstone). The shells were collected from an area of abundant shells, mostly whole valves but none in growth position, on the surface of stony glaciomarine silty sand forming a veneer over till just behind the youngest of three end moraine loops of the Eqalulik Moraine System. The veneer extends upslope to a prominent bench of beach gravel recording marine limit inside the moraine system at 41 m above high tide as measured by altimeter. Marine limit on the next older moraine is marked by a clear beach limit at 50 m. Just beyond the moraine system to the north, marine limit is recorded by a fan delta superimposed by a beach at 76 m. The glaciomarine sediment veneer from which the dated shells were collected occurs in several large patches behind the moraines but shells were found at only one site. GSC-5083 provides a minimum date on the 41 m marine limit behind the Eqalulik Moraine System and a maximum date on a 25 m relative sea level stand. The elevation is based on one altimeter measurement with 17 minutes between readings at sample site and high tide; 13 minutes between marine limit and high tide. Second measurement of marine limit beach behind moraines was 40 m with 15 minutes between readings at high tide and beach.

GSC-5361 Lavoie Point 9280±80
$\delta^{13}C$= + 2.1‰

The marine shells (*Mya truncata*; identified by A.S. Dyke) were enclosed in silt and clay with dropstones. Sample 91-DCA-136 was collected by A.S. Dyke on August 1, 1991 from Lavoie Point, on the Navy Board Inlet coast of Borden Peninsula, northwest Baffin Island, District of Franklin, Northwest Territories (72° 45'N, 80° 18'W), at an elevation of 53 m; submitted by A.S. Dyke.

The sample (49.1 g dry weight) was treated with an acid leach to remove the outer 20% of the sample. The treated sample (40.0 g) yielded 8.54 L of CO_2 gas. The age estimate is based on one count for 3900 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 8.894±0.063, 2.215±0.033, and 28.129±0.131 cpm, respectively.

The uncorrected age is 9250±80.

Comments (**A.S. Dyke**): The shells were collected from a 15 m high section of horizontally bedded silt and clay with scattered dropstones exposed in a deep stream cut through the bottomset sediments of a large raised, marine-limit delta at Lavoie Point. The sample includes *Mya truncata*, *Hiatella arctica* (co-dominant), *Macoma calcarea* (common), and rare *Clinocardium ciliatum* and *Portlandia arctica*. The section terminates upward at an extensive terrace, apparently marine limit, at 53 m elevation. The delta extends outward from and partly occupies a breach in a set of lateral and end moraines formed by an eastward flowing lobe of Borden Peninsula Ice Cap. The sample submitted for dating consisted of whole valves, many paired, of *Mya truncata* cleaned by sandblasting and by cavitron to remove periostraca, stains, and chalky exterior layers. GSC-5361 provides a date on marine limit and deglaciation. The elevation is based on 2 altimeter measurements with 17 minutes between readings at the sample site and at high tide line.

GSC-5428 Lavoie Point 4170±60
$\delta^{13}C$= -24.6‰

The driftwood (*Larix*; identified by H. Jetté (unpublished GSC Wood Report No. 92-51)) was enclosed in sand. Sample 91-DCA-153 was collected by A.S. Dyke on August 2, 1991 from a bay northwest of Lavoie Point, on the Navy Board Inlet coast of Borden Peninsula, northwest Baffin Island, District of Franklin, Northwest Territories (72° 49'N, 80° 26.5'W), at an elevation of 9 m; submitted by A.S. Dyke.

The sample (16.3 g dry weight) was treated with hot base, hot acid, and distilled water rinses (noncalcareous). The treated sample (8.2 g) yielded 8.04 L of CO_2 gas. The age estimate is based on one count for 2100 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 16.846±0.098, 2.106±0.025, and 28.293±0.128 cpm, respectively.

The uncorrected age is 4160±60.

Comments (**A.S. Dyke**): The driftwood log, about 20 cm diameter, was protruding from gravelly beach sand with 30 cm exposed. The wood extended below the frost table but the sample was taken from the active layer. The log was finely cracked along the grain throughout its thickness and the entire mass was saturated at time of collection. Some plant roots had penetrated along the cracks. The wood was removed from the active layer and the soundest and least discoloured material was sampled. The wood was oven dried and surfaces and wood along cracks were cut off prior to submission for dating. GSC-5428 provides a date on a 9 m beach and on the only piece of old driftwood found yet in this area. A bowhead whale (*Balaena mysticetus*) earbone from a nearby raised beach at 8.5 m elevation yielded an uncorrected age of 3910±140 (S-3427; $\delta^{13}C$ = -14.9‰) and another bowhead earbone from the 11.5 m level yielded an uncorrected age of 4450±140 (S-3417; $\delta^{13}C$ = -15.8‰). The elevation is based on 1 altimeter measurement with 5 minutes between readings at the sample site and at high tide line.

GSC-5380 Lavoie Point 7940±90
$\delta^{13}C$= + 1.5‰

The marine shells (*Mya truncata*; identified by A.S. Dyke) were enclosed in silty and sandy clay with dropstones. Sample 91-DCA-186 was collected by A.S. Dyke on August 6, 1991 from a bay northwest of Lavoie Point, on the Navy Board Inlet coast of Borden Peninsula, northwest Baffin Island, District of Franklin, Northwest Territories (72° 50.5'N, 80° 32.5'W), at an elevation of 15 m; submitted by A.S. Dyke.

The sample (38.1 g dry weight) was treated with an acid leach to remove the outer 20% of the sample. The treated sample (30.7 g) yielded 6.82 L of CO_2 gas. The age estimate is based on two counts for 1690 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 10.616±0.092, 2.234±0.029, and 28.421±0.132 cpm, respectively.

The uncorrected age is 7910±90.

Comments (**A.S. Dyke**): The shells were paired in a freshly slumping section that exposes 8 m of silty and sandy clay, rich in dropstones; stones (pebbles to small boulders) comprise 20-30% of the sediment volume. The sediment has weak horizontal stratification

expressed mainly by massive sand beds up to 30 cm thick. The stony clay itself has no visible lamination. This deepwater sediment is capped by 1.5 m of beach gravel at an elevation of 20 m. This site is located directly in front of a marine-limit delta that has a kettled terrace at 84 m elevation and a non-kettled terrace at 73 m. The latter was built when there was still sufficient meltwater supply to move coarse gravel. The nature of the sediment from which the shells were collected indicates that it was laid down shortly after deglaciation of the site. Overall, the collection included a rich variety of species dominated by *Mya truncata* and *Hiatella arctica* with *Mya pseudoarenaria* (common) and rare *Mytilus edulis*, *Serripes groenlandicus*, *Clinocardium ciliatum*, and *Macoma calcarea* and a gastropod. Whole valves of *Mya truncata* were rinsed and scrubbed to remove sediment and loose periostraca and submitted for dating. GSC-5380 provides a date of a diverse mollusk assemblge, including species well beyond their present ranges, and a maximum date on a 20 m relative sea level. The site was deglaciated before 8.9 ka (see GSC-5436, this series). The elevation is based on one altimeter measurement with 6 minutes between readings at the sample site and at high tide line.

GSC-5378 Lavoie Point 8310±80
$\delta^{13}C = +2.6‰$

The marine shells (*Mya truncata*; identified by A.S. Dyke) were enclosed in pebbly clay. Sample 91-DCA-149 was collected by A.S. Dyke on August 2, 1991 from a bay northwest of Lavoie Point, on the Navy Board Inlet coast of Borden Peninsula, northwest Baffin Island, District of Franklin, Northwest Territories (72° 53.5'N, 80° 32'W), at an elevation of 0.0 m; submitted by A.S. Dyke.

The sample (47.0 g dry weight) was treated with an acid leach to remove the outer 20% of the sample. The treated sample (37.8 g) yielded 8.52 L of CO_2 gas. The age estimate is based on one count for 3730 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 10.084±0.067, 2.305±0.035, and 28.206±0.135 cpm, respectively.

The uncorrected age is 8260±80.

Comments (**A.S. Dyke**): Paired valves of several species of shells were recovered from pebbly brown clay at high tide line. One metre of clay is exposed above high tide line and is overlain by 3 m of beach sand gravel. The site is situated at the toe of a large, ice-contact, marine-limit delta whose lip is at 61 m above high tide. The nature of the sediment suggests that it could be either bottomset beds of the glaciomarine delta or younger prolittoral sediment. The site is very rich in shells and contains species not commonly found in glaciomarine sediment in this area. The assemblage is dominated by *Mya truncata* with common *Mya pseudoarenaria*, *Hiatella arctica*, and *Macoma calcarea*. *Serripes groenlandicus* and *Clinocardium ciliatum* are present. The is one of the northernmost records of early Holocene *M. pseudoarenaria*, a species now near extinction but widespread in the early Holocene. Whole valves of *Mya truncata*, cleaned by sandblaster and cavitron to remove periostraca and chalky exterior layers, were submitted for dating. GSC-5378 provides a date on this diverse species assemblage which dates from shortly after deglaciation of the site as recorded by GSC-5436.

GSC-5436 Lavoie Point 8920±90
$\delta^{13}C = +2.83‰$

The marine shells (*Mya truncata*; identified by A.S. Dyke) were enclosed in stony silt. Sample 91-DCA-150 was collected by A.S. Dyke on August 2, 1991 from a bay northwest of Lavoie Point, on the Navy Board Inlet coast of Borden Peninsula, northwest Baffin Island, District of Franklin, Northwest Territories (72° 54'N, 80° 32.5'W), at an elevation of 18 m; submitted by A.S. Dyke.

The sample (58.50 g dry weight) was treated with an acid leach to remove the outer 30% of the sample. The treated sample (40.6 g) yielded 8.0 L of CO_2 gas. The age estimate is based on one count for 3385 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 9.277±0.064, 2.111±0.026, and 28.013±0.180 cpm, respectively.

The uncorrected age is 8880±90.

Comments (**A.S. Dyke**): Shells, mostly whole valves of *Mya truncata*, *Hiatella arctica*, and *Macoma calcarea* were collected from the floor of a slump in stony silt on the lower foreslope of a large ice-contact, marine-limit delta whose lip is at 61 m above high tide. The top of the slump is at 18 m elevation and the first terrace above the site is at 20 m. The 20 m terrace is underlain by silty sand is likely erosional. The shells likely relate to the marine-limit terrace. GSC-5436 provides a minimum date on marine limit and on deglaciation. The elevation is based on two altimeter measurements with two minutes between sample site and sea level readings.

Lab. Comment: Our system developed a small leak during the processing of this sample and therefore the age of the sample may be slightly younger than expected.

GSC-5223 Victor Bay 8630±160
$\delta^{13}C = +1.6‰$

The marine shells (*Hiatella arctica*; identified by A.S. Dyke) were enclosed in pebbly deltaic sand. Sample Victor Bay 1 was collected by S.K. Short on July 8, 1987, from 1.4 km inland of the west side of Victor Bay, and 2.35 km northeast of town of Arctic Bay, Borden Peninsula, Baffin Island, District of Franklin, Northwest Territories (73° 3'N, 85° 5'W), at an elevation of 50 m; submitted by A.S. Dyke.

The sample (8.4 g dry weight) was treated with an acid leach to remove the outer 10% of the sample. The treated sample (7.7 g) yielded 1.67 L of CO_2 gas. The age estimate is based on one count for 3720 minutes in the 2 L counter with a mixing ratio of 2.66. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 6.300±0.110, 1.110±0.028, and 18.388±0.133 cpm, respectively.

The uncorrected age is 8600±160.

Comments (**A.S. Dyke**): The sample consisted of fragile, juvenile *Hiatella arctica*, mostly paired at time of collection. The shells appeared free of secondary carbonate or other encrustation. The shells were collected from a 10-15 cm thick lens of shell-rich sand about 8 m above stream level and 3 m below the top of a stream-cut through a glaciomarine delta. The section is cut through the first terrace below the marine-limit terrace as identified by Dyke from airphoto interpretation. The back end of the marine-limit terrace plots on the 60 m contour on the 1:50 000 scale topographic map (10 m contour interval). The delta was likely built by glacial meltwater at a time when the site of the Hamlet of Arctic Bay was still ice covered. The modern streams entering Victor Bay have not constructed deltas despite the availability of erodable raised marine sediments. The site of a deposit of radiocarbon-dated peat at Arctic Bay (Short and Andrews, 1988) must have been ice covered when the delta was being deposited. Nine dates have been run on this peat: I-1315 (9360±120), GX-9304 (14 185±760), GX-10628 (15 810±490), GX-9303 (16 849±860), GX-10290 (7830±230), GX-9302 (8635±565), GX-12852 (6720±390), GX-9686 (5075±210), and GX-9685 (modern). Recent redating of macrofossils from the peat by AMS indicate that the deposit is entirely of Holocene age (J.T. Andrews, pers. comm., 1991). GSC-5223 provides a minimum age of marine limit and deglaciation.

GSC-5232 Silt Point uncorrected 6860±150

The marine shells (*Hiatella arctica* and *Macoma calcarea*; identified by A.S. Dyke) were collected from the surface in fine sand on delta terrace. Sample CD 36/63 was collected by B.G. Craig on July 13, 1963, from 1.35 km northeast of Silt Point, Strathcona Sound, Borden Peninsula, Baffin Island, District of Franklin, Northwest Territories (73º 6.5'N, 84º 21.5'W), at an elevation of 35 m; submitted by A.S. Dyke.

The sample (10.9 g dry weight) was treated with an acid leach to remove the outer 10% of the sample. The treated sample (9.8 g) yielded 2.13 L of CO_2 gas. The age estimate is based on two counts for 1700 minutes in the 2 L counter with a mixing ratio of 2.09. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 7.832±0.126, 1.110±0.028, and 18.388±0.133 cpm, respectively.

The uncorrected age is 6860±150.

Comments (**A.S. Dyke**): The shells were collected from the surface of a raised delta terrace at 35 m altitude. Marine limit is marked by another delta terrace just up stream from the collection site and lies at about 50 m as interpolated from the 1:50 000 topographic map. This marine-limit delta lies between moraine ridges of a major end moraine system. According to B.G. Craig's field notes, the shells at this site consisted mostly of fragments but one articulated *Hiatella arctica* was collected. Species in this collection (GSC locality 60183) were identified by F.J.E. Wagner (GSC, unpublished report, 1964) as *Hiatella arctica*, *Mya truncata*, and *Macoma calcarea*. The largest and cleanest fragments from this small sample were cleaned by cavitron (June 1991) and submitted for dating. GSC-5232 should provide a minimum age on marine limit and deglaciation and maximum age on a 35 m relative sea level. However, the age determination is anomalous in that it is the only one in a large series that places the 7 ka shoreline this high on northern Borden Peninsula.

GSC-5216 Baillarge Bay 8850±100
$\delta^{13}C$= +1.18‰

The marine shells (*Hiatella arctica*; identified by A.S. Dyke) were enclosed in deltaic sand. Sample CD 29a/63 was collected by B.G. Craig on July 11, 1963, from 3.6 km upvalley from the head of Baillarge Bay, Borden Peninsula, Baffin Island, District of Franklin, Northwest Territories (73º 13'N, 84º 13'W), at an elevation of 33 m; submitted by A.S. Dyke.

The sample (50.83 g dry weight) was treated with an acid leach to remove the outer 20% of the sample. The treated sample (41.0 g) yielded 8.70 L of CO_2 gas. The age estimate is based on one count for 2000 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 9.429±0.085, 2.048±0.039, and 28.302±0.166 cpm, respectively.

The uncorrected age is 8830±100.

Comments (**A.S. Dyke**): The shells were collected from a gully eroded in a marine-limit delta terrace on the south side of the main stream flowing into the head of Baillarge Bay. It is not clear whether the elevation of 33 m measured by altimeter by Craig is that of the sample site or the delta terrace as this is not specified in his field notes. However, the 1:50 000 scale topographic map (10 m contour interval) shows a 40 m contour outlining the outer edge of the delta terrace. This is taken here as the minimum estimate of marine limit elevation. Species in this collection were identified by F.J.E. Wagner (GSC, unpublished report, 1964) as *Hiatella arctica*, *Mya truncata*, *Macoma calcarea*, *Serripes groenlandicus*, and *Clinocardium ciliatum*. Well-preserved whole valves of *Hiatella arctica* were cleaned by cavitron and submitted for dating. GSC-5216 provides a closely limiting minimum age of marine limit and deglaciation.

GSC-5072 Cape Charles York 8550±100
$\delta^{13}C$= +1.11‰

The marine shells (*Mya truncata*; identified by A.S. Dyke) were enclosed in stony silt. Sample 90-DCA-14 was collected by A.S. Dyke on July 10, 1990 from Cape Charles York, Borden Peninsula, Baffin Island, District of Franklin, Northwest Territories (73º 39'N, 82º 59'W), at an elevation of 14.5 m; submitted by A.S. Dyke.

The sample (51.02 g dry weight) was treated with an acid leach to remove theouter 20% of the sample. The treated sample (40.35 g) yielded 38.67 L of CO_2 gas. The age estimate is based on one count for 3510 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 6.247±0.051, 1.020±0.024, and 18.094±0.144 cpm, respectively.

The uncorrected age is 8540±100.

Comments (**A.S. Dyke**): The shells were collected from a small stony silt deposit of a square kilometre or so extending outward from the lip of a raised delta at 22 m above sea level. The silts are thought to represent prodelta bottomset deposits laid down when relative sea level stood at 22 m although deposition could have continued until the sea level fell to 14.5 m. The 22 m delta appears to have been deposited by glacial meltwater although it occurs well below marine limit on the adjacent coast, which is recorded by a distinct upper beach limit at 58 m (measured by altimeter; 2 measurements with 5 minutes between marine limit and high tide readings). The 58 m marine limit could be Late Wisconsinan or older. The sample consisted mostly of whole valves of *Mya truncata* (dominant), *Hiatella arctica*, and either *Astarte borealis* or *Macoma calcarea* (common). All were collected from the face of a section; all were disarticulated. The valves are of variable quality, depending on length of residence at the surface, the worst having lichen and calcite encrustations. The cleanest whole valves were submitted for dating after cleaning with a cavitron. GSC-5072 provides a minimum date on the 22 m glaciomarine delta and on deglaciation of the Lancaster Sound coast of Borden Peninsula. The elevation of the shells is based on 1 altimeter measurement with 8 minutes between sample site and high tide readings.

GSC-5075 Cape Charles York 1300±70
$\delta^{13}C$= -23.5‰

The driftwood (*Picea*; identified by R.J. Mott (unpublished GSC Wood Report No. 90-45)) was enclosed in beach gravel. Sample 90-DCA-35 was collected by A.S. Dyke on July 14, 1990 from Cape Charles York, Borden Peninsula, Baffin Island, District of Franklin, Northwest Territories (73º 43.5'N, 82º 52'W), at an elevation of 0 m; submitted by A.S. Dyke.

The sample (12.0 g dry weight) was treated with hot base, hot acid, and distilled water rinses (noncalcareous). The treated sample (9.1 g) yielded 8.53 L of CO_2 gas. The age estimate is based on two counts for 2090 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 15.137±0.091, 1.003±0.022, and 17.754±0.102 cpm, respectively.

The uncorrected age is 1280±70.

Comment (**A.S. Dyke**): The driftwood, about 1 m long and 10 cm diameter, was 95% buried in beach gravel of the fifth beach ridge back from the water's edge. The outer two beach ridges are currently active, so the wood is in the third abandonned ridge, on the gentle backslope of that ridge. Four ridges have been added since its deposition. The sample is at the same elevation as the crest of the modern storm ridge, which is about 1 m above quiet high tide, so sea level has not changed appreciably since deposition of the log. A series of 30 or so distinct relict beaches at Cape Charles York rise regularly by about 2 m (as measured by altimeter) from oldest (land-

ward) to youngest (seaward). Lichen cover on beach cobbles and on archaeological structures increases inland, indicating that a considerable span of time is represented by this beach plain. The log consisted largely of intact wood along one side and of very cracked and broken wood along the other. The sample submitted for dating consisted of clean inner material with all outside wood removed. GSC-5075 provides an indication of the rate of accretion of beach ridges at the present coast which is slowly submerging.

Bylot Island (Fig. 14)

GSC-5189 Sermilik Glacier 460±120
$\delta^{13}C$= -25.1‰

The organic debris was enclosed in finely divided organic material in gelatinous silt. Sample 90-SCA-101 was collected by W.W. Shilts and M. Bouchard on July 11, 1990 from about 1.5 km up glacier from the snout of Sermilik Glacier, 25 km north-northwest of town of Pond Inlet, south side of Bylot Island, District of Franklin, Northwest Territories (72° 55'N, 78° 10'W), at an elevation of 150 m; submitted by W.W. Shilts.

The sample (418.8 g wet weight) was treated with hot acid and distilled water rinses; base treatment was omitted (noncalcareous). The treated sample (108.2 g) yielded 2.61 L of CO_2 gas. The age estimate is based on two counts for 1400 minutes in the 2 L counter with a mixing ratio of 1.71. The count rates for the sample (net), and monthly backgrounds and standards (net) were 17.203±0.196, 1.087±0.025, and 18.225±0.161 cpm, respectively.

The uncorrected age is 460±120.

Comment (**W.W. Shilts**): Organic debris melting out of closed fractures occurs extensively in and adjacent to a meltwater valley running along the glacier's axis. An extensive crevasse-field up ice may be a trap for organic debris which then melts out at the ice surface after the crevasses are closed up in the zone of compression. The sediment is dominated by fragments of the algae *Ancylonema nordenskioldii* (identified by A. Larouche and N. Marcoux) which grows vigorously on these glaciers. The relatively old date suggests that the bulk of the organic material collected in depressions that were subsequently sealed to preserve it. Crevasses in the ice-field are the obvious candidates.

GSC-5116 Aktineq Glacier 150±130
$\delta^{13}C$= -23.1‰

The organic debris was enclosed in finely divided organic debris in gelatinous silt. Sample 90-SCA-100 was collected by W.W. Shilts and M. Bouchard on July 13, 1990 from the surface in the snout area of Aktineq Glacier, 37.5 km northwest of the town of Pond Inlet on the south side of Bylot Island, District of Franklin, Northwest Territories (72° 53'N, 78° 55'W), at an elevation of 300 m; submitted by W.W. Shilts.

The sample (68.2 g wet weight) was treated with hot acid and distilled water rinses; base treatment was omitted (noncalcareous). The treated sample (25.5 g) yielded 2.02 L of CO_2 gas. The age estimate is based on two counts for 1800 minutes in the 2 L counter with a mixing ratio of 2.27. The count rates for the sample (net), and monthly backgrounds and standards (net) were 17.793±0.170, 1.092±0.024, and 18.125±0.241 cpm, respectively.

The uncorrected age is 150±130.

Comment (**W.W. Shilts**): The material was composed primarily of fetid lacustrine silt with abundant fecal material, presumably derived from the bottom of a proglacial lake that was densely inhabited by Snow Geese during the breeding season. If this interpretation is correct then the sediment has been transported more than 4 km and uplifted either along a thrust plane or along a meltwater conduit over 100 m above its site of origin.

Charles Island (Fig. 13)

GSC-5197 Charles Bay 1880±60
$\delta^{13}C$= -21.8‰

The organic rich detritus was enclosed in sand. Sample 90-DKA-37.1 was collected by R.A. Daigneault on June 30, 1990 from the east bank of the river flowing northward to Charles Bay, about 1 km from the north coast of Charles Island, District of Franklin, Northwest Territories (62° 39'50"N, 74° 20'10"W), at an elevation of 8 m; submitted by R.A. Daigneault.

The sample (28.5 g dry weight) was treated with cold base, hot acid, and distilled water rinses (slightly calcareous). The treated sample (12.0 g) yielded 6.57 L of CO_2 gas. The age estimate is based on one count for 3785 minutes in the 5 L counter with a mixing ratio of 1.00. The count rate for the sample (net), and monthly backgrounds and standards (net) were 22.681±0.089, 2.107±0.038, and 28.490±0.183 cpm, respectively.

The uncorrected age is 1830±60.

Comment (**R.A. Daigneault**): Sandy littoral sequence containing rare broken shells (Balanus) and two layers of mixed plant remnants (algae and wood, identified by M. Garneau). GSC-5197 dates a sea-level stand at 8 m.

Melville Peninsula (Fig. 13)

GSC-5132 Frozen Strait 6920±100
$\delta^{13}C$= + 1.5‰

The marine shells (*Hiatella arctica*; identified by L.A. Dredge) were enclosed in sandy silt. Sample 90-DU-2598 was collected by L.A. Dredge on July 31, 1990, from a marine plain north of Frozen Strait, 6.2 km east of Siuraqtujaq Point, Melville Peninsula, District of Franklin, Northwest Territories (66° 23.2'N, 85° 10.7'W), at an elevation of 100 m; submitted by L.A. Dredge.

The sample (46.2 g dry weight) was treated with an acid leach to remove the outer 20% of the sample. The treated sample (46.2 g) yielded 8.43 L of CO_2 gas. The age estimate is based on one count for 1800 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 7.858±0.073, 1.094±0.019, 18.531±0.106 cpm, respectively.

The uncorrected age is 6890±100.

Comment (**L.A. Dredge**): The shells were collected from the surface of a sandy marine plain below a flight of raised beaches. They provide a minimum date for deglaciation of the southern part of Melville Peninsula.

Repulse Bay Series

GSC-5146 Repulse Bay (I) 6760±100
$\delta^{13}C$= + 1.2‰

The marine shells (*Hiatella arctica*; identified by L.A. Dredge) were enclosed in silt. Sample 90-DU-2321 was collected by L.A. Dredge on July 14, 1990, from a small valley along the road to the reservoir, 1.5 km north of the hamlet of Repulse Bay, Melville Peninsula, District of Franklin, Northwest Territories (66° 33.3'N, 86° 14.9'W), at an elevation of 80 m; submitted by L.A. Dredge.

The sample (37.6 g dry weight) was treated with an acid leach to remove the outer 20% of the sample. The treated sample (30.4 g)

yielded 6.87 L of CO_2 gas. The age estimate is based on two counts for 2060 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 8.080±0.071, 1.101±0.023, 18.696±0.163 cpm, respectively.

The uncorrected age is 6740±100.

Comment (**L.A. Dredge**): The shells were collected from the surface of silty mudboils near Repulse Bay. They date the silty enclosing material and provide a minimum age for deglaciation.

GSC-5166 Repulse Bay (II) 6530±80
$\delta^{13}C$= + 2.0‰

The marine shells (*Mya truncata*; identified by L.A. Dredge) were enclosed in stony sand. Sample 90-DU-2419 was collected by L.A. Dredge on October 22, 1990, from a river bank exposure 12.5 km east of Repulse Bay, Melville Peninsula, District of Franklin, Northwest Territories (66° 35.7'N, 86° 1.7'W), at an elevation of 75 m; submitted by L.A. Dredge.

The sample (52.7 g dry weight) was treated with an acid leach to remove the outer 30% of the sample. The treated sample (30.9 g) yielded 6.64 L of CO_2 gas. The age estimate is based on two counts for 1800 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 12.657±0.098, 2.233±0.035, 28.426±0.139 cpm, respectively.

The uncorrected age is 6500±80.

Comment (**L.A. Dredge**): Paired and single Mya truncata valves were extracted from a 30 m section of beach gravel overlying shelly stony sand and silt (diamicton) which in turn overlies a marine clay. This sample is from the stony diamicton and is thought to date a period of intensive rafting of dirty ice, possibly of glacial origin.

GSC-5112 Hoppner Inlet 6490±140
$\delta^{13}C$= + 1.5‰

The marine shells (*Hiatella arctica* and *Mya truncata*; identified by L.A. Dredge) were enclosed in fine sand. Sample 90-DU-2014 was collected by L.A. Dredge on July 14, 1990, from along a small stream emptying into the eastern side of Hoppner Inlet, southern Melville Peninsula, District of Franklin, Northwest Territories (66° 32'N, 86° 15'W), at an elevation of 125 m; submitted by L.A. Dredge.

The sample (13.5 g dry weight) was treated with an acid leach to remove the outer 10% of the sample. The treated sample (11.0 g) yielded 2.45 L of CO_2 gas. The age estimate is based on one count for 3925 minutes in the 2 L counter with a mixing ratio of 1.84. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 8.080±0.082, 1.092±0.024, 18.125±0.241 cpm, respectively.

The uncorrected age is 6490±140.

Comment (**L.A. Dredge**): The shells were collected from an exposure in a raised marine delta, whose surface lies at 125-130 m. The shells were extracted from the upper 3 m. They give an approximate age for the 125 m waterplane and a minimum date for deglaciation. Marine limit lies at about 140 m.

GSC-5172 Ujarasugjulik Point 3020±80
$\delta^{13}C$= + 1.5‰

The marine shells (*Mya truncata*; identified by L.A. Dredge) were enclosed in fine sand. Sample 90-DU-2454 was collected by L.A. Dredge on October 24, 1990, from along a river 2.5 km north of Ujarasugjulik Point, Haviland Bay, southern Melville Peninsula, District of Franklin, Northwest Territories (66° 33.7'N, 86° 38.0'W), at an elevation of 12 m; submitted by L.A. Dredge.

The sample was treated with an acid leach to remove the outer 20% of the sample. The treated sample (43.0 g) yielded 7.69 L of CO_2 gas. The age estimate is based on two counts for 1780 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 12.683±0.091, 1.057±0.020, 18.411±0.103 cpm, respectively.

The uncorrected age is 2990±80.

Comment (**L.A. Dredge**): Paired valves with periostracum were collected from a river exposure. The valves were within intertidal sands and silts, about 1.5 m below the top of the section. They date recent emergence in the Repulse Bay area.

GSC-5110 Rae Isthmus 6500±120
$\delta^{13}C$= + 1.5‰

The marine shells (*Mya truncata* and *M. arenaria*; identified by L.A. Dredge) were enclosed in sorted littoral sand. Sample 90-DU-2024 was collected by L.A. Dredge on July 12, 1990, from Rae Isthmus, Melville Peninsula, District of Franklin, Northwest Territories (66°43.5'N, 86°38.8'W), at an elevation of 105 m; submitted by L.A. Dredge.

The sample (32.9 g dry weight) was treated with an acid leach to remove the outer 20% of the sample. The treated sample (26.9 g) yielded 5.92 L of CO_2 gas. The age estimate is based on one count for 3695 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 8.094±0.055, 1.092±0.024, 18.125±0.241 cpm, respectively.

The uncorrected age is 6480±120.

Comment (**L.A. Dredge**): Whole valves and fragments were collected from a fresh exposure of stratified medium and fine sand overlying cobbly sand. The shells were collected from the upper unit. They provide a minimum and approximate age for deglaciation and marine inundation across Rae Isthmus. The dates are about 400 years younger than Craig's date (GSC-286, 6850±140; Dyck et al., 1966) from the same site. The redating of Craig's original sample yielded an uncorrected age of 7080±120.

GSC–286 2 Anigorchli Lake 7120±120
$\delta^{13}C$= + 2.5‰

The marine shells were from a surface collection on silt. Sample CD/DF 148/64 was collected by J.A. Donaldson on July 5, 1964, from Anigorchli Lake, District of Franklin, Northwest Territories (66° 44'N, 86° 42'W), at an elevation of 121 m; submitted by R. McNeely.

The sample (10.4 g dry weight) was treated with an acid leach to remove the outer 10% of the sample. The treated sample (9.4 g) yielded 2.08 L of CO_2 gas. The age estimate is based on one count for 370 minutes in the 2 L counter with a mixing ratio of 1.97. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 7.511±0.091, 1.238±0.028, and 18.133±0.104 cpm, respectively.

The uncorrected age is 7080±120.

For comments see discussion on "**Crosschecks**" in the "Introduction" section. This crosscheck date also relates to GSC-5110 (6500±120). Original date was published in Dyck et al. (1966).

Arctic Islands (Western Zone) (Fig. 15)

Brock Island (Fig. 15)

GSC-5181 Cape Murray (I) 5310±70
$\delta^{13}C$= -24.3‰

The plant material was enclosed in sand. Sample HCA 13-7-3A was collected by D.A. Hodgson on July 13, 1990 from 29 km east-southeast of Cape Murray, northeast shore of Brock Island, District of Franklin, Northwest Territories (77º 54.5'N, 113º 54'W), at an elevation of 2 m; submitted by D.A. Hodgson.

The sample (22.9 g dry weight) was treated with hot base, hot acid, and distilled water rinses (noncalcareous). The treated sample (12.0 g) yielded 8.70 L of CO_2 gas. The age estimate is based on one count for 5180 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net), and monthly backgrounds and standards (net) were 9.520±0.049, 1.057±0.020, and 18.411±0.103 cpm, respectively.

The uncorrected age is 5300±70.

Comment (**D.A. Hodgson**): A 1 cm thick mat of compressed allochthonous moss was exposed for a 30 m horizontal distance, halfway up a 4 m high cutbank of stratified sand. The convolute bedding of the frozen sediments suggested subaqueous deposition of the moss, and subsequent dewatering (Hodgson et al., 1994). The related sea level was±4 m asl.

GSC-5148 Cape Murray (II) 10 700±120
$\delta^{13}C$= - 0.2‰

The marine shells (*Hiatella arctica*; identified by D.A. Hodgson) were enclosed in silty sand. Sample HCA-90-13-7-4A was collected by D.A. Hodgson on July 13, 1990 from 29 km east-southeast of Cape Murray, northeast shore of Brock Island, District of Franklin, Northwest Territories (77º 54'N, 113º 55'W), at an elevation of 1 m; submitted by D.A. Hodgson.

The sample (19.3 g dry weight) was treated with an acid leach to remove the outer 10% of the sample. The treated sample (17.6 g) yielded 3.89 L of CO_2 gas. The age estimate is based on one count for 3400 minutes in the 2 L counter with a mixing ratio of 1.15. The count rates for the sample (net), and monthly backgrounds and standards (net) were 4.923±0.053, 1.101±0.023, and 18.696±0.163 cpm, respectively.

The uncorrected age is 10 700±120.

Comment (**D.A. Hodgson**): Rare shells were collected from a stony stratum exposed over a 30 m length of a 6 m high cutbank. These are the oldest clearly finite shells so far found on Brock Island. Related sea level is greater than 6 m (Hodgson et al., 1994).

GSC-5150 Brock Island 10 000±90
$\delta^{13}C$= + 0.7‰

The marine shells (*Hiatella arctica*; identified by D.A. Hodgson) were from a surface collection on silty sand pea gravel. Sample HCA-90-13-7-5 was collected by D.A. Hodgson on July 12, 1990 from the northeast shore of Brock Island, District of Franklin, Northwest Territories (77º 55.7'N, 113º 55'W), at an elevation of 6.5 m; submitted by D.A. Hodgson.

The sample (46.0 g dry weight) was treated with an acid leach to remove the outer 20% of the sample. The treated sample (37.7 g) yielded 8.76 L of CO_2 gas. The age estimate is based on one count for 3800 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net), and monthly backgrounds and standards (net) were 8.171±0.063, 2.233±0.035, and 28.426±0.139 cpm, respectively.

The uncorrected age is 10 000±90.

Comment (**D.A. Hodgson**): Abundant shells were collected on probable beach deposits related to a sea level±6.5 m (Hodgson et al., 1994).

GSC-5175 Cape Murray (III) 8830±90
$\delta^{13}C$= -25.1‰

The plant material was enclosed in silty sand. Sample HCA-90-14-7-4A was collected by D.A. Hodgson on July 14, 1990 from 32 km southeast of Cape Murray on southwest coast near southern extremity of Brock Island, District of Franklin, Northwest Territories (77º 43.5'N, 114º 20'W), at an elevation of 2 m; submitted by D.A. Hodgson.

The sample (16.0 g dry weight) was treated with cold base, hot acid, and distilled water rinses (slightly calcareous). The treated sample (4.9 g) yielded 4.12 L of CO_2 gas. The age estimate is based on one count for 3710 minutes in the 2 L counter with a mixing ratio of 1.09. The count rates for the sample (net), and monthly backgrounds and standards (net) were 6.132±0.051, 1.057±0.020, and 18.411±0.103 cpm, respectively.

The uncorrected age is 8830±90.

TO-2292 Cape Murray (IIIa) 6650±60

In the same section, rare paired *Macoma* sp. shells were present in stratified sand 1.75 m higher than GSC-5175. D.A. Hodgson collected sample HCA-90-14-7-4 and dated it by AMS.

Comment (**D.A. Hodgson**): Sand adjacent to the plant mats contained (undated) marine shells. The top of the (deltaic?) sediment at 5.5 m asl is the minimum related sea level for 6.5 ka (Hodgson et al., 1994).

GSC-5109 Cape Murray (IV) 5830±130
$\delta^{13}C$= -24.7‰

The moss was enclosed in sand. Sample HCA 90 12-7-5 was collected by R.B. Taylor and D.A. Hodgson on July 12, 1990 from 9 km southeast of Cape Murray, on the southwest shore of Brock Island, District of Franklin, Northwest Territories (77º 49.5'N, 114º 42'W), at an elevation of 2.5 to 3 m; submitted by D.A. Hodgson.

The sample (190.6 g wet weight) was treated with cold base, hot acid, and distilled water rinses (noncalcareous). The treated sample (14.2 g) yielded 3.61 L of CO_2 gas. The age estimate is based on one count for 3460 minutes in the 2 L counter with a mixing ratio of 1.38. The count rates for the sample (net), and monthly backgrounds and standards (net) were 8.777±0.072, 1.092±0.024, and 18.125±0.241 cpm, respectively.

The uncorrected age is 5820±130.

Comments (**R.B. Taylor**): The lens of compressed moss was found 3 m asl in silty sand (fluvial or marine) exposed in a cut through the seaward slope of a sea-ice built shore ridge, 300 m inland of the southwest shore of Brock Island (Taylor and Hodgson, 1991). The allochthonous moss was deposited in sediment just upslope and adjacent to well sorted sands interpreted as upper foreshore, i.e. swash deposits. It has not been possible to establish a clear relationship between the age of the sample and the timing of the ridge building as originally hoped (Hodgson et al., 1994). The swash deposits most likely post-date the formation of the shore ridge but their continuity and position below a series of disturbed sediment facies could also mean that they predate the ridge. Sea ice could have built the shore ridge when the beach was frozen without disturbing the swash and moss deposits.

Melville Island (Fig. 15)

GSC-5002 Cape Grassy 10 200±120
$\delta^{13}C$= -27.1‰

The plant material and wood (twigs of *Salix*; identified by R. Mott (unpublished GSC Wood Report No. 90-22)); possibly *S. arctica* (G. Argus, pers. comm., 1990) were enclosed in a frozen dark grey fine sand, silt, clay, and granules with a reduced odour. Sample HCA-89-11.8.4 was collected by D.A. Hodgson on August 4, 1989 from 25 km west of Cape Grassy, northwest Melville Island, District of Franklin, Northwest Territories (76º11.3'N, 113º50'W), at an elevation of 22 m; submitted by D.A. Hodgson.

The sample (29.4 g dry weight) was treated with hot base, hot acid, and distilled water rinses (noncalcareous). The treated sample (10.4 g) yielded 5.52 L of CO_2 gas. The age estimate is based on two counts for 2000 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net), and monthly backgrounds and standards (net) were 5.059±0.061, 1.013±0.027, and 18.000±0.102 cpm, respectively.

The uncorrected age is 10 200±120.

Comment (**D.A. Hodgson**): The detrital? organic sample was collected 8 m below the top of an exposure in a delta formed by north flowing meltwater from an ice cap centred on western Melville Island. The presence of the *Salix arctica* at a site shown by Edlund (1993) to be at the present limit of the shrub indicates that summers were as warm as at present at the time of the Viscount Melville Sound Ice Shelf (Hodgson, 1992, p. 21; Hodgson, 1994, p. 26).

Prince Patrick Island (Fig. 15)

GSC-5170 Cape Hemphill 10 600±110
$\delta^{13}C$= + 1.2‰

The marine shells (*Hiatella arctica*; identified by D.A. Hodgson) were enclosed in silt and sand. Sample HCA 90 9-7-2 was collected by D.A. Hodgson on July 9, 1990 from 5 km southwest of Cape Hemphill, northeast Prince Patrick Island, District of Franklin, Northwest Territories (76º 55.5'N, 115º 59'W), at an elevation of 11.5 m; submitted by D.A. Hodgson.

The sample (32.8 g dry weight) was treated with an acid leach to remove the outer 30% of the sample. The treated sample (23.4 g) yielded 5.13 L of CO_2 gas. The age estimate is based on one count for 3570 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net), and monthly backgrounds and standards (net) were 4.951±0.047, 1.099±0.023, 18.484±0.104 cpm, and respectively.

The uncorrected age is 10 600±110.

Comment (**D.A. Hodgson**): Abundant shells were collected from deltaic sediments below a 14 m asl terrace; this is the minimum related sea level (Hodgson et al., 1994).

GSC-5191 Mould Bay uncorrected > 39 000
$\delta^{13}C$= -26.9‰

The plant material (all moss?) was enclosed in pebbly sand. Sample HCA-90 27-7-2 was collected by D.A. Hodgson on July 27, 1990 from 9 km northeast of the head of the northeast arm of Mould Bay, Prince Patrick Island, District of Franklin, Northwest Territories (76º 25.1'N, 119º 17.3'W), at an elevation of 120 m; submitted by D.A. Hodgson.

The sample (31.7 g dry weight) was treated with cold base, hot acid, and distilled water rinses (noncalcareous). The treated sample (9.1 g) yielded 6.23 L of CO_2 gas. The age estimate is based on one count for 1260 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net), and monthly backgrounds and standards (net) were -0.038±0.035, 1.057±0.020, and 18.411±0.103 cpm, respectively.

Comment (**D.A. Hodgson**): The material is probably an autochthonous or allochthonous deposit of moss from/in the Tertiary Beaufort Formation.

Arctic Islands (N. & Central Zone) (Fig. 16)

Griffith Island (Fig. 16)

GSC-5074 Griffith Island 1380±60
$\delta^{13}C$= -25.9‰

The driftwood (*Picea*; identified by R.J. Mott (unpublished GSC Wood Report No. 90-46) was from a surface collection on gravel. Sample 90-DCA-8 was collected by A.S. Dyke on July 7, 1990, from the northeast coast of Griffith Island, District of Franklin, Northwest Territories (74º 38.6'N, 95º 34.0'W), at an elevation of 4.5 to 5.0 m; submitted by A.S. Dyke.

The sample (11.6 g dry weight) was treated with hot base, hot acid, and distilled water rinses (noncalcareous). The treated sample (8.3 g) yielded 7.87 L of CO_2 gas. The age estimate is based on one count for 3200 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 14.922±0.074, 1.003±0.022, and 17.754±0.102 cpm, respectively.

The uncorrected age is 1400±60.

Comment (**A.S. Dyke**): GSC-5074 provides a reasonable age estimate on the 4.5 m relative sea level for Griffith Island. Other RSL dates from Griffith Island can be found in Dyke (1993).

W. Axel Heiberg Island (Fig. 17)

Expedition and Strand Fiord Series

Seventeen samples of marine shells collected in 1990 and 1991 along Strand and Expedition fiords were submitted for radiocarbon dating by D.S. Lemmen. Fossiliferous raised marine deposits are rare along Expedition Fiord, and none of the dated samples were composed exclusively of *in situ* shells. Seven of the samples (GSC-5108, -5128, -5130, -5151, -5301, -5318 and TO-2882) serve to define a minimum emergence curve for the head of Expedition Fiord. Deglaciation of both fiords occurred between about 8.4 and 8.2 ka, as evidenced by 10 dates on local marine limits. This is younger than the chronology proposed by Müller (1963), which was based upon a single date of 9000±200 (L-647F). The similar deglacial chronologies of the two fiords are noteworthy as the last glacial maximum was considerably more extensive in Expedition Fiord than in Strand Fiord.

GSC-5396 Strand Fiord (I) 8390±120
$\delta^{13}C$= + 2.1‰

The marine shells (dominantly *Mya truncata*, rare *Hiatella arctica*; identified by A.E. Aitken) were enclosed in marine sediments, sandy silt. Sample 91-LJA-SFS8 was collected by D.S. Lemmen and A.E. Aitken on July 31, 1991, from 5 km east-northeast of head of Strand Fiord, on the south side of the main river, west-central Axel Heiberg Island, District of Franklin, Northwest Territories (79º 16'N, 90º 7'W), at an elevation of 94-102 m; submitted by D.S. Lemmen.

The sample (35.0 g dry weight) was treated with an acid leach to remove the outer 20% of the sample. The treated sample (13.2 g) yielded 2.91 L of CO_2 gas. The age estimate is based on one count for 3730 minutes in the 2 L counter with a mixing ratio of 1.51. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 6.412±0.069, 1.249±0.025, and 18.139±0.145 cpm, respectively.

The uncorrected age is 8350±120.

Comment (**D.S. Lemmen**): Sample GSC-5396 was collected from the northwest flank of a 113 m asl marine limit delta which provides the related sea level for the date. It comprises the highest shells discovered in the Expedition / Strand Fiord region. Along with TO-2883 date a former ice margin (limit?) about 5 km upvalley of the fiord head.

TO-2883 Strand Fiord (II) 8380±60

The fragments of marine shells (*Mya truncata*, identified by A.E. Aitken) were collected from silty sand gravel forming the foreslope of a raised glaciomarine delta. Sample 91-LJA-SFS9 was collected by D.S. Lemmen and A.E. Aitken on July 30, 1991 from 4.5 km east-northeast of the head of Strand Fiord, on the south side of a main river, west-central Expedition Fiord (79º 16'N, 90º 09"W), at an elevation of 76-86 m.

Comment (**D.S. Lemmen**): The sample dates an ice-contact glaciomarine delta at 112 m asl. It compares well with GSC-5396 which is from site <1 km farther upvalley and relates to an separate delta complex at 113 m asl.

GSC-5419 Strand Fiord (III) 8080±100
$\delta^{13}C$= +2.13‰

The marine shells (*Mya truncata*, rare *Hiatella arctica* present; identified by A.E. Aitken) were enclosed in marine sediments, sandy silt. Sample 91-LJA-SFS22 was collected by D.S. Lemmen and A.E. Aitken on August 4, 1991, from 4.5 km east-northeast of the head of Strand Fiord, south side of large river, west-central Axel Heiberg Island, District of Franklin, Northwest Territories (79º 16'N, 90º 9'W), at an elevation of 64-67 m; submitted by D.S. Lemmen.

The sample (51.6 g dry weight) was treated with an acid leach to remove the outer 30% of the sample. The treated sample (36.1 g) yielded 4.03 L of CO_2 gas. The age estimate is based on one count for 3725 minutes in the 2 L counter with a mixing ratio of 1.02. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 6.632±0.053, 1.246±0.024, and 18.063±0.123 cpm, respectively.

The uncorrected age is 8050±100.

Comment (**D.S. Lemmen**): GSC-5419 relates to the same ice contact delta as TO-2883. Shells collected from outlier, interpreted as proximal bottomset deposits, immediately distal to delta foreslope. It is superseded by TO-2883 as a date on deglaciation and 112 m sea level.

GSC-5411 Strand Fiord (IV) 8430±80
$\delta^{13}C$= + 1.4‰

The marine shells (*Mya truncata*, with rare *Hiatella arctica*; identified by A.E. Aitken) were enclosed in silty marine sand. Sample 91-LJA-SFS10 was collected by D.S. Lemmen and A.E. Aitken on August 1, 1991, from 1.25 km northeast of the head of Strand Fiord, west-central Axel Heiberg Island, District of Franklin, Northwest Territories (79º 15'N, 90º 17'W), at an elevation of 84-93 m; submitted by D.S. Lemmen.

The sample (51.0 g dry weight) was treated with an acid leach to remove the outer 10% of the sample. The treated sample (35.8 g) yielded 7.99 L of CO_2 gas. The age estimate is based on one count for 3870 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 9.924±0.067, 2.197±0.037, and 28.267±0.155 cpm, respectively.

The uncorrected age is 8410±80.

Comment (**D.S. Lemmen**): This sample relates to marine limit at the head of Strand Fiord, which extends to at least 114 m and perhaps to 124 m asl. Fossiliferous sediments are overlain by thin regressive beach deposits. The similarity of marine limit dates throughout Strand Fiord indicates that tributary glaciers began retreat at similar times, and preclude the systematic retreat of a trunk glacier upfiord.

GSC-5368 Strand Fiord (V) 8430±80
$\delta^{13}C$= + 1.9‰

The marine shells (*Mya truncata*; identified by D.S. Lemmen) were enclosed in deltaic sediments (gravelly sand). Sample 91-LJA-SFS5 was collected by D.S. Lemmen and A.E. Aitken on July 25, 1991, from the south coast of Strand Fiord, about 24.5 km west-southwest of fiord head, west-central Axel Heiberg Island, District of Franklin, Northwest Territories (79º 11'N, 91º 28'W), at an elevation of 69-79 m; submitted by D.S. Lemmen.

The sample (44.9 g dry weight) was treated with an acid leach to remove the outer 20% of the sample. The treated sample (33.8 g) yielded 7.44 L of CO_2 gas. The age estimate is based on one count for 3750 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 9.912±0.067, 2.305±0.035, and 28.206±0.135 cpm, respectively.

The uncorrected age is 8400±80.

Comment (**D.S. Lemmen**): This date relates to age of local marine limit at 95 m and initial retreat of glacier in tributary valley to Strand Fiord. The similarity of marine limit dates throughout Strand Fiord indicates that tributary glaciers began retreat at similar times, and preclude the systematic retreat of a trunk glacier upfiord.

GSC-5408 Strand Fiord (VI) 8390±100
$\delta^{13}C$= + 1.9‰

The marine shells (*Mya truncata* and *Hiatella arctica*; identified by A.E. Aitken) were enclosed in sand and gravel (marine and colluvial sediments). Sample 91-LJA-SFS6 was collected by D.S. Lemmen and A.E. Aitken on July 28, 1991, from 16 km east of the mouth of Amarok River on the south coast of Strand Fiord, west-central Axel Heiberg Island, District of Franklin, Northwest Territories (79º 10'N, 91º 47'W), at an elevation of 37-63 m; submitted by D.S. Lemmen.

The sample (32.0 g dry weight) was treated with an acid leach to remove the outer 20% of the sample. The treated sample (25.9 g) yielded 5.66 L of CO_2 gas. The age estimate is based on one count for 3730 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 6.379±0.051, 1.246±0.024, and 18.063±0.123 cpm, respectively.

The uncorrected age is 8360±100.

Comment (**D.S. Lemmen**): GSC-5408 records sedimentation from meltwater channel and relates to initial retreat of tributary valley glacier to Strand Fiord. Shells continue above a washing limit at 53 m into coarse colluvium. Marine limit in adjacent valley is 105 m. The similarity of marine limit dates throughout Strand Fiord indicates that tributary glaciers began retreat at similar times, and preclude the systematic retreat of a trunk glacier upfiord.

GSC-5151 Expedition River (I) 8200±110
$\delta^{13}C$= + 2.1‰

The marine shells (unidentified fragments only) were enclosed in gravelly sand. Sample 90-LJA-EFS1 was collected by D.S. Lemmen on July 31, 1990, from the Expedition River area, 11 km north of the fiord head and about 2.2 km from the terminus of Thompson Glacier, west-central Axel Heiberg Island, District of Franklin, Northwest Territories (79º 24'N, 90º 35'W), at an elevation of 78 m; submitted by D.S. Lemmen.

The sample (35.6 g dry weight) was treated with an acid leach to remove the outer 20% of the sample. The treated sample (29.1 g) yielded 6.55 L of CO_2 gas. The age estimate is based on one count for 2070 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 6.769±0.066, 1.101±0.023, and 18.696±0.163 cpm, respectively.

The uncorrected age is 8160±110.

Comment (**D.S. Lemmen**): This sample provides the best estimate of site deglaciation and age of local marine limit (98 m). The shell fragments appear to be derived from gravelly sand foreset beds. Sample GSC-5151 is the most easterly (upvalley) sample collected from Expedition Fiord / River area. It provides a minimum date on site deglaciation and local marine limit of 98 m. Along with samples GSC-5108 and -5301, it documents retreat of the trunk glacier that formerly occupied much of Expedition Fiord.

TO-2882 Expedition River (II) 8120±60

The fragments of marine shells (*Mya truncata*; identified by A.E. Aitken) were collected from the surface of wave-washed till that forms a veneer over gypsum bedrock. Sample 91-LJA-EFS3 was collected by D.S. Lemmen, A.E. Aitken and M. Parent on July 13, 1991 from the north side of Expedition River, 9.5 km east of the head of Expedition Fiord and about 1.5 km from the snout of Thompson Glacier, west-central Axel Heiberg Island (79º 25'N, 90º 41'W), at an elevation of 86 m.

Comment (**D.S. Lemmen**): Abundant shell fragments occur from 55-73 m on the slope. Sample TO-2882 is the highest marine shells yet discovered in Expedition Fiord. A former related sea level is not recorded, but must lie >86 m and <102 m asl. This date confirms other dates from the area (GSC-5151, and -5301) and suggests that the date of 9000±200 (L-647F, Müller, 1963) is anomalously old.

GSC-5301 Expedition River (III) 8310±130
$\delta^{13}C$= + 2.5‰

The marine shells (*Hiatella arctica* and *Mya truncata*; identified by A.E. Aitken) were enclosed in stony, sandy marine silt. Sample 91-LJA-EFS1 was collected by D.S. Lemmen and A.E. Aitken on July 9, 1991, from the south of Gypsum Hill on the north side of Expedition River, 7.5 km east of the head of Expedition Fiord, west-central Axel Heiberg Island, District of Franklin, Northwest Territories (79º 24'N, 90º 44'W), at an elevation of 68-75 m; submitted by D.S. Lemmen.

The sample (27.9 g dry weight) was treated with an acid leach to remove the outer 20% of the sample. The treated sample (22.6 g) yielded 5.04 L of CO_2 gas. The age estimate is based on two counts for 2080 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 6.573±0.085, 1.188±0.059, and 18.396±0.155 cpm, respectively.

The uncorrected age is 8270±130.

Comment (**D.S. Lemmen**): GSC-5301 was collected from the same site as L-647 (9000±200; Müller 1963). Both samples were surface collections from a similar elevational range, and comprised the same species. The difference in the dates, with consideration that nine other dates between about 8.2 and 8.4 ka were obtained on local marine limits in Expedition and Strand fiords, questions the interpretation of Müller's date. This date is the oldest obtained east of the fiord head, and serves as a minimum estimate of site deglaciation and the 102 m marine limit recorded across the trunk valley.

GSC-5199 Expedition River (IV) 6970±90
$\delta^{13}C$= + 1.1‰

The marine shells (*Astarte borealis* and unidentified fragments; identified by D.S. Lemmen) were situated on the surface of slightly stony marine silt. Sample 90-LJA-EFS3 was collected by D.S. Lemmen on August 1, 1990, from the south side of Expedition River, north-northwest of Little Matterhorn about 7.5 km east of the fiord head, west-central Axel Heiberg Island, District of Franklin, Northwest Territories (79º 23'N, 90º 50'W), at an elevation of 25 m; submitted by D.S. Lemmen.

The sample (38.7 g dry weight) was treated with an acid leach to remove the outer 20% of the sample. The treated sample (30.9 g) yielded 6.98 L of CO_2 gas. The age estimate is based on one count for 2000 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 11.987±0.092, 2.107±0.038, and 28.490±0.183 cpm, respectively.

The uncorrected age is 6950±90.

Comment (**D.S. Lemmen**): The sample was collected below a 102 m marine limit delta. There was no stratigraphic evidence to link the sample to the delta, and the date demonstrates that the shells are about 1.3 ka younger than local deglaciation (cf. GSC-5108 and -5151). The sample is superceded by GSC-5128 on a minimum emergence curve for Expedition Fiord.

GSC-5318 Wolf River 8230±80
$\delta^{13}C$= + 2.6‰

The marine shells (*Mya truncata*; identified by A.E. Aitken) were enclosed in marine silt. Sample 91-LJA-EFA8 was collected by D.S. Lemmen and A.E. Aitken on July 11, 1991, from the south side of Wolf River, immediately west of Striae Hill, about 4 km east of the head of Expedition Fiord, west-central Axel Heiberg Island, District of Franklin, Northwest Territories (79º 24'N, 90º 56'W), at an elevation of 61 to 75 m; submitted by D.S. Lemmen.

The sample (35.4 g dry weight) was treated with an acid leach to remove the outer 20% of the sample. The treated sample (28.8 g) yielded 6.48 L of CO_2 gas. The age estimate is based on one count for 3785 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 10.176±0.063, 2.107±0.027, and 28.215±0.129 cpm, respectively.

The uncorrected age is 8190±80.

Comment (**D.S. Lemmen**): Shells occur distal to a small marine limit delta at 95 m. This date records deglaciation in the Wolf Valley, one of the major tributaries that contributed ice to the trunk glacier formerly occupying Expedition Fiord.

GSC-5130 Expedition Fiord (I) 7880±70
$\delta^{13}C$= + 2.0‰

The marine shells (*Mya truncata*; identified by D.S. Lemmen) were enclosed in sandy silt. Sample 90-LJA-EFS8 was collected by D.S. Lemmen on August 7, 1990, from the south head of Expedition Fiord, about 0.8 km east of the coast, west-central Axel Heiberg Island, District of Franklin, Northwest Territories (79º 21'N, 91º 6'W), at an elevation of 39-47 m; submitted by D.S. Lemmen.

The sample (46.0 g dry weight) was treated with an acid leach to remove the outer 20% of the sample. The treated sample (34.6 g) yielded 7.17 L of CO_2 gas. The age estimate is based on one count for 3530 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 10.586±0.066, 2.149±0.028, and 28.117±0.107 cpm, respectively.

The uncorrected age is 7850±70.

Comment (**D.S. Lemmen**): This sample relates to a relative sea level of >69 m. The shells were collected from the upper part of a marine unit that coarsens upward from clayey-silt to sandy-silt, interpreted as proximal bottomset beds. The presence of Astarte borealis along with *Mya truncata* suggests that the deposit does not relate to local deglaciation.

GSC-5128 Expedition Fiord (II) 5540±60
$\delta^{13}C$= + 1.3‰

The marine shells (*Astarte borealis* and *Mya truncata*; identified by D.S. Lemmen) were enclosed in marine silt with a trace of fine sand. Sample 90-LJA-EFS5 was collected by D.S. Lemmen on August 5, 1990, from the north head of Expedition Fiord, about 0.8 km inland 0.7 km from the terminus of Crusoe glacier, west-central Axel Heiberg Island, District of Franklin, Northwest Territories (79º 23'N, 91º 9'W), at an elevation of 19-24 m; submitted by D.S. Lemmen.

The sample (36.0 g dry weight) was treated with an acid leach to remove the outer 20% of the sample. The treated sample (28.8 g) yielded 6.38 L of CO_2 gas. The age estimate is based on two counts for 4200 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 14.135±0.070, 2.149±0.028, and 28.117±0.107 cpm, respectively.

The uncorrected age is 5520±60.

Comment (**D.S. Lemmen**): GSC-5128 dates a unique faunal assemblage for Expedition Fiord that includes Cylichna sp., which is interpreted to represent quiescent, shallow (5-20 m water depth) water sedimentation. It provides a control point on minimum emergence curve for the fiord head.

GSC-5108 Expedition Fiord (III) 8410±170
$\delta^{13}C$= + 0.6‰

The marine shells (*Mya truncata*; identified by D.S. Lemmen) were from a surface collection on slightly stony marine silt. Sample 90-LJA-EFS4 was collected by D.S. Lemmen on August 3, 1990, from the south shore of Expedition Fiord, 6 km west-southwest of the fiord head, west-central Axel Heiberg Island, District of Franklin, Northwest Territories (79º 20'N, 91º 23'W), at an elevation of 58-64 m; submitted by D.S. Lemmen.

The sample (34.1 g dry weight) was treated with an acid leach to remove the outer 20% of the sample. The treated sample (28.0 g) yielded 6.27 L of CO_2 gas. The age estimate is based on two counts for 1600 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 6.373±0.070, 1.092±0.024, and 18.125±0.241 cpm, respectively.

The uncorrected age is 8400±170.

Comment (**D.S. Lemmen**): GSC-5108 provides a minimum age estimate of site deglaciation. An erosional terrace at >82 m is a minimum estimate of marine limit. *Hiatella arctica* was also present at the sample site.

GSC-5350 Expedition Fiord (IV) 7450±70
$\delta^{13}C$= + 0.8‰

The marine shells (*Astarte borealis*; identified by D.S. Lemmen) were enclosed in sandy marine silt. Sample 91-LJA-EFA12 was collected by D.S. Lemmen on July 15, 1991, from the north coast of Expedition Fiord, 10.5 km west of fiord head and 0.5 km west of an unnamed tributary river, west-central Axel Heiberg Island, District of Franklin, Northwest Territories (79º 22'N, 91º 41'W), at an elevation of 30-41 m; submitted by D.S. Lemmen.

The sample (39.3 g dry weight) was treated with an acid leach to remove the outer 20% of the sample. The treated sample (31.8 g) yielded 7.10 L of CO_2 gas. The age estimate is based on one count for 3570 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 11.143±0.069, 2.215±0.033, and 28.129±0.131 cpm, respectively.

The uncorrected age is 7440±70.

Comment (**D.S. Lemmen**): This sample records a period of reduced sedimentation following ice retreat in a major tributary valley to Expedition Fiord. It also relates to a sea level between 60 m and 88 m.

GSC-5193 Expedition Fiord (V) 7620±80
$\delta^{13}C$= + 0.7‰

The marine shells (*Astarte borealis*; identified by D.S. Lemmen) were situated on the surface of marine silt. Sample 90-LJA-EFS11 was collected by D.S. Lemmen on August 10, 1990, from the north coast of Expedition Fiord, 11 km west of fiord head, about 1 km west of a large tributary river, west-central Axel Heiberg Island, District of Franklin, Northwest Territories (79° 22'N, 91° 43'W), at an elevation of 38 m; submitted by D.S. Lemmen.

The sample (60.3 g dry weight) was treated with an acid leach to remove the outer 30% of the sample. The treated sample (42.6 g) yielded 8.43 L of CO_2 gas. The age estimate is based on one count for 3770 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 11.045±0.070, 2.107±0.038, and 28.490±0.183 cpm, respectively.

The uncorrected age is 7610±80.

Comment (**D.S. Lemmen**): GSC-5193 relates to a former sea level that lies between 68 and 88 m. The sample was collected from deltaic sediments that fines laterally from the central axis of the valley. Despite excellent preservation and numerous paired valves, no in situ shells were found.

TO-2259 Expedition Fiord (VI) 7170±80

The marine shell (*Astarte borealis*, identified by D.S. Lemmen) was collected from the surface of soliflucting sandy marine silt. Sample 90-LJA-EFS7 was collected by D.S. Lemmen on August 6, 1990 along the south coast of Expedition Fiord, about 9 km east of the fiord mouth and 1 km south of Index Peninsula, west-central Axel Heiberg Island (79° 18'N, 92° 07'W), at an elevation of 38 m.

Comment (**D.S. Lemmen**): The shell had been fractured by solifluction but the periostracum was intact and complete. The sample was collected at the base of an outlier distal to marine limit delta at 75 m. The sample postdates a major period of delta progradation and is the highest shell sample collected from outer Expedition Fiord.

GSC-5176 Crusoe Glacier modern
$\delta^{13}C$= -28.7‰

The terrestrial plants (organic) were overlain by glacier ice and underlain by ablation material. Sample 90-LJA-EFO1 was collected by D.S. Lemmen on August 4, 1990, from the terminus of Crusoe Glacier, about 1.3 km northeast of the head of Expedition Fiord, west-central Axel Heiberg Island, District of Franklin, Northwest Territories (79° 24'N, 91° 5'W), at an elevation of about 140 m; submitted by D.S. Lemmen.

The sample (196.0 g wet weight) was treated with hot base, hot acid, and distilled water rinses (noncalcareous). The treated sample (10.6 g) yielded 6.91 L of CO_2 gas. The age estimate is based on one count for 1000 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 22.776±0.156, 1.057±0.020, and 18.411±0.103 cpm, respectively.

Comment (**D.S. Lemmen**): This sample documents a recent advance of the Crusoe Glacier which, like the nearby Thompson Glacier (Parent, 1991), is currently more extensive than at anytime since the last glaciation (8.3 ka).

GSC-5162 Thompson Glacier 4770±70
$\delta^{13}C$= -25.8‰

The wood (*Picea*; identified by R.J. Mott (unpublished GSC Wood Report No. 91-08)) was enclosed in gravel. Sample 90-PIA-140 was collected by M. Parent on July 16, 1990 from a push moraine of the Thompson Glacier in the Expedition Fiord area, Axel Heiberg Island, District of Franklin, Northwest Territories (79° 24.7'N, 90° 35.4'W), at an elevation of 35 m; submitted by M. Parent.

The sample (17.6 g dry weight) was treated with hot base, hot acid, and distilled water rinses (noncalcareous). The treated sample (8.4 g) yielded 8.22 L of CO_2 gas. The age estimate is based on two counts for 2070 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net), and monthly backgrounds and standards (net) were 15.664±0.100, 2.233±0.035, and 28.426±0.139 cpm, respectively.

The uncorrected age is 4790±70.

GSC-5160 White Glacier 180±60
$\delta^{13}C$= -29.9‰

The plant debris (organics) was enclosed in a palaeosol buried under till. Sample 90-PIA-105 was collected by M. Parent on July 10, 1990 from the modern end-moraine of White Glacier in the Expedition Fiord area, Axel Heiberg Island, District of Franklin, Northwest Territories (79° 25.6'N, 90° 37.9'W), at an elevation of 55 m; submitted by M. Parent.

The sample (87.3 g dry weight) was treated with hot base, hot acid, and distilled water rinses (noncalcareous). The treated sample (18.4 g) yielded 6.27 L of CO_2 gas. The age estimate is based on two counts for 1960 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net), and monthly backgrounds and standards (net) were 17.906±0.102, 1.099±0.023, and 18.484±0.104 cpm, respectively.

The uncorrected age is 260±60.

Ellesmere Island (Fig. 16)

GSC-5055 Piliravijuk Bay 2880±60
$\delta^{13}C$= -24.5‰

The driftwood (*Picea*; identified by H. Jetté (unpublished GSC Wood Report No. 90-29)) was enclosed in beach shingle. Sample BS-77-357 was collected by W. Blake, Jr. on August 17, 1977, 1.7 km west of the mouth of "Basecamp river", Piliravijuk Bay, Makinson Inlet, Ellesmere Island, District of Franklin, Northwest Territories (77° 19'N, 82° 10'W), at an elevation of 5.3 m; submitted by W. Blake, Jr.

The sample (12.2 g dry weight) was treated with hot base, hot acid, and distilled water rinses (noncalcareous). The treated sample (9.1 g) yielded 8.89 L of CO_2 gas. The age estimate is based on two counts for 2760 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net), and monthly backgrounds and standards (net) were 19.741±0.094, 2.074±0.027, and 28.244±0.132 cpm, respectively.

The uncorrected age is 2880±60.

Comment (**W. Blake, Jr.**): Together with several other dates on driftwood logs (cf. Blake, 1988), this age determination aided in the construction of an emergence curve for innermost Makinson Inlet (Blake, 1993).

Hot Weather Creek Series

GSC-5180 Hot Weather Creek (I) 7120±80
$\delta^{13}C$= -27.0‰

The basal peat was underlain by sand overlain by peat. Sample FP-23.07.90-05 (2.8 cm) was collected by C. Bégin and Y. Michaud on July 23, 1990, from 5 km north of the Hot Weather Creek campsite, Fosheim Peninsula, Ellesmere Island, District of Franklin, Northwest Territories (79° 59'N, 84° 08'W), at an elevation of 122 m; submitted by C. Bégin and Y. Michaud.

The sample (124.4 g dry weight) was treated with cold base, hot acid, and distilled water rinses (slightly calcareous). The treated sample (38.1 g) yielded 4.62 L of CO_2 gas. The age estimate is based on one count for 3800 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 7.563±0.052, 1.057±0.020, and 18.411±0.103 cpm, respectively.

The uncorrected age is 7150±80.

GSC-5137 Hot Weather Creek (II) 2640±70
$\delta^{13}C$= -27.5‰

The basal peat was underlain by sand overlain by peat. Sample FP-25.07.90-02 (1.5 m) was collected by C. Bégin and Y. Michaud on July 25, 1990, from 5 km south of the Hot Weather Creek campsite, Fosheim Peninsula, Ellesmere Island, District of Franklin, Northwest Territories (79º 56'30"N, 84º 30'W), at an elevation of 92 m; submitted by C. Bégin and Y. Michaud.

The sample (35 g dry weight) was treated with cold base, hot acid, and distilled water rinses (noncalcareous). The treated sample (16.6 g) yielded L of CO_2 gas. The age estimate is based on one count for 2140 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 13.325±0.084, 1.094±0.019, and 18.531±0.106 cpm, respectively.

The uncorrected age is 2650±70.

GSC-5155 Hot Weather Creek valley 8570±120
$\delta^{13}C$= + 1.1‰

The marine shells (*Mya truncata*; identified by T. Bell) were enclosed in silt. Sample FP-26-S-8906 was collected by T. Bell on August 6, 1989 from the eastern side of Hot Weather Creek valley, 29 km east of Eureka, central Fosheim Peninsula, west-central Ellesmere Island, District of Franklin, Northwest Territories (79º 58'N, 84º 26'W), at an elevation of 100 m; submitted by T. Bell.

The sample (39.9 g dry weight) was treated with an acid leach to remove the outer 30% of the sample. The treated sample (32.7 g) yielded 7.26 L of CO_2 gas. The age estimate is based on one count for 2200 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 6.446±0.063, 1.101±0.023, and 18.696±0.163 cpm, respectively.

The uncorrected age is 8550±120.

Comment (**T. Bell**): Hot Weather Creek valley was submerged by the sea during the early Holocene. (Re)occupation of the existing drainage basin began as relative sea level dropped below 134 m and a divide emerged to separate Greely Fiord and Slidre Fiord drainages. GSC-5155 provides a minimum estimate on the initial establishment of local marine limit at 145 m and a maximum date for the initiation of geomorphic processes in the lower two-thirds of the drainage basin. A more complete discussion, including the regional context, appears in Bell (1992).

GSC-5081 Slidre River 6040±170

The wood (twigs of *Salix*; identified by R.J. Mott, (unpublished GSC Wood Report No. 90-34)) was enclosed in clayey silt. Sample HCA 90 8-8-1 was collected by D.A. Hodgson on August 8, 1990 from the south bank of the Slidre River, 13 km from its mouth, 4.5 km southwest of the mouth of Hot Weather Creek, Ellesmere Island, Northwest Territories (79º 54.5'N, 84º 38.0'W), at an elevation of 15 m; submitted by D.A. Hodgson.

The sample (2.4 g dry weight) was treated with hot base, hot acid, and distilled water rinses. The treated sample (1.5 g) yielded 1.22 L of CO_2 gas. The age estimate is based on two counts for 2000 minutes in the 2 L counter with a mixing ratio of 3.65. The count rates for the sample (net), and monthly backgrounds and standards (net) were 8.370±0.169, 1.003±0.022, and 17.754±0.102 cpm, respectively.

Comment (**D.A. Hodgson**): The detrital wood sample was collected 29 m below the top of an exposure of sediments deposited by the Slidre River prograding into a sea at least 44 m (Hodgson et al., 1991).

Central Eureka Sound Series

A series of marine shell samples from southwestern Fosheim Peninsula, west-central Ellesmere Island, District of Franklin, Northwest Territories was collected by T. Bell and G. Davidge on August 12, 1990; submitted for dating by T. Bell.

GSC-5117 Central Eureka Sound (I) 6330±90
$\delta^{13}C$= + 1.5‰

The marine shells (*Hiatella arctica*; identified by T. Bell) were enclosed in sandy gravel. Sample FP-90-S-9012 was collected from about 90 km south-southeast of Eureka and 4 km north of Vesle Fiord (79º 14'N, 85º 38'W) at an elevation of 28 m.

The sample (40.0 g dry weight) was treated with an acid leach to remove the outer 20% of the sample. The treated sample (31.6 g) yielded 7.20 L of CO_2 gas. The age estimate is based on one count for 3175 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 12.885±0.077, 2.172±0.034, and 28.328±0.234 cpm, respectively.

The uncorrected age is 6330±90.

GSC-5147 Central Eureka Sound (II) 5180±90
$\delta^{13}C$= + 1.4‰

The marine shells (*Hiatella arctica*; identified by T. Bell) were enclosed in sandy gravel. Sample FP-82-S-9012 was collected from 82 km south-southwest of Eureka and 12 km north of the mouth of Vesle Fiord (79º 19'N, 85º 31'W) at an elevation of 14 m.

The sample (37.0 g dry weight) was treated with an acid leach to remove the outer 20% of the sample. The treated sample (30.6 g) yielded 6.48 L of CO2 gas. The age estimate is based on one count for 3520 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 14.752±0.112, 2.153±0.088, and 28.109±0.195 cpm, respectively.

The uncorrected age is 5180±90.

Comment (**T. Bell**): GSC-5117 and -5147 were collected from gravelly foreset beds of adjacent raised marine deltas in central Eureka Sound. If the overlying horizontal gravels are interpreted as topset beds, then GSC-5117 and -5147 relate to former sea levels at 30 m and 16 m, respectively. A more complete discussion, including the regional context, appears in Bell (1992).

Blue Man Cape Series

A series of marine shell samples from the Blue Man Cape area, 20 km south-southwest of Eureka, Fosheim Peninsula, west-central Ellesmere Island, District of Franklin, Northwest Territories was collected and submitted by T. Bell.

GSC-5119 Blue Man Cape (I) 7920±100
$\delta^{13}C$= + 0.5‰

The marine shells (*Hiatella arctica*; identified by T. Bell) were enclosed in stony silt. Sample FP-30-S-9027 was collected on July 27,

1990 from Blue Man Cape (79º 51'N, 86º 25'W), at an elevation of 75 m.

The sample (42.5 g dry weight) was treated with an acid leach to remove the outer 20% of the sample. The treated sample (33.8 g) yielded 7.65 L of CO_2 gas. The age estimate is based on one count for 3495 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 10.574±0.069, 2.172±0.034, and 28.328±0.234 cpm, respectively.

The uncorrected age is 7920±100.

Comment (**T. Bell**): A former outlet glacier draining local ice on "Hare Cape ridge" terminated in a valley facing Eureka Sound. Downvalley from associated end moraines, a thick wedge of glaciomarine sediments is overlain by beaches to 106 m. GSC-5119 was collected near the top of the glaciomarine wedge and represents a minimum estimate on recession of the local outlet glacier and initial establishment of marine limit at 148-150 m. A more complete discussion, including the regional context, appears in Bell (1992).

GSC-5156 Blue Man Cape (II) 8680±80
$\delta^{13}C$= + 1.0‰

The marine shells (*Hiatella arctica*; identified by T. Bell) were enclosed in stony silt. Sample FP-28-S-9026 was collected on July 26, 1990 beside a lake 5 km north of Blue Man Cape (79º48'N, 86º18'W), at an elevation of 132 m.

The sample (40.1 g dry weight) was treated with an acid leach to remove the outer 20% of the sample. The treated sample (32.4 g) yielded 7.46 L of CO_2 gas. The age estimate is based on one count for 3870 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 9.673±0.066, 2.233±0.035, and 28.426±0.139 cpm, respectively.

The uncorrected age is 8660±80.

TO-2237 Blue Man Cape (III) 8640±80

Paired valves of *Hiatella arctica* (identified by T. Bell), a subsample of FP-28-S-9026 (0.204 g dry weight), was treated by the IsoTrace Laboratory with an acid leach to remove the outer 30-40% of the sample. The dated sample was corrected to a base of $\delta^{13}C$=0.0‰, equivalent to a marine reservoir correction of 410 years.

The normalized age is 9050±80.

Comment (**T. Bell**): This sample was collected from the surface of a stony silt veneer at 132 m, 8 m lower than a shell sample collected by J.G. Fyles at the same general location (GSC-254, Dyck et al., 1965a, b). GSC-5156, TO-2237, and GSC-254 provided similar radiocarbon dates of 8680±80, 8640±80, and 8710±140, respectively. All three samples lie within 18 m of local marine limit. A more complete discussion, including the regional context, appears in Bell (1992).

REFERENCES

Alley, N.F., Valentine, K.W.G., and Fulton, R.J.
1986: Paleoclimatic implications of middle Wisconsinan pollen and a paleosol from the Purcell Trench, south central British Columbia; Canadian Journal of Earth Sciences, v. 23, p. 1156-1168.

Aylsworth, J.M., Boydell, A.N., Cunningham, C.M., Kettles, I.M., and Shilts, W.W.
1986: Surficial geology, Henik Lakes, District of Keewatin; Geological Survey of Canada, Map 2-1985, scale 1:125 000.

Bell, T.
1992: Glacial and sea level history of western Fosheim Peninsula, Ellesmere Island, Arctic Canada; Ph.D. Thesis, Department of Geography, University of Alberta, Edmonton, Alberta, 172 p.

Blake, W., Jr.
1983: Geological Survey of Canada radiocarbon dates XXIII; Geological Survey of Canada, Paper 83-7, 34 p.
1986: Geological Survey of Canada radiocarbon dates XXV; Geological Survey of Canada, Paper 85-7, 32 p.
1987: Geological Survey of Canada radiocarbon dates XXVI; Geological Survey of Canada, Paper 86-7, 60 p.
1988: Geological Survey of Canada radiocarbon dates XXVII; Geological Survey of Canada, Paper 87-7, 100 p.
1993: Holocene emergence along the Ellesmere Island coasts of northernmost Baffin Bay; Norsk Geologisk Tidsskrift, v. 73, p. 147-160.

Bobrowsky, P.T. and Clague, J.J.
1992: Neotectonic investigations on Vancouver Island (92B,F); in Geological Fieldwork 1991; British Columbia Geological Survey Branch, Paper 1992-1, p. 325-329.

Brookes, I.A., McAndrews, J.H., and von Bitter, P.H.
1982: Quaternary interglacial and associated deposits in southwest Newfoundland; Canadian Journal of Earth Sciences, v. 19, p. 410-423.

Brookes, I.A., Scott, D.B., and McAndrews, J.H.
1985: Postglacial relative sea-level change, Port au Port area, west Newfoundland; Canadian Journal of Earth Sciences, v. 22, p. 1039-1047.

Clague, J.J., Naesgaard, E., and Sy, A.
1992: Liquifaction features on the Fraser delta-Evidence for prehistoric earthquakes?; Canadian Journal of Earth Sciences, v. 29, p. 1734-1745.

Dionne, J-C.
1992: Etat des connaissances sur la terrasse Mitis; ligne de rivage Micmac de Goldwait; 7e Congrès de l'AQQUA (Rouyn-Noranda), Bulletin de l'AQQUA, 18, p. 32-33.

Dyck, W.
1967: The Geological Survey of Canada Radiocarbon Dating Laboratory; Geological Survey of Canada, Paper 66-45, 45 p.

Dyck, W. and Fyles, J.G.
1962: Geological Survey of Canada radiocarbon dates I; Radiocarbon, v. 4, p. 13-26.
1963: Geological Survey of Canada radiocarbon dates I and II; Geological Survey of Canada, Paper 63-21, 31 p.

Dyck, W., Fyles, J.G., and Blake, W., Jr.
1965a: Geological Survey of Canada radiocarbon dates IV; Geological Survey of Canada, Paper 65-4, 23 p.
1965b: Geological Survey of Canada radiocarbon dates IV; Radiocarbon, v. 7, p. 24-46.

Dyck, W., Lowdon, J.A., Fyles, J.G., and Blake, W., Jr.
1966: Geological Survey of Canada radiocarbon dates V; Geological Survey of Canada, Paper 66-48, 32 p.

Dyke, A.S.
1993: Glacial and sea level history of Lowther and Griffith islands, Northwest Territories: a hint of tectonics; Géographie physique et Quaternaire, v. 47, p. 133-145.

Dyke, A.S. and Dredge, L.A.
1989: Quaternary geology of the northwestern Canadian Shield; in Quaternary Geology of Canada and Greenland, R.J. Fulton (ed.); Geological Survey of Canada, Geology of Canada, Chapter 3, no. 1, p. 189-214.

Edlund, S.A.
1993: The distribution of plant communities on Melville Island, Arctic Canada; in The Geology of Melville Island, Arctic Canada, R.L. Christie and N.J. McMillan (ed.); Geological Survey of Canada, Bulletin 450, p. 247-255.

Falconer, G.
1966: Preservation of vegetation and patterned ground under a thin ice body in northern Baffin Island, NWT; Geographical Bulletin, v. 8, no. 2, p. 194-200.

Fulton, R.J.
1968: Olympia Interglaciation, Purcell Trench, British Columbia; Geological Society of America, Bulletin 79, p. 1075-1080.

Fulton, R.J. and Warner, B.G.
1990: Nonglacial sediments at Meadow Creek, British Columbia; in Current Research, Part E; Geological Survey of Canada, Paper 90-1E, p. 335-358.

Grant, D.R.
1970: Recent coastal submergence of the Maritime Provinces, Canada; Canadian Journal of Earth Sciences, v. 7, p. 676-689.
1987: Quaternary geology of Nova Scotia and Newfoundland (including Magdalen Islands); International Union for Quaternary Research, XII INQUA Congress, Ottawa, Excursion Guidebook A-3/C-3, National Research Council of Canada, Publication 27525, 62 p.
1991: Surficial geology, Stephenville - Port aux Basques, Newfoundland; Geological Survey of Canada, Map 1737A, scale 1:250 000.
1994: Quaternary geology of Port Saunders map area, Newfoundland; Geological Survey of Canada, Paper 91-20, 59 p.

Haffner, G.D. and McNeely, R.
1989: Community structure in epilimnetic and metalimnetic phytoplankton assemblages; Hydrobiologia, v. 182, p. 59-71.

Hodgson, D.A.
1992: Quaternary geology of western Melville Island, Northwest Territories; Geological Survey of Canada, Paper 89-21, 35 p.
1994: Episodic ice streams and ice shelves during retreat of the northwesternmost sector of the late Wisconsinan Laurentide Ice Sheet over the central Canadian Arctic Archipelago; Boreas, v. 23, p. 14-28.

Hodgson, D.A., St-Onge, D.A., and Edlund, S.A.
1991: Surficial materials of Hot Weather Creek basin, Ellesmere Island, Northwest Territories; in Current Research, Part E; Geological Survey of Canada, Paper 91-1E, p. 157-163.

Hodgson, D.A., Taylor, R.B., and Fyles, J.G.
1994: Late Quaternary sea level changes on Brock and Prince Patrick islands, western Canadian Arctic Archipelago; Géographie physique et Quaternaire, v. 48, p. 69-84.

Kaufman, D.S. and Williams, K.M.
1992: Radiocarbon Date List VII: Baffin Island, N.W.T., Canada; Occasional Paper No. 48, Institute of Arctic and Alpine Research, University of Colorado, 82 p.

Lian, O.B.
1991: The late Quaternary Surficial Geology and Geomorphology of the lower Seymour Valley, North Vancouver, British Columbia; M.Sc. Thesis, Simon Fraser University, Burnaby, British Columbia.

Lian, O.B. and Hickin, E.J.
1993: Late Pleistocene stratigraphy and chronology of lower Seymour Valley, southwestern British Columbia; Canadian Journal of Earth Sciences, v. 30, p. 841-850

Long, A. and Kalin, R.M.
1990: A suggested Quality Assurance Protocol for Radiocarbon Dating Laboratories; Radiocarbon, v. 32, p. 329-334.
Lowdon, J.A.
1985: The Geological Survey of Canada radiocarbon dating laboratory; Geological Survey of Canada, Paper 84-24, 19 p.
Lowdon, J.A. and Blake, W., Jr.
1968: Geological Survey of Canada radiocarbon dates VII; Geological Survey Canada, Paper 68-2, Part B, p. 207-245.
1973: Geological Survey of Canada radiocarbon dates XIII; Geological Survey of Canada, Paper 73-7, 61 p.
1975: Geological Survey of Canada radiocarbon dates XV; Geological Survey of Canada, Paper 75-7, 32 p.
1979: Geological Survey of Canada radiocarbon dates XIX; Geological Survey of Canada, Paper 79-7, 58 p.
1980: Geological Survey of Canada radiocarbon dates XX; Geological Survey of Canada, Paper 80-7, 28 p.
Lowdon, J.A., Fyles, J.G., and Blake, W., Jr.
1967: Geological Survey of Canada radiocarbon dates VI; Geological Survey Canada, Paper 67-2, Part B, 42 p.
Lowdon, J.A., Robertson, I.M., and Blake, W., Jr.
1971: Geological Survey of Canada radiocarbon dates XI; Geological Survey of Canada, Paper 71-7, p. 255-324.
1977: Geological Survey of Canada radiocarbon dates XVII; Geological Survey of Canada, Paper 77-7, 25 p.
Macpherson, J.B.
1982: Postglacial vegetational history of the eastern Avalon Peninsula, Newfoundland, and Holocene climatic change along the eastern Canadian seaboard; Géographie physique et Quaternaire, v. 36, p. 175-196.
McNeely, R.
1988: Radiocarbon Dating Laboratory; Geos, v. 17, no. 2, p. 10-12.
McNeely, R. and Jorgensen, P.K.
1992: Geological Survey of Canada radiocarbon dates XXX; Geological Survey of Canada, Paper 90-7, 84 p.
1993: Geological Survey of Canada radiocarbon dates XXXI; Geological Survey of Canada, Paper 91-7, 85 p.
McNeely, R. and McQuaig, S.
1991: Geological Survey of Canada radiocarbon dates XXIX; Geological Survey of Canada, Paper 89-7, 134 p.
Miller, G.H.
1980: Late Foxe glaciation of southern Baffin Island, Northwest Territories, Canada; Geological Society of America Bulletin, Part I, v. 91, p. 399-405.
Miller, G.H. and Kaufman, D.S.
1990: Rapid fluctutations of the Laurentide Ice Sheet at the mouth of Hudson Strait - New evidence for ocean / ice-sheet interactions as a control on the Younger Dryas; Paleoceanography, v. 5, p. 907-919.
Miller, G.H., Andrews, J.T., and Short, S.K.
1977: The last interglacial-glacial cycle, Clyde foreland, Baffin Island, N.W.T.: stratigraphy, biostratigraphy, and chronology; Canadian Journal of Earth Sciences, v. 14, p. 2824-2857.
Mott, R.J.
1994: Wisconsinan Late-glacial environmental change in Nova Scotia: a regional synthesis; Journal of Quaternary Science, v. 9, p. 155-160.
Mott, R.J. and Stea, R.R.
1993: Late-glacial (Allerød / Younger Dryas) buried organic deposits, Nova Scotia, Canada; Quaternary Science Reviews, v. 12, p. 645-657.
Mott, R.J., Grant, D.R., Stea, R.R., and Occhietti, S.
1986: A late glacial climatic oscillation in Atlantic Canada - an Allerød / Younger Dryas equivalent; Nature, v. 323, no. 6085, p. 247-250.
Müller, F.
1963: Radiocarbon dates and notes on the climatic and morphological history; in Preliminary Report 1961-1962, Jacobson-McGill Arctic Research Reports, McGill University, Montreal, p. 169-172.
Parent, M.
1991: La zone frontale des glaciers Thompson et White dans l'ile Axel Heiberg du Haut Arctique canadien: quelques observations préliminaires; dans Recherches en cours, Partie E; Commission géologique du Canada, Étude 91-1E, p. 203-210.
Rampton, V.N.
1988: Quaternary geology of the Tuktoyaktuk coastlines, Northwest Territories; Geological Survey of Canada, Memoir 423, 98 p.
Rozanski, K.
1991: Consultants' Group Meeting on C-14 Reference Materials for Radiocarbon Laboratories; Report of the IAEA, Vienna, Austria, 25 p., 6 annexes.
Rozanski, K., Stichler, W., Gonfiantini, R., Scott, E.M., Beukens, R.P., Kromer, B., and van der Plicht, J.
1992: The IAEA 14C Intercomparison Exercise 1990; Radiocarbon, v. 34, no. 3, p. 506-519.
Short, S.K. and Andrews, J.T.
1988: A sixteen thousand year old organic deposit, northern Baffin Island, N.W.T., Canada: palynology and significance; Géographie physique et Quaternaire, v. 42, p. 75-82.
Stea, R.R. and Mott, R.J.
1989: Deglaciation environments and evidence for glaciers of Younger Dryas age in Nova Scotia, Canada; Boreas, v. 18, p. 169-187.
Stea, R.R. and Mott, R.J.
1990: Quaternary Geology of Nova Scotia; Guidebook for Field Excursion. 53rd Annual Reunion, Friends of the Pleistocene. Halifax, Nova Scotia, May 25-28, 1990, Nova Scotia Department of Mines and Energy, Open File Report 90-008, 85 p.
Stea, R.R., Forbes, D.L., and Mott, R.J.
1992: Quaternary geology and coastal evolution of Nova Scotia; Guidebook, Field Ex. A-6. Geological Association of Canada, Mineralogical Association of Canada, Joint Annual meeting, Wolfville '92, 125 p.
Taylor, R.B. and Hodgson, D.A.
1991: Coastal studies in the Canadian Arctic Archipelago; Brock, Devon, Prince Patrick and the Polynia islands; Geological Survey of Canada, Open File 2380, 54 p.
Vanderburgh, S. and Smith, D.G.
1988: Slave River Delta: geomorphology, sedimentology, and Holocene reconstruction; Canadian Journal of Earth Sciences, v. 25, p. 1990-2004.
Wolfe, A.P.
1994a: A paleolimnological assessment of late Quaternary environmental change on southwestern Cumberland Peninsula, Baffin Island, N.W.T.; Ph.D. Thesis, Department of Geography, Queen's University, Kingston, Ontario, 161 p.
1994b: Modern and Holocene diatoms from Ukalik Lake, Baffin Island, N.W.T.: preliminary results; in Proceedings of the fourth Arctic-Antarctic diatom workshop, P.B. Hamilton (ed.). Canadian Technical Report of Fisheries and Aquatic Sciences, v. 1957, p. 5-11.
1994c: Late Wisconsinan and Holocene diatom stratigraphy from Amarok Lake, Baffin Island, N.W.T., Canada; Journal of Paleolimnology, v. 10, p. 129-13

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-5135	22
-5136	34
-5137	59

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-5148	53
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-5161	28
-5162	58
-5163	37
-5164	34
-5165	22
-5166	52
-5169	8
-5170	54
-5171	9
-5172	52
-5173	44
-5174	31
-5175	53
-5176	58
-5178	22
-5179	27
-5180	58
-5181	53
-5182	31
-5184	27
-5185	13
-5186	33
-5188	33
-5189	51
-5190	30
-5191	54
-5192	22
-5193	58
-5194	33
-5196	27
-5197	51
-5199	56
-5200	22
-5214	44
-5216	50
-5223	49
-5230	13
-5232	50
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-5259	13
-5273	13
-5276	21
-5279	21
-5283	14
-5289	44
-5290	45
-5294	39
-5295	39
-5301	56
-5318	57
-5325	47
-5327	41
-5329	46
-5331	41
-5345	40
-5350	57
-5352	23
-5361	48
-5364	40
-5368	56
-5372	41
-5373	42
-5374	40
-5375	47
-5376	45
-5378	49
-5380	48
-5382	46
-5391	16
-5395	40
-5396	55
-5398	45
-5408	56
-5411	55
-5419	55
-5428	48
-5434	46
-5435	46
-5436	49
-5466	45
-5478	38
-5483	37
-5486	38
-5492	38
-5496	38
-5497	38
-5543	15
-5552	15
-5641	19
-5855	21
SUC-2 *	7

2 - second preparation of a sample
* - sample counted in both counters
HP - 'High Pressure' (5 L counter at 4 atmospheres)

Samples dated by other laboratories

Alberta Environmental Centre in Vegreville

AECV-1205C 31

Brock Geological Sciences

BGS-1472 37

Beta Analytic Inc.

Beta-34766 22
-38907 28
-38908 28
-38909 29
-38910 29
-38911 28
-38912 28
-40686 29
-40687 28
-40688 28
-40689 28
-40690 28
-46052 28
-46053 29
-61400 17
-66129 18
-66130 13

Centre for AMS (Livermore Lab.)

CAMS-11121 38
-11122 38
-11125 38
-11335 38
-11340 38
-12256 38

IsoTrace Laboratory (University of Toronto)

TO-2131 30
-2237 60
-2259 58
-2292 53
-2445 25
-2882 56
-2883 55
-3241 38
-3242 38
-3243 38
-3628 16
-3630 14
-3973 15
-3974 14
-3975 14

Sample Series Dates

Newfoundland
- *Springdale Series* 8
- *Burgeo Series* 9
- *Parsons Pond Series* 9
- *Port aux Basque Series* 11

Nova Scotia
- *Timber Lake Series* 13
- *Collins Pond Series II* 13
- *Hector Lake Series* 14
- *Pye Lake Series* 14
- *Piper Lake Series* 15
- *Hirtles Beach Series* 16
- *Silver Lake Series* 17
- *Bower Lake Series* 17

New Brunswick
- *Harrigan Lake Series* 19
- *Bacon Lake Series* 19

Quebec
- *lac à Raymond Series* 21
- *Rivière Jacquère Series* 22
- *lac Dana Series* 23
- *Rupert River Series* 23

Ontario
- *McKay Lake Series* 25

Manitoba
- *Wheatcroft Lake Series* 26

British Columbia
- *Meadow Creek Series* 27
- *Burns Bog Series* 27
- *Seymour Valley Series* 28
- *Cheekye River Series* 29
- *Richmond Series* 30
- *Esquimalt Lagoon Series* 30
- *Port Alberni Series* 31
- *Maltby Slough Series* 31

N. Canada (Mainland): Yukon Territory
- *Volcano Mountain Series* 32

Northwest Territories (mainland)
- *"Hornaday" lake Series* 33
- *Norman Wells Series* 34
- *Hooper Island Series* 35

Northern Canada, Arctic Archipelago

Arctic Islands (Eastern Zone): Baffin Island
- *Countess of Warwick Sound Series* 36
- *Southwestern Cumberland Peninsula Series* 37
- *Berlinquet R. series* 42

Melville Peninsula
- *Repulse Bay Series* 51

W. Axel Heiberg Island
- *Expedition and Strand Fiord Series* 55

Ellesmere Island
- *Hot Weather Creek Series* 58
- *Blue Man Cape Series* 59

Month	2-L Counter (2 atm) cpm[1] (N)	5-L Counter (I or 4 atm) cpm[1] (N)
January	1.261±0.033 (3)	2.231±0.034 (3)
February	1.288±0.028 (3)	2.215±0.033 (3)
March	1.312±0.025 (3)	2.306±0.034 (2)
April	1.238±0.028 (4)	2.234±0.029 (4)
May	1.249±0.025 (2)	2.185±0.041 (2)
June	1.246±0.024 (3)	2.197±0.037 (3)
July	1.209±0.024 (4)	2.106±0.025 (4)
August	1.214±0.025 (3)	2.111±0.026 (4)
September	1.198±0.024 (3)	2.122±0.040 (3)
October	No Counts	No Counts
November	1.207±0.022 (4)	2.201±0.062 (3)
December	1.200±0.024 (3)	2.193±0.042 (3)

[1] CPM= counts/minute

Table 1. Monthly average count rate for backgrounds and the number of individual counts (N) made during the period January through December 1992.

Month	2-L Counter (2 atm) cpm[1] (N)	5-L Counter (I or 4 atm) cpm[1] (N)
January	18.546±0.156 (1)	28.364±0.176 (1)
February	18.276±0.111 (2)	28.129±0.131 (2)
March	18.119±0.128 (2)	28.205±0.135 (2)
April	18.133±0.104 (2)	28.421±0.132 (2)
May	18.139±0.145 (1)	27.969±0.203 (1)
June	18.063±0.123 (1)	28.267±0.155 (1)
July	18.316±0.145 (1)	28.293±0.128 (2)
August	18.357±0.145 (1)	28.013±0.180 (1)
September	18.457±0.104 (2)	28.386±0.132 (2)
October	No Counts	No Counts
November	18.234±0.101 (2)	28.038±0.135 (2)
December	18.324±0.104 (2)	28.163±0.147 (2)

[1] CPM= counts/minute

Table 2. Monthly average net count rate for oxalic acid standards (No (= 95% of the net activity of the NBS Oxalic Acid Standard)) and the number of individual counts (N) made during the period January through December 1992.

IAEA Sample Number	GSC Data 2 L 5 L	IAEA Consensus Values
C1 $\delta^{13}C$	+2.3±0.2*	+2.42±0.33
C1 pMC (age) "Carrara" marble	0.020±0.028 (>39ka) -0.002 _ 0.041 (>41ka)	0.00±0.02
C2 $\delta^{13}C$	-8.7±0.2*	-8.25±0.31
C2 pMC (age) travertine	41.01±0.43 (7150±100) 41.28±0.31 (7100±100)	41.14±0.03
C3 $\delta^{13}C$	-25.4±0.2*	-24.91±0.49
C3 pMC wood cellulose	130.19±0.48 131.93±0.53 (modern)	129.41±0.06
C4 $\delta^{13}C$	-24.4±0.2*	-23.96±0.62
C4 pMC (age) *Kauri* wood	0.028±0.16 (>40ka) -0.039±0.17 (>39ka) 0.050±0.04 (>50ka)	0.20-0.44
C5 $\delta^{13}C$	-25.5±0.2*	-25.49±0.72
C5 pMC (age) "Two Creeks" wood	23.04±0.27 (11 80±120) 23.18±0.26 (11 700±110)	23.05±0.2
C6 $\delta^{13}C$	-11.18±0.2*	-10.80±0.47
C6 pMC ANU Sucrose	151.26±0.63 151.39±0.75	150.61±0.11

* Analyzed by GSC Stable Isotope Laboratory (B.E. Taylor)

Table 3. IAEA ^{14}C Quality Assurance Data

	GSC-39	GSC-47	GSC-241	GSC-286	GSC-392	GSC-683
Orig. (Uncorrected)	9440±120	8700±120	9280±150	6850±140	9260±150	2320±130
New (Uncorrected)	9460±80	8720±80	9440±90	7080±120	9240±90	2200±80
$\delta^{13}C$ (‰)	+1.83	+0.33	+1.41	+2.52	+0.73	+2.87
Corrected (0‰)	9490±80	8730±80	9460±90	7120±120	9250±90	2240±80

Table 4. Results of redating selected archival samples. Complete details of these redated samples appear in the relevant section (Province or Territory) in the text.

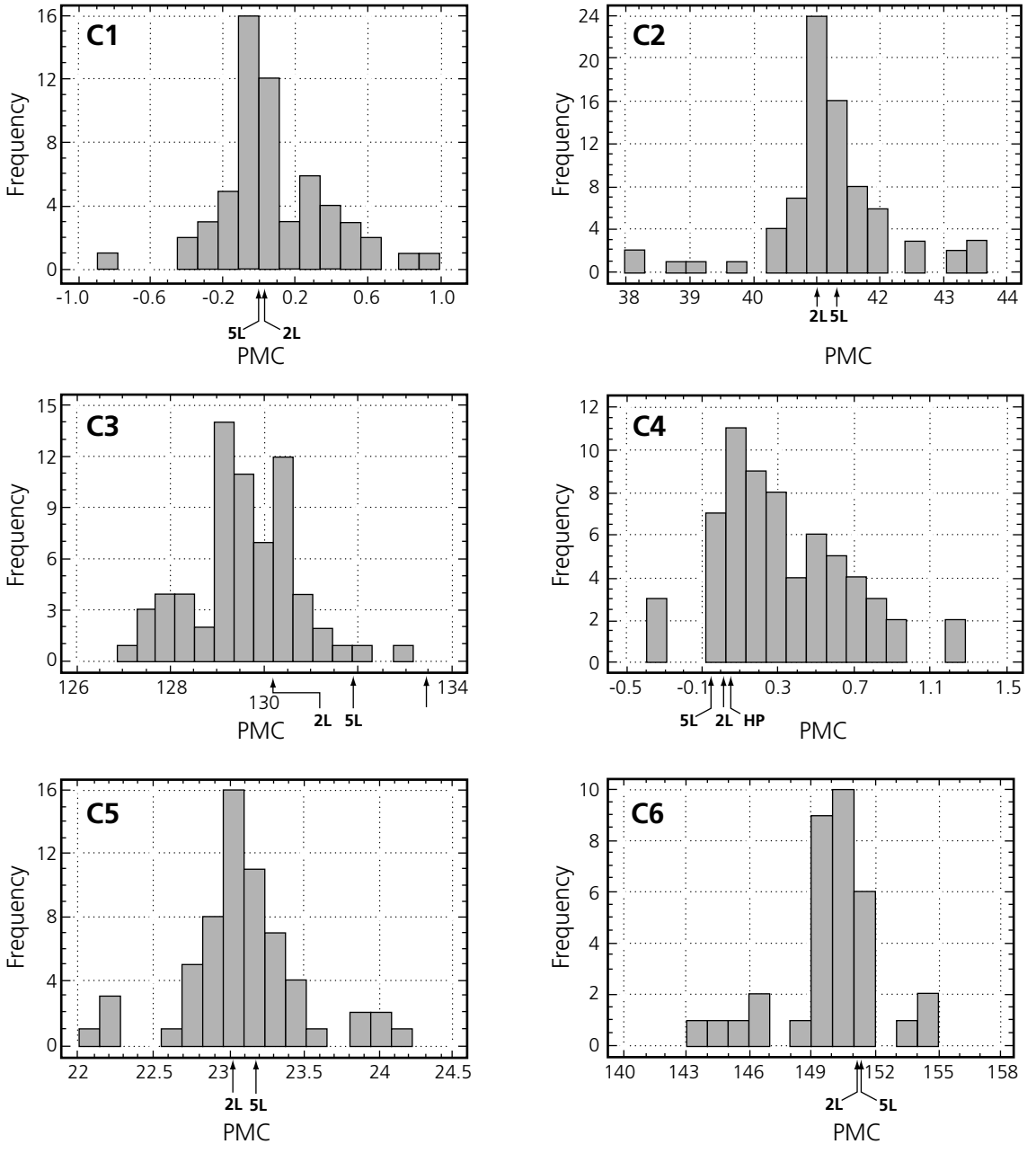

Fig. 1. Frequency distribution histograms of quality assurance data (modified after Rozanski, 1991)

Maps[1]

Fig. 2. Radiocarbon dated sites in Newfoundland. *Shows the location of 19 dates and 4 date series. All are GSC dates*

Fig. 3. Radiocarbon dated sites in Nova Scotia. *Shows the location of 33 dates and 8 date series. Dates come from several labs and include AMS dates.*

Fig. 4. Radiocarbon dated sites in New Brunswick. *Shows the location of 9 dates and 2 date series. All are GSC dates.*

Fig. 5. Radiocarbon dates sites from Quebec. *Shows the location of 21 dates, all GSC dates except one. One of the dates is a High Pressure analysis (HP) and one is an AMS date.*

Fig. 6. Radiocarbon dated sites in Ontario. *Shows the location of three dates, two of which are in one date series. The dates include a High Pressure analysis (HP) and one is an AMS date.*

Fig. 7. Radiocarbon dated sites in Manitoba. *Shows the location of 3 dates and 1 date series. All are GSC dates*

Fig. 8. Radiocarbon dated sites in British Columbia. *Two High Pressure (HP) GSC dates are shown in addition to a link to a series of dates on the lower mainland and Vancouver Island.*

Fig. 9. Radiocarbon dated sites in the lower mainland and southern Vancouver Island, British Columbia. *Shows the location of 35 dates and 7 date series. Dates come from several labs and include AMS dates. One series includes 13 AMS dates.*

Fig. 10. Radiocarbon dated sites in the Yukon. *Two dates, both from the GSC and both from a single site.*

Fig. 11. Radiocarbon dated sites on the mainland Northwest Territories. *Shows the location of 14 GSC dates and 2 date series.*

Fig. 12. Radiocarbon dated sites in the Arctic Archipelago. *A base map showing links to three different areas of the Arctic (Western Zone, Northern-Central Zone and the Eastern Zone)*

Fig. 13. Radiocarbon dated sites in the Eastern Zone of the Arctic Archipelago. *Shows the location of 28 dates and 5 date series. Dates come from several labs and include AMS dates. Map also contains a link to a cluster of dates on Northwestern Baffin Island.*

Fig. 14. Radiocarbon dates sites on northwest Baffin Island. *Shows the location of 52 dates, all from the GSC date lab.*

Fig. 15. Radiocarbon dated sites in the western zone of the Arctic Archipelago. *Shows the location of 9 dates. Dates come from several labs and include 1 AMS date.*

Fig. 16. Radiocarbon dated sites in the Northern & Central Zone of the Arctic Archipelago.*Shows the location of 10 dates and three date series.. Dates come from several labs and include 1 AMS date. Map also contains a link to a number of dates on the west side of Axel Heiberg Island.*

Fig. 17. Radiocarbon dated sites on the west side of Axel Heiberg Island near Expedition and Strand Fiords. *Shows the location of 20 dates and 2 date series. All dates come from the GSC date lab. except for 3 AMS dates.*

[1] *Dates shown in blue on the maps are links to the date information in a format most suitable for printed output. To see the information on the dates within the context of the full date list, either select the date from the bookmarks on the left side of the screen or use the page number link next to the date in the Index.*

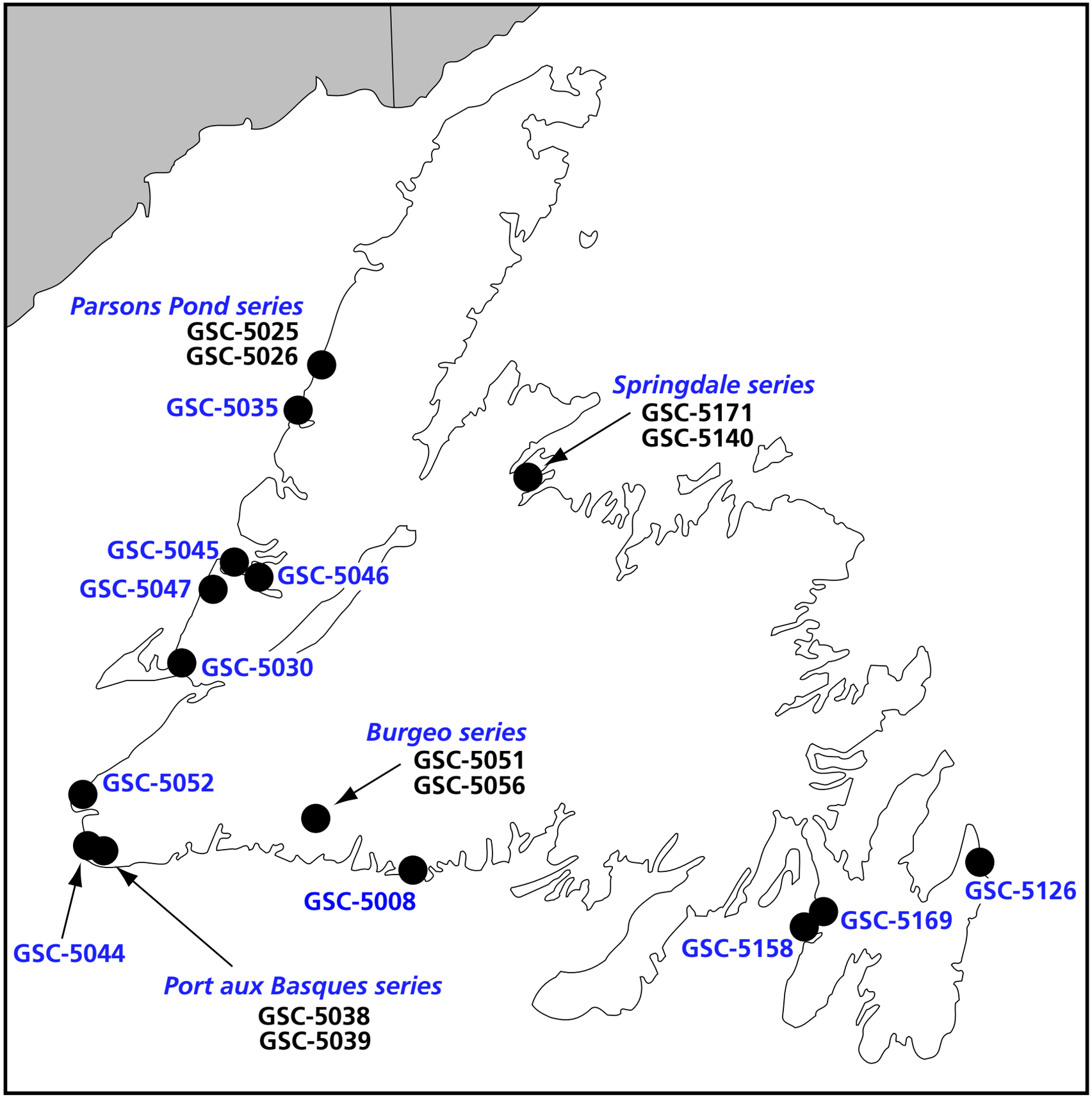

Fig. 2. Radiocarbon dated sites in Newfoundland

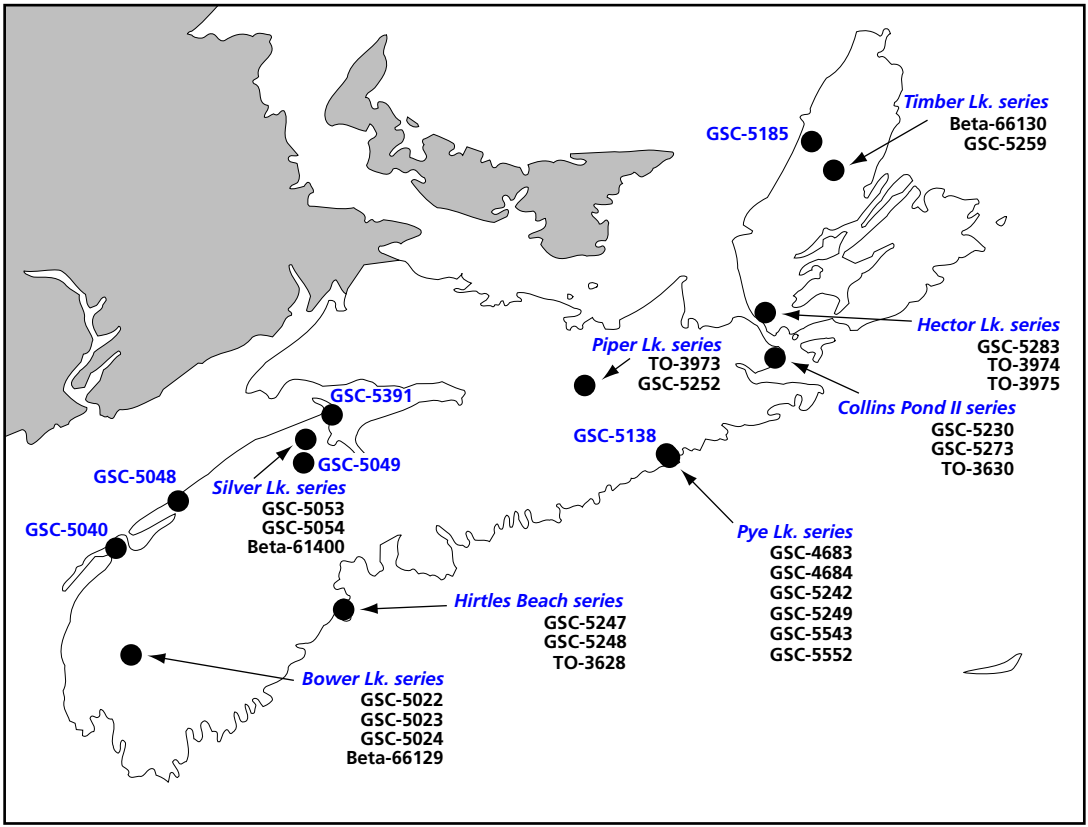

Fig. 3. Radiocarbon dated sites in Nova Scotia

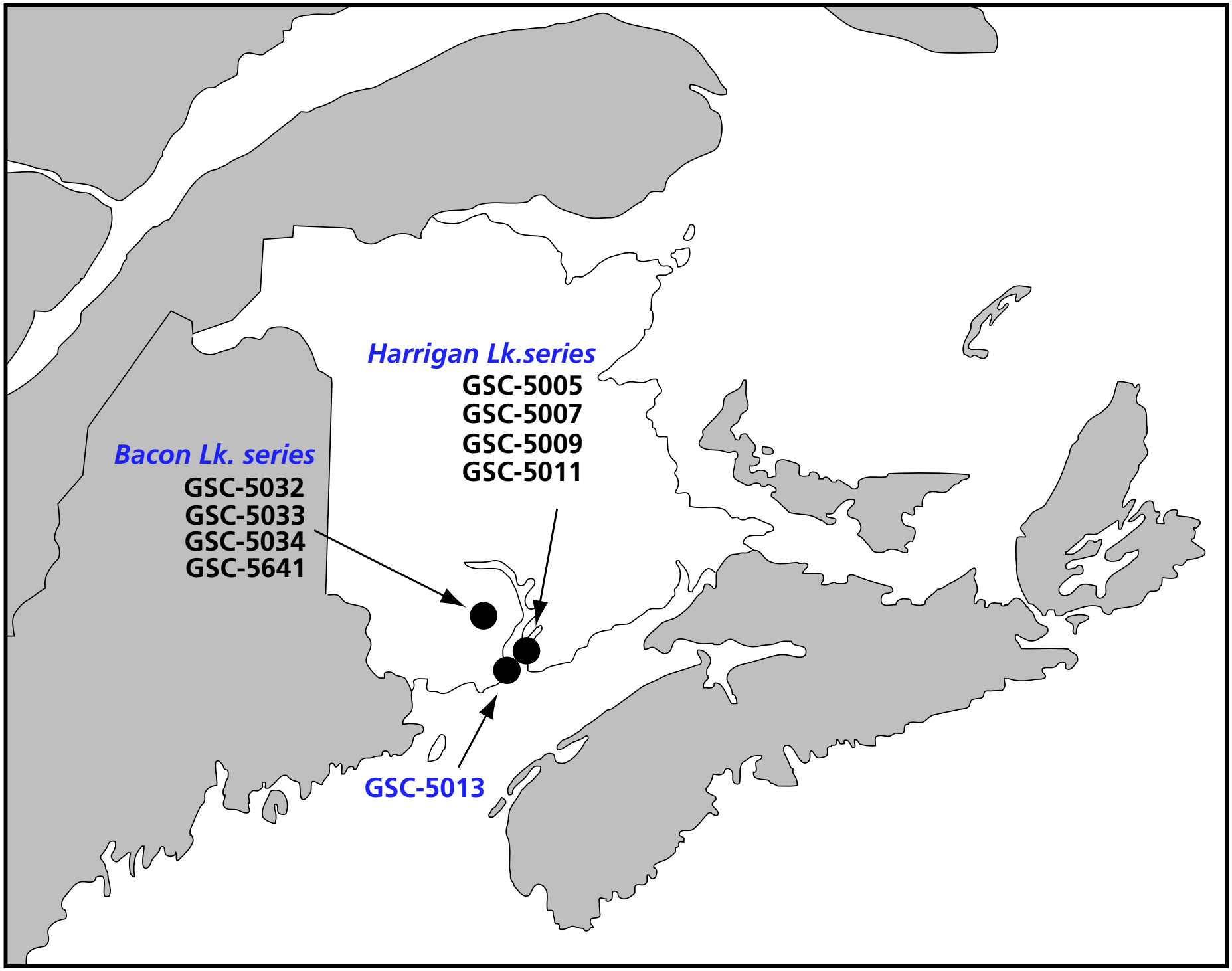

Fig. 4. Radiocarbon dated sites in New Brunswick

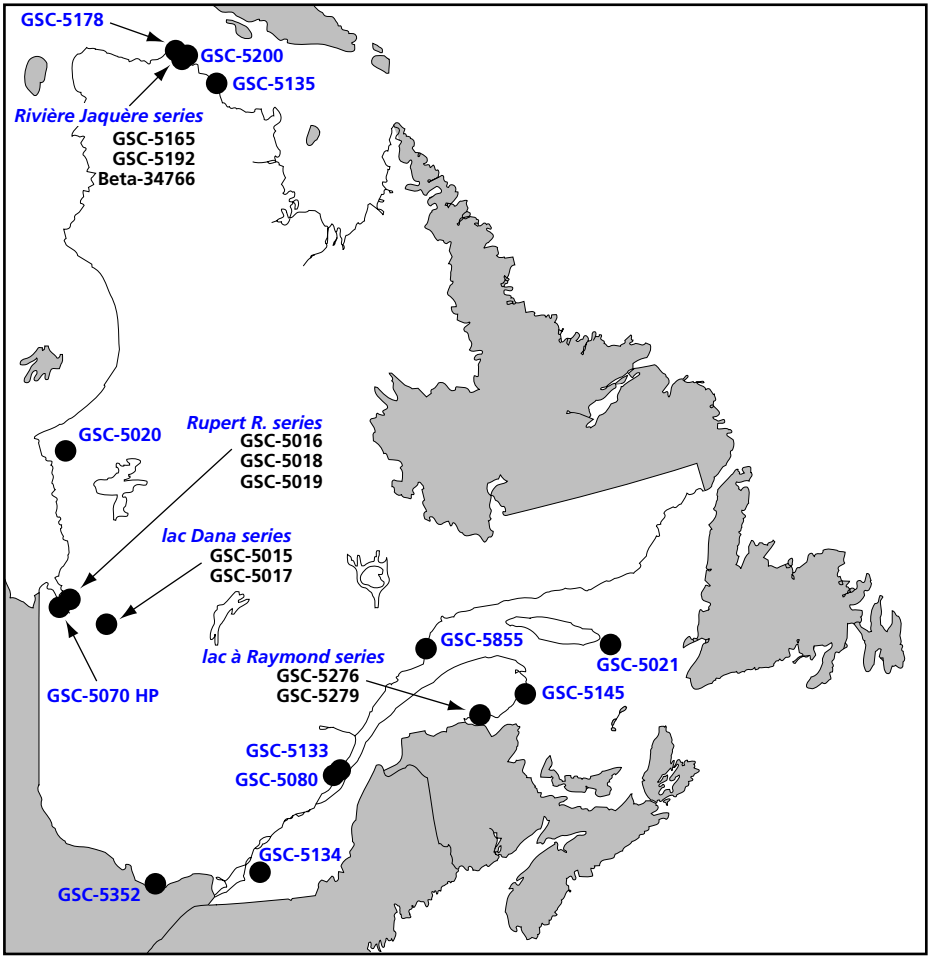

Fig. 5. Radiocarbon dated sites from Quebec

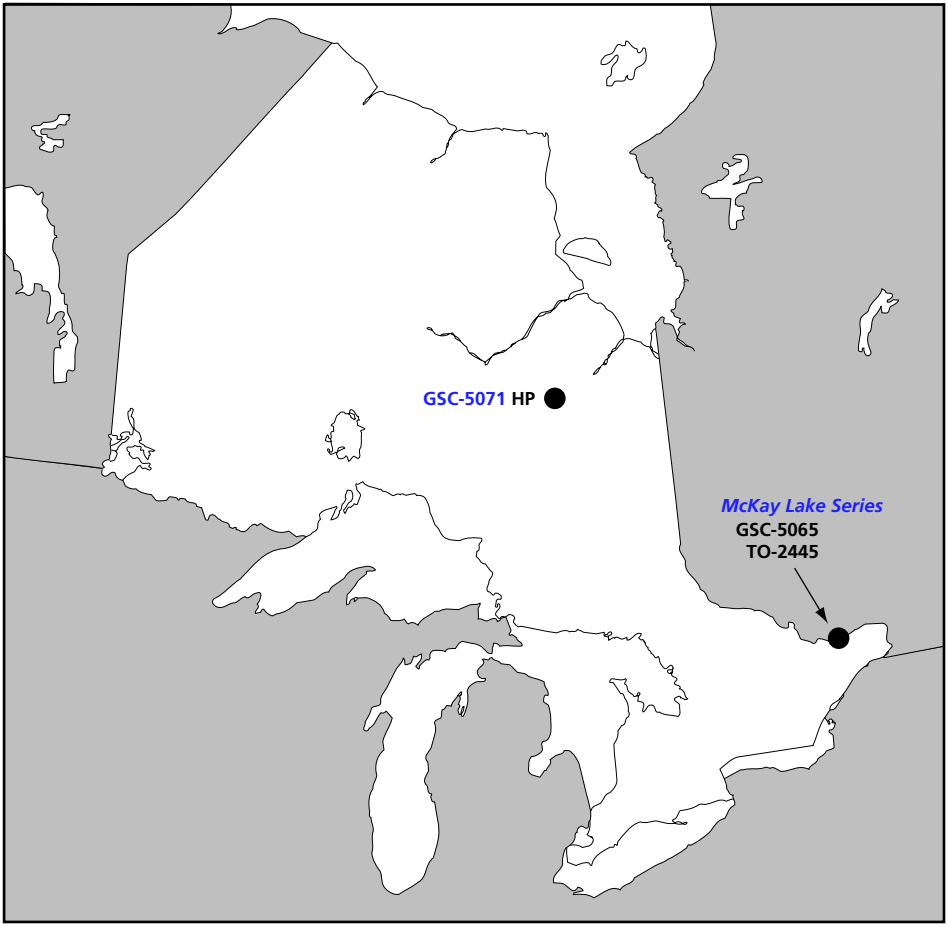

Fig. 6. Radiocarbon dated sites in Ontario

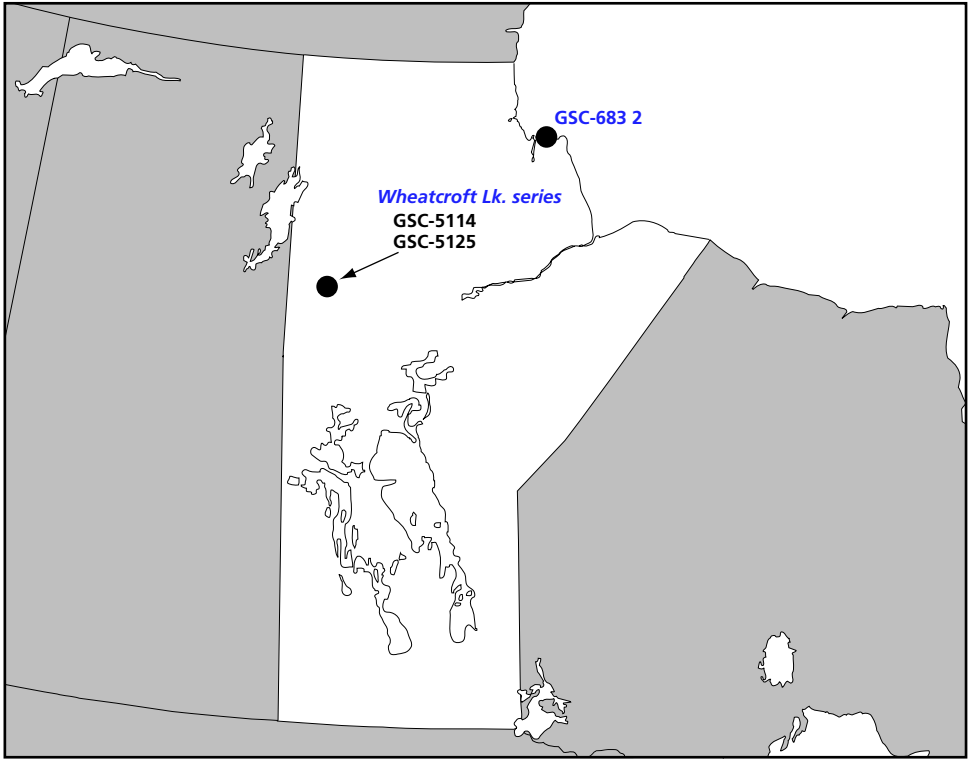

Fig. 7. Radiocarbon dated sites in Manitoba

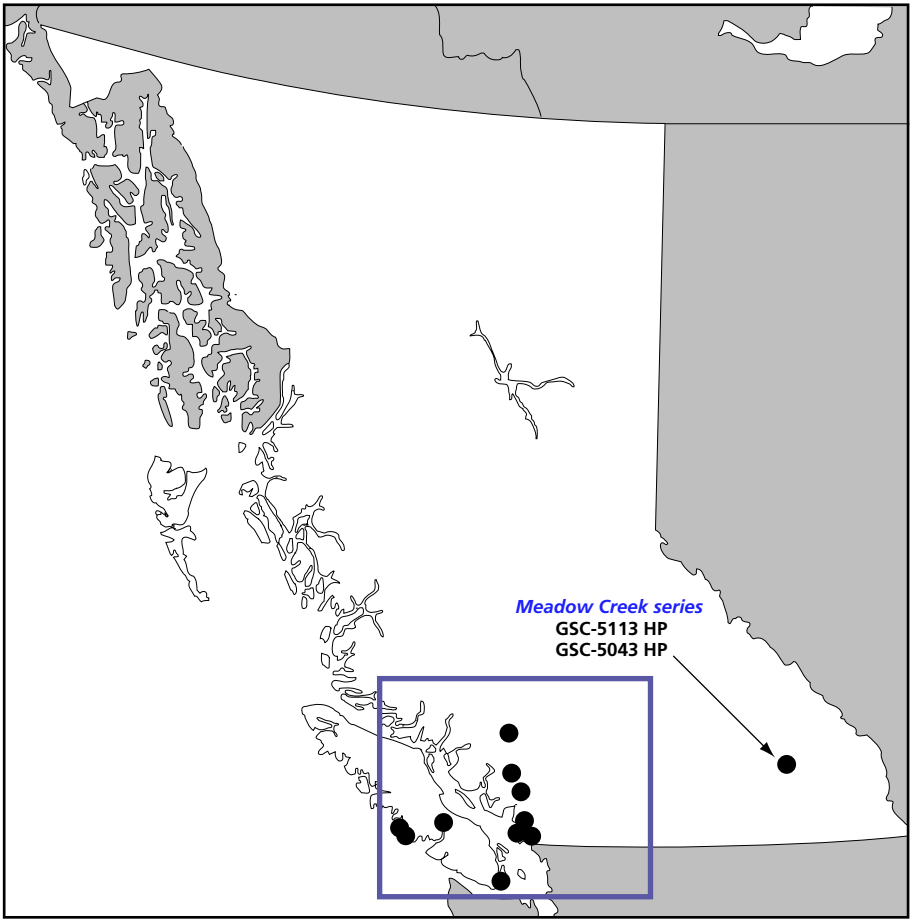

Fig. 8. Radiocarbon dated sites in British Columbia. Inset links to large scale-map.

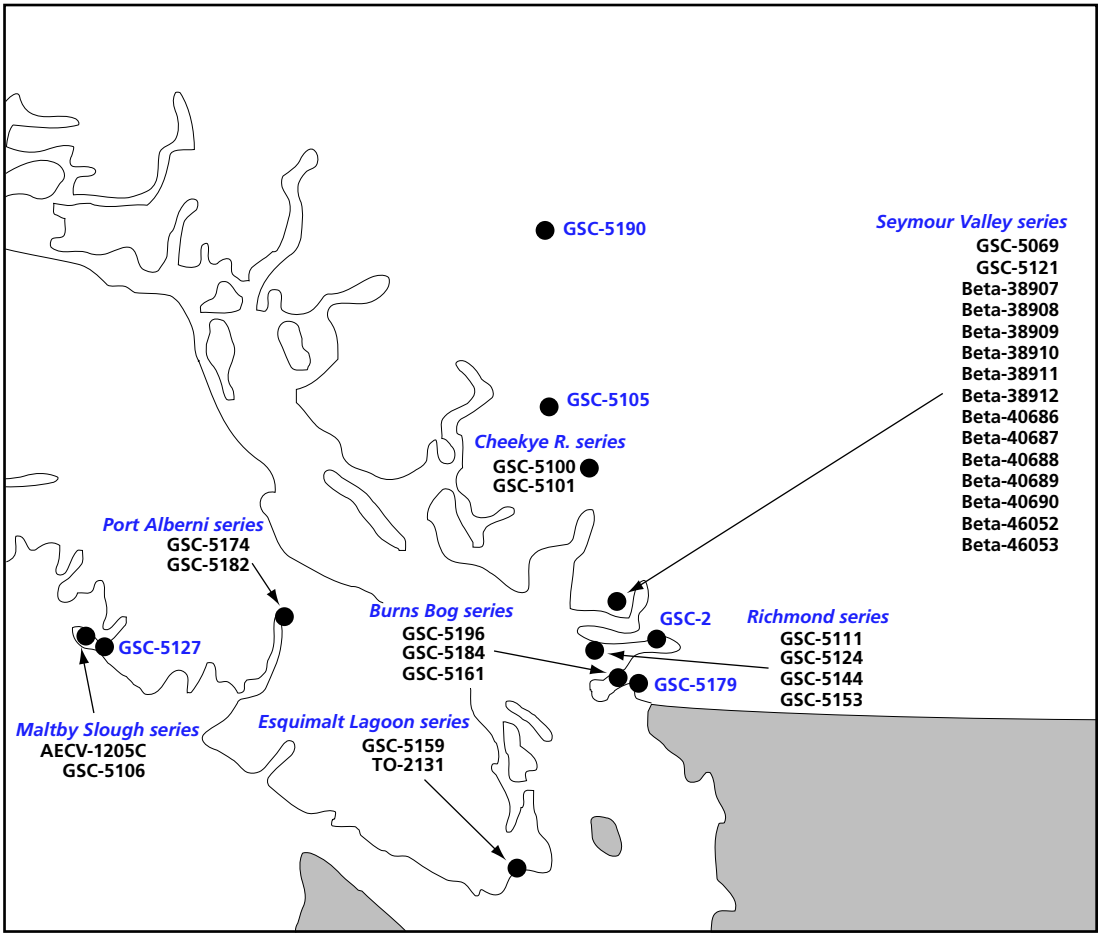

Fig. 9. Radiocarbon dated sites in the lower mainland and southern Vancouver Island, British Columbia

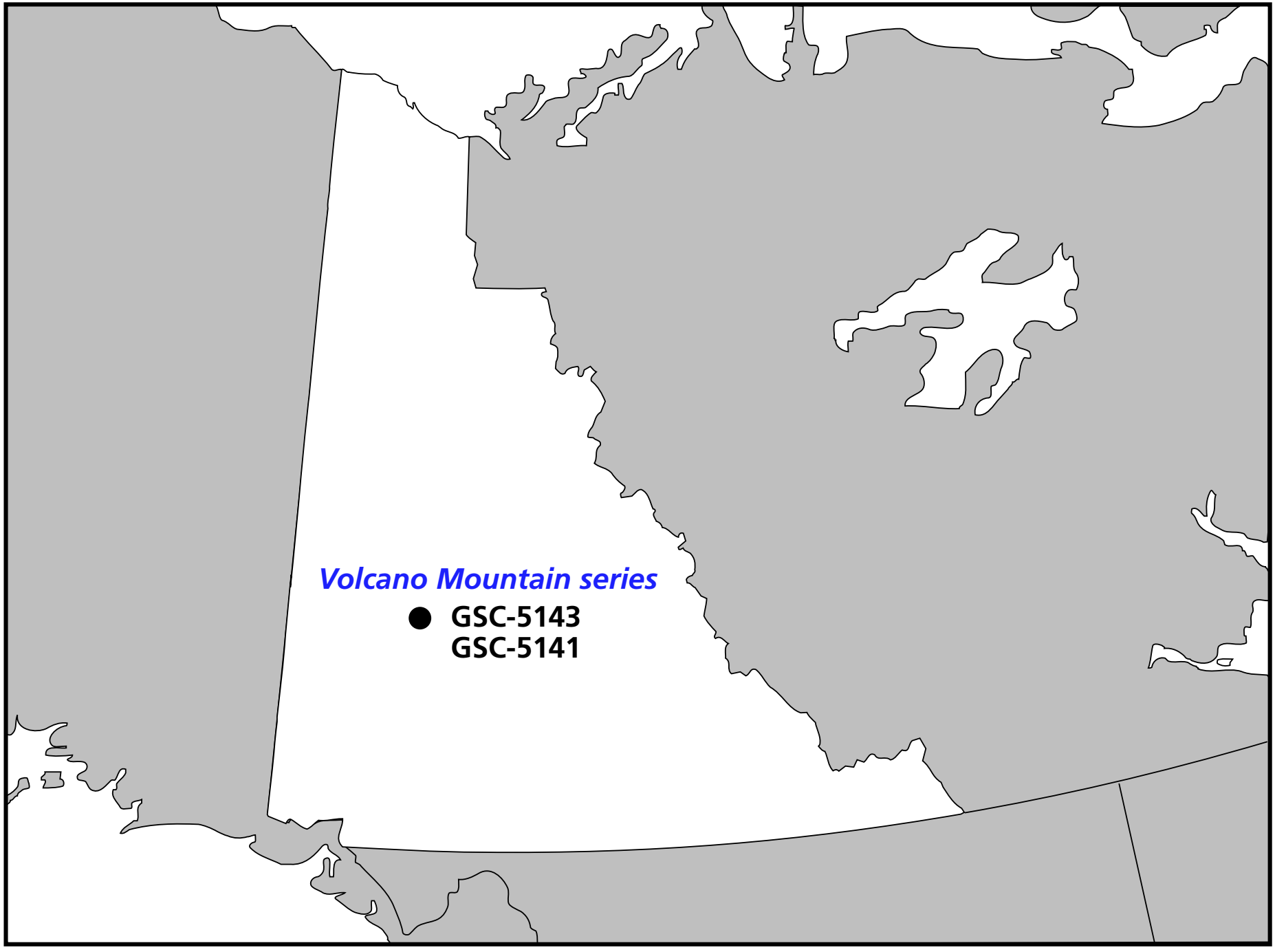

Fig. 10. Radiocarbon dated sites in the Yukon

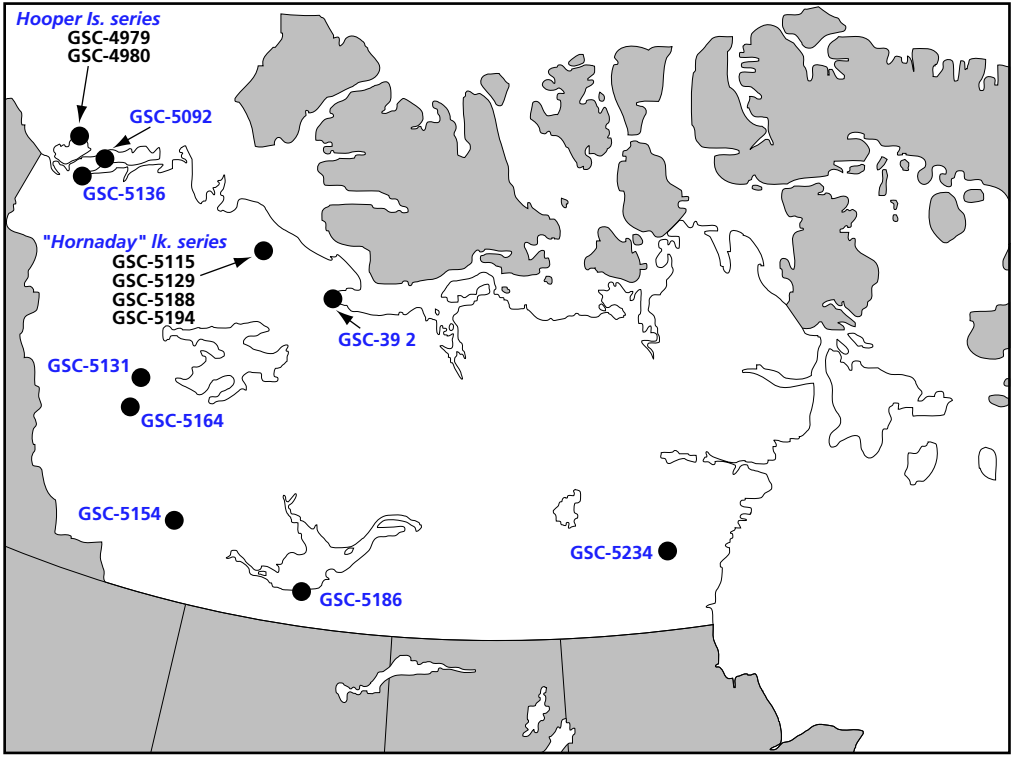

Fig. 11. Radiocarbon dated sites on the mainland Northwest Territories

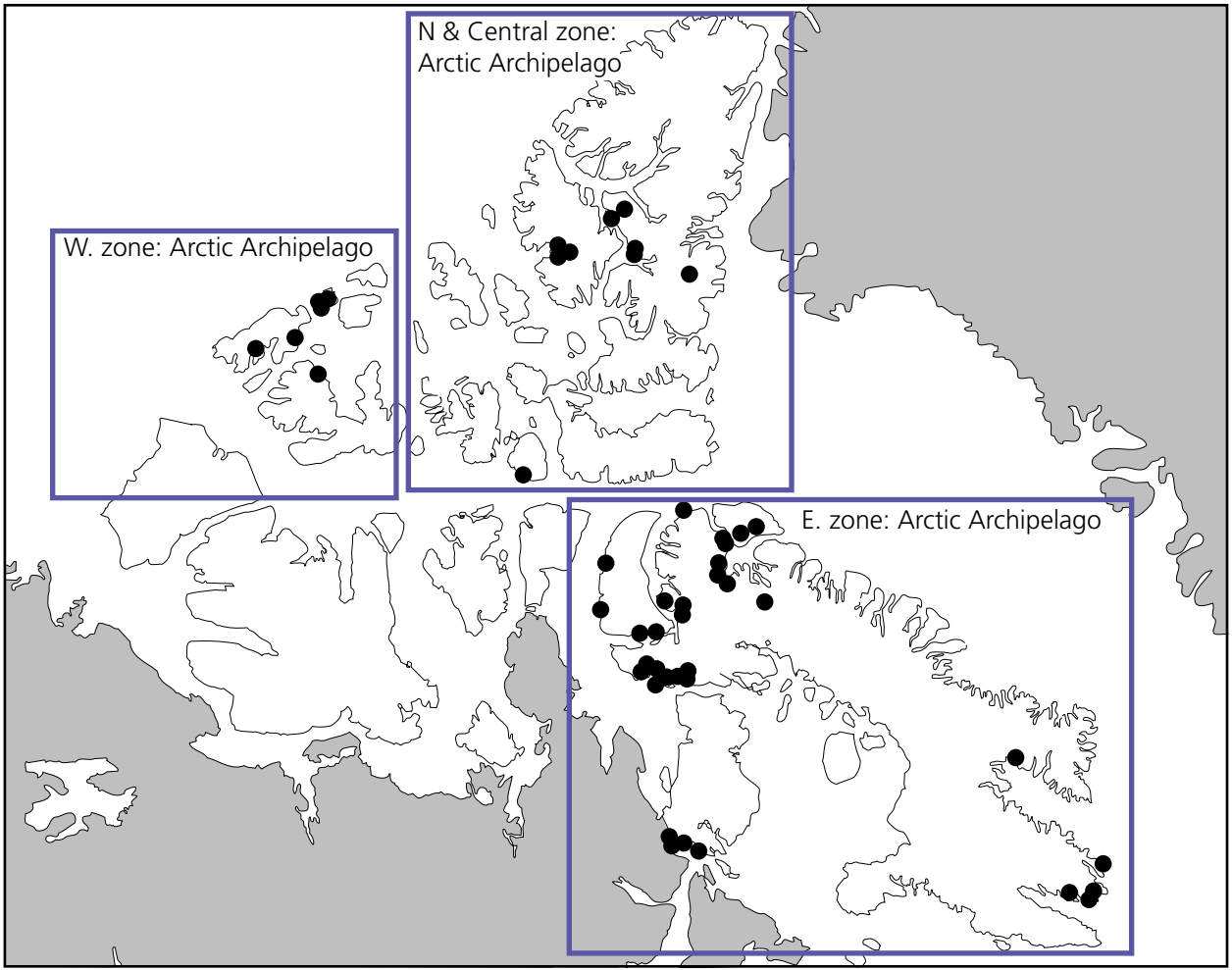

Fig. 12. Radiocarbon dated sites in the Arctic Archipelago. Insets link to larger scale maps.

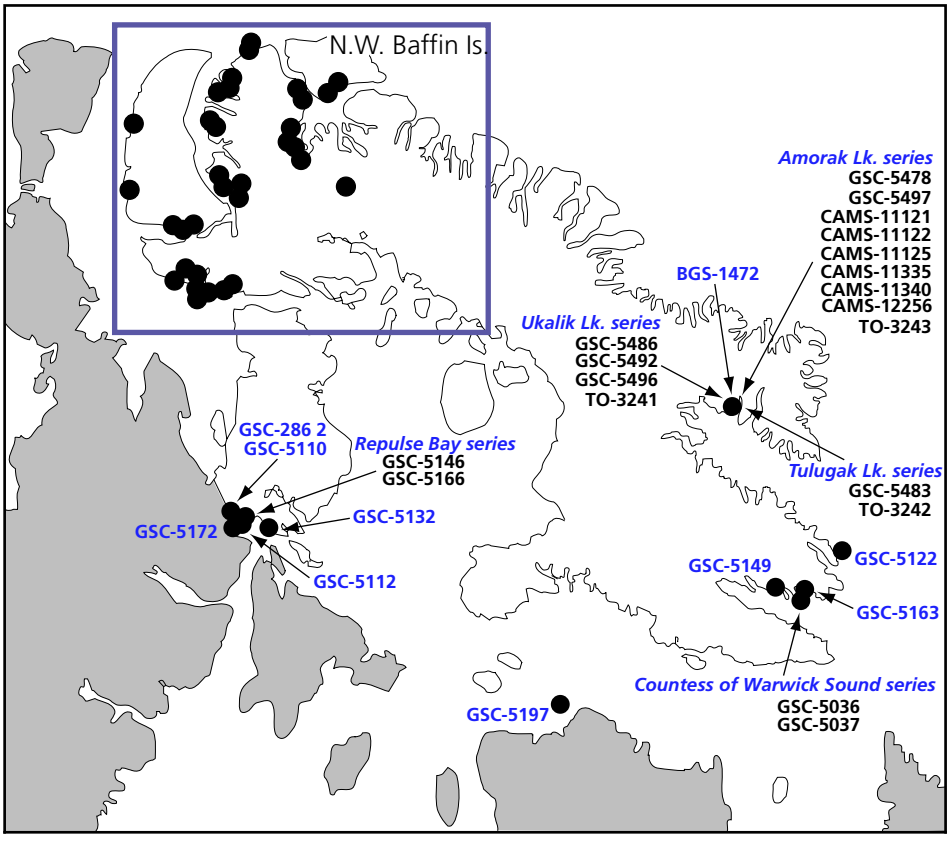

Fig. 13. Radiocarbon dated sites in the Eastern Zone of the Arctic Archipelago. Inset links to large scale map of sites on northwestern Baffin Island.

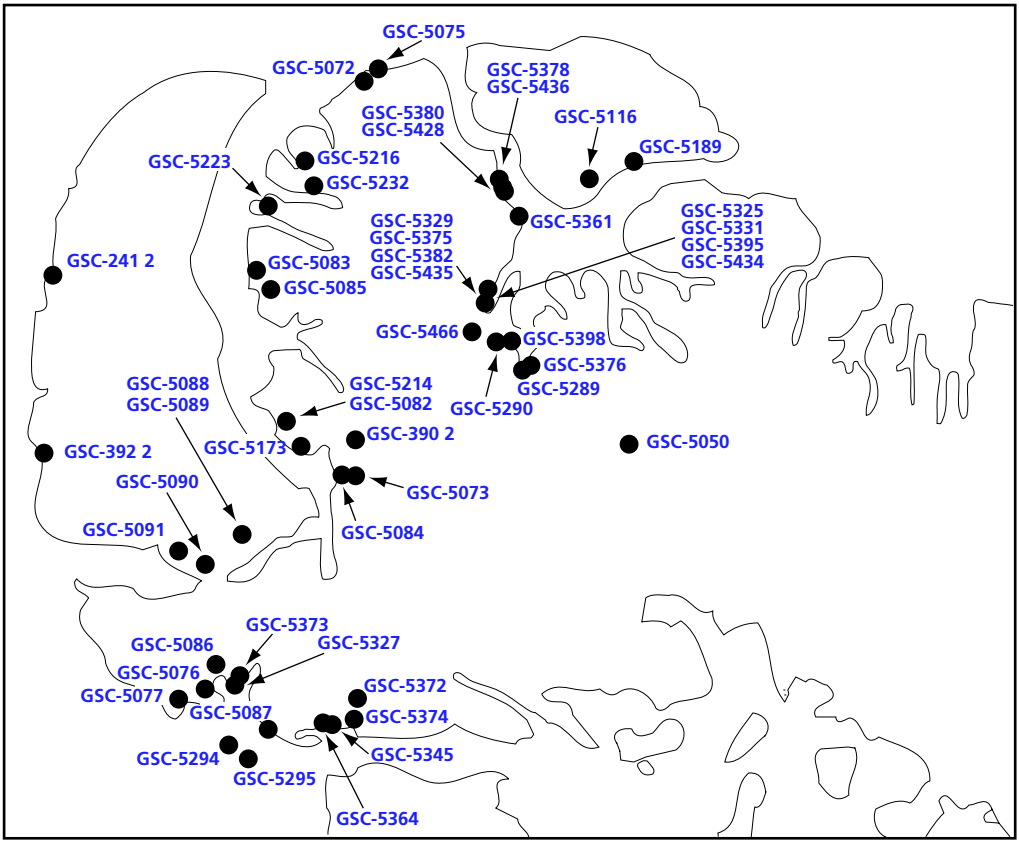

Fig. 14. Radiocarbon dated sites on northwest Baffin Island

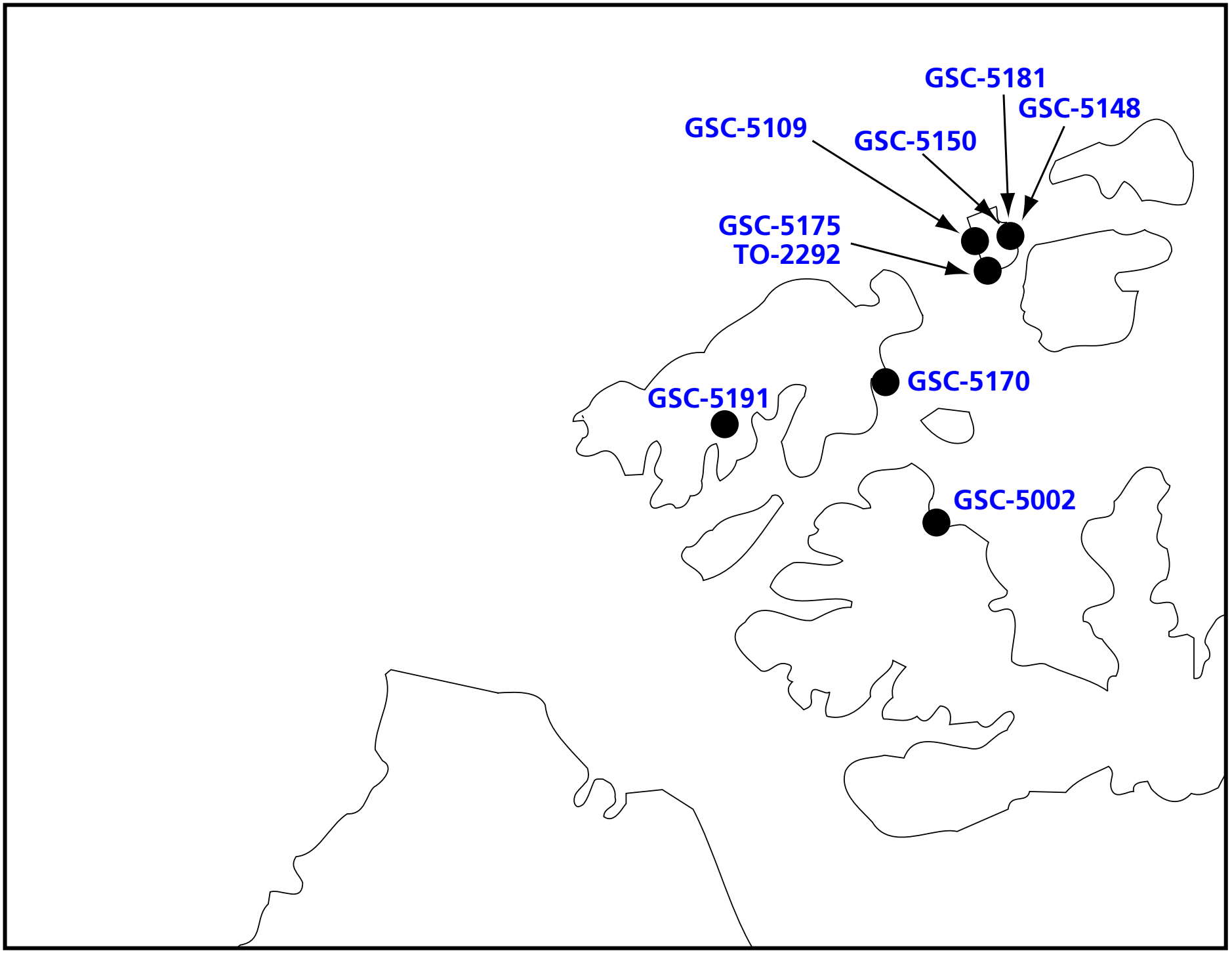

Fig. 15. Radiocarbon dated sites in the western zone of the Arctic Archipelago

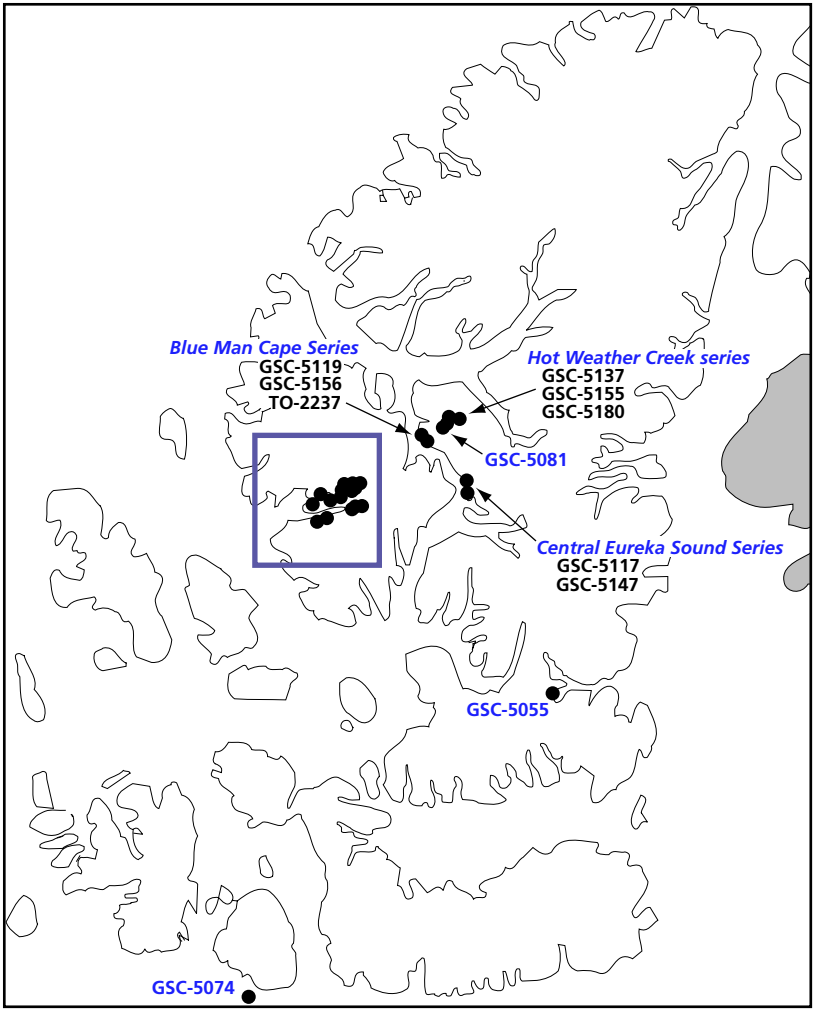

Fig. 16. Radiocarbon dated sites in the Northern and Central Zone of the Arctic Archipelago. Inset links to larger scale map.

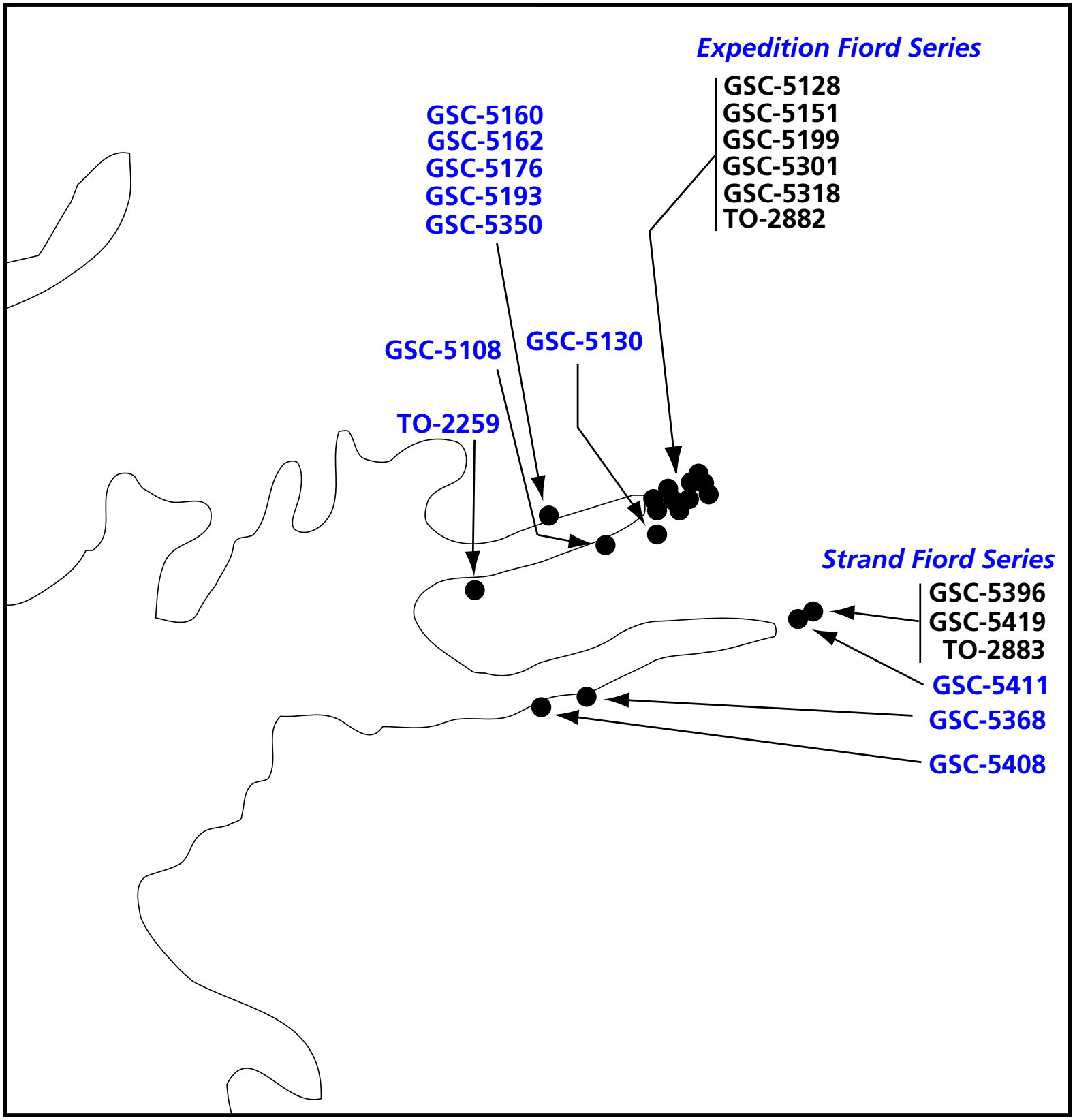

Fig. 17. Radiocarbon dated sites on the west side of Axel Heiberg Island near Expedition and Strand Fiords

Individual Dates and Date series

The pages that follow are designed primarily for printed output. They are arranged by either a single date/page or by date series. The reader can browse this section on a page-by-page basis, but since the information contained here is no different than that available in the first part of the document, more often pages in this section will be reached via one of the established links. There are two areas where such links can be found. The first is on the maps. Clicking on any of the dates or date series shown in blue will take the reader to the appropriate page in this section. At that point, if a printed copy is required, one need only select "print" from the menu and enter the page or page range in the appropriate printer dialogue box. Another way to view the dates in this section is to click the date number shown in the Index.

Newfoundland (Fig. 2)

GSC-5126 Branscombes Pond 8010±90

$\delta^{13}C$= -24.9‰

The lake sediment (gyttja) was underlain by silty clay. Sample BP90A 274-279 is the basal gyttja (2.74-2.79 m) from a 3.00 m core. The core was collected by D.L. Butler and J.B. Macpherson on October 7, 1990 from Branscombes Pond, Mount Pearl, Newfoundland, adjacent to Blackmarsh Road (47° 31.63'N, 52° 47.00'W) at an elevation of 109 m; submitted by J.B. Macpherson and D.L. Butler.

The sample (106.4 g wet weight) was treated with hot acid and distilled water rinses; base treatment was omitted (noncalcareous). The treated sample (18.2 g) yielded 4.36 L of CO_2 gas. The age estimate is based on one count for 3760 minutes in the 2 L counter with a mixing ratio of 1.04. The count rates for the sample (net), and monthly backgrounds and standards (net) were 6.842±0.051, 1.094±0.019, and 18.531±0.106 cpm, respectively.

The uncorrected age is 8000± 90.

Comment (**J.B. Macpherson**): Pollen assemblages in the dated sediment indicate initial expansion of *Abies* and expanding *Picea*. The date is considered correct because initial expansion of *Picea* is dated 8570±90 (GSC-3618, Blake 1983; Kennys Pond) and 8370±130 (GSC-4015, Blake 1987; Golden Eye Pond) elsewhere on the northeast Avalon Peninsula; by interpolation *Abies* began to expand about 300 years later (Macpherson 1982). The date is young for a minimal deglacial date; previously the youngest acceptable date on basal gyttja was 8570±90 (GSC-3618) from the Kennys Pond kettle site (elevation 70 m). Branscombes Pond occupies a shallow depression in till; if this depression is also a kettle the absence of older organic sediment is explained.

Newfoundland (Fig. 2)

GSC-5169 Fox Harbour 5150±80

$\delta^{13}C = -27.7‰$

The basal peat was underlain by glaciomarine diamicton and overlain by 16 cm peat; capped by 10-15 cm of loess. Sample FH-3 was collected by N. Catto on September 5, 1990, from Fox Harbour, Newfoundland (47° 19'N, 53° 56'W), at an elevation of 5 m; submitted by N. Catto.

The sample (106.8 g wet weight) was treated with cold base, hot acid, and distilled water rinses (noncalcareous). The treated sample (17.8 g) yielded 8.54 L of CO_2 gas. The age estimate is based on one count for 3000 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 9.648±0.063, 1.057±0.020, and 18.411±0.103 cpm, respectively.

The uncorrected age is 5190±80.

Newfoundland (Fig. 2)

GSC-5158 Point Verde 6130±80

$\delta^{13}C = -30.6‰$

The basal peat was underlain by glaciofluvial gravel and overlain by 1.28 m peat; capped by loess. Sample PV-36 was collected by N. Catto on August 6, 1990, from Point Verde, Newfoundland (47° 14'N, 54° 4'W), at an elevation of 10.5 m; submitted by N. Catto.

The sample (208.8 g wet weight) was treated with cold base, hot acid, and distilled water rinses (noncalcareous). The treated sample (11.4 g) yielded 8.29 L of CO_2 gas. The age estimate is based on two counts for 1830 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 13.101±0.100, 2.233±0.035, and 28.426±0.139 cpm, respectively.

The uncorrected age is 6220±80.

Comment (**N. Catto**): These two dates provide minimum estimates of sea level changes along the eastern shore of Placentia Bay. Both peat units lie on erosional terraces cut into glaciogenic sediments, and represent terrestrial deposition at some distance from the shoreline. They therefore indicate that sea levels had dropped from the postglacial maximum position prior to 6.1 ka (Point Verde, 10.5 m), and prior to 5.1 ka (Fox Harbour, 5 m). The maximum elevation at Point Verde represents the highest known sea level position on the Placentia Bay shore of the Avalon Peninsula. The presence of these erosional terraces, however, indicates that sea levels subsequent to deglaciation were higher than at present along the Avalon Peninsula shoreline.

The peats are capped by loess at both localities, and similar loess caps are present at other localities along Placentia Bay. Late Holocene eolian activity is also indicated by dunal development at Point Lance, St. Marys Bay. Evaluation of ^{14}C dateable material from this exposure will enable an assessment of the regional significance of the eolian activity. Preliminary investigations suggest that the climate indicated by the peat deposits is boreal, similar to that proposed for the mid-Holocene in other parts of the Avalon Peninsula.

Newfoundland (Fig. 2)

GSC-5008 Hermitage 12 600±130
$\delta^{13}C$= -18.8‰

The lake sediment, silty gyttja, sample AP-82-4 (290-296.5 cm) was collected by T.W. Anderson on August 20, 1982 from an unnamed lake about 1.5 km south of town of Hermitage, on the south coast of Newfoundland (47° 32'45"N, 55° 56'30"W), at an elevation of about 10.5 m; submitted by T.W. Anderson.

The sample (204 g wet weight) was treated with hot acid and distilled water rinses; base treatment was omitted (noncalcareous). The treated sample (49.1 g) yielded 4.67 L of CO_2 gas. The age estimate is based on one count for 3200 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net), and for monthly backgrounds and standards (net) were 3.798±0.047, 1.013±0.027, and 18.000±0.102 cpm, respectively.

The uncorrected age is 12 500±130.

Comment (**T.W. Anderson**): The sample occurs at the top of a gyttja unit below banded light grey silty clay. The overlying clay is correlated with the Younger Dryas cool interval of the North Atlantic Ocean. The sample dates gyttja deposition during a period of climatic improvement prior to the Younger Dryas episode.

Newfoundland (Fig. 2)

Springdale Series

A series of marine shells samples from George Huxter Memorial Park, 2.5 km northwest of the town of Springdale, on the south side of Indian Brook, Newfoundland (49° 30.5'N, 56° 6.4'W), at an elevation of 12.45 m, was collected by S. Scott on July 2, 1990; submitted by J. Shaw.

GSC-5140 Springdale (I) 11 300±120
$\delta^{13}C$= + 0.6‰

The marine shell sample SS19 90071 (Biodatabase No. 90042; 45.9 g dry weight; *Balanus* and *Mya truncata*; identified by J. Shaw), enclosed in sand gravel, was treated with an acid leach to remove the outer 30% of the sample. The treated sample (32.3 g) yielded 7.39 L of CO_2 gas. The age estimate is based on one count for 4840 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 4.562±0.047, 1.150±0.032, and 18.513±0.124 cpm, respectively.

The uncorrected age is 11 300±120.

Comment (**J. Shaw** and **S. Scott**): The shells are from sand gravel deposits associated with the marine limit in the Halls Bay area. See GSC-5171 for further comments.

GSC-5171 Springdale (II) 11 700±110
$\delta^{13}C$= + 2.3‰

The marine shell sample SS19 90065 (Biodatabase No. 90043; 29.1 g dry weight; *Hiatella arctica* and *Mya truncata*; identified by J. Shaw), enclosed in sand gravel, was treated with an acid leach to remove the outer 20% of the sample. The treated sample (22.9 g) yielded 5.06 L of CO_2 gas. The age estimate is based on one count for 3960 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 4.314±0.044, 1.099±0.023, and 18.484±0.104 cpm, respectively.

The uncorrected age is 11 700±110.

Comment (**J. Shaw** and **S. Scott**): This date is on a shell sample from marine limit delta deposits in the Halls Bay area, in the same locality as GSC-5140. These dates are similar to previously reported dates in this area: GSC-1733 (Blake, 1983), on a sample from a terrace at Halls Bay, and GSC-2085 (Lowdon and Blake, 1975) on a sample from delta bottomset beds near South Brook.

Newfoundland (Fig. 2)

Burgeo Series

A series of sediment samples from a lake about 21 km north of Burgeo, Newfoundland (47° 48′0″N, 57° 39′0″W), at an elevation of 220 m, was collected by T.W. Anderson on August 9, 1989; submitted by T.W. Anderson.

GSC-5051 Burgeo (I) 10 700±150
$\delta^{13}C$= -19.6‰

The lake sediment, gyttja sample AP-89-3, (389-391.4 cm; 197.1 g wet weight), was treated with hot acid and distilled water rinses; base treatment was omitted (noncalcareous). The treated sample (61.1 g) yielded 3.86 L of CO_2 gas. The age estimate is based on two counts for 2050 minutes in the 2 L counter with a mixing ratio of 1.17. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 4.765±0.067, 1.032±0.028, and 17.834±0.163 cpm, respectively.

The uncorrected age is 10 600±150.

Comment (**T.W. Anderson**): The sample occurs at the base of the upper gyttja unit overlying grey sandy clay containing scattered plant detritus. The sample dates a return to gyttja deposition and the onset of regional warming following the Younger Dryas cooling episode indicated by the clay unit.

GSC-5056 Burgeo (II) 11 900±150
$\delta^{13}C$= -21.2‰

The lake sediment, gyttja sample AP-89-3A (424-428.6 cm; 341.7 g wet weight), was treated with hot acid and distilled water rinses; base treatment was omitted (noncalcareous). The treated sample (106.0 g) yielded 4.53 L of CO_2 gas. The age estimate is based on two counts for 2680 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 4.109±0.066, 1.049±0.019, and 17.851±0.099 cpm, respectively.

The uncorrected age is 11 800±150.

Comment (**T.W. Anderson**): The sample is from one of several organic-rich bands within an interbedded detritus-clay sequence below the grey sandy clay. The sample dates the early deposition of gyttja during a pre-Younger Dryas warm interval. The overlying sandy clay unit is correlated with the Younger Dryas cooling of the North Atlantic Ocean.

Newfoundland (Fig. 2)

GSC-5035 Western Brook 70±40

$\delta^{13}C$= -24.1‰

The wood was enclosed in sand. Sample 86-GS-29 was collected by D.R. Grant on September 18, 1986 at the mouth of Western Brook, on the Gulf of St. Lawrence coast, west coast of Newfoundland (49° 49.86'N, 57° 51.58'W), at an elevation of 2 m; submitted by D.R. Grant.

The sample (12.8 g dry weight) was treated with hot base, hot acid and distilled water rinses (noncalcareous). The treated sample (9.1 g) yielded 9.15 L of CO_2 gas. The age estimate is based on two counts for 3900 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net), and monthly backgrounds and standards (net) were 28.183±0.092, 2.080±0.026, and 28.377±0.129 cpm, respectively.

The uncorrected age is 60±40.

Comment (**D.R. Grant**): The dated material comes from the lower of two undulating 10-30 cm thick forest/peat horizons which cut across the high-angle eolian bedding of coastal dunes which have accumulated by onshore transport of beach sand. Like the similar date of 40±60 BP (GSC-4306, Blake, 1988) at nearby Stanford River, the vegetal horizons are surprisingly young and show that the dunes have stabilized twice in the last century such that the surface was degraded and became vegetated. Whether vegetation took hold because the sand supply was interrupted or because the climate became wetter cannot be ascertained from the available data.

Newfoundland (Fig. 2)

Parsons Pond Series

A series of marine shell samples from the west side of highway 430, about 3 km north of Parsons Pond village, on the west coast of Newfoundland (50° 3.43'N, 57° 42.35'W), at an elevation of 3 m, was collected by D.R. Grant on July 18, 1980; submitted by D.R. Grant.

GSC-5025 Parsons Pond (I) 9720±100
$\delta^{13}C = +0.7‰$

The marine shells sample 80-GS-55 (Paleontology Collection No. 101032; 50.3 g dry weight; *Mya truncata* and *M. truncata uddevalensis*; identified by D.R. Grant), enclosed in sand, were treated with an acid leach to remove the outer 30% of the sample. The treated sample (35.0 g) yielded 7.72 L of CO_2 gas. The age estimate is based on two counts for 1600 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 8.472±0.088, 2.080±0.026, and 28.377±0.129 cpm, respectively.

The uncorrected age is 9710±100.

Comment (**D.R. Grant**): The shells were juveniles and adults up to 5 cm long, mostly in life position. Although most were chalky and slightly pitted, some had periostracum. They were collected from a highway borrow pit that exposed the following sequence: 3+ m diamicton (till or glaciomarine drift), 20 cm of almost pure *Chlamys islandicus*, 5± m sand in which these shells occur suspended like an infauna. The sand grades laterally and vertically to gravel which forms a raised beach that crests at 8 m elevation. If the sand is coeval with the raised beach, the shells would appear to date a paleoshoreline at +8 m (or somewhat higher). When considered with nearby dates (GSC-1762 and -1768, Lowdon et al., 1977; GSC-4060, Blake, 1986; GSC-4304, Blake, 1988) having similar ages and stratigraphic context (8.3-9.3 ka, 5.2-11 m), the implication is that sea level fell below its present level shortly after 8 ka and has since recovered (Grant, 1994). The underlying *Chlamys* horizon is a deepwater deposit relating to an earlier higher sea level.

GSC-5026 Parsons Pond (II) 10 300±90
$\delta^{13}C = +0.8‰$

The marine shells (sample 84-GS-25, Paleontology Collection No. 101043; 48.4 g dry weight; *Mya truncata uddevalensis*; identified by D.R. Grant), enclosed in sand, were treated with an acid leach to remove the outer 20% of the sample. The treated sample (39.3 g) yielded 8.52 L of CO_2 gas. The age estimate is based on two counts for 4160 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 7.878±0.059, 2.080±0.026, and 28.377±0.129 cpm, respectively.

The uncorrected age is 10 300±90.

Comment (**D.R. Grant**): The shells measured 3x4 cm, had periostracum, and were mostly intact and in life position. They were collected from a coastal cliff that exposed the following sequence: 7+ m till, 2 m brown (oxidized) sand with a layer of mixed shells at its base, 5 m gravel grading from pebbly at its base to bouldery at its top. The gravel forms a raised beach ridge cresting 18 m above sea level. The dated shells occurred in the lower part of the beach formation and thus do not relate directly to a sea level. This date, together with others nearby on littoral beds, is the basis for a postglacial paleosealevel recovery which began at 140 m 12.5 ka, fell below present level about 8 ka, and has subsequently risen (Grant, 1994).

Newfoundland (Fig. 2)

GSC-5047 Red Barren Brook 12 700±150
$\delta^{13}C$= - 1.3‰

The marine shells (*Buccinum*? *tenue*, *Natica clausa*, *Nuculana pernula*, and *Mya arenaria*; identified by I.A. Brookes and D.R. Grant) were enclosed in grey silty clay. Sample 79-BHB-03 was collected by I.A. Brookes on August 19, 1979 from the southwest side of Red Barren Brook, a lower tributary of the Serpentine River, on the piedmont of Lewis Hills, about 35 km west of Corner Brook, Newfoundland (48° 55.65'N, 58° 28.44'W), at an elevation of about 40 m; submitted by D.R. Grant.

The sample (18.8 g dry weight) was treated with an acid leach to remove the outer 10% of the sample. The treated sample (16.8 g) yielded 3.85 L of CO_2 gas. The age estimate is based on one count for 3910 minutes in the 2 L counter with a mixing ratio of 1.17. The count rates for the sample (net), and monthly backgrounds and standards (net) were 3.669±0.050, 1.032±0.028, and 17.834±0.163 cpm, respectively.

The uncorrected age is 12 700±150.

Comment (**D.R. Grant**): The sample (composed of several species to produce a dateable quantity) consisted mostly of juveniles with nacreous interior derived from a 5+ m thick bed of silty clay representing the bottomset beds of a glaciomarine delta, the gravelly foreset beds of which have been aggraded on top up to the 56 m local marine limit. The date would appear to approximate the time of construction of this delta by a local valley glacier emanating from the Lewis Hills. However, a similar sample from the same stratum exposed in nearby Rope Cove Brook (GSC-2942; Lowdon and Blake, 1980) is 1000 years older, so, either this sample does not date the initial marine incursion because it does not derive from the earliest-formed bottomset layers, or it has been affected by local differences in carbonate geochemistry (as alluded to under GSC-5046, below).

Newfoundland (Fig. 2)

GSC-5030 Romaines River 12 800±100
$\delta^{13}C = +1.0‰$

The marine shells (*Hiatella arctica*; identified by D.R. Grant) were enclosed in silty mud. Sample 89-AP-09 was collected by T.W. Anderson on August 13, 1989 from 0.7 km west of the mouth of the Romaines River, on St. Georges Bay coast, Newfoundland (48° 33.22'N, 58° 41.02'W), at an elevation of 2 to 4 m; submitted by D.R. Grant.

The sample (37.6 g dry weight) was treated with an acid leach to remove the outer 20% of the sample. The treated sample (29.5 g) yielded 6.55 L of CO_2 gas. The age estimate is based on one count for 4440 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net), and monthly backgrounds and standards (net) were 5.791±0.049, 2.080±0.026, and 28.377±0.129 cpm, respectively.

The uncorrected age is 12 800±100.

Comment (**D.R. Grant**): This date supplements others pertaining to the long and complex glacial and marine sequence at this site (Grant, 1991; McNeely and Jorgensen, 1993). The dated shells occurred as juveniles (1x2 cm) and as adults (2x4 cm) mostly with intact paired valves, and partly with periostracum. The site is a coastal cliff composed of 20+ m of gravel interpreted to be a kame moraine, overlain by a pinkish till (the Robinsons Head Drift) over which is draped a deepwater marine mud containing these shells. The mud also contained a vertebra of a bowhead whale (*Balena mysticetus*) which dated 13 345±230 (S-3047; McNeely and Jorgensen, 1993). The mud is succeeded by offlap marine gravel (with shells that date 13 100±180; GSC-4095; Blake, 1988) which was deposited during regression from the 25 m local marine limit. The sediments apparently accumulated in a gradually deepening depression, which is either a kettle that formed by melting of buried glacial ice, or by solution of the underlying gypsum. Freshwater marl with plant debris dating 12 700±110 (GSC-4017; Blake, 1988) completes the sequence. The shell age would seem to confirm the bone age, but both are apparently somewhat too young compared to the overlying shells. Taken together (Grant, 1987), the dates show that the site was ice free before 13 ka and that paleosealevel fell below its present position by 12-13 ka (rather than at 9-10 ka according to Brookes et al., 1985), to perhaps 20 m or more before recovering.

Newfoundland (Fig. 2)

GSC-5046 Benoit's Cove 11 200±150

$\delta^{13}C = +1.2‰$

The marine shells (*Mya arenaria*; identified by I.A. Brookes and D.R. Grant) were enclosed in sandy, pebbly clay. Sample 72-BHB-04 was collected by I.A. Brookes on August 14, 1968 from the village of Benoit's Cove, south shore of Bay of Islands, western Newfoundland (49° 0.63'N, 58° 8.19'W), at an elevation of about 15 m; submitted by D.R. Grant.

The sample (22.1 g dry weight) was treated with an acid leach to remove the outer 10% of the sample. The treated sample (18.4 g) yielded 4.13 L of CO_2 gas. The age estimate is based on two counts for 2000 minutes in the 2 L counter with a mixing ratio of 1.08. The count rates for the sample (net), and monthly backgrounds and standards (net) were 4.449±0.063, 1.032±0.028, and 17.834±0.163 cpm, respectively.

The uncorrected age is 11 200±150.

Comment (**D.R. Grant**): The sample consisted of whole but disarticulated valves with chalky interior and intact periostracum. They come from a fresh exposure of the basal layers of a clayey mud blanket which underlies a sandy marine terrace and gravelly marine delta. The mud thus represents the deepwater sedimentation during the early stages of postglacial marine invasion of Humber Arm (Bay of Islands) following glacial retreat by calving. The date is somewhat younger than expected, considering that dates on beach and terrace gravels closer to marine limit at both head and mouth of the bay are up to 1000 years older. The discrepancy may lie in the fact that the surface water in a fjord with voluminous input of meltwater derived from a carbonate terrain will have considerable old carbon compared to inflowing bottom water of more "normal" geochemistry. This could be checked by comparing the apparent ages of modern littoral and pelagic infauna of a given species in fiords with a thick freshwater layer.

Newfoundland (Fig. 2)

GSC-5045 Mine Brook 800±100

$\delta^{13}C = +1.4‰$

The marine shells (*Mya truncata* and *M. truncata uddevalensis*; identified by D.R. Grant) were enclosed in silty sand. Sample 84-GS-51 was collected by D.R. Grant on July 19, 1984 from south side of Bay of Islands, east of mouth of Mine Brook, foot of Blow-me-Down Hills, western Newfoundland (49° 3.78'N, 58° 18.37'W), at an elevation of 0.5 m; submitted by D.R. Grant.

The sample (52.7 g dry weight) was treated with an acid leach to remove the outer 20% of the sample. The treated sample (39.7 g) yielded 8.68 L of CO_2 gas. The age estimate is based on one count for 3800 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net), and monthly backgrounds and standards (net) were 6.519±0.055, 2.074±0.027, and 28.244±0.132 cpm, respectively

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The uncorrected age is 11 800±100.

Comment (**D.R. Grant**): The sample consisted of whole but disarticulated valves with smooth interior and chalky exterior, associated with various other species (*Balanus crenatus*, *Macoma calcarea*, *Hiatella arctica*, *Mya pseudoarenaria*, and *Chlamys islandicus*). The dated level is the top metre of a thick stratum of silty marine sand that blankets the coast and in this area appears to underlie a small raised delta which relates to local marine limit of 45-50 m. The date was intended to resolve the discrepancy between dates of marine overlap at the mouth and the head of Humber Arm (Bay of Islands) and to perhaps derive rates of glacial retreat resulting from marine calving. It is, however, somewhat younger than expected, considering that the mouth was deglaciated at least by 12 000±320 (GSC-1462; Lowdon and Blake, 1973) and the head of the bay by 12 700±300 (GSC-4272; Blake, 1988). Perhaps the explanation lies in the fact that the date relates to the upper part of the deep-water unit, rather than the base. Together, the dates show that the bay was deglaciated by calving prior to 13 ka and that the duration of the 50 m regression from marine limit to present sea level was about 2 ka.

Newfoundland (Fig. 2)

GSC-5044 Cape Ray 3980±60

$\delta^{13}C$= -23.9‰

The wood (*Picea*; identified by R.J. Mott (Wood Report No. 90-35)) was rooted in grus with peat above. Sample 80-GS-15 was collected by D.R. Grant on June 24, 1980 from 0.5 km east of Cape Ray lighthouse, on the shore of Cape Ray Cove, Cabot Strait, southwestern extremity of Newfoundland (47° 37.24'N, 59° 17.87'W), at a depth of 0.2 m; submitted by D.R. Grant.

The sample (12.1 g dry weight) was treated with hot base, hot acid and distilled water rinses (noncalcareous). The treated sample (9.0 g) yielded 7.37 L of CO_2 gas. The age estimate is based on two counts for 2060 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net), and monthly backgrounds and standards (net) were 17.255±0.101, 2.074±0.027, and 28.244±0.132 cpm, respectively.

The uncorrected age is 3960±60.

Comment (**D.R. Grant**): The dated sample is the outer 1 cm (10 rings) of a root of a 25 cm diameter tree stump that was rooted in grus (weathered granite bedrock) and overlain by 0.5-1.0 m of sphagnum peat. The date shows that sea level has risen in the last 4 ka, but by how much is unknown because the original position of the tree relative to sea level is unknown. Together with a similar date of 3520±50 BP (GSC-2179; Lowdon et al., 1977) on a nearby coastal bog, the date also shows that there has been a paludification sufficient to replace forest with bog (perhaps due to an increasingly wetter climate). The site is also interesting in that a layer of beach boulders and cobbles occurs in the top 20-30 cm of the peat layer. The disjunct layer resembles similar clastic layers in coastal peat bogs on southern Burin Peninsula of Newfoundland which are tentatively attributed to the tsunami which struck southern Newfoundland following the 1929 Grand Banks earthquake (A. Ruffman, personal communication, 1994), but, if so it probably relates to a much earlier tsunami because it lies beneath 30 cm of peat.

Newfoundland (Fig. 2)

GSC-5052 Woody Cove 8650±90

$\delta^{13}C$= -24.6‰

The wood (*Picea*; identified by H. Jetté (unpublished GSC Wood Report No. 90-28)) was enclosed in peat. Sample 80-GS-22 was collected by D.R. Grant on June 24, 1980 from coast of Woody Cove, Cabot Strait, 2.9 km southeast of Codroy village wharf, southwest Newfoundland (47° 51.75'N, 59° 22.30'W), at an elevation of about 25 m; submitted by D.R. Grant.

The sample (12.1 g dry weight) was treated with hot base, hot acid and distilled water rinses (noncalcareous). The treated sample (8.9 g) yielded 9.22 L of CO2 gas. The age estimate is based on two counts for 2025 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net), and monthly backgrounds and standards (net) were 9.633±0.081, 2.074±0.027, and 28.244±0.132 cpm, respectively.

The uncorrected age is 8640±90.

Comment (**D.R. Grant**): The wood sample comes from a 1 to 3 m thick bed of peaty material - one of a variety of sediments which have accumulated in a solution depression in gypsum which has been deepening since 125 ka, as indicated by last-interglacial organic beds lower in the sequence (Brookes et al., 1985), and is still developing as evidenced by a sinkhole on the surface. This upper organic layer is sandwiched between Wisconsin till and 5+ m of surficial sandy gravel. The gravel was thought to be outwash, so the peat was expected to date from a lateglacial interstade in the period 14-10 ka. However, its early Holocene age cannot be explained and the surface gravel unit must be reinterpreted.

Newfoundland (Fig. 2)

Port aux Basques Series

A series of lake sediment samples from an unnamed lake 7.5 km northwest of Port aux Basques, Newfoundland (47° 36'55"N, 59° 12'45"W), at an elevation of about 12 m, was collected by T.W. Anderson on August 14, 1989; submitted by T.W. Anderson.

GSC-5038 Port aux Basques (I) 10 900±170
$\delta^{13}C$= -26.0‰

The lake sediment, gyttja sample AP-89-10 (552-554 cm; 135.9 g wet weight), was treated with hot acid and distilled water rinses; base treatment omitted (noncalcareous). The treated sample (56.3 g) yielded 2.93 L of CO_2 gas. The age estimate is based on two counts for 2000 minutes in the 2 L counter with a mixing ratio of 1.55. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 4.555±0.081, 1.032±0.028, and 17.834±0.163 cpm, respectively.

The uncorrected age is 11 000±170.

Comment (**T.W. Anderson**): The sample occurs at the base of an upper gyttja unit overlying grey sandy clay containing moss fragments. The sample dates a return to regional warming following a cool period inferred by the underlying clay. The clay unit corresponds to the Younger Dryas cooling of the North Atlantic Ocean. The date is about 0.5 ka too old because of "hardwater error" based on a comparison with a more reliable date of 10.4 ka (GSC-4999, McNeely and Jorgensen, 1992) for post-Younger Dryas climatic improvement.

GSC-5039 Port aux Basques (II) 11 400±150
$\delta^{13}C$= -24.9‰

The lake sediment, gyttja sample AP-89-10A (574-576 cm; 124.4 g wet weight), was treated with hot acid and distilled water rinses; base treatment was omitted (noncalcareous). The treated sample (41.6 g) yielded 3.17 L of CO_2 gas. The age estimate is based on one count for 3200 minutes in the 2 L counter with a mixing ratio of 1.43. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 4.325±0.064, 1.032±0.028, and 17.834±0.163 cpm, respectively.

The uncorrected age is 11 400±150.

Comment (**T.W. Anderson**): The sample occurs at the top of the lower gyttja unit under grey sandy clay. The sample dates the termination of an early warm interval prior to the onset of the Younger Dryas cool period indicated by the clay unit.

Nova Scotia (Fig. 3)

Timber Lake Series

A series of lake sediment samples from Timber Lake, about 7 km northwest of Tarbot, Cape Breton Island, Nova Scotia (46° 22′ 46″N, 60° 39′ 55″W), at an elevation of about 386 m, was collected by R.J. Mott on July 6, 1990; submitted by R.J. Mott.

Timber Lake is a small, relatively shallow lake in an area of shallow drift over bedrock on the southern Cape Breton Highlands. Dark brown to black gyttja to 253 cm in the core overlies mottled clay to 273 cm, pink-grey clay to 278 cm and stiff grey silty clay to 284 cm below the mud/water interface. The corer could not penetrate below 284 cm depth.

Beta-66130 Timber Lake (I) 5930±110

A gyttja sample from a depth of 138-142 cm was selected by H. Jetté to confirm whether that zone of the core related to 6 ka time period.

GSC-5259 Timber Lake (II) 11 200±200
$\delta^{13}C$= -22.0‰

The basal clayey gyttja sample 90-MS-06 (245-248 cm; 91.7 g wet weight), overlain by brown gyttja and underlain by mottled clay, was treated with hot acid and distilled water rinses; base treatment was omitted (noncalcareous). The treated sample (23.5 g) yielded 2.36 L of CO_2 gas. The age estimate is based on two counts for 2260 minutes in the 2 L counter with a mixing ratio of 1.88. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 4.711±0.090, 1.224±0.025, and 18.875±0.273 cpm, respectively.

The uncorrected age is 11 100±200.

Comment (**R.J. Mott**): GSC-5259 is probably about 1000 years too old, but suitable terrestrial material for AMS dating could not be obtained from the basal sediments for corroboration. The lack of stratigraphic changes similar to those found in many areas of the Maritimes that are indicative of a late-glacial climatic oscillation correlative with the Allerød / Younger Dryas oscillation also suggests that this date is too old (Stea and Mott, 1989). Therefore, this area was probably covered by ice until about 10 ka or was an area of renewed glaciation during the Younger Dryas cold interval.

Nova Scotia (Fig. 3)

GSC-5185 Pembroke Lakes 10 700±190
$\delta^{13}C$= -24.6‰

The lake sediment, basal clayey gyttja, was enclosed in gyttja and clay. Sample 90-MS-07 (500-503 cm) was collected by R.J. Mott on July 7, 1990, from Pembroke Lakes, about 8 km northwest of Kingross, Cape Breton Island, Nova Scotia (46° 29′ 46″N, 60° 59′ 45″W), at an elevation of about 406 m; submitted by R.J. Mott.

The sample (105.7 g wet weight) was treated with hot acid and distilled water rinses; base treatment was omitted (noncalcareous). The treated sample (28.5 g) yielded 2.51 L of CO_2 gas. The age estimate is based on 2 counts for 2100 minutes in the 2 L counter with a mixing ratio of 1.77. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 4.967±0.089, 1.224±0.025, and 18.875±0.273 cpm, respectively.

The uncorrected age is 10 700±190.

Comment (**R.J. Mott**): Pembroke Lakes are small, irregular interconnected lakes along the western edge of the Cape Breton Highlands. The core was taken with a modified Livingstone corer in the deepest basin in 12 m of water. The coring penetrated to 6.0 m below the mud/water interface. The core shows stiff, pink banded clay and silt at the base to 563 cm overlain by 9 cm of pink clay. Banded pink and black slightly organic sediment to 526 cm is overlain by pinkish grey clay to 505 cm and then by dark brown gyttja to the surface.

The date of 10 700±190 at the contact with the upper organic sediments and underlying more mineral sediments is probably anomalously old by 700 years judging by the usual age of about 10 ka for this contact at many other sites. The mineral sediment below the dated interval overlies a more organic zone that is similar to, although not as prominent as, many sites throughout the Maritimes where the sequence has been interpreted as being correlative with the Allerød / Younger Dryas climatic oscillation (Mott et al., 1986; Stea and Mott, 1989). Corroboration of this interpretation awaits further dating and pollen analysis.

Nova Scotia (Fig. 3)

Collins Pond Series II

Dates from Collins Pond site were reported in a previous date list (McNeely and McCuaig, 1991). Three new dates have been obtained: one AMS date from the same exposure as the dates reported previously at the western end of the section and two from the exposure at the eastern end of the section.

Organic sediment (peat) overlying till and overlain by diamicton was exposed in a coastal section near Collins Pond, about 2 km southwest of St. Francis Harbour along the north coast of Chedabucto Bay, Nova Scotia (45° 25.8'N, 61° 20.3'W), (Stea and Mott, 1989). The western exposure showed a compressed peat bed bounded by thin layers of organic clay about 1-2 m above high tide level. The organic sediments rested on till and were covered by boulder gravel and diamicton in the bed of a small stream occupying the depression between drumlin ridges. The peat layer could be traced as a thin uneven seam (<10 cm thick) up the flank of the adjacent drumlin where it was overlain by up to 2 m of diamicton. At the eastern end of the section, distorted and irregular bodies of peat and organic silt overlie till and are overlain and incorporated into a gravelly diamicton. Collected by R.J. Mott and R.R. Stea September 4, 1986 and July 13, 1990; submitted by R.J. Mott.

Dates obtained previously are:
GSC-4475 10 900±100 (McNeely and McCuaig, 1991)
GSC-4367 11 800±100 (McNeely and McCuaig, 1991)
GSC-4474 12 700±130 (McNeely and McCuaig, 1991)

GSC-5273 Collins Pond (I) 11 100±110
$\delta^{13}C$= -30.1‰

The sample, peaty organics with willow twigs, 90-MS-13 (top 2 cm; 120.0 g wet weight) from the top of the eastern exposure, enclosed in diamicton and organic silt, was treated with cold base, hot acid, and distilled water rinses (noncalcareous). The treated sample (38.6 g) yielded 8.08 L of CO_2 gas. The age estimate is based on two counts for 2365 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 7.062±0.073, 2.196±0.038, and 28.279±0.131 cpm, respectively.

The uncorrected age is 11 100±110.

GSC-5230 Collins Pond (II) 11 400±100
$\delta^{13}C$= -26.8‰

The sample of organic silt and clay with willow twigs (90-MS-13 basal 2-3 cm; 154.9 g wet weight; *Salix* (willow) twigs are present according to R.J. Mott), enclosed in diamicton and organic silt, was treated with cold base, hot acid, and distilled water rinses (noncalcareous). The treated sample (76.5 g) yielded 8.17 L of CO_2 gas. The age estimate is based on one count for 3530 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 6.862±0.057, 2.055±0.028, and 28.334±0.123 cpm, respectively.

The uncorrected age is 11 400±100.

TO-3630 Collins Pond (III) 12 160±80

The sample of *Salix* (willow) twigs (MS-86-25 base: 39 mg dry weight) was obtained from near the base of the exposure from which GSC-4474 (12 700±130) was obtained.

Comment (**R.J. Mott**): The Collins Pond site has been interpreted by Stea and Mott (1989) as representing an interval following deglaciation when the climate ameliorated allowing vegetation to invade the area and organic sediments to accumulate, followed by climatic deterioration and renewed or revitalized glaciation of the area. Organic accumulation began after 12.1 ka rather than about 12.7 ka as indicated by the original basal date. Herb and shrub tundra-like vegetation characterized the site. This type of environment persisted until at least 11.8 ka (top 2 cm of peat bed), but this date may be somewhat anomalous judging by the basal AMS date and the new dates on the eastern exposure. The thin organic seam that dated 10.9 ka has a somewhat different but still treeless pollen spectrum. The overlying diamicton has a distinct fabric, indicating the deposit is till emplaced by ice flowing from the east-northeast, opposite to the northwest-southeast fabric of the till forming the drumlins.

The new dates from the eastern exposure show that the peat formed between 11.4 and 11.1 ka (assuming they are valid) and that the sediment was subsequently deformed and overlain by diamicton. This strengthens the interpretation of possible local glacial activity after 10.9 ka (Mott and Stea, 1993).

Nova Scotia (Fig. 3)

Hector Lake Series

A series of lake sediment samples from Hector Lake, 3.5 km north of Port Hawkesbury, Cape Breton Island, Nova Scotia (45° 39′ 8″N, 61° 21′ 45″W), at an elevation of 103 m, was collected by R.J. Mott on July 15, 1990; submitted by R.J. Mott.

Hector Lake is a small, narrow, shallow lake on the flank of the upland area north of Canso Strait. The core was taken in the area of maximum water depth of 4 m. A total of 479 cm of sediment was recovered. Brown gyttja extends from the mud/water interface to a depth of 383 cm. This overlies a lighter brown silty clay gyttja and brownish grey clayey gyttja to 421 cm. A black organic clay layer 3 cm thick separates the above from the underlying soft pink clay that becomes stiffer with more sand gravel particles towards the base of the core at 479 cm.

TO-3974 Hector lake (I) 9810±90

Sample 90-MS-15 consisted of small unidentified twigs (13.7 mg dry weight) which were enclosed in organic gyttja at a depth of 388 cm.

TO-3975 Hector Lake (II) 11 910±90

Sample 90-MS-15 (II) consisted of small unidentified twig fragments (16.5 mg dry weight) which were enclosed in clayey organic lake sediment at a depth of 417 cm.

GSC-5283 Hector Lake (III) 13 400±170
$\delta^{13}C$= -24.2‰

The lake sediment, basal clayey gyttja, sample 90-MS-15 (421-424 cm; 114.0 g wet weight), with gyttja above and pink clay below, was treated with hot acid and distilled water rinses; base treatment was omitted (noncalcareous). The treated sample (47.3 g) yielded 2.77 L of CO_2 gas. The age estimate is based on one count for 3710 minutes in the 2 L counter with a mixing ratio of 1.60. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 3.427±0.063, 1.216±0.026, and 18.122±0.101 cpm, respectively.

The uncorrected age is 13 400±170.

Comment (**R.J. Mott**): The basal date of 13.4 ka (GSC-5283) is shown to be anomalously old by about 1500 years by the AMS date on twigs of 11.9 ka (TO-3975) recovered from the sediment increment immediatley above the sediment dated by conventional bulk dating. Although the Younger Dryas cold interval is not represented by a prominent mineral zone as it is in many cores throughout the Maritimes (Mott et al., 1986; Stea and Mott, 1989), the date on the basal organic layer and the date of 9.8 ka (TO-3974) above suggest that the light brown silty clay gyttja layer probably represents the cold interval. Further studies of organic content and pollen analysis as well as more dating will be needed to corroborate this conclusion.

Nova Scotia (Fig. 3)

GSC-5138 Marie-Joseph 110±70

$\delta^{13}C$= -31.5‰

The peat was enclosed in gravel. Sample FBP 90 (Biodatabase No. 90041) was collected by J. Shaw and R.B. Taylor on December 11, 1990, from 40 km east of the town of Sheet Harbour, Fancy's Point, Nova Scotia (44° 58.0'N, 62° 3.18'W), at an elevation of 1.52 m; submitted by J. Shaw.

The sample (38g dry weight) was treated with cold base, hot acid, and distilled water rinses (noncalcareous). The treated sample (20.1 g) yielded 7.72 L of CO_2 gas. The age estimate is based on two counts for 1700 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 18.023±0.111, 1.150±0.032, and 18.513±0.124 cpm, respectively.

The uncorrected age is 220±70.

Comment (**J. Shaw** and **R.B. Taylor**): This sample was collected at high water mark on the shore of a back-barrier lagoon. It was from the lowest 20 mm of a layer of dark, well-humified, freshwater peat, 0.24 m thick, which overlies gravel beach ridges on a prograded gravel barrier which formed during a period of sea-level rise - the earliest (and lowest) beach ridges on the barrier are completely submerged in the lagoon at high tide. It was hoped that this sample would help estimate the age of the barrier. However, it probably postdates barrier emplacement by a considerable time.

Nova Scotia (Fig. 3)

Pye Lake Series

Pye Lake is on the east coast of Nova Scotia, about 0.75 km northwest of the town of Marie Joseph (44° 58′ 30″N, 62° 05′ 27″W), at an elevation of 5 m. The lake, with a maximum depth of 8 m, occupies a shallow bedrock basin in a glaciated terrain with some low drumlins. The core was obtained with a modified Livingstone corer by R.J. Mott and others on July 12, 1990 and totalled 606 cm of sediment. Dark brown gyttja to a depth of 513 cm overlay 22 cm of slightly organic clay over organic silty clay grading downwards to black and grey clay at 568 cm. Below 568 cm the grey clay and pink clay changes to stiff banded clay at 606 cm depth. Samples were submitted by R.J. Mott.

GSC-4684 Pye Lake (I) (85-90 cm) 1140±80 $\delta^{13}C$= -29.0‰

The dark brown gyttja (sample 90-MS-11; 63.2 g wet weight), enclosed in gyttja, was treated with hot acid and distilled water rinses; base treatment was omitted (noncalcareous). The treated sample (6.3 g) yielded 2.9 L of CO_2 gas. The age estimate is based on two counts for 2040 minutes in the 2 L counter with a mixing ratio of 1.48. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 15.590±0.124, 1.216±0.035, and 18.123±0.108 cpm, respectively.

The uncorrected age is 1210±80.

Comment (**R.J. Mott**): The date gives the age for a prominent birch decline and rise in spruce and fir seen near the top of the pollen diagram.

GSC-4683 Pye Lake (II) (323-327 cm) 4440±90 $\delta^{13}C$= -29.6‰

The dark brown gyttja (sample 90-MS-11; 70.0 g wet weight), enclosed in gyttja, was treated with hot acid and distilled water rinses; base treatment was omitted (noncalcareous). The treated sample (8.8 g) yielded 2.7 L of CO_2 gas. The age estimate is based on one count for 3470 minutes in the 2 L counter with a mixing ratio of 1.70. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 10.332±0.099, 1.216±0.035, and 18.123±0.108 cpm, respectively.

The uncorrected age is 4510±90.

Comment (**R.J. Mott**): The date provides an age for the prominent hemlock decline seen in the pollen diagram.

GSC-5552 Pye Lake (III) (423-427 cm) 8120±140 $\delta^{13}C$= -30.5‰

The dark brown gyttja (sample 90-MS-11; 71.60 g wet weight), enclosed in gyttja, was treated with hot acid and distilled water rinses; base treatment was omitted (noncalcareous). The treated sample (12.8 g) yielded 2.1 L of CO_2 gas. The age estimate is based on one count for 3731 minutes in the 2 L counter with a mixing ratio of 2.05. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 6.526±0.101, 1.216±0.035, and 18.123±0.108 cpm, respectively.

The uncorrected age is 8200±140.

Comment (**R.J. Mott**): The date provides an age for a prominent birch and spruce decline and rise in pine seen in the pollen diagram.

GSC-5249 Pye Lake (IV) (511-513 cm) 10 000±160 $\delta^{13}C$= -25.3‰

The somewhat silty brown gyttja (sample 90-MS-11; 96.0 g wet weight), with gyttja above and 22 cm of silty clay below, was treated with hot acid and distilled water rinses; base treatment omitted (noncalcareous). The treated sample (34.8 g) yielded 2.15 L of CO_2 gas. The age estimate is based on one count for 3530 minutes in the 2 L counter with a mixing ratio of 2.09. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 5.266±0.088, 1.110±0.028, and 18.388±0.133 cpm, respectively.

The uncorrected age is 10 000±160.

Comment (**R.J. Mott**): The sample dates the return to organic sedimentation following an interval of minerogenic sedimentation and the beginning of dominance of tree pollen as seen in the pollen profile.

GSC-5242 Pye Lake (V) (535-541 cm) 10 800±190 $\delta^{13}C$= -25.6‰

The clayey gyttja (sample 90-MS-11; 100.3 g wet weight), with 22 cm of clay above and organic sediment below, was treated with hot acid and distilled water rinses; base treatment was omitted (noncalcareous). The treated sample (12.1 g) yielded 1.69 L of CO_2 gas. The age estimate is based on one count for 3900 minutes in the 2 L counter with a mixing ratio of 2.61. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 4.765±0.102, 1.110±0.028, and 18.388±0.133 cpm, respectively.

The uncorrected age is 10 800±190.

Nova Scotia (Fig. 3)

Comment (**R.J. Mott**): The sample dates the change from organic to mineral dominated sedimentation and a change from shrub to herb pollen domination as seen in the pollen diagram.

GSC-5543 Pye lake (VI) 12 200±220
(549.5-553 cm) $\delta^{13}C$= -23.3‰

The basal clayey gyttja (sample 90-MS-11; 97.60 g wet weight), enclosed in clayey gyttja, was treated with hot acid and distilled water rinses; base treatment was omitted (noncalcareous). The treated sample (41.4 g) yielded 1.6 L of CO_2 gas. The age estimate is based on one count for 3915 minutes in the 2 L counter with a mixing ratio of 2.81. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 4.003±0.100, 1.214±0.024, and 18.297±0.145 cpm, respectively.

The uncorrected age is 12 200±220.

Comment (**R.J. Mott**): The sample provides an minimum age for deglaciation of the site and for the beginning of organic deposition.

General Comment (**R.J. Mott**): Pye Lake is one of a number of sites along the eastern seaboard of Nova Scotia that indicates that the region was deglaciated relatively early, i.e. prior to 12.0 ka. The site also records sedimentation changes in the basal sediments characteristic of a late-glacial climatic oscillation that has been correlated with the Allerød / Younger Dryas climatic event of Europe (Mott et al., 1986). Pollen analysis corroborates this interpretation with changes to herb from shrub domination that is dated in the core at 10.8 ka. Organic sedimentation resumed after the cool interval dated at 10.0 ka when pollen analysis shows a reversion to shrub vegetation and then the migration of trees into the area. By about 8.0 ka, white pine began to increase at the expense of birch and spruce. Hemlock followed but crashed prior to 4.4 ka and birch proliferated. Declining birch and increasing balsam fir and spruce culminated about 1.1 ka with the dominance of these latter taxa.

Nova Scotia (Fig. 3)

Piper Lake Series

A series of wood and small twigs samples from Piper Lake, about 15 km southeast of Hopewell, Pictou County, Nova Scotia (45° 20′ 50″N, 62° 39′ 38″W), at an elevation of 175 m, was collected by R.J. Mott on July 14, 1990; submitted by R.J. Mott.

TO-3973 Piper Lake (I) (478-484 cm) 10 890±80

The wood and small twigs comprising sample 90-MS-14 (0.022 g dry weight) were enclosed in silty-clayey gyttja.

GSC-5252 Piper Lake (II) (486-489 cm) 12 300±200 $\delta^{13}C$= -23.8‰

The lake sediment, basal clayey gyttja sample 90-MS-14 (61.2 g wet weight), overlain by grey / brown silty gyttja and underlain by clay, was treated with hot acid and distilled water rinses; base treatment was omitted (noncalcareous). The treated sample (24.5 g) yielded 2.22 L of CO_2 gas. The age estimate is based on two counts for 2340 minutes in the 2 L counter with a mixing ratio of 2.02. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 3.982±0.087, 1.213±0.021, and 18.379±0.137 cpm, respectively.

The uncorrected age is 12 300±200.

Comment (**R.J. Mott**): A core extending 518 cm below the mud/water interface shows brown gyttja with some coarse detritus grading to mottled grey/brown gyttja that becomes more silty and clayey to a depth of 471 cm. Below 471 cm, a 3 cm thick clay layer overlies darker slity/clayey gyttja to 489 cm and stiff grey/brown sandy clay to 518 cm. The interval from which the small twigs used for AMS dating (TO-3973) were taken is only 2 cm above the the interval used for the bulk conventional date (GSC-5252). The difference of 1400 years in the two dates suggests that the lower age is probably anomalous. The AMS date indicates that organic accumulation began at the site just before onset of the Younger Dryas cold interval and little time had elapsed since deglaciation of the area. This is one of several sites where the pre-Younger Dryas interval appears to be very short in contrast to numerous sites throughout the Maritimes where this interval is recorded by a much longer and better defined sedimentary interval (Mott et al., 1986; Stea and Mott, 1989)

Nova Scotia (Fig. 3)

Hirtles Beach Series

The Hirtles Beach site is located along Hartling Bay on the south coast of Nova Scotia, southwest of Lunenburg (44° 16'N, 64° 16'W), at an elevation of 3-4 m. Coastal erosion has exposed 20 cm of woody and matted peat over 20 cm of silty clay with organic seams and twigs that overlies a bouldery diamicton; the entire sequence is overlain by sand. The exposure was originally sampled by R. Addison for R.B. Taylor on July 16, 1986 and resampled by R.B. Taylor and R.R. Stea in May 1990; samples submitted by R.J. Mott.

GSC-5248 Hirtles Beach (I) 11 700±110
$\delta^{13}C$= -27.9‰

The peat sample 90-PL-26 (TU-1-86) from top 2 cm of matted peat (30.4 g wet weight), enclosed in peat and clay, was treated with cold base, hot acid, and distilled water rinses (noncalcareous). The treated sample (9.3 g) yielded 6.50 L of CO_2 gas. The age estimate is based on one count for 2345 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 6.565±0.067, 2.055±0.028, and 28.334±0.123 cpm, respectively.

The uncorrected age is 11 700±110.

TO-3628 Hirtles Beach (II) 12 270±90

The willow (*Salix* sp.; identified by R.J. Mott) twig sample 90-PL-26 (TU-1-86) from layer of abundant twigs and/or roots at base of grey silty clay above the diamicton weighed 150 mg (dry weight).

GSC-5247 Hirtles Beach (III) 12 300±150
$\delta^{13}C$= -28.0‰

The basal peat sample 90-PL-26 (TU-1-86) from 2 cm below matted peat at top of grey silty clay with peat stingers (35.0 g wet weight) was treated with cold base, hot acid, and distilled water rinses (noncalcareous). The treated sample (9.3 g) yielded 3.83 L of CO_2 gas. The age estimate is based on one count for 2545 minutes in the 2 L counter with a mixing ratio of 1.18. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 3.961±0.059, 1.110±0.028, and 18.388±0.133 cpm, respectively.

The uncorrected age is 12 300±150.

Comment (**R.J. Mott**): Plants were present at the site at least 12 300 years ago as indicated by the AMS date TO-3628 and the conventional date GSC-5247 meaning that the area had been deglaciated prior to that time. Willow shrubs and other herbaceous plants growing in a depression on the eroding drumlin flank had twigs and roots incorporated in the accumulating grey silty clay. Increased organic production formed stingers in the clay and eventually a matted peat with abundant twigs accumulated for several hundred years. The two identical lower dates suggest that the clay accumulated rapidly or the conventional date may be somewhat anomalous. However organic accumulation lasted until at least 11.7 ka when the peat was covered by sand. Preliminary pollen analysis indicates that shrubs and herbs comprised the vegetation cover; no trees were present in the area. This site is similar to many throughout the Maritimes that indicate the vegetation was migrating into the area as the climate warmed following deglaciation. Cooling after about 11.0 ka led to the sites being covered by mineral sediments. This event has been correlated with the Allerød / Younger Dryas event of Europe (Mott et al., 1986; Stea and Mott, 1990).

Nova Scotia (Fig. 3)

GSC-5391 Blomidon Site 11 200±100
$\delta^{13}C$= -27.5‰

The peat was enclosed in organic silt/sand peat. Sample 89-MS-16 (28 cm) was collected by R.J. Mott on July 22, 1989, from the Blomidon Site at Blomidon on southeast coast of Blomidon Peninsula, North Mountain, about 15 km north of Wolfville, Nova Scotia (45º 13.5'N, 64º 22.56'W), at an elevation of about 23 m; submitted by R.J. Mott.

The sample (49.8 g wet weight) was treated with cold base, hot acid, and distilled water rinses (noncalcareous). The treated sample (12.2 g) yielded 8.0 L of CO_2 gas. The age estimate is based on one count for 3710 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 7.011±0.057, 2.234±0.029, and 28.421±0.132 cpm, respectively.

The uncorrected age is 11 200±100.

Comment (**R.J. Mott**): A roadside ditch exposure revealed 35 cm of compact fibrous peat with abundant twigs buried by up to 1.7 m of red, sandy/silty diamicton. Several centimetres of grey silty sand with minor organic seams occur beneath the peat and above the underlying till. Grey, clayey silt with organic seams (10 cm thick) overlies the peat.

Palynological results indicate that at about 11.7 ka sparse vegetation dominated by sedges (Cyperaceae) and various other herbaceous taxa characterized the area. Soon after, willow (*Salix*) shrubs were abundant bordering the depression where peat began to accumulate. Shrub birch (*Betula*) may have been present. Shrub birch became abundant as vegetation developed. Spruce (*Picea*) also began to invade the area about the same time and by 11.2 ka had formed an open spruce woodland. Shortly after 11.2 ka, probably at about 10.8 ka judging by other sites in Nova Scotia, climatic deterioration caused profound vegetation changes in the region. Spruce trees were decimated to be replaced by shrub birch and then willow as the climate continued to cool. By 10.6 ka, increased solifluction and other mass-wasting processes caused the organic sediments to be inundated by mineral sedimentation that eventually buried the site (Stea et al., 1992). This climatic oscillation has been correlated with the Allerød / Younger Dryas event of Europe (Mott et al., 1986).

Nova Scotia (Fig. 3)

GSC-5049 Tupper Lake 12 800±200
$\delta^{13}C$= -18.2‰

The basal organic lake sediment was enclosed in pink clay and gyttja. Sample 90-MS-15 (616-620 cm) was collected by H. Jetté on July 22, 1990, from Tupper Lake, on South Mountain, about 10 km southwest of Kentville, Nova Scotia (45º 1'N, 64º 35.3'W), at an elevation of about 200 m; submitted by R.J. Mott.

The sample (87.4 g wet weight) was treated with hot acid and distilled water rinses; base treatment was omitted (noncalcareous). The treated sample (33.7 g) yielded 2.25 L of CO_2 gas. The age estimate is based on one count for 3300 minutes in the 2 L counter with a mixing ratio of 1.98. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 3.679±0.080, 1.032±0.028, and 17.834±0.163 cpm, respectively.

The uncorrected age is 12 700±200.

Comment (**R.J. Mott**): The core from Tupper Lake (totalling 670 cm) shows medium to coarse grey/brown sand below 574 cm with seams and bands of clay at the base. Above 574 cm the silt and clay content increases to 553 cm where an orange silty clay band several centimetres thick is overlain by a similar thickness of a laminated dark brown to black silty organic layer to 541 cm depth. Above 541 cm there is coarsely banded, somewhat organic silt with mica flakes with increasing organic content to about 490 cm and then a lower organic content to about 420 cm depth. Light brown, faintly banded silty gyttja occurs to about 325 cm where a transition occurs from 420 cm to dark brown gyttja which continues to the top of the core (Dyck and Fyles, 1963). The bulk sediment date at 534-536 cm depth seems to be exceptionally old for the area, and the core does not show a prominent sediment change indicative of the Allerød / Younger Dryas climatic oscillation seen at many other sites throughout the Maritimes (Mott et al., 1986; Stea and Mott, 1989). Not enough terrestrial organic remains suitable for AMS dating could be found in the basal part of the core for comparison with the conventional date. Therefore, the validity of the basal date must await further dating and pollen analysis is required to show the presence or absence of a climatic oscillation which is not readily apparent (Mott, 1994).

Nova Scotia (Fig. 3)

Silver Lake Series

A series of lake sediment samples from Silver Lake at Lakeville, about 9 km northwest of Kentville, Nova Scotia (45° 6.81'N, 64° 35.67'W), at an elevation of 22 m, was collected by H. Jetté on July 21, 1989; submitted by R.J. Mott.

Silver Lake is a small kettle lake in outwash terrain in the Annapolis Valley. Coring was done in the central part of the lake in about 14 m of water. The preliminary coring penetrated 426 cm of sediment below the sediment / water interface. A nearby duplicate coring reached 435 cm depth. Both cores have similar stratigraphy but with slightly different unit increments. The primary core shows dark brown to black gyttja to 255 cm that is finely laminated at the base, overlying reddish brown fine to coarse sand with some fine gravel layers toward the base of the core. A clayey interval in the sand between 413 to 425 cm contains some organic matter content that reaches about 15% in the central part of the interval. Small twigs, including one identified as willow (*Salix* sp.) and used for AMS dating, occur in this zone. The twig used for AMS dating was from the duplicate core at a depth of 425 cm which is stratigraphically just below the interval 413-416 cm used for the conventional date.

GSC-5054 Silver Lake (I) (253-255 cm) — 10 700±180; $\delta^{13}C$= -29.8‰

The gyttja sample 89-MS-14, (45.1 g wet weight), enclosed in gyttja and silty sand, was treated with hot acid and distilled water rinses; base treatment was omitted (noncalcareous). The treated sample (14.8 g) yielded 2.31 L of CO_2 gas. The age estimate is based on two counts for 2200 minutes in the 2 L counter with a mixing ratio of 1.92. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 4.687±0.093, 1.032±0.028, and 17.834±0.163 cpm, respectively.

The uncorrected age is 10 700±180.

GSC-5053 Silver Lake (II) (413-416 cm) — 12 600±280; $\delta^{13}C$= -30.8‰

The silty gyttja sample 89-MS-14, (28.9 g wet weight), enclosed in silty gyttja and silty sand, was treated with hot acid and distilled water rinses; base treatment was omitted (noncalcareous). The treated sample (8.2 g) yielded 2.00 L of CO_2 gas. The age estimate is based on two counts for 2760 minutes in the 2 L counter with a mixing ratio of 2.29. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 3.674±0.120, 1.032±0.028, and 17.834±0.163 cpm, respectively.

The uncorrected age is 12 700±280.

Beta-61400
CAMS-5809 Silver Lake (III) (425 cm) — 11 350±60

The small twig sample 89-MS-14, (21 mg dry weight of *Salix* sp. (willow), identified by R.J. Mott), enclosed in silty gyttja and silty sand, was treated with acid and alkali prior to gas preparation.

Comment (**R.J. Mott**): Comparison of the AMS and conventional date indicates that the latter is anomalous. Carbonates in the basal part of the core suggest that hardwater error is the contaminating factor. The conventional bulk sediment date from 253-255 cm depth at the base of the upper organic sediments is also considered anomalous for the same reason. The organic interval in the sand is somewhat equivocal. Does it represent the pre-Younger Dryas interval as the age would indicate, or is it reworked pre-Younger Dryas organic material that was deposited with sand during the Younger Dryas cold interval? The nebulous character of this organic interval contrasts with more prominent late-glacial organic intervals at lake sites throughout the Maritimes (Mott et al., 1986; Stea and Mott, 1989) and thick late-glacial buried organic deposits bordering the Annapolis Valley (Mott and Stea, 1993) suggesting that the latter interpretation is a distinct possibility.

GSC-5048 Youngs Lake — 12 500±220; $\delta^{13}C$= -20.0‰

The basal organic lake sediment was enclosed in clay and gyttja. Sample 89-MS-12 (305-307 cm) was collected by H. Jetté on July 19, 1989, from Youngs Lake on North Mountain, about 12.5 km west of Bridgetown, Nova Scotia (44° 49.14'N, 65° 26.44'W), at an elevation of about 210 m; submitted by R.J. Mott.

The sample (103.8 g wet weight) was treated with hot acid and distilled water rinses; base treatment was omitted (noncalcareous). The treated sample (41.0 g) yielded 1.74 L of CO_2 gas. The age estimate is based on three counts for 4000 minutes in the 2 L counter with a mixing ratio of 2.59. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 3.790±0.097, 1.049±0.019, and 17.851±0.099 cpm, respectively.

The uncorrected age is 12 400±220.

Comment (**R.J. Mott**): Youngs Lake occupies a small bedrock basin in basalt terrane of the North Mountain. The core taken in the central part of the lake shows dark brown, coarse detritus gyttja that contains less detritus toward a depth of 279 cm below the mud/water interface. This overlies a lighter yellowish brown gyttja of

Nova Scotia (Fig. 3)

lower organic content and then darker and more clayey gyttja to 295 cm depth. Below is pinkish grey clay to a depth of 328 cm and fine gravel and pinkish clay with gravel to the base of the core at 377 cm depth.

This site does not have a prominent late-glacial reversion to minerogenic sediment seen at many sites throughout the Maritimes that has been correlated with the Allerød / Younger Dryas climatic oscillation (Mott et al., 1986; Stea and Mott, 1989). The lighter coloured, more mineral sediment between about 280 and 293 cm depth may represent the Younger Dryas interval, but pollen analysis will be required to clarify the record. However, the basal date of 12.5 ka is considered to be anomalously old when compared to other reliable dates in the region.

Nova Scotia (Fig. 3)

Bower Lake Series

A series of lake sediment samples from Bower Lake, just west of East Kemptville, and about 15.5 km northeast of Carleton, Nova Scotia (44° 5.24'N, 65° 46.56'W), at an elevation of about 73 m, was collected by R.J. Mott on July 17, 1989; samples submitted for conventional dating by R.J. Mott.

Bower Lake is a small lake on granite terrane covered by glacial deposits. The lake has an irregular bottom with a maximum depth of 4 m. The coring penetrated to a depth of 680 cm below the mud/water interface. Basal, soft grey clay was encountered at 660 cm above which a transition zone of dark grey clay with organic streaks graded into olive, slightly silty gyttja. The latter changes to dark brown silty gyttja to 632 cm. From 632 to 612 cm the sediment becomes a dark grey brown colour and consists of more silty gyttja with pebbles and blebs of lighter sediment. Above this is dark grey brown gyttja that becomes dark brown algal gyttja to the surface.

Beta-66129 Bower Lake (I) (369-371 cm) 5930±110

A brown silty gyttja sample (99 g wet weight) from a depth of 369-371 cm in core 89-MS-09 was submitted by H. Jetté to ascertain the depth related to 6 ka.

GSC-5022 Bower Lake (II) (609-611 cm) 9820±160 $\delta^{13}C$= -25.8‰

The brown silty gyttja sample 89-MS-09 (85.7 g wet weight), enclosed in silty gyttja, was treated with hot acid and distilled water rinses; base treatment was omitted (noncalcareous). The treated sample (19.1 g) yielded 1.98 L of CO_2 gas. The age estimate is based on one count for 3900 minutes in the 2 L counter with a mixing ratio of 2.24. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 5.229±0.094, 0.990±0.030, and 17.773±0.104 cpm, respectively.

The uncorrected age is 9830±160.

GSC-5023 Bower Lake (III) (632.5-634.5 cm) 10 700±170 $\delta^{13}C$= -26.1‰

The brown silty gyttja sample 89-MS-09 (104.5 g wet weight), enclosed in silty gyttja, was treated with hot acid and distilled water rinses; base treatment was omitted (noncalcareous). The treated sample (19.8 g) yielded 2.59 L of CO_2 gas. The age estimate is based on two counts for 2000 minutes in the 2 L counter with a mixing ratio of 1.72. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 4.677±0.090, 0.990±0.030, and 17.773±0.104 cpm, respectively.

The uncorrected age is 10 700±170.

GSC-5024 Bower Lake (IV) (653-656 cm) 12 400±220 $\delta^{13}C$= -23.3‰

The basal silty gyttja sample 89-MS-09 (116.9 g wet weight), with grey clay below and silty gyttja above, was treated with hot acid and distilled water rinses; base treatment was omitted (noncalcareous). The treated sample (52.2 g) yielded 2.35 L of CO_2 gas. The age estimate is based on two counts for 2000 minutes in the 2 L counter with a mixing ratio of 1.91. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 3.789±0.094, 0.990±0.030, and 17.773±0.104 cpm, respectively.

The uncorrected age is 12 400±220.

Comment (**R.J. Mott**): All the ages appear to be reliable although there is the possibility that the basal date on organic poor sediment in the recently deglaciated terrain may be somewhat anomalous. If valid the date provides a minimum age for deglaciation. The dates of 10.7 ka (GSC-5023) and 9.8 ka (GSC-5022) bracket an interval of greater mineral content that relates in many areas in the Maritimes to a cold interval correlated with the Younger Dryas (Mott et al., 1986; Stea and Mott, 1989). Beta-66129 relates to the pollen profile around 6 ka.

Nova Scotia (Fig. 3)

GSC-5040 St. Mary Bay 970±70

$\delta^{13}C$= -23.5‰

The wood (*Picea*; identified by H. Jetté (unpublished GSC Wood Report No. 90-26)) had till below and tidal clay above. Sample 79-GS-174 was collected by D.R. Grant on July 31, 1974 from the head of St. Mary Bay (Bay of Fundy), about 10 km south of town of Digby, Nova Scotia (44º 34.94'N, 65º 51.49'W), at a depth of 1.3 m; submitted by D.R. Grant.

The sample (13.4 g dry weight) was treated with hot base, hot acid and distilled water rinses (noncalcareous). The treated sample (9.1 g) yielded 8.79 L of CO_2 gas. The age estimate is based on two counts for 2000 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net), and monthly backgrounds and standards (net) were 25.113±0.167, 2.074±0.027, and 28.244±0.132 cpm, respectively.

The uncorrected age is 940±70.

Comment (**D.R. Grant**): The dated material comes from the inner third of a root of a 10 cm diameter tree stump that is rooted in till 1.30 m below mean higher high water and overlain by tidal marsh mud which has been aggrading because of rising sea level. Together with the age of 2090±70 BP (GSC-2911; Blake, 1983) on a nearby stump at -2.55 m, this date shows that sea level in upper St. Mary Bay has been rising relatively steadily at about 12-13 cm per century for the past two millenia. This compares with an average rate of 30 cm per century for the Bay of Fundy region over the past 4 ka (Grant, 1970).

New Brunswick (Fig. 4)

Harrigan Lake Series

A series of lake sediment samples from Harrigan Lake, Rockwood Park, 5 km southeast of Saint John, New Brunswick (45° 19'N, 66° 4'W), at an elevation of 51 m, was collected by A. McAslan, H. Black, and D.J. Rawlence on August 15, 1989; submitted by D.J. Rawlence.

GSC-5005 Harrigan Lake (I) (215-220 cm) 2120±100 $\delta^{13}C$= -30.8‰

The lake sediment sample H.L.C.1; S.1 (98.8 g wet weight), enclosed in lake sediment and mud, was treated with hot acid and distilled water rinses; base treatment was omitted (noncalcareous). The treated sample (5.9 g) yielded 2.56 L of CO_2 gas. The age estimate is based on three counts for 3000 minutes in the 2 L counter with a mixing ratio of 1.74. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 13.669±0.152, 1.013±0.027, and 18.000±0.102 cpm, respectively.

The uncorrected age is 2210±100.

GSC-5007 Harrigan Lake (II) (397-402.5 cm) 4410±100 $\delta^{13}C$= -34.2‰

The lake sediment sample H.L.C.1; S.2 (95.0 g wet weight), enclosed in mud and clay, was treated with hot acid and distilled water rinses; base treatment was omitted (noncalcareous). The treated sample (5.3 g) yielded 3.02 L of CO_2 gas. The age estimate is based on two counts for 2000 minutes in the 2 L counter with a mixing ratio of 1.48. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 10.208±0.101, 1.013±0.027, and 18.000±0.102 cpm, respectively.

The uncorrected age is 4560±100.

GSC-5009 Harrigan Lake (III) (670-675 cm) 10 800±130 $\delta^{13}C$= -33.3‰

The lake sediment sample H.L.C.1; S.3 (98.0 g wet weight), enclosed in mud and clay, was treated with hot acid and distilled water rinses; base treatment was omitted (noncalcareous). The treated sample (10.5 g) yielded 4.83 L of CO_2 gas. The age estimate is based on two counts for 2000 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 4.605±0.060, 1.013±0.027, and 18.000±0.102 cpm, respectively.

The uncorrected age is 11 000±130.

GSC-5011 Harrigan Lake (IV) (700-705 cm) 11 700±120 $\delta^{13}C$= -30.0‰

The lake sediment sample H.L.C.1; S.4 (89.7 g wet weight), enclosed in mud, was treated with hot acid and distilled water rinses; base treatment was omitted (noncalcareous). The treated sample (13.7 g) yielded 3.85 L of CO_2 gas. The age estimate is based on one count for 3900 minutes in the 2 L counter with a mixing ratio of 1.16. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 4.160±0.051, 1.013±0.027, and 18.000±0.102 cpm, respectively.

The uncorrected age is 11 800±120.

New Brunswick (Fig. 4)

GSC-5013 Connor's Lake 5180±70

$\delta^{13}C$= -29.0‰

The lake sediment was enclosed in mud. Sample C.L. S1 was collected by R.J. Mott and D.J. Rawlence in August 1986, from Connor's Lake, 1 km south of Highway 1, 5 km northwest of Lorneville, 2 km southwest of Ludgate Lake, Saint John County, New Brunswick (45° 11'N, 66° 14'W), at an elevation of 70 m; submitted by D.J. Rawlence.

The sample (55.0 g wet weight) was treated with hot acid and distilled water rinses; base treatment was omitted (noncalcareous). The treated sample (14.8 g) yielded 6.69 L of CO_2 gas. The age estimate is based on two counts for 2000 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 14.741±0.095, 2.095±0.026, and 28.326±0.128 cpm, respectively.

The uncorrected age is 5250±70.

New Brunswick (Fig. 4)

Bacon Lake Series

A series of lake sediment samples was collected by H. Jetté on July 13, 1989, from Bacon Lake, about 1.75 km north of Greenwich Centre, northwest side of Long Reach, north of Saint John, New Brunswick (45° 31.57'N, 66° 27.4'W), at an elevation of about 90 m; submitted by R.J. Mott.

Bacon Lake is a small shallow lake in a depression between uplands at the north end of Long Reach at the southern end of the Saint John River valley. Maximum water depth is about 2 m. The area was deglaciated relatively early as the ice retreated up the Saint John Valley.

The core from the central part of the lake showed 500 cm of dark brown gyttja overlying a lighter brown clayey sediment to 568 cm below the mud/water interface. Below this, a black clayey gyttja to 576 cm overlies a pinkish brown clay to about 595 cm which in turn overlies a coarsely banded, brown clayey gyttja to about 613 cm. Brownish grey clay extends below to the base of the core at 662 cm depth.

GSC-5641 Bacon Lake (I) (308-312 cm) 5120±140 $\delta^{13}C$= -22.5‰

The lake sediment, gyttja sample 89-MS-05 (42.5 g wet weight), enclosed in light clayey gyttja, was treated with hot acid and distilled water rinses; base treatment was omitted (noncalcareous). The treated sample (4.5 g) yielded 1.47 L of CO_2 gas. The age estimate is based on two counts for 2135 minutes in the 2 L counter with a mixing ratio of 2.97. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 9.678±0.151, 1.284±0.021, and 18.219±0.103 cpm, respectively.

The uncorrected age is 5080±140.

GSC-5032 Bacon Lake (II) (501-503 cm) 8890±150 $\delta^{13}C$= -26.7‰

The gyttja sample 89-MS-05 (79.0 g wet weight), enclosed in light clayey gyttja, was treated with hot acid and distilled water rinses; base treatment was omitted (noncalcareous). The treated sample (13.3 g) yielded 2.77 L of CO_2 gas. The age estimate is based on two counts for 2060 minutes in the 2 L counter with a mixing ratio of 1.63. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 5.875±0.090, 1.032±0.028, and 17.834±0.163 cpm, respectively.

The uncorrected age is 8920±150.

GSC-5033 Bacon Lake (III) 11 300±240 $\delta^{13}C$= -26.8‰

The black gyttja sample 89-MS-05 (568-570 cm; 72.6 g wet weight), enclosed in clay (pink) and light clayey gyttja, was treated with hot acid and distilled water rinses; base treatment was omitted (noncalcareous). The treated sample (18.1 g) yielded 2.72 L of CO_2 gas. The age estimate is based on two counts for 3925 minutes in the 2 L counter with a mixing ratio of 1.65. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 4.345±0.120, 1.032±0.028, and 17.834±0.163 cpm, respectively.

The uncorrected age is 11 300±240.

GSC-5034 Bacon Lake (IV) 13 700±210 $\delta^{13}C$= -29.2‰

The clayey gyttja sample 89-MS-05 (603-605 cm; 98.3 g wet weight), above clay, was treated with hot acid and distilled water rinses; base treatment was omitted (noncalcareous). The treated sample (36.6 g) yielded 3.05 L of CO_2 gas. The age estimate is based on two counts for 2025 minutes in the 2 L counter with a mixing ratio of 1.49. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 3.226±0.072, 1.032±0.028, and 17.834±0.163 cpm, respectively.

The uncorrected age is 13 700±210.

Comment (**R.J. Mott**): GSC-5641 was dated to verify the core depth related to 6 ka and thus provide a chronological control for the pollen assemblage at this site. The dates of 8.9 ka (GSC-5032) and 11.3 ka (GSC-5033) bracket the clayey gyttja layer that has been referred to the Younger Dryas cold interval of similar age at numerous sites throughout the Maritimes (Mott et al., 1986; Stea and Mott, 1989). Although this area was deglaciated relatively early, the basal date of 13.7 ka (GSC-5034) is probably somewhat anomalously old as is often the case with low organic content sediments in recently deglaciated areas.

Quebec (Fig. 5)

GSC-5021 Anticosti Island modern

$\delta^{13}C = +1.86‰$

The marine shells (*Chlamys islandica*; identified by C.G. Rodrigues) were enclosed in sand gravel. Sample 89-007-080 was collected by C.G. Rodrigues on May 27, 1989 from southeast of Anticosti Island, Gulf of St. Lawrence, Quebec (49° 18.78'N, 61° 0.82'W), in a water depth of 70 m; submitted by C.G. Rodrigues.

The sample (21.0 g dry weight) was treated with an acid leach to remove the outer 10% of the sample. The treated sample (18.8 g) yielded 4.27 L of CO_2 gas. The age estimate is based on two counts for 2000 minutes in the 2 L counter with a mixing ratio of 1.10. The count rates for the sample (net), and monthly backgrounds and standards (net) were 18.399±0.105, 1.049±0.019, and 17.851±0.099 cpm, respectively.

Quebec (Fig. 5)

GSC-5145 Chaleur Bay 12 500±280
$\delta^{13}C = +3.0‰$

The marine shells (*Mya*; identified by C.G. Rodrigues) were enclosed in sandy mud. Sample 90-031-027PC-(816-820 cm) was collected by C.G. Rodrigues on November 24, 1990 from Chaleur Bay, Gulf of St. Lawrence, Quebec (48° 19.48'N, 64° 23.54'W), in a water depth of 109 m; submitted by C.G. Rodrigues.

The sample (7.3 g dry weight) was not pre-treated. The sample (7.3 g) yielded 1.44 L of CO_2 gas. The age estimate is based on one count for 3720 minutes in the 2 L counter with a mixing ratio of 3.20. The count rates for the sample (net), and monthly backgrounds and standards (net) were 3.945±0.130, 1.150±0.032, and 18.513±0.124 cpm, respectively.

The uncorrected age is 12 400±280.

Quebec (Fig. 5)

lac à Raymond Series

A series of lake sediment samples from lac à Raymond, 6 km north of New Richmond, Gaspésie, Quebec (48º 14'03"N, 65º 50'58"W), at an elevation of 50 m, was collected by H. Jetté, P. Richard, and R.J. Mott on July 7, 1989; submitted by H. Jetté.

GSC-5276 lac à Raymond (I) (288-291 cm) 3140±100 $\delta^{13}C$= -29.0‰

The lake sediment, gyttja sample MS-89-02 (68.0 g wet weight), enclosed in gyttja, was treated with hot acid and distilled water rinses; base treatment was omitted (noncalcareous). The treated sample (5.0 g) yielded 2.40 L of CO_2 gas. The age estimate is based on two counts for 2000 minutes in the 2 L counter with a mixing ratio of 1.87. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 12.163±0.126, 1.216±0.026, and 18.122±0.101 cpm, respectively.

The uncorrected age is 3200±100.

GSC-5279 lac à Raymond (II) (759-761 cm) 6470±110 $\delta^{13}C$= -29.7‰

The lake sediment, gyttja sample MS-89-02 (58.2 g wet weight), enclosed in gyttja, was treated with hot acid and distilled water rinses; base treatment was omitted (noncalcareous). The treated sample (12.0 g) yielded 2.72 L of CO_2 gas. The age estimate is based on two counts for 2220 minutes in the 2 L counter with a mixing ratio of 1.63. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 8.025±0.095, 1.216±0.026, and 18.122±0.101 cpm, respectively.

The uncorrected age is 6540±110.

Comments (**H. Jetté**): Two of three dates on bulk sediment for lac à Raymond have been redone on selected terrestrial material using AMS technology. GSC-4922 (McNeely and Jorgensen, 1993), a conventional date on gyttja, yielded an age of 12 000±240 while TO-1613 (McNeely and Jorgensen, 1993), an AMS date on terrestrial remains, returned an age of 10 150±220 (a difference of 1850 years). GSC-5279, a conventional date on gyttja, yielded an age of 6470±110 while TO-2694, an AMS date on terrestrial remains, returned an age of 5990±60 (a difference of 480 years). Sediment submitted for GSC-4922 contained 15% calcium carbonate and the sediment submitted for GSC-5279 contained 13.3% calcuim carbonate. The difference between conventional (bulk) and accelerator dates (on terrestrial remains), for this series, is attributed to the hardwater effect. A calcium carbonate equivalence of 10.5%, for GSC-5276, would suggest the possibility of contamination by hardwater effect at that level as well.

Quebec (Fig. 5)

GSC-5855 rivière du Calumet 940±80

$\delta^{13}C$= -25.7‰

The wood (*Abies*, identified by H. Jetté (unpublished GSC Wood Report No. 94-88)), was overlain by detrital organic material and peat clay and underlain by 6 m of sand gravel. Sample VH-93-03 was collected by J-S. Vincent in July 1993 from a bluff at the mouth of rivière du Calumet, 10.2 km south-southwest of Pointe-aux-Anglais, on the north shore of the Gulf of St. Lawrence, Quebec (49^0 35.8'N, 67^0 13.3'W), at an elevation of 1-2 m; submitted by J-S. Vincent.

The sample (12.5 g dry weight) was treated with hot base, hot acid, and distilled water rinses (noncalcareous). The treated sample (5.1 g) yielded 4.95 L of CO_2 gas. The age estimate is based on two counts for 2090 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 16.408±0.094, 1.228±0.021, and 18.462±0.140 cpm, respectively.

The uncorrected age is 950±80.

Comment (**J-S. Vincent**): The date is too young for the Mitis shoreline (Dionne, 1992). However it seems correct for the level mentioned. Wood fragments and organic debris unconformably lying on Goldwait Sea fossiliferous clays and left at high tide level were probably buried by sand gravel brought by a storm or by a freshet of the rivière du Calmet. However, along the south shore of the St. Lawrence estuary, about 10 dates ranging from 0.6 to 0.9 ka have been acquired on wood and shells for the level just above the highest high tide level. A piece of wood from an emergent beach ridge, at the eastern tip of Île aux Coudres, yielded a date of 150±60 (UL-447) while a beach ridge with *Mytilus edulis* (Lumachelle), situated above the high tide level on an islet of the Mingan archipelago, was dated at 50±70 (QU-830; Dionne, pers. comm., 1995).

Quebec (Fig. 5)

GSC-5133 St-Bernard-sur-mer 9580±80
$\delta^{13}C = +0.6‰$

The marine shells (*Balanus hameri*; identified by P. LaSalle) were enclosed in stony marine clay. Sample 90-1 was collected by P. LaSalle on September 10, 1989 from 3 km southeast of St-Bernard-sur-mer, Quebec (47° 24′ 30″N, 70° 20′ 30″W), at an elevation of 35 m; submitted by P. LaSalle.

The sample (46.7 g dry weight) was treated with an acid leach to remove the outer 20% of the sample. The treated sample (32.1 g) yielded 7.26 L of CO_2 gas. The age estimate is based on one count for 3750 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net), and monthly backgrounds and standards (net) were 8.544±0.060, 2.149±0.028, and 28.117±0.107 cpm, respectively.

The uncorrected age is 9570±80.

Comment (**P. LaSalle**): This result is younger than the dates obtained on *Balanus hameri* shells collected in the Champlain Sea sediments in the Quebec City area and farther west, which cluster around 10.9-11.0 ka. However, as the high salinity waters migrated eastward as the Goldthwait sea was shoaling, one should also expect the migration of the high salinity fauna eastward. Accordingly, GSC-1533 at 12.5 ka, (Lowdon and Blake, 1973) appears quite reasonable especially since the collection site is located 100 km east of Quebec City.

Quebec (Fig. 5)

GSC-5080 Petite-Rivière > 39 000
$\delta^{13}C$= -25.5‰

The wood (coniferous; identified by R.J. Mott (unpublished GSC Wood Report No. 90-36)) was enclosed in a sand pocket in modified clay. Sample PR-1-90 was collected by J-C. Dionne on July 12, 1990, from Petite-Rivière, Charlevoix, Quebec (47° 18.55'N, 70° 33.32'W), at an elevation of about 5 m; submitted by J-C. Dionne.

The sample (11.7 g dry weight) was treated with hot base, hot acid, and distilled water rinses (noncalcareous). The treated sample (8.2 g) yielded 9.50 L of CO_2 gas. The age estimate is based on one count for 2200 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 0.002±0.031, 1.003±0.022, and 17.754±0.102 cpm, respectively.

Comment (**J-C. Dionne**): The date is in agreement with other dates from organic debris from the same locality (Beta-45279: >39 390) and from îles-aux-Coudres (GSC-4252: >39 000; McNeely and McCuaig, 1991). Older dates were also obtained from the same locality on organic debris in lacustrine silt enclosed in a till deposit overlying varves (TO-3424: 52 900±1560) and a Th/U date from GEOTOP (60 000 to 70 000±5000) on a calcareous concretion, in situ, in varves underlying till. These dates clearly indicate the existence of a lacustrine event before the Laurentide Ice Sheet occupied the valley of the middle St. Lawrence estuary.

Quebec (Fig. 5)

GSC-5135 Wakeham River 6760±90

$\delta^{13}C = +1.5‰$

The marine shells (*Hiatella arctica* and *Mya truncata*; identified by R.A. Daigneault) were enclosed in coarse sand. Sample 90-DKA-31.5 was collected by R.A. Daigneault on June 27, 1990 from about 100 m south of the Wakeham River, 18 km west of the Kangiqsujuak on the east bank of a small river flowing toward the Wakeham River, Ungava Peninsula, Nouveau-Quebec (61° 33′ 10″N, 72° 15′ 50″W), at an elevation of 29 m; submitted by R.A. Daigneault.

The sample (26.1 g dry weight) was treated with an acid leach to remove the outer 20% of the sample. The treated sample (20.6 g) yielded 4.58 L of CO_2 gas. The age estimate is based on two counts for 2050 minutes in the 2 L counter with a mixing ratio of 1.00. The count rate for the sample (net), and monthly backgrounds and standards (net) were 7.988±0.069, 1.094±0.019, and 18.531±0.106 cpm, respectively.

The uncorrected age is 6760±90.

Comment (**R.A. Daigneault**): Broken shells in a prodeltaic sequence (alternating layers of silt and sand, shells in the coarser layers) on top of a massive clay unit. GSC-5135 provides a minimum age for the deglaciation of the Wakeham River valley.

Quebec (Fig. 5)

GSC-5200 Promontoire de Martigny 3720±90

$\delta^{13}C = +1.9‰$

The marine shells (*Mya truncata*; identified by D. Bruneau) were enclosed in sand. Sample PM-89-2 was collected by J.T. Gray and D. Bruneau on July 29, 1989 from west of the Promontoire de Martigny, Ungava, Nouveau-Quebec (62° 6'N, 72° 47'W), at an elevation of 14 m; submitted by D. Bruneau.

The sample (24.8 g dry weight) was treated with an acid leach to remove the outer 20% of the sample. The treated sample (21.5 g) yielded 4.62 L of CO_2 gas. The age estimate is based on one count for 3585 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net), and monthly backgrounds and standards (net) were 11.509±0.064, 1.087±0.025, and 18.225±0.161 cpm, respectively.

The uncorrected age is 3690±90.

Quebec (Fig. 5)

Rivière Jacquère Series

GSC-5192 Rivière Jacquère (I) 4080±100
$\delta^{13}C = +1.9‰$

The marine shells (*Mya truncata*; identified by D. Bruneau) were enclosed in marine silty sand. Sample RJ-IC was collected by J.T. Gray and D. Bruneau before 1991 from the first major tributary of rivière Jacquère, about 1 km upstream from the mouth of the river, Ungava Peninsula, Quebec (62° 7'N, 72° 57'W), at an elevation of 2.2 m; submitted by D. Bruneau.

The sample (24.4 g dry weight) was treated with an acid leach to remove the outer 20% of the sample. The treated sample (19.4 g) yielded 4.10 L of CO_2 gas. The age estimate is based on two counts for 1800 minutes in the 2 L counter with a mixing ratio of 1.09. The count rates for the sample (net), and monthly backgrounds and standards (net) were 11.013±0.091, 1.087±0.025, and 18.225±0.161 cpm, respectively.

The uncorrected age is 4050±100.

Comment (**D. Bruneau**): Sample RJ-IC overlies a detritus bed that was dated at 4.2 ka (Sample RJ-ID; Beta-34766, below). The AMS date for the detritus is probably too old because the sample was situated less than a metre above the high water mark; GSC-5192 will confirm the AMS date.

Beta-34766 Rivière Jacquère (II) 4240±130

Sample RJ-ID, taken from a detritus bed and overlain by sample RJ-IC (GSC-5192), was submitted to Beta Analytic, Inc. for dating by D. Bruneau.

GSC-5165 Rivière Jacquère (III) 5540±100
$\delta^{13}C = +1.5‰$

The marine shells (*Hiatella arctica*; identified by D. Bruneau) were enclosed in silty sand. Sample LT-5 was collected by J.T. Gray and D. Bruneau on July 16, 1989 from 1 km upstream along the rivière Jacquère, at the head of lac Tasialujjuaq, Ungava Peninsula, Quebec (62° 4'N, 73° 11'W), at an elevation of 13 m; submitted by D. Bruneau.

The sample (47.6 g dry weight) was treated with an acid leach to remove the outer 20% of the sample. The treated sample (32.5 g) yielded 7.12 L of CO_2 gas. The age estimate is based on two counts for 1800 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net), and monthly backgrounds and standards (net) were 9.301±0.100, 1.099±0.023, and 18.484±0.104 cpm, respectively.

The uncorrected age is 5520±100.

Comment (**D. Bruneau**): The age of this sample should date the delta feature and provide more information for the emergence curve in this area.

Quebec (Fig. 5)

GSC-5178 Foul Bay 4550±100
$\delta^{13}C = +2.9‰$

The marine shells (*Mya truncata*; identified by D. Bruneau) were enclosed in silty clay. Sample LT-4A was collected by J.T. Gray on July 14, 1989 from 7 km to the northeast of lac Tasialujjuaq, on the shore of Foul Bay, Hudson Strait, Quebec (62° 10′N, 72° 59′W), at an elevation of 11 m; submitted by D. Bruneau.

The sample (28.4 g dry weight) was treated with an acid leach to remove the outer 20% of the sample. The treated sample (22.8 g) yielded 2.77 L of CO_2 gas (some gas lost during sample preparation). The age estimate is based on one count for 3247 minutes in the 2 L counter with a mixing ratio of 1.59. The count rates for the sample (net), and monthly backgrounds and standards (net) were 10.408±0.087, 1.087±0.025, and 18.225±0.161 cpm, respectively.

The uncorrected age is 4500±100.

Comment (**J.T. Gray** and **D. Bruneau**): This is the second in a series of two dates from the exposure. The date is in excellent conformity with the age of 4240±130 (Beta-34766) obtained for organic detritus immediately below the presently dated shell bed, which is probably infra-littoral. Contemporary sea-level was probably situated higher than the summit of the terrace at 4 m.

Quebec (Fig. 5)

GSC-5134 Mont St. Hilaire 11 000±120
$\delta^{13}C$= - 2.3‰

The marine shells (*Mya truncata*; identified by V.K. Prest) were enclosed in sand. Sample PC11a/75 (c) was collected by V.K. Prest and J.V. Matthews, Jr. on June 16, 1975 from a borrow pit on south side of Mont St. Hilaire, Quebec (45° 31.8'N, 73° 8.5'W), at an elevation of 43±2 m; submitted by V.K. Prest.

The sample (28.3 g dry weight) was treated with an acid leach to remove the outer 20% of the sample. The treated sample (22.4 g) yielded 4.97 L of CO_2 gas. The age estimate is based on one count for 3920 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net), and monthly backgrounds and standards (net) were 4.671±0.050, 1.150±0.032, and 18.513±0.124 cpm, respectively.

The uncorrected age is 11 100±120.

Comment (**V.K. Prest**): (1) Shells (*Mya truncata*) in growth position in and on the vegetal debris were dated at 10 800±100 (GSC-2195, Lowdon and Blake, 1979); (2) Tiny pieces of wood were also present, one 6.3 x 1.8 cm piece was dated at 10 100±150 (GSC-2200, Lowdon and Blake, 1979); (3) The vegetal layer also contains abundant needles of spruce and larch, and one spruce cone; and (4) Remains of numerous beetles, as well as wasps and ants were present (details are presented in the unpublished GSC Fossil Arthropod Report No. 76-11, and Plant Macrofossil Report No. 76-9, J.V. Matthews, Jr.). Conclusion: The wood and shells from the vegetal layer should be redated. Other information both supports and contradicts the age discrepancy.

Quebec (Fig. 5)

GSC-5352 Gatineau Park 4340±110

$\delta^{13}C$= -23.2‰

The wood, charcoal (unidentifiable; R.J. Mott (unpublished GSC Wood Report No. 91-55)) was enclosed in sand. Sample (80-90 cm) was collected by B. Lauriol on July 5, 1991, from a mine cave in Gatineau Park, Quebec (45° 28'N, 75° 55'W), at an elevation of 200 m; submitted by H. Jetté and B. Lauriol.

The sample (4.0 g dry weight) was treated with hot base, hot acid, and distilled water rinses (noncalcareous). The treated sample (2.1 g) yielded 2.27 L of CO_2 gas. The age estimate is based on two counts for 2000 minutes in the 2 L counter with a mixing ratio of 1.94. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 10.599±0.125, 1.238±0.028, and 18.133±0.104 cpm, respectively.

The uncorrected age is 4310±110.

Comment (**H. Jetté** and **B. Lauriol**): This date is part of a series which includes two other dates so far: UQ-1958 (50 cm; 2850±200 BP) and UQ-1652 (110 cm; 3147±120 BP). The whole sequence seems to cover the complete Holocene and results of pollen analysis indicate an age of approximately 7700 at a depth of 190 cm. This seems to indicate that one of the dates, UQ-1652, could be too young, possibly because of reworking or contamination of material prior to dating.

Quebec (Fig. 5)

lac Dana Series

A series of peat samples from lac Dana, Quebec (50° 54′ 10″N, 77° 20′ 35″W), at an elevation of 244 m, was collected by P. Buteau on August 21, 1989; submitted by J.J. Veillette.

GSC-5017 lac Dana (I) 4380±60

$\delta^{13}C$= -27.8‰

The peat sample 7215 (220.0 g wet weight; *Kalmia* or *Ledum*; identified by R.J. Mott (unpublished GSC Wood Report No. 91-07)), was treated with cold base, hot acid, and distilled water rinses (noncalcareous). The treated sample (9.0 g) yielded 8.94 L of CO_2 gas. The age estimate is based on two counts for 2000 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 16.360±0.099, 2.080±0.026, and 28.377±0.129 cpm, respectively.

The uncorrected age is 4420±60.

Comment (**J.J. Veillette**): The date is on a thin (2 mm) slice of fine organic material obtained at 1.66 m depth from a 2.26 m section of peat along the eroded shoreline of the lake. This sample dates the passage from fen to bog in the area.

GSC-5015 lac Dana (II) 6700±70

$\delta^{13}C$= -26.7‰

The basal peat sample 7215 (449.9 g wet weight), underlain by clay, was treated with hot base, hot acid, and distilled water rinses (noncalcareous). The treated sample (27.2 g) yielded 11.27 L of CO_2 gas. The age estimate is based on one count for 3900 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 12.257±0.066, 2.095±0.026, and 28.326±0.128 cpm, respectively.

The uncorrected age is 6730±70.

Comment (**J.J. Veillette**): The date is on a thin (2 mm) slice of organics obtained at 2.26 m depth at the base of a peat section along the eroded shoreline of the lake. Provides a minimum age for the onset of paludification in the area.

Quebec (Fig. 5)

Rupert River Series

A series of peat samples (7224) from Rupert River area, James Bay, Quebec (51° 21′ 40″N, 78° 26′ 0″W), at an elevation of 46 m, was collected by P. Buteau on August 23, 1989; submitted by J.J. Veillette.

GSC-5018 Rupert River (I) (1.16 m) 5370±70 $\delta^{13}C$= -26.6‰

The peat (72.9 g wet weight), was treated with cold base, hot acid, and distilled water rinses (noncalcareous). The treated sample (8.0 g) yielded 8.00 L of CO_2 gas. The age estimate is based on two counts for 2000 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 14.490±0.095, 2.080±0.026, and 28.377±0.129 cpm, respectively.

The uncorrected age is 5400±70.

Comment (**J.J. Veillette**): The date is on a thin (2 mm) slice of fine organic material obtained at 1.16 m depth in the fen to bog transition zone. This sample dates the passage from fen to bog in the area.

GSC-5019 Rupert River (II) (1.84 m) 5830±70 $\delta^{13}C$= -26.8‰

The peat (95.1 g wet weight) was treated with cold base, hot acid, and distilled water rinses (noncalcareous). The treated sample (9.1 g) yielded 6.60 L of CO_2 gas. The age estimate is based on two counts for 2000 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 13.678±0.092, 2.080±0.026, and 28.377±0.129 cpm, respectively.

The uncorrected age is 5860±70.

Comment **(J.J. Veillette**): The date is on a thin (2 mm) slice of organic material obtained at the 1.84 m level, 3 cm above the clay substrate. This date is a better estimate than GSC-5016 for the onset of paludification at this site, because the lowermost 3 cm of the peat sequence had been disturbed (cf. GSC-5016).

GSC-5016 Rupert River (III) (1.87 m) 5350±60 $\delta^{13}C$= -26.6‰

The basal peat (490.6 g wet weight), underlain by clay, was treated with cold base, hot acid, and distilled water rinses (noncalcareous). The treated sample (26.8 g) yielded 6.33 L of CO_2 gas. The age estimate is based on one count for 3200 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 14.504±0.077, 2.095±0.026, and 28.326±0.128 cpm, respectively.

The uncorrected age is 5380±60.

Comment (J.J. Veillette): The date is on a thin (2 mm) slice of organic material obtained at the base of a 1.87 m section of peat resting on clay along the bank of the Rupert River. P. Buteau had warned that there was a possibility of disturbance in the lowermost part of the section (cf. GSC-5019).

Quebec (Fig. 5)

GSC-5020 Cape Jones 270±70

$\delta^{13}C$= -27.4‰

The basal peat sample 7226 (34 cm), overlying a clayey silt, was collected by P. Buteau on August 24, 1989 from south of Cape Jones, Roggan River area, Quebec (54º 23′ 0″N, 78º 28′ 30″W), at an elevation of 11 m; submitted by J.J. Veillette.

The sample (204.1 g wet weight) was treated with cold base, hot acid and distilled water rinses (noncalcareous). The treated sample (12.7 g) yielded 5.14 L of CO_2 gas. The age estimate is based on two counts for 2000 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net), and monthly backgrounds and standards (net) were 17.102±0.100, 0.990±0.030, and 17.773±0.104 cpm, respectively.

The uncorrected age is 310±70.

Comment (**J.J. Veillette**): This sample is from the base of a shallow (34 cm) pit on the site of a degraded palsa. A thin (2 mm) slice of organics mixed with silty clay was collected at the base of the sequence to estimate the age of the earliest organic accumulation at the site.

Quebec (Fig. 5)

GSC-5070 HP Nottaway River > 48 000
$\delta^{13}C$= -24.0‰

The wood (*Picea*; identified by R.J. Mott (unpublished GSC Wood Report No. 87-45)) was enclosed in clay. Sample VH-87-17 was collected by J.J. Veillette on June 30, 1987 from southwest bank of Nottaway River, 5 km downstream from Île d'Herbomez, Quebec (51° 8.6'N, 78° 48.4'W), at an elevation of about 18 m; submitted by J.J. Veillette.

The sample (50.7 g wet weight) was treated with hot base, hot acid and distilled water rinses (noncalcareous). The treated sample (28.1 g) yielded 27.89 L of CO_2 gas. The age estimate is based on one count for 5130 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net), and monthly backgrounds and standards (net) were 0.083±0.041, 2.741±0.034, and 99.955±0.788 cpm, respectively.

Comment (**J.J. Veillette**): The sample is from an organic-rich horizon of probable interglacial age in the base of the section. It is overlain by clay-silt rythmites, and a capping of till.

Ontario (Fig. 6)

McKay Lake Series

A series of lake sediment samples from McKay (Hemlock) Lake, about 2.25 km northeast of Rideau Falls, Rockcliffe Park (Ottawa), Ontario (45° 27.2'N, 75° 17.9'W), at an elevation of about 46 m, were collected by R. McNeely on March 24, 1987; submitted by R. McNeely.

GSC-5065 McKay Lake (I) (429-430 cm) 8190±120 $\delta^{13}C$= -32.6‰

The basal 1-cm of gyttja (90-MIB-1 ML: 87.03.24 429-430 cm; 29.4 g dry weight), overlain by gyttja and underlain by clay, was treated with hot acid, and distilled water rinses; base treatment was omitted (noncalcareous). The treated sample (13.2 g) yielded 2.18 L of CO_2 gas. The age estimate is based on one count for 3970 minutes in the 2 L counter with a mixing ratio of 2.07. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 6.345±0.077, 1.049±0.019, 17.851±0.099 cpm, respectively.

The uncorrected age is 8310±120.

TO-2445 McKay Lake (II) 7430±140

A fossil male winged ant (12 mg dry weight; *Camponotus*?; identified by J.V. Matthews, Jr.), enclosed in the gyttja processed for GSC-5065, was recovered by M. Leflar during a detailed examination of the freeze-dried sediment.

Comment (**R. McNeely**): Sediment cores were taken through the ice in 10.5 m of water on March 24, 1987 in the southern end of the deep basin of McKay Lake. The material was stored in the dark at 4°C until extruded, lyophlized and treated in July 1987. These dates are part of a more extensive suite of samples of McKay Lake sediment that were dated to ascertain whether this calcareous lake was prone to "hardwater" error, and to determine the magnitude of any errors detected.

The limnology of the lake has been described in Haffner and McNeely (1989) and a detailed discussion of the sedimentary column is in preparation. The dated sediment was from the base of a 4.3-m organic section. An earlier date on this basal sediment (GSC-621) is reported in Lowdon et al. (1971) and is corroborated and refined by a more recent date (GSC-4059; McNeely and McCuaig, 1991). The two dates reported here and the earlier dates provide an indication of the "hardwater" error in the basal sediments of McKay Lake. The conventional dates on bulk sediment are between 0.6 and 0.8 ka too old, with best comparison being between GSC-5065 and TO-2445, which were dated on equivalent material and suggest a "hardwater" error of 0.76 ka. A discussion of all the dates in relation to the "hardwater" effect is in preparation.

Ontario (Fig. 6)

GSC-5071 HP Missinaibi River > 50 000
$\delta^{13}C$= -24.2‰

The wood (*Picea*; identified by R.J. Mott (unpublished GSC Wood Report No. 90-38)) was enclosed in peat. Sample 90TCA-26M-W-11 was collected by L.H. Thorleifson and A.V. Morgan on August 5, 1990 from the southeast bank of the Missinaibi River, 2 km downstream from the Soweska River confluence, Ontario (50° 23.4'N, 82° 35.5'W), at an elevation of 90 m; submitted by L.H. Thorleifson and A.V. Morgan.

The sample (44.84 g dry weight) was treated with hot acid, hot base, and distilled water rinses. The treated sample (30.61 g) yielded 29.53 L of CO_2 gas. The age estimate is based on three counts for 3800 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net), and monthly backgrounds and standards (net) were 0.035±0.039, 2.505±0.029, and 101.52±0.473 cpm, respectively.

Comment (**L.H. Thorleifson**): The determination confirms that this deposit, near the type locality of the Missinaibi Formation, is of an age beyond the range of radiocarbon dating.

Manitoba (Fig. 7)

GSC-683 2 Twin Lakes 2240±80

$\delta^{13}C = 2.87‰$

The marine shells (*Mytilus edulis*; identified by A.S. Dyke) were enclosed in sandy gravel. Sample CD/24/60 was collected by B.G. Craig in 1966, from ditch on Twin Lakes road, 20.3 km east-southeast of CNR station, Churchill, Manitoba (58° 42′ 10″N, 93° 50′ 35″W), at an elevation of 27 m; submitted by R. McNeely.

The sample (22.2 g dry weight) was treated with no treatment. The treated sample (21.9 g) yielded 5.0 L of CO_2 gas. The age estimate is based on two counts for 2160 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 13.802±0.087, 1.227±0.024, and 18.146±0.137 cpm, respectively.

The uncorrected age is 2200±80.

For comments see discussion on "Crosschecks" in the "Introduction" section. Original date was published in Lowdon et al. (1971).

Manitoba (Fig. 7)

Wheatcroft Lake Series

A series of moss and wood (twigs) samples from Wheatcroft Lake, 55 km southwest of Leaf Rapids, Manitoba (56° 12'N, 100° 42'W), at an elevation of 253 m, was collected by J. Danko in January 1990; submitted by R.N.W. DiLabio and C.A. Kaszycki.

GSC-5114 Wheatcroft Lake (I) (17.5-18 m) 340±100 $\delta^{13}C$= -26.7‰

The moss and wood (twigs) sample WL-90-26, (7.6 g dry weight), enclosed in silt, was treated with cold base, hot acid, and distilled water rinses (noncalcareous). The treated sample (6.5 g) yielded 2.24 L of CO_2 gas. The age estimate is based on one count for 1000 minutes in the 2 L counter with a mixing ratio of 2.10. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 17.698±0.209, 1.094±0.019, and 18.531±0.106 cpm, respectively.

The uncorrected age is 370±100.

Comment (**R.N.W. DiLabio** and **C.A. Kaszycki**): The age is much younger than was anticipated. The organic materials may have been slumped into the lake bottom, and were probably not as deeply buried as originally estimated by the collector (also see GSC-5125).

GSC-5125 Wheatcroft Lake (II) (4-4.3 m) 5540±80 $\delta^{13}C$= -25.0‰

The lake sediment, silty with mosses sample WL-90-20, (377.8 g dry weight), enclosed in silt, was treated with hot acid and distilled water rinses; base treatment was omitted (noncalcareous). The treated sample (124.0 g) yielded 3.30 L of CO_2 gas. The age estimate is based on one count for 3930 minutes in the 2 L counter with a mixing ratio of 1.36. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 9.295±0.066, 1.094±0.019, and 18.531±0.106 cpm, respectively.

The uncorrected age is 5540±80.

Comment (**R.N.W. DiLabio** and **C.A. Kaszycki**): The sample has a post-Lake Agassiz age, but is younger than expected. The organic materials seem to be part of the normal Holocene lake sediment sequence in Wheatcroft Lake. They are younger than basal peat in the same region (cf. GSC-2759, 6 ka, Lowdon and Blake, 1979).

British Columbia (Fig. 8 and Fig. 9)

Meadow Creek Series

A series of wood samples from the Meadow Creek site on the road to a borrow pit for Duncan Dam, 9 km north of the north end of Kootenay Lake, British Columbia (50^0 15′ 5″N, 116^0 59′ 0″W), at an elevation of 590 m, was collected by R.J. Fulton on August 20, 1989; submitted by R.J. Fulton.

GSC-5113 HP — Meadow Creek (I) — 43 400±600
$\delta^{13}C$= *-25.9‰*

The wood sample FldX-89-B (44.3 g dry weight; *Picea*; identified by R.J. Mott (unpublished GSC Wood Report No. 90-32)), from a woody peat unit enclosed in silt and fine-grained sand, was treated with hot acid, hot base, and distilled water rinses (noncalcareous). The treated sample (30.0 g) yielded 32.3 L of CO_2 gas. The age estimate is based on one count for 6381 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net), and monthly backgrounds and standards (net) were 0.463±0.032, 2.521±0.023, and 102.618±0.351 cpm, respectively.

The uncorrected age is 43 400±600.

GSC-5043 HP — Meadow Creek (II) — 43 500±600
$\delta^{13}C$= -25.9‰

The wood (42.5 g dry weight; *Picea*; identified by R.J. Mott (unpublished GSC Wood Report No. 90-32)) was part of a stump in growth position within a woody peat which in turn was enclosed in silt and fine-grained sand. Sample FldX-89-A was treated with hot acid, hot base, and distilled water rinses. The treated sample (37.5 g) yielded 36.6 L of CO_2 gas. The age estimate is based on one count for 5620 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net), and monthly backgrounds and standards (net) were 0.454± 0.031, 2.477±0.021, and 102.221±0.494 cpm, respectively.

The uncorrected age is 43 500±600.

Comment (**R.J. Fulton**): GSC-5043 and GSC-5113 are from a single exposure in the well-dated Meadow Creek site which was originally opened during construction of the Duncan Dam (Fulton, 1968; Alley et al., 1986; Fulton and Warner, 1990). The floodplain sediments exposed at the site had earlier given ages ranging from 32 700±800 (GSC-493; Lowdon and Blake, 1968) to 43 800±800 (GSC-740; Lowdon and Blake, 1968). The new dating was conducted so that ages would be available for beds which are being examined as part of renewed paleoenvironmental studies. GSC-5043 agrees closely with GSC-1017 2 (43 600±700; Lowdon et al., 1971) a peat sample which is thought to have been collected from the same bed. GSC-5043 was collected from 2.6 m below GSC-5113 and is the oldest age at this locale on organic material that is definitely autochthonous.

British Columbia (Fig. 8 and Fig. 9)

GSC-2 Port Mann Bridge uncorrected 7600±150

The silty peat was enclosed in silt. Sample B6 No. 8 was collected by R.A. Spence and W.H. Mathews in 1959 from about 305 m east along the CNR track from the site of the (then) proposed Port Mann Bridge, near New Westminster, British Columbia ($49^0$13'N, $122^0$48'W), at a depth of about 10 m; submitted by W.H. Mathews.

The sample (36.1 g dry weight) was treated with hot acid and distilled water rinses; base treatment was omitted. The treated sample (24.0 g) yielded 12.5 L of CO_2 gas.

Comment (**W.H. Mathews**): The sample was taken from a peat layer about 10 m below mean sea level, located at a depth of about 13 m below the Fraser River floodplain, south of the river. The sample was overlain by flood plain silt and underlain by silt of similar texture (likewise floodplain?). The peaty bed has been traced about 700 m along a north-south axis and extends east-west at least the same distance parallel to the river. It has also been found north of the river, occupying an area of at least 2 acres. The peat is detrital and contains small pieces wood as well as pollen of a Hemlock/Douglas fir forest and the remains of diatoms characteristic of large lakes. The peat layer appears to be an overbank deposit of the Fraser River rather than a filling on the floor of an abandoned channel of the river (this is based chiefly on the overall shape of the peat deposit), and on this basis is inferred to record a sea level stand about 12 m below present sea level. The sample was recovered using a Shelby tube sampler from a borehole.

British Columbia (Fig. 8 and Fig. 9)

GSC-5179 Serpentine River 2120±70

$\delta^{13}C$= -24.8‰

The wood (a single piece of *Picea*; identified by R.J. Mott (unpublished GSC Wood Report No. 90-56)) was enclosed in peat. Sample CIA-90-143-14 was collected by A. Blais on August 2, 1990 from Serpentine River, 14 km south-southeast of New Westminster, British Columbia (49^0 5.3'N, 122^0 50.4'W), at an elevation of 0 m (msl); submitted by J.J. Clague.

The sample (9.2 g dry weight) was treated with hot base, hot acid and distilled water rinses (noncalcareous). The treated sample (8.0 g) yielded 7.76 L of CO_2 gas. The age estimate is based on two counts for 2000 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net), and monthly backgrounds and standards (net) were 14.138±0.089, 1.057±0.020, and 18.411±0.103 cpm, respectively.

The uncorrected age is 2120±70.

Comment (**J.J. Clague**): The dated sample is part of a log enclosed in peat. This peat is exposed in the bank of the lower, tidal portion of the Serpentine River. It extends below present sea level and was deposited at a time when sea level was lower relative to the land than today. The peat unit at this site also is cut by sand dykes and sills which record a liquefaction event, probably related to an earthquake (Clague et al., 1992). The dated sample is about 40 cm below the top of the peat unit and about 2 m above its base.

British Columbia (Fig. 8 and Fig. 9)

Burns Bog Series

GSC-5196 Burns Bog (I) 3880±100

$\delta^{13}C$= -27.8‰

The plant detritus was enclosed in sand. Sample CIA-90-104-1 was collected by J.J. Clague on May 30, 1990 from Burns Bog, 10 km south of New Westminster, British Columbia (49^0 6.8'N, 122^0 56.3'W), at a depth of 4 m (msl); submitted by J.J. Clague.

The sample (4.8 g dry weight) was treated with cold base, hot acid and distilled water rinses (noncalcareous). The treated sample (3.6 g) yielded 2.70 L of CO_2 gas. The age estimate is based on one count for 3730 minutes in the 2 L counter with a mixing ratio of 1.65. The count rates for the sample (net), and monthly backgrounds and standards (net) were 11.174±0.086, 1.087±0.025, and 18.225±0.161 cpm, respectively.

The uncorrected age is 3930±100.

Comment (J.J. Clague): The dated sample is from a woody layer about 5 m below the surface of Burns Bog. This woody layer occurs within a sequence of interbedded silt and sand (probably floodplain and/or intertidal deposits) which underlies peat and overlies thick, distributary channel sand.

GSC-5184 Burns Bog (II) 4170±80

$\delta^{13}C$= -28.9‰

The dated peat was overlain by peat and underlain by mud. Sample CIA-90-102-3 was collected by J.J. Clague on May 28, 1990 from Burns Bog, 10 km south-southwest of New Westminster, British Columbia (49^0 6.8'N, 122^0 57.3'W), at a depth of 1 m (msl); submitted by J.J. Clague.

The sample (99.4 g wet weight) was treated with cold base, hot acid and distilled water rinses (noncalcareous). The treated sample (11.3 g) yielded 8.56 L of CO_2 gas. The age estimate is based on two counts for 2070 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net), and monthly backgrounds and standards (net) were 16.817±0.103, 2.107±0.038, and 28.490±0.183 cpm, respectively.

The uncorrected age is 4240±80.

Comment (**J.J. Clague**): The dated sample is from the lower part of a 31-cm-thick silty peat bed which is overlain and underlain by intertidal or floodplain mud. The mud above the peat bed is organic rich and grades up into peat 3 m below the land surface (about 50 cm above the dated sample). The organic-rich sediments at this site record the formation and evolution of a domed peat bog (Burns Bog). GSC-5184 approximates the time that organic sedimentation first began; the main phase of bog formation, however, is younger. GSC-5184 is in agreement with GSC-5161 from the same stratigraphic position at another site in the bog.

GSC-5161 Burns Bog (III) 4290±100

$\delta^{13}C$= -28.6‰

The peat was enclosed in mud. Sample CIA-90-101-7 was collected by J.J. Clague on May 28, 1990 from Burns Bog, 10 km south-southwest of New Westminster, British Columbia (49^0 6.9'N, 122^0 57.5'W), at a depth of 1 m (msl); submitted by J.J. Clague.

The sample (107.4 g wet weight) was treated with cold base, hot acid and distilled water rinses (noncalcareous). The treated sample (6.9 g) yielded 5.66 L of CO_2 gas. The age estimate is based on two counts for 2070 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net), and monthly backgrounds and standards (net) were 10.759±0.109, 1.099±0.023, and 18.484±0.104 cpm, respectively.

The uncorrected age is 4350±100.

Comment (**J.J. Clague**): The dated sample is from a 17-cm-thick peat bed which is overlain and underlain by intertidal or floodplain mud. The mud above the peat bed is organic-rich and grades up into peat 3 m below the land surface (about 1 m above the dated sample). This latter peat is continuous to the surface. The organic rich sediments at this site record the formation and evolution of a domed peat bog (Burns Bog); GSC-5161 approximates the time that organic sedimentation first began; the main phase of bog formation, however, is younger.

British Columbia (Fig. 8 and Fig. 9)

Seymour Valley Series

A series of wood, peat, and charcoal samples was collected from sites in the lower Seymour Valley, southwestern British Columbia between 49^0 21.2'N, 123^0 00'W, and 49^0 24.4'N, 123^0 1.8'W. All the samples were collected by O.B. Lian between January 1990 and May 1991, and were submitted for dating by O.B. Lian and E.J. Hickin. The samples submitted to Beta Analytic Inc. were treated with hot acid, and alkali solutions prior to synthesizing benzene for counting. A detailed description of the sample sites and elevations can be found in Lian and Hickin (1993).

Beta-46052 Seymour Valley (I) 4980±60

The wood sample 5-18-1 (30 g dry weight), enclosed in silt and sand, was collected by O.B. Lian on May 18, 1991 at an elevation of 113 m.

Beta-40688 Seymour Valley (II) 5300±70

The wood sample 10-10-1 (19 g dry weight), enclosed in silt and sand, was collected by O.B. Lian on October 10, 1990, at an elevation of 113 m.

Note: The laboratory number for the age 5300±70 (Beta-40688) is *incorrectly* quoted in Lian and Hickin (1993) as Beta-40686.

Comment (**O.B. Lian**): The wood samples Beta-40688 and -46052 were both collected from an aggradational terrace. Beta-46052 was located about 50 cm above Beta-40688 and both were enclosed in sand silt. These ages suggest that the present vertical position of Seymour River was attained shortly before 5 ka.

Beta-40690 Seymour Valley (III) 9700±170

The charcoal fragments of sample 10-10-4 (9 g dry weight), enclosed in organic-rich alluvial apron gravel, were collected by O.B. Lian on October 10, 1990, at an elevation of 189 m.

Beta-38911 Seymour Valley (IV) 10 120±60

The wood sample 7-10-1 (36 g dry weight), enclosed in organic-rich silt and sand, was collected by O.B. Lian on July 10, 1990, at an elevation of 175 m.

Beta-38912 Seymour Valley (V) 10 350±60

The wood sample 7-10-2 (more than 20 g dry weight), enclosed in organic-rich silt and sand, was collected by O.B. Lian on July 10, 1990, at an elevation of 175 m.

Beta-40687 Seymour Valley (VI) 11 420±110

The charcoal fragments of sample 9-21-2 (7 g dry weight), enclosed in organic-rich alluvial fan sand, were collected by O.B. Lian on September 9, 1990, at an elevation of 179 m.

Note: The elevation for Beta-40690 was *incorrectly* reported as 166 m in Lian and Hickin (1993).

Comment (**O.B. Lian**): Beta-40690, Beta-38911, Beta-38912, and Beta-40687 date early postglacial (paraglacial) sedimentation in Seymour Valley. The charcoal samples Beta-40687 and Beta-40690 were collected from organic-rich sand beds contained within alluvial fan and alluvial apron gravel, respectively. The wood samples Beta-38912 and -38911 were both collected from an organic-rich silt and sand unit that likely represents a channel fill; these two ages are supportive (i.e. they were both collected from the the same stratum). Beta-40687 is also a minimum age for deglaciation of the valley.

Beta-38907 Seymour Valley (VII) 17 600±130

The wood sample 5-24-2 (55 g dry weight), enclosed in clayey silt, was collected by O.B. Lian on May 21, 1990, at an elevation of 171 m.

Beta-40689 Seymour Valley (VIII) 17 910±100

The wood sample 10-10-2 (25 g dry weight), enclosed in clayey silt, was collected by O.B. Lian on October 10, 1990, at an elevation of 172 m.

Beta-38908 Seymour Valley (IX) 18 490±90

The wood sample 5-29-1 (more than 20 g dry weight), enclosed in clayey silt, was collected by O.B. Lian on May 29, 1990, at an elevation of 176 m.

Comment (**O.B. Lian**): The wood samples Beta-38907, Beta-40689, and Beta-38908 date the Port Moody interstade in the Seymour Valley, a nonglacial period separating the Coquitlam and Vashon stades of the Fraser Glaciation. All of these samples were enclosed in glaciolacustrine clayey silt. Each sample comes from a different site, the sites spanning a distance of about 2 km along the Seymour River. All were found above an organic-rich bed that likely represents a soil that formed during the Port Moody interstade and was subsequently reworked during the onset of the Vashon Stade.

British Columbia (Fig. 8 and Fig. 9)

Beta-38909 Seymour Valley (X) 22 040±130

The wood sample 5-19-2 (more than 20 g dry weight), enclosed in clayey silt and sand, was collected by O.B. Lian on September 26, 1990, at an elevation of 142 m.

Beta-40686 Seymour Valley (XI) 22 320±130

The wood sample 9-12-1 (330 g dry weight), enclosed in clayey silt and sand, was collected by O.B. Lian on September 21, 1990, at an elevation of 141 m.

Comment (**O.B. Lian**): The wood samples Beta-38909 and Beta-40686 date the first arrival of Fraser Glaciation ice (Coquitlam Stade) in Seymour Valley. Both samples were collected from the same lithostratigraphic unit. The enclosing sediments were ice-contact (glaciolacustrine) clayey silt and sand.

Beta-46053 Seymour Valley (XII) 29 440±300

The peat sample 6-27-1 (more than 100 g dry weight), enclosed in fine sand/silt, was collected by O.B. Lian on June 13, 1990, at an elevation of 102 m.

GSC-5069 HP Seymour Valley (XIII) 35 700±320
$\delta^{13}C$= -24.7‰

The wood sample S1-1 (45.81 g dry weight; *Picea*; identified by R.J. Mott (unpublished GSC Wood Report No. 90-41)), enclosed in fine sand/silt, was treated with hot acid, hot base, and distilled water rinses. The treated sample (30.36 g) yielded 30.29 L of CO_2 gas. The age estimate is based on one count for 6070 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 1.190±0.039, 2.505±0.029, and 101.52±0.473 cpm, respectively.

The uncorrected age is 35 700±320.

GSC-5069 2L Seymour Valley (XIII) 37 600±1610
$\delta^{13}C$= -24.7‰

The age estimate is based on one count for 3700 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 0.169±0.333, 1.129±0.028, and 18.121±0.154 cpm, respectively.

The uncorrected age is 37 600±1610.

Laboratory comment: Because GSC-5069 HP dated finite and less than 40 ka, the same gas preparation was recounted in the 2 L counter at normal operating pressure to compare the counter system at GSC. The two age determinations are in acceptable agreement.

GSC-5121 HP Seymour Valley (XIV) 37 100 ±340
$\delta^{13}C$= -23.3‰

The wood sample SVP2-W (43.0 g dry weight; *Abies*; identified by R.J. Mott (unpublished GSC Wood Report No. 90-74)), enclosed in fine sand/silt, was treated with hot acid, hot base, and distilled water rinses (noncalcareous). The treated sample (28.8 g) yielded 28.0 L of CO_2 gas. The age estimate is based on one count for 5400 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 1.015±0.034, 2.521±0.023, and 102.618±0.351 cpm, respectively.

The uncorrected age is 37 100±340.

Comment (**O.B. Lian**): GSC-5121 HP and GSC-5069 HP, and Beta-46053 were all collected from an aggradation unit of sand, gravel, and peat. The wood samples were collected from within peat beds. This unit represents the Olympia nonglacial interval in the Seymour Valley. An older peat bed (SVMS7-3) is now exposed below the location of GSC-5121 HP and has been submitted for dating. Beta-46053 likely dates the end of the Olympia in the Seymour Valley. It was collected 2 m above the wood sample SVP2-W (GSC-5121 HP). Sediments extracted from within the peat layer gave a thermoluminescence (TL) age of 41±7 ka (SVP1). The TL analysis was performed at Simon Fraser University by O.B. Lian. A detailed discussion of the TL analysis can be found in Lian (1991), and a discussion of the stratigraphy and chronology is presented in Lian and Hickin (1993).

Beta-38910 Seymour Valley (XV) > 43 500

The wood sample 7-6-1 (20 g dry weight), enclosed in till, was collected by O.B. Lian on July 6, 1990 at an elevation of 175 m.

Comment (**O.B. Lian**): The wood sample was collected from a till unit (Vashon Stade) that overlies units that have been dated younger. Beta-38910 is therefore anomalously old. This is supported by the fact that the fragments were rounded and polished suggesting that they had been reworked by ice.

General Comment (**O.B. Lian**): The Seymour Valley contains some of the best exposures of Middle and Late Wisconsinian sediments in southwestern British Columbia. Lithostratigraphic units representing the period from the Olympia nonglacial interval to the Holocene are exposed in the valley fill. In addition, there are rare exposures of sediments representing the Coquitlam Stade and Port Moody interstade of the Fraser Glaciation.

British Columbia (Fig. 8 and Fig. 9)

Cheekye River Series

A series of wood charcoal samples from beneath power lines, 5 km north of Brackendale, Cheekye River, British Columbia (49^0 47.8'N, 123^0 6.0'W), at an elevation of 310 m, was collected by S.G. Evans on June 17, 1989; submitted by S.G. Evans.

GSC-5100 Cheekye River (I) 1550±80

$\delta^{13}C$= -26.1‰

The wood charcoal sample EN-89-17JN9C (12.3 g dry weight; unidentifiable (unpublished GSC Wood Report No. 90-49)), enclosed in debris avalanche diamicton, was treated with hot base, hot acid, and distilled water rinses (noncalcareous). The treated sample (7.9 g) yielded 9.63 L of CO_2 gas. The age estimate is based on two counts for 1800 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 23.303±0.125, 2.172±0.034, and 28.328±0.234 cpm, respectively.

The uncorrected age is 1570±80.

GSC-5101 Cheekye River (II) 2190±140

$\delta^{13}C$= -25.7‰

The wood charcoal sample EN-89-17JN9B (2.3 g dry weight; unidentifiable; cf. R.J. Mott (unpublished GSC Wood Report No. 90-50)), enclosed in debris avalanche diamicton, was treated with cold base, hot acid, and distilled water rinses (noncalcareous). The treated sample (1.55 g) yielded 1.30 L of CO_2 gas. The age estimate is based on two counts for 1705 minutes in the 2 L counter with a mixing ratio of 3.46. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 14.074±0.221, 1.150±0.032, and 18.513±0.124 cpm, respectively.

The uncorrected age is 2200±140.

British Columbia (Fig. 8 and Fig. 9)

Richmond Series

A series of wood samples from Richmond, British Columbia (49^0 10.5'N, 123^0 7.5'W) was collected by J.J. Clague and E. Naesgaard on September 23 and October 12, 1990; submitted by J.J. Clague.

GSC-5153 Richmond (I) 3540±90

$\delta^{13}C$= -26.6‰

The wood sample CIA-90-166-3 (5.2 g dry weight), enclosed in mud at an elevation of 0 m (msl), was treated with hot base, hot acid, and distilled water rinses (noncalcareous). The treated sample (4.2 g) yielded 4.17 L of CO_2 gas. The age estimate is based on one count for 2200 minutes in the 2 L counter with a mixing ratio of 1.07. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 12.001±0.084, 1.101±0.023, and 18.696±0.163 cpm, respectively.

The uncorrected age is 3560±90.

GSC-5124 Richmond (II) 3660±140

$\delta^{13}C$= -24.1‰

The single piece of wood, sample CIA-90-166 (3.1 g dry weight; *Picea*; identified by R.J. Mott (unpublished GSC Wood Report No. 90-63)), enclosed in mud at an elevation of 1 m (msl), was treated with hot base, hot acid, and distilled water rinses (noncalcareous). The treated sample (2.6 g) yielded 2.66 L of CO_2 gas. The age estimate is based on two counts for 2470 minutes in the 2 L counter with a mixing ratio of 1.69. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 11.501±0.127, 1.092±0.024, and 18.125±0.241 cpm, respectively.

The uncorrected age is 3650±140.

GSC-5144 Richmond (III) 3680±130

$\delta^{13}C$= -28.1‰

The unidentifiable deciduous wood sample (CIA-90-166-5, 2.7 g dry weight), enclosed in mud at an elevation of 0 m (msl), was treated with hot base, hot acid, and distilled water rinses (noncalcareous). The treated sample (2.3 g) yielded 1.74 L of CO_2 gas. The age estimate is based on two counts for 2000 minutes in the 2 L counter with a mixing ratio of 2.60. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 11.752±0.150, 1.101±0.023, and 18.696±0.163 cpm, respectively.

The uncorrected age is 3730±130.

GSC-5111 Richmond (IV) 3880±80

$\delta^{13}C$= -24.8‰

The poorly preserved, single piece of wood, sample CIA-90-166-2 (12.4 g dry weight; *Picea* or *Larix*; identified by R.J. Mott (unpublished GSC Wood Report No. 90-73)) enclosed in sand at a depth of 1 m (msl), was treated with hot base, hot acid, and distilled water rinses (noncalcareous). The treated sample (9.1 g) yielded 9.50 L of CO_2 gas. The age estimate is based on two counts for 2270 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 17.482±0.099, 2.172±0.034, and 28.328±0.234 cpm, respectively.

The uncorrected age is 3880±80.

Comment (**J.J. Clague**): Four radiocarbon ages were obtained from the walls of an excavation at this site. The oldest (GSC-5111) is from a piece of wood collected from distributary channel or intertidal sand about 3 m below the land surface. This sand is overlain by intertidal or floodplain mud which extends to the surface. The latter unit yielded three overlapping radiocarbon ages centred on 3.6 ka (GSC-5124, -5144, -5153). This unit, in turn, is cut by sand dykes rooted in the underlying sand unit. The sand dykes and related sand boils are the products of liquefaction thought to have been triggered by an earthquake (Clague et al., 1992). The radiocarbon ages at this site indicate that this event is younger than 3.6 ka.

British Columbia (Fig. 8 and Fig. 9)

GSC-5105 Turbid Creek 180±100

$\delta^{13}C$= -24.2‰

The wood (*Thuja plicata*; identified by R.J. Mott (unpublished GSC Wood Report No. 90-57)) was enclosed in debris avalanche diamicton. Sample EN-89-30J14 was collected by S.G. Evans on June 30, 1989 from Turbid Creek, west of Mount Cayley, British Columbia (50^0 4'N, 123^0 20'W), at an elevation of 245 m; submitted by S.G. Evans.

The sample (17.6 g dry weight) was treated with hot base, hot acid, and distilled water rinses (noncalcareous). The treated sample (7.6 g) yielded 7.53 L of CO_2 gas. The age estimate is based on two counts for 1890 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net), and monthly backgrounds and standards (net) were 27.834±0.321, 2.233±0.035, and 28.426±0.139 cpm, respectively.

The uncorrected age is 170±100.

British Columbia (Fig. 8 and Fig. 9)

GSC-5190 Lillooet River 2300±90

$\delta^{13}C = -24.4‰$

The wood was enclosed in pyroclastic (landslide?) debris. Sample EN-89-22JN7F was collected by S.G. Evans on June 22, 1989 from northeast bank of Lillooet River, 6.5 km upstream of Meager River, British Columbia (50^0 40'N, 123^0 27'W), at an elevation of 487 m; submitted by S.G. Evans.

The sample (7.8 g dry weight) was treated with hot base, hot acid, and distilled water rinses (noncalcareous). The treated sample (7.3 g) yielded 7.56 L of CO_2 gas. The age estimate is based on two counts for 1800 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net), and monthly backgrounds and standards (net) were 13.705±0.095, 1.087±0.025, and 18.225±0.161 cpm, respectively.

The uncorrected age is 2290±90.

British Columbia (Fig. 8 and Fig. 9)

Esquimalt Lagoon Series

A series of wood samples from the Esquimalt Lagoon, 2 km southeast of Colwood, British Columbia (48^0 25.1'N, 123^0 28.2'W), was collected by J.J. Clague and P.T. Bobrowsky on July 28, 1990; submitted by J.J. Clague.

GSC-5159 Esquimalt Lagoon (I) 780±60
$\delta^{13}C$= -23.4‰

The single piece of wood from an elevation of 0 m, (CIA-90-131-16, 9.7 g dry weight; *Thuja plicata*; identified by R.J. Mott (unpublished GSC Wood Report No. 90-54)), enclosed in muddy peat, was treated with hot base, hot acid, and distilled water rinses (noncalcareous). The treated sample (8.4 g) yielded 8.70 L of CO_2 gas. The age estimate is based on one count for 2000 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 25.996±0.124, 2.255±0.036, and 28.572±0.180 cpm, respectively.

The uncorrected age is 760±60.

TO-2131 Esquimalt Lagoon (II) 3730±60

The wood sample (CIA-90-131-15) was enclosed in peat at a depth of 1 m (msl) near the base of the peat unit and 40 cm below GSC-5159.

Comment (**J.J. Clague**): The peat dated by GSC-5159 underlies a gravelly spit enclosing Esquimalt Lagoon. The peat probably was deposited when sea level was slightly lower relative to the land than today.

British Columbia (Fig. 8 and Fig. 9)

Port Alberni Series

A series of wood samples from Port Alberni, British Columbia (49^0 15.2'N, 124^0 49.6'W) was collected by J.J. Clague and P.T. Bobrowsky on July 29, 1990; submitted by J.J. Clague.

GSC-5174 Port Alberni (I) 360±50

$\delta^{13}C$= -25.7‰

The single piece wood, sample CIA-90-132-1 (9.2 g dry weight; *Picea*; identified by R.J. Mott (unpublished GSC Wood Report No. 90-59)), enclosed in sand at an elevation of 0 m, was treated with hot base, hot acid, and distilled water rinses (noncalcareous). The treated sample (7.5 g) yielded 7.23 L of CO_2 gas. The age estimate is based on one count for 3160 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 27.122±0.103, 2.233±0.035, and 28.426±0.139 cpm, respectively.

The uncorrected age is 380±50.

Comment (**J.J. Clague**): The dated wood was collected from a thin sheet of sand within an intertidal mud and peat succession at the head of Alberni Inlet. This sand sheet is interpreted to have been deposited by a tsunami; the radiocarbon age suggests this event occurred sometime after 360 BP (note: the wood is detrital, thus the date is a maximum for the age of the enclosing sediments). A similar sand sheet near the top of the succession and about 60 cm above the dated layer was emplaced by the destructive tsunami generated by the 1964 Alaskan earthquake.

GSC-5182 Port Alberni (II) 1570±70

$\delta^{13}C$= -30.0‰

The single piece wood, sample CIA-90-132-8 (4.9 g dry weight; *Abies*; identified by R.J. Mott (unpublished GSC Wood Report No. 90-61)), enclosed in silt and sand at a depth of 1 m, was treated with hot base, hot acid, and distilled water rinses (noncalcareous). The treated sample (4.9 g) yielded 4.33 L of CO_2 gas. The age estimate is based on two counts for 1760 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 14.994±0.098, 1.057±0.020, and 18.411±0.103 cpm, respectively.

The uncorrected age is 1650±70.

Comment (**J.J. Clague**): The dated sample was collected from a sandy mud or muddy fine sand of probable intertidal origin. These sediments are overlain by three sheets of sand, the lowermost of which has a gravelly base. The sand sheets are interpreted to be tsunami deposits, and GSC-5182 indicates that all three are younger than 1570 BP. The lowest sand sheet was deposited between 1570 and 360 BP (GSC-5174); the middle sheet is younger than 360 BP; and the uppermost sheet was deposited by a tsunami in 1964 that was triggered by a great earthquake in Alaska.

British Columbia (Fig. 8 and Fig. 9)

GSC-5127 Grice Bay 5280±70

$\delta^{13}C = +0.1‰$

The marine shells were enclosed in sand. Sample CIA-90-115-9 was collected by J.J. Clague on July 13, 1990 from Grice Bay, 14 km southeast of Tofino, British Columbia (49^0 4.6'N, 125^0 44.8'W), at a depth of 1 m (msl); submitted by J.J. Clague.

The sample (54.7 g dry weight) was treated with an acid leach to remove the outer 30% of the sample. The treated sample (37.9 g) yielded 8.61 L of CO_2 gas. The age estimate is based on two counts for 2070 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net), and monthly backgrounds and standards (net) were 14.578±0.094, 2.149±0.028, and 28.117±0.107 cpm, respectively.

The uncorrected age is 5280±70.

Comment (**J.J. Clague**): The dated sediments were probably deposited in an intertidal or shallow subtidal environment. Comparable environments in this area today are slightly lower than the level of the dated material. This suggests that sea level at about 5.2 ka was slightly higher relative to the land than at present.

British Columbia (Fig. 8 and Fig. 9)

Maltby Slough Series

A series of wood samples from Maltby Slough, 7 km south-southeast of Tofino, British Columbia (49^0 5.8'N, 125^0 50.9'W), at an elevation of about 0 m (msl), was collected by J.J. Clague and P.T. Bobrowsky on July 11, 1990.

AECV-1205C Maltby Slough (I) 7070±120
$\delta^{13}C$= -25.1‰

The wood, a single piece from a stump, sample PTB90-94-01 (*Abies*; identified by M-L. Florian) was enclosed in intertidal mud.

GSC-5106 Maltby Slough (II) 7900±100
$\delta^{13}C$= -23.3‰

The single piece wood, sample CIA-90-111 (18.0 g dry weight; *Picea*; identified by R.J. Mott (unpublished GSC Wood Report No. 90-55)) enclosed in mud, was treated with hot base, hot acid, and distilled water rinses (noncalcareous). The treated sample (7.1 g) yielded 7.04 L of CO_2 gas. The age estimate is based on two counts for 1733 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 10.637±0.093, 2.172±0.034, and 28.328±0.234 cpm, respectively.

The uncorrected age is 7870±100.

Comment (**J.J. Clague**): The wood dated by GSC-5106 comprises the outermost rings of a stump in growth position. This stump is one of several occurring within the present-day intertidal zone south-southeast of Tofino. This date and AECV-1205C show that sea level was lower relative to the land during the early Holocene than at present. This period of low sea levels was both preceded and followed by periods when sea level was higher than today (Bobrowsky and Clague, 1992).

Yukon Territory (Fig. 10)

Volcano Mountain Series

A series of organic lake sediment samples was collected from an unnamed lake 3.5 km southwest of Volcano Mountain and 8 km northwest of Pelly Ranch, Yukon Territory (62° 53'N, 137° 24'W), at an elevation of 2300 m, by L. Cwynar on July 7, 1989; submitted by L.E. Jackson, Jr.

GSC-5143 Volcano Mountain (I) 3210±70
$\delta^{13}C$= -27.5‰

The organic lake sediment sample 070789 RC 1B (TSE-2; 87.8 g wet weight), enclosed in silty organic mud, was treated with hot acid and distilled water rinses; base treatment was omitted. The treated sample (54.2 g) yielded 5.49 L of CO_2 gas. The age estimate is based on two counts for 2090 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 12.333±0.084, 1.099±0.023, and 18.484±0.104 cpm, respectively.

The uncorrected age is 3250±70.

GSC-5141 Volcano Mountain (II) 4210±90
$\delta^{13}C$= -28.2‰

The organic lake sediment sample 070789 RC 1A (TSE-1; 102.0 g wet weight), enclosed in silty organic mud, was treated with hot acid and distilled water rinses; base treatment was omitted (noncalcareous). The treated sample (73.5 g) yielded 7.44 L of CO_2 gas. The age estimate is based on two counts for 2130 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 10.892±0.086, 1.150±0.032, and 18.513±0.124 cpm, respectively.

The uncorrected age is 4260±90.

Comment (**L.E. Jackson, Jr.**): Samples TSE-2 (GSC-5143) and TSE-1 (GSC-5141) provide minimum ages for the latest eruption of Volcano Mountain.

Northwest Territories (mainland) (Fig. 11)

GSC-47 2 Arrowsmith River 8730±80
$\delta^{13}C = 0.33‰$

The marine shells were enclosed in marine silt. Sample CD/TJ/224f/60 was collected by M. Tremblay in 1960, from Arrowsmith River, District of Keewatin, Northwest Territories (68° 5'N, 90°9'W), at an elevation of 171 m; submitted by R. McNeely.

The sample (29.8 g dry weight) was treated with no treatment. The treated sample (29.8 g) yielded 6.89 L of CO_2 gas. The age estimate is based on one count for 5230 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 9.567±0.058, 2.233±0.034, and 28.337±0.129 cpm, respectively.

The uncorrected age is 8720±80.

For comments see discussion on "Crosschecks" in the "Introduction" section. Original date published in Dyck and Fyles (1963).

Northwest Territories (mainland) (Fig. 11)

GSC-5234 Kinga Lake 6800±120

$\delta^{13}C = +1.9‰$

The marine shells (*Hiatella arctica*; identified by A.S. Dyke) were enclosed in surface collection and underlain by till. Sample D.E.C. Green 01 was collected by D.E.C. Green on August 4, 1990 from 10 km east of the former Hudson Bay Company Post (Padlei), Kinga Lake, central District of Keewatin, Northwest Territories (61° 56'N, 96° 27'55"W), at an elevation of 110 m; submitted by A.S. Dyke.

The sample (17.4 g dry weight) was treated with an acid leach to remove the outer 10% of the sample. The treated sample (15.8 g) yielded 3.53 L of CO_2 gas. The age estimate is based on two counts for 2480 minutes in the 2 L counter with a mixing ratio of 1.29. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 7.913±0.103, 1.110±0.028, and 18.388±0.133 cpm, respectively.

The uncorrected age is 6770±120.

Comment (**A.S. Dyke**): This sample consisted of *Hiatella arctica* valves only collected from the dry, depleted surface of till at about 110 m elevation, interpolated from a topographic map with a 10 m contour interval. Marine limit has been mapped in the area by Aylsworth et al. (1986) as lying between the 500 and 600 foot contours (about 170 m). Lake sediment from a nearby lake at 110 m elevation dated 5080±170 (GSC-2634; Blake, 1983), a minimum date on emergence of that level. According to the relative sea level curve for central Keewatin in Dyke and Dredge (1989), the 110 m level emerged about 6 ka. GSC-5234 provides a maximum date on emergence of the 110 m level and a minimum date on deglaciation of a site near the final position of the Keewatin Ice Divide.

Northwest Territories (mainland) (Fig. 11)

GSC-5186 Pine Point 7210±100
$\delta^{13}C$= -27.2‰

The peat was enclosed in the base of a 95 cm thick peat bed and underlain by wave-washed till. Sample 90-LJA-017-01 was collected by D.S. Lemmen on June 16, 1990, from 0.4 km south of highway 6, 7 km southwest of the former townsite of Pine Point, District of Mackenzie, Northwest Territories (60° 47.5'N, 114° 36'W), at an elevation of about 230 m; submitted by D.S. Lemmen.

The sample (77.6 g dry weight) was treated with cold base, hot acid, and distilled water rinses (slightly calcareous). The treated sample (20.5 g) yielded 8.13 L of CO_2 gas. The age estimate is based on one count for 3500 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 7.396±0.055, 1.087±0.025, and 18.225±0.161 cpm, respectively.

The uncorrected age is 7240±100.

Comment (**D.S. Lemmen**): This sample provides a date for the initial paludification at the site on the Great Slave Plain. It also serves as a minimum estimate of the regression of glacial Lake McConnell across the 230 m a.s.l. shoreline. A comparison with Vanderburgh and Smith (1988) data suggests a period of at least 1.0 ka between shoreline regression and the initiation of peat growth.

Northwest Territories (mainland) (Fig. 11)

GSC-39 2 Rae River 9490±80

$\delta^{13}C = +1.83‰$

The marine shell fragments (*Mya* and *Hiatella* mixed collection) were enclosed in marine clay. Sample CD/DA/194/59 was collected by W.L. Davidson in 1959, from Rae River, Coronation Gulf, District of Mackenzie, Northwest Territories (67° 57'N, 115° 38'W), at an elevation of 8 m; submitted by R. McNeely.

The sample (31.3 g dry weight) was treated with no treatment. The treated sample (31.3 g) yielded 7.1 L of CO_2 gas. The age estimate is based on one count for 3900 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 8.661±0.061, 2.197±0.031, and 28.117±0.130 cpm, respectively.

The uncorrected age is 9460±80.

For comments see discussion on "Crosschecks" in the "Introduction" section. Original date published in Dyck and Fyles (1963).

Northwest Territories (mainland) (Fig. 11)

"Hornaday" lake Series

A series of wood and peat samples from the east shore of "Hornaday" lake (informal name), District of MacKenzie, Northwest Territories (68° 43'N, 120° 38'W), at an elevation of 515 m, was collected by S.C. Zoltai on July 26, 1990; submitted by S.C. Zoltai.

GSC-5194 "Hornaday" lake (I) 1680±90
$\delta^{13}C$= -29.3‰

The peat sample HP-2 (30-34 cm; 115.7 g wet weight), enclosed in peat, was treated with cold base, hot acid, and distilled water rinses (moderately calcareous). The treated sample (10.7 g) yielded 7.35 L of CO_2 gas. The age estimate is based on two counts for 2040 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 14.653±0.091, 1.087±0.025, and 18.225±0.161 cpm, respectively.

The uncorrected age is 1750±90.

Comment (**S.C. Zoltai**): The peat deposit occurs in a high centre polygon with bare, oxidizing peat surface. The sample was taken from beneath the rooting zone to avoid contamination. The date indicates the approximate cessation of peat accumulation, possibly due to the drainage of the peatland by the deepening polygon trenches.

GSC-5188 "Hornaday" lake (II) 3980±100
$\delta^{13}C$= -28.5‰

The peat sample HP-3 (115-117 cm; 100.9 g dry weight), enclosed in peat, was treated with cold base, hot acid, and distilled water rinses (noncalcareous). The treated sample (9.1 g) yielded 8.20 L of CO_2 gas. The age estimate is based on two counts for 1800 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 11.033±0.086, 1.087±0.025, and 18.225±0.161 cpm, respectively.

The uncorrected age is 4030±100.

Comment (**S.C. Zoltai**): The peat deposit occurs in a high centre polygon, dissected by eroding polygon trenches. The peat sample dates the initiation of peat deposition in an arctic environment. As the present rate of peat formation is very slow in the region, this date indicates a climate that was somewhat more favourable for the growth of peat-forming vegetation.

GSC-5129 "Hornaday" lake (III) >40 000
$\delta^{13}C$= -25.7‰

The wood sample HW-2 (14.2 g dry weight; *Larix*; identified by R.J. Mott (unpublished GSC Wood Report No. 91-01)), enclosed in surface collection on beach sand, was treated with hot base, hot acid, and distilled water rinses (noncalcareous). The treated sample (8.7 g) yielded 8.72 L of CO_2 gas. The age estimate is based on two counts for 1600 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were -0.086±0.045, 2.149±0.028, and 28.117±0.107 cpm, respectively.

GSC-5115 "Hornaday" lake (IV) > 41 000
$\delta^{13}C$= -25.9‰

The wood sample HW-1 (13.8 g dry weight; *Pinus strobus* type; identified by R.J. Mott (unpublished GSC Wood Report No. 91-02)), was treated with hot base, hot acid, and distilled water rinses (noncalcareous). The treated sample (8.6 g) yielded 8.67 L of CO_2 gas. The age estimate is based on one count for 3430 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were -0.015±0.042, 2.172±0.034, and 28.328±0.234 cpm, respectively.

Comment (**S.C. Zoltai**): The source of the wood was not found on land. The deposit is probably under the shallows of the lake and is being released through the degradation of permafrost. As the wood appears to be fresh, although blackened, and floats on water, it was assumed to be of Holocene age. However, the old date and the southern boreal pine species indicate an interglacial age. Other possible sources can be eliminated, as Tertiary deposits are not known to occur in the region, and the site lies far above Pleistocene marine limits.

Northwest Territories (mainland) (Fig. 11)

GSC-5154 Fort Simpson 270±60

The sandy peat was enclosed in dune sand. Sample FS-1 was collected by C. Bégin and Y. Michaud on July 31, 1990, from 10 km west of Fort Simpson, District of Mackenzie, Northwest Territories (61° 53'N, 121° 30'W), at an elevation of 159 m; submitted by C. Bégin and Y. Michaud.

The sample (28.8 g dry weight) was treated with cold base, hot acid, and distilled water rinses (slightly calcareous). The treated sample (9.6 g) yielded 3.80 L of CO_2 gas. The age estimate is based on two counts for 5370 minutes in the 2 L counter with a mixing ratio of 1.18. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 17.870±0.079, 1.099±0.023, and 18.484±0.104 cpm, respectively.

Northwest Territories (mainland) (Fig. 11)

Norman Wells Series

GSC-5131 Norman Wells (I) 17 600±180
$\delta^{13}C$= -30.2‰

The organic detritus was enclosed in sand. Sample DOA 16-90 was collected by A. Duk-Rodkin on August 12, 1990 from 80.4 km northwest of Norman Wells, District of Mackenzie, Northwest Territories (64° 58'N, 125° 27'W), at an elevation of 150 m; submitted by A. Duk-Rodkin and O.L. Hughes.

The sample (27.1 g dry weight) was treated with hot base, hot acid, and distilled water rinses (noncalcareous). The treated sample (23.3 g) yielded 8.07 L of CO_2 gas. The age estimate is based on two counts for 3400 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net), and monthly backgrounds and standards (net) were 3.124±0.056, 2.149±0.028, and 28.117±0.107 cpm, respectively.

The uncorrected age is 17 600±180.

Comment (**A. Duk-Rodkin**): The organic detritus was obtained from deltaic sediments south of Great Bear River and near the confluence with the Mackenzie River. These organic sediments presumably have been contaminated with coal. The purpose of dating this sample was to verify the 10.6 ka date obtained for GSC-2328 (Lowdon and Blake, 1979), but the age is anomalously old. Wood fragments and other identifiable organic matter should have been dated instead of the bulk sample.

GSC-5164 Norman Wells (II) 260±50
$\delta^{13}C$= -26.5‰

The wood detritus was enclosed in sand silt. Sample DOA 29-90 b was collected by A. Duk-Rodkin on August 22, 1990 from a bank 2 m above river level, at the confluence of the Keele River and a northern tributary, 141.6 km south-southwest of Norman Wells, District of Mackenzie, Northwest Territories (64°13'N, 125°30'W), at an elevation of 200 m; submitted by A. Duk-Rodkin.

The sample (17.9 g wet weight) was treated with hot base, hot acid, and distilled water rinses (noncalcareous). The treated sample (8.2 g) yielded 8.04 L of CO_2 gas. The age estimate is based on two counts for 1960 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net), and monthly backgrounds and standards (net) were 27.448±0.128, 2.233±0.035, and 28.426±0.139 cpm, respectively.

The uncorrected age is 280±50.

Comment (**A. Duk-Rodkin**): This date reflects a catastrophic flood that occurred about 300 years ago. The wood was obtained from flood deposits of two interfingering streams, the Keele River and a small tributary.

Northwest Territories (mainland) (Fig. 11)

GSC-5092 Involuted Hill > 29 000
$\delta^{13}C$= -24.0‰

The wood (*Picea*; identified by R.J. Mott (unpublished GSC Wood Report No. 90-37)) was overlain by 7 m of sand, 16 m of massive ice and 4 m of diamicton. Sample DHA 1H882 2700 was collected by S.R. Dallimore on September 7, 1988 from Involuted Hill, 1.5 km northwest of village of Tuktoyaktuk, District of McKenzie, Northwest Territories (69^{0} 28'N, 132^{0} 38'W), at an elevation of about 0 m; submitted by S.R. Dallimore.

The sample (1.8 g dry weight) was treated with hot base, hot acid, and distilled water rinses (noncalcareous). The treated sample (1.5 g) yielded 1.62 L of CO_2 gas. The age estimate is based on one count for 3575 minutes in the 2 L counter with a mixing ratio of 2.74. The count rates for the sample (net), and monthly backgrounds and standards (net) were 0.137±0.082, 1.092±0.024, and 18.125±0.241 cpm, respectively.

Comment (**S.R. Dallimore**): The non-finite age confirms that the organic-rich sand in which the wood was contained is likely the Kidluit Formation (after Rampton, 1988).

Northwest Territories (mainland) (Fig. 11)

GSC-5136 Eskimo Lake Peninsula 3430±100
$\delta^{13}C$= -27.6‰

The peat with twigs was enclosed in peat. Sample EL-3 was collected by C. Bégin and Y. Michaud on August 9, 1990, from 55 km north of Inuvik, Eskimo Lake Peninsula, District of Mackenzie, Northwest Territories (68° 50'N, 133° 26'W), at an elevation of 50 m; submitted by C. Bégin and Y. Michaud.

The sample (57.1 g dry weight) was treated with cold base, hot acid, and distilled water rinses. The treated sample (11.9 g) yielded 8.36 L of CO_2 gas. The age estimate is based on two counts for 3200 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 12.084±0.122, 1.094±0.019, and 18.531±0.106 cpm, respectively.

The uncorrected age is 3440±100.

Northwest Territories (mainland) (Fig. 11)

Hooper Island Series

A series of peat samples from the north side of Hooper Island, Mackenzie Delta, District of Mackenzie, Northwest Territories (69° 42'N, 134° 53'W), at an elevation of 15 m, was collected by P.A. Egginton on August 1, 1989; submitted by P.A. Egginton.

GSC-4979 Hooper Island (I) 1310±80
$\delta^{13}C$= -27.3‰

The peat sample EK89-1 (35.0 g wet weight), enclosed in fine sand, was treated with hot acid and distilled water rinses; base treatment was omitted (noncalcareous). The treated sample (7.2 g) yielded 3.25 L of CO_2 gas. The age estimate is based on two counts for 2010 minutes in the 2 L counter with a mixing ratio of 1.26. The count rates for the sample (net), and monthly backgrounds and standards (net) were 15.214±0.106, 1.013±0.022, and 17.992±0.133 cpm, respectively.

The uncorrected age is 1350±80.

GSC-4980 Hooper Island (II) 760±80
$\delta^{13}C$= -27.4‰

The peat sample EK89-1A (43.5 g wet weight), enclosed in sand, was treated with hot acid and distilled water rinses; base treatment was omitted (noncalcareous). The treated sample (10.4 g) yielded 4.78 L of CO_2 gas. The age estimate is based on two counts for 2000 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net), and monthly backgrounds and standards (net) were 16.281±0.096, 1.013±0.022, and 17.992±0.133 cpm, respectively.

The uncorrected age is 800±80.

Comment (**P.A. Egginton**): Two peat `balls' were found resting on top of a truncated ice wedge (i.e. a thaw unconformity). The dates indicate that the active layer was significantly deeper at this site about 760 to 1310 BP. This period is roughly coincident in time with the so-called medieval-warm period documented elsewhere in western Canada.

Baffin Island (Fig. 13 and Fig. 14)

GSC-241 2 McBean Bay 9460±90

$\delta^{13}C = +1.4‰$

The marine shells (*Hiatella arctica*; identified by A.S. Dyke) were collected from the surface on stony clay beach. Sample CD 25/63 was collected by B.G. Craig on July 5, 1963, from McBean Bay, Baffin Island, District of Franklin, Northwest Territories (72° 46'N, 89° 31'W), at an elevation of 81 m; submitted by R. McNeely.

The sample (35.9 g dry weight) was treated with an acid leach to remove the outer 20% of the sample. The treated sample (28.6 g) yielded 6.34 L of CO_2 gas. The age estimate is based on one count for 2460 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 8.776±0.073, 2.234±0.029, and 28.421±0.132 cpm, respectively.

The uncorrected age is 9440±90.

For comments see discussion on "Crosschecks" in the "Introduction" section. Original date was published in Dyck et al. (1965a, b).

Baffin Island (Fig. 13 and Fig. 14)

GSC-390 2 "Magda river" 5990±110
$\delta^{13}C = +1.68‰$

The marine shells were collected from the surface on sand. Sample CD 129/65 was collected by B.G. Craig on August 13, 1963, from "Magda river" (unofficial name), Baffin Island, District of Franklin, Northwest Territories (71° 39'N, 84° 13'W), at an elevation of 39 m; submitted by R. McNeely.

The sample (22.1 g dry weight) was treated with a hand-leached and then an acid leach to remove the outer 10% of the sample. The treated sample (18.8 g) yielded 2.59 L of CO_2 gas. The age estimate is based on two counts for 225 minutes in the 2 L counter with a mixing ratio of 1.68. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 8.629±0.101, 1.238±0.028, and 18.133±0.104 cpm, respectively.

The uncorrected age is 5960±110.

For comments see discussion on "Crosschecks" in the "Introduction" section. Original date reported in Dyck et al. (1966).

Baffin Island (Fig. 13 and Fig. 14)

GSC-392 2 Bourassa Bay 9250±90
Cape Kater $\delta^{13}C = +0.73‰$

The marine shells (*Hiatella arctica*; identified by A.S. Dyke) were collected from the surface of mudboils on stony silt. Sample CD 128/63 was collected by B.G. Craig on August 11, 1963, from top of knoll above highest distinct beach between Bourassa Bay and Cape Kater, southwest Brodeur Peninsula, Baffin Island, District of Franklin, Northwest Territories (71° 46'N, 89° 48'W), at an elevation of 95 m; submitted by R. McNeely.

The sample (42.4 g dry weight) was treated with a hand-leach then an acid leach to remove the outer 20% of the sample. The treated sample (33.9 g) yielded 7.60 L of CO_2 gas. The age estimate is based on two counts for 345 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 8.996±0.076, 2.234±0.029, and 28.421±0.132 cpm, respectively.

The uncorrected age is 9240±90.

For comments see discussion on "Crosschecks" in the "Introduction" section. Original date published in Dyck et al. (1966).

Baffin Island (Fig. 13 and Fig. 14)

Countess of Warwick Sound Series

A series of marine shell samples from Countess of Warwick Sound, north side, outer Frobisher Bay, southeast Baffin Island, District of Franklin, Northwest Territories (62°49.7'N, 65°31'W), at an elevation of 63 m, was collected by G.H. Miller on August 12, 1977; submitted by G.H. Miller.

GSC-5036 5L — Countess of Warwick Sound (I) — 10 400±90
$\delta^{13}C$= + 0.4‰

The marine shells (sample M77 BSh26; 100.1 g dry weight; *Mya truncata*; identified by G.H. Miller), enclosed in marine sands, were treated with an acid leach to remove the outer 20% of the sample. The treated sample (36.9 g) yielded 8.20 L of CO_2 gas. The age estimate is based on one count for 3200 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 7.791±0.062, 2.074±0.027, and 28.244±0.132 cpm, respectively.

The uncorrected age is 10 300±90.

GSC-5036 2L — Countess of Warwick Sound (II) — 10 400±120
$\delta^{13}C$= +0.43‰

A second count was made in the 2L counter. The age estimate is based on three counts for 2970 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 4.911±0.059, 1.049±0.019, and 17.851±0.099 cpm, respectively.

The uncorrected age is 10 400±120.

GSC-5037 5L — Countess of Warwick Sound (III) — 10 200±100
$\delta^{13}C$= + 0.2‰

The marine shells (sample M77 BSh27; 117.3 g dry weight; *Mya truncata*; identified by G.H. Miller), enclosed in marine sands, were treated with an acid leach to remove the outer 30% of the sample. The treated sample (36.4 g) yielded 8.18 L of CO_2 gas. The age estimate is based on two counts for 2050 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 7.974±0.075, 2.074±0.027, and 28.244±0.132 cpm, respectively.

The uncorrected age is 10 200±100.

GSC-5037 2L — Countess of Warwick Sound (IV) — 10 200±120
$\delta^{13}C$= 0.26‰

A second count was made in the 2L counter. The age estimate is based on two counts for 3412 minutes in the 2 L counter. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 5.070±0.055, 1.020±0.024, and 18.094±0.144 cpm, respectively.

The uncorrected age is 10 200±120.

Comment (**D.S. Kaufman** and **G.H. Miller**): With the addition of these two dates, we now have six radiocarbon dates from four laboratories on paired shells from this site. The two new dates agree favourably with the previously determined dates. The deposit was originally interpreted as the distal facies of a delta formed at the marine limit by breaching of a moraine-dammed lake shortly after deglaciation from the Hall Moraines (Miller, 1980). More recent work (Miller and Kaufman, 1990), however, shows that the deposit was formed prior to the Gold Cove readvance; it was overrun by Gold Cove ice, but was not completely removed. The age of a shell fragment collected from carbonate-rich drift exposed in a bluff across the river (10 375±80; AA-6303) is indistinguishable from the age of these shells, supporting our reinterpretation that this deposit predates the Gold Cove readvance. These dates were also reported in Kaufman and Williams (1992).

Baffin Island (Fig. 13 and Fig. 14)

GSC-5050 "Tiger ice cap" 460±50

$\delta^{13}C$= -25.7‰

A surface collection of moss (organic material), sample GRL-799-0, was made by G.H. Miller and R.A. Klassen on July 22, 1981 from "Tiger ice cap" (unofficial name), Baffin Island, District of Franklin, Northwest Territories (71° 19'N, 78° 44'W), at an elevation of 580 m; submitted by G.H. Miller.

The sample (24.4 g dry weight) was treated with hot base, hot acid, and distilled water rinses (noncalcareous). The treated sample (11.6 g) yielded 9.59 L of CO_2 gas. The age estimate is based on two counts for 2000 minutes in the 5 L counter with a mixing ratio of 1.00. The count rate for the sample (net), and monthly backgrounds and standards (net) were 26.633±0.123, 2.074±0.027, and 28.244±0.132 cpm, respectively.

The uncorrected age is 470±50.

Comment (**G.H. Miller**): This sample of dead moss from undisturbed patterned ground emerging beneath the centre of the former ice cap, provides a close maximum date for the onset of the last Little Ice Age expansion. This sample is close to the center rather than near the margin, which was the only exposed area in 1963 when Falconer collected (Falconer, 1966; I-1204, 330±75). The radiocarbon age is slightly older, which coupled with a more precise determination provides a better calibrated age for the onset of the last build up of permanent snow over the north-central Baffin Island plateau.

Baffin Island (Fig. 13 and Fig. 14)

GSC-5122 Brevoort Island 670±70

$\delta^{13}C = -27.0‰$

The peat sample, M90 BS2, was collected by G.H. Miller on July 22, 1990 from the west coast of Brevoort Island, southeast Hall Peninsula, Baffin Island, District of Franklin, Northwest Territories (63° 23'N, 64° 16'W), at an elevation of 1.5 m; submitted by G.H. Miller.

The sample (6.6 g dry weight) was treated with hot base, hot acid, and distilled water rinses (noncalcareous). The treated sample (4.3 g) yielded 3.90 L of CO_2 gas. The age estimate is based on two counts for 2070 minutes in the 2 L counter with a mixing ratio of 1.17. The count rate for the sample (net), and monthly backgrounds and standards (net) were 16.975±0.104, 1.094±0.019, and 18.531±0.106 cpm, respectively.

The uncorrected age is 700±70.

Comment (**G.H. Miller**): This date supports our earlier contention (summarized in Miller et al., 1977) that the outer southeast coast of Baffin Island is currently experiencing a relative sea level rise. The date is similar to several others from the region that fall between 0.5 and 2.0 ka. This date is also reported in Kaufman and Williams (1992).

Baffin Island (Fig. 13 and Fig. 14)

GSC-5149 Newton Fiord 9410±100
$\delta^{13}C = +0.8‰$

The marine shells (*Hiatella arctica* and *Mya truncata*; identified by G.H. Miller) were enclosed in sand. Sample M77 Bsh21 was collected by G.H. Miller on August 8, 1977 from the central reaches on the east side of Newton Fiord, northeast side of Frobisher Bay, southeast Baffin Island, District of Franklin, Northwest Territories (63° 7'N, 66° 13'W), at an elevation of 19 m; submitted by G.H. Miller.

The sample (51.5 g dry weight) was treated with an acid leach to remove the outer 30% of the sample. The treated sample (17.6 g) yielded 3.89 L of CO_2 gas. The age estimate is based on one count for 2600 minutes in the 5 L counter with a mixing ratio of 1.00. The count rate for the sample (net), and monthly backgrounds and standards (net) were 8.869±0.074, 2.255±0.036, and 28.572±0.180 cpm, respectively.

The uncorrected age is 9400±100.

Comment (**G.H. Miller**): This date supports the interpretation previously made on the basis of a single date from the head of the fiord that deglaciation was well underway by 9.5 ka, and that initial isostatic recovery was rapid. The Gold Cove readvance was at its maximum limit at 9.7 ka, and the regional marine limit in Newton Fiord is about 70 m asl, thereby indicating that sea level fell 30 m in about 200 radiocarbon years, or 15 m/century. The occurrence of prominent deltas below the marine limit at the fiord head at this site suggests either a brief halt in emergence, or a rapid pulse of sedimentation due to regional climate change. The rivers feeding these two valleys drain very different areas, thus the changes are unlikely to be related to local events in their catchments.

Baffin Island (Fig. 13 and Fig. 14)

GSC-5163 Frenchman Cove 8690±90
$\delta^{13}C = +2.7‰$

The marine shells (*Mya truncata*; identified by G.H. Miller) were enclosed in silty sand. Sample M77 Bsh 39 was collected by G.H. Miller on September 21, 1977 from Frenchman Cove, Inner Cyrus Field Bay, southeast Hall Peninsula, Baffin Island, District of Franklin, Northwest Territories (62° 58'N, 65° 16'W), at an elevation of 2 m; submitted by G.H. Miller.

The sample (32.2 g dry weight) was treated with an acid leach to remove the outer 20% of the sample. The treated sample (26.6 g) yielded 5.70 L of CO_2 gas. The age estimate is based on one count for 3870 minutes in the 2 L counter with a mixing ratio of 1.00. The count rate for the sample (net), and monthly backgrounds and standards (net) were 6.297±0.050, 1.099±0.023, and 18.484±0.104 cpm, respectively.

The uncorrected age is 8650±90.

Comment (**G.H. Miller**): The lack of evidence for ice nearby suggests that ice of the Cockburn readvance did not reach this site, although the abundance of sediment of Cockburn age suggests that there were glaciers farther up in the catchment. The region was covered by ice during the Gold Cove readvance, but apparently has been ice free since about 9.5 ka. This date is also reported in Kaufman and Williams (1992).

Baffin Island (Fig. 13 and Fig. 14)

Southwestern Cumberland Peninsula Series

A series of lake sediment samples from four sites north of Panguirtung, Baffin Island, District of Franklin, Northwest Territories (66° 16'N, 65° 45'W), at elevations of 545 to 848 m, was collected by A.P. Wolfe in June 1991; samples submitted by A.P. Wolfe.

BGS-1472 Nauyak Lake 9500±150
$\delta^{13}C$= -28.9‰

The gyttja sample (NKL-190), enclosed in silty lake sediment, was taken from a depth of 28-36 cm in the core.

Tulugak Lake

GSC-5483 Tulugak Lake (I) (37.5-45.5 cm) 8870±100
$\delta^{13}C$= -22.5‰

The lake sediment with moss (sample TKL-191-a 37.5-45.5 cm; 22.9 g wet weight; *Drepanocladus exannulatus*; identified by A.P. Wolfe), enclosed in silty gyttja, was treated with hot acid and distilled water rinses (base treament omitted; noncalcareous). The treated sample (20.8 g) yielded 4.11 L of CO_2 gas. The age estimate is based on one count for 3700 minutes in the 2 L counter with a mixing ratio of 1.08. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 6.076±0.052, 1.207±0.022, and 18.234±0.101 cpm, respectively.

The uncorrected age is 8830±100.

TO-3242 Tulugak Lake (II) (90-91 cm) 36 120±340

The bryophyte (moss) sample (TKL-191 90-91 cm; *Warnstorfia exannulata*; identified by A.P. Wolfe) was enclosed in silty gyttja.

Ukalik Lake

GSC-5496 Ukalik Lake (I) (22-28.5 cm) 3220±110
$\delta^{13}C$= -27.1‰

The dispersed organic material in lake sediment (sample UKL-L291-a 22-28.5 cm; 73.8 g wet weight), enclosed in silt and fine sand, was treated with hot acid and distilled water rinses; base treatment was omitted (noncalcareous). The treated sample (68.3 g) yielded 1.79 L of CO_2 gas. The age estimate is based on two counts for 2000 minutes in the 2 L counter with a mixing ratio of 2.44. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 12.220±0.155, 1.200±0.024, and 18.324±0.104 cpm, respectively.

The uncorrected age is 3250±110.

GSC-5492 Ukalik Lake (II) (66-73 cm) 6980±110
$\delta^{13}C$= -26.3‰

The plant and moss macrofossils sample (UKL-L291-b 66-73 cm; 91.7 g wet weight; *Drepanocladus exannulatus*; identified by A.P. Wolfe), enclosed in silt and fine sand, was treated with hot acid and distilled water rinses; base treatment was omitted (noncalcareous). The treated sample (86.0 g) yielded 2.34 L of CO_2 gas. The age estimate is based on one count for 3735 minutes in the 2 L counter with a mixing ratio of 1.89. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 7.668±0.084, 1.200±0.024, and 18.324±0.104 cpm, respectively.

The uncorrected age is 7000±110.

GSC-5486 Ukalik Lake (III) (89-95.5 cm) 9370±90
$\delta^{13}C$= -28.6‰

The gyttja sample (UKL-L291-c 89-95.5 cm; 31.2 g wet weight), enclosed in silty lake sediment, was treated with hot acid and distilled water rinses; base treatment was omitted (noncalcareous). The treated sample (27.9 g) yielded 5.38 L of CO_2 gas. The age estimate is based on one count for 6800 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 5.663±0.040, 1.200±0.024, and 18.324±0.104 cpm, respectively.

The uncorrected age is 9430±90.

TO-3241 Ukalik Lake (IV) (102-103 cm) 37 990±410

The bryophyte (moss) sample (UKL-L291 102-103 cm; *Warnstorfia exannulata*; identified by A.P. Wolfe) was enclosed in silty lake sediment.

Baffin Island (Fig. 13 and Fig. 14)

Amarok Lake

CAMS-11335 Amarok Lake (I) (11-12 cm) modern

The *in situ* moss sample (AKL-191 11-12 cm; *Warnstorfia exannulata*; identified by A.P. Wolfe) was enclosed in gyttja.

CAMS-11125 Amarok Lake (II) (29.5-30.5 cm) 8380±60

The *in situ* moss sample (AKL-191 29.5-30.5 cm; *Warnstorfia exannulata*; identified by A.P. Wolfe), was enclosed in gyttja.

CAMS-11122 Amarok Lake (III) (37.0-37.5 cm) 8890±70

The in situ moss sample (AKL-191 37.0-37.5 cm; *Warnstorfia exannulata*; identified by A.P. Wolfe), was enclosed in gyttja.

GSC-5478 Amarok Lake (IV) (37-45 cm) 10 500±110 $\delta^{13}C$= -28.1‰

The lake sediment with moss (sample AKL-191-a 37-45 cm; 30.4 g wet weight; *Drepanocladus exannulatus*; identified by A.P. Wolfe), enclosed in silty gyttja, was treated with hot acid and distilled water rinses (base treament omitted; noncalcareous). The treated sample (25.4 g) yielded 4.60 L of CO_2 gas. The age estimate is based on one count for 2690 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 4.922±0.053, 1.207±0.022, and 18.234±0.101 cpm, respectively.

The uncorrected age is 10 500±110.

CAMS-11121 Amarok Lake (V) (44-45 cm) 12 860±90

The in situ moss sample (AKL-191 44-45 cm; *Warnstorfia exannulata*; identified by A.P. Wolfe) was enclosed in gyttja.

CAMS-12256 Amarok Lake (VI) (68-69 cm) 17 330±1200

The *in situ* moss sample (AKL-191 68-69 cm; *Warnstorfia exannulata*; identified by A.P. Wolfe) was enclosed in gyttja.

CAMS-11340 Amarok Lake (VII) (111-113 cm) 18 730±90

The *in situ* moss sample (AKL-191 111-113 cm; *Warnstorfia exannulata*; identified by A.P. Wolfe) was enclosed in gyttja.

TO-3243 Amarok Lake (VIII) (112-113 cm) 20 110±340

The i*n situ* moss sample (AKL-191 112-113 cm; *Warnstorfia exannulata*; identified by A.P. Wolfe) was enclosed in gyttja.

GSC-5497 Amarok Lake (IX) (110-117 cm) > 38 000 $\delta^{13}C$= -29.7‰

The dispersed organic material in lake sediment (sample AKL-191-b 110-117 cm; 42.2 g wet weight; very sparse bryophyte fragments), enclosed in silty gyttja, was treated with hot acid and distilled water rinses; base treatment was omitted (noncalcareous). The treated sample (42.2 g) yielded 4.19 L of CO_2 gas. The age estimate is based on one count for 5370 minutes in the 2 L counter with a mixing ratio of 1.06. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 0.037±0.030, 1.200±0.024, and 18.324±0.104 cpm, respectively.

Comment (**A.P. Wolfe**): The four studied lakes are situated on a highly weathered, unglaciated, granitic upland (545-848 m) north of Pangnirtung. The recovery of pre-Holocene lake sediments, a major goal of this investigation, has been successful, although only Amarok Lake seems to preserve a continuous record. AMS dates of 36-38 ka (TO-3241, -3242) on bryophyte remains (principally *Warnstorfia exannulata*) from silty sediments in Ukalik and Tulugak lakes are interpreted as redeposited old mosses. The base of the Amarok Lake core has finite AMS dates in the 18-20 ka range (TO-3243, CAMS-11340), but a nonfinite bulk date from the same interval (GSC-5497). This discrepancy is problematic due to the very different effects the same degrees of contamination by young and old carbon will have. For example, if we consider the AMS dates to be correct, the bulk sediment, to have an apparent age too old by >20 ka, would have to have incorporated around 90% dead

Baffin Island (Fig. 13 and Fig. 14)

carbon with respect to ^{14}C. Despite very slow rates of organic matter decomposition that may constitute a potential source of carbon with old ^{14}C signatures, this mechanism is unlikely capable of accounting for the observed discrepancies. On the other hand, contamination by as little as 10% modern carbon is sufficient to procure apparent ages of 20 ka from mosses twice that age. Indeed, this possibility, resulting for example from bacterial growth during core storage, can unfortunately not be eliminated. The modern result from 11-12 cm in the same core (CAMS-11335), which was expected to be in the 2-4 ka range, may support the possibility of potential contamination, although coring and/or transport artefacts are also possible.

As far as Holocene sediments, basal gyttja dates (BGS-1472, GSC-5486, -5483, -5478; see also CAMS-11121) suggest that the abrupt transition from inorganic to organic sediments is of similar age in three of the lakes (8.8-9.5 ka), but considerably older at the highest site, Amarok Lake. The integrity of the Amarok Lake bulk date from 37-45 cm (GSC-5478) is verified by the two AMS dates at 37-37.5 cm (CAMS-11122) and 44-45 cm (CAMS-11121). Linear interpolation of the latter two dates gives a result very similar to the bulk date, for the depth upon which it is centred (41 cm). The bulk dates from Holocene sediments at Ukalik Lake (GSC-5496, -5492, -5486) indicate a nearly linear depth-age relationship. However, AMS results from in situ moss horizons in Amarok Lake (CAMS-11121, -11122, -11125) suggest much lower sediment accumulation rates for the initial basal gyttja than that deposited after about 9 ka. Although none of the Holocene bulk dates are suspect analytically, these data underscore the finer resolution obtainable by AMS, if sufficient macrofossils are present and *in situ*. This is particularly relevant given the very low overall sediment accumulation rates observed. It must be recognized that the dating of arctic lake sediments continues to present challenges that demand critical interpretations of all ^{14}C results. For example, despite considerable effort, none of the basal core sections have been satisfactorily dated, although the results do persuasively indicate the existence of terrestrial and aquatic refugia of Wisconsinan age in the study area.

The radiocarbon dates from the lakes studied are tabulated below. The AMS dates (TO- and CAMS-) are age determinations on macrofossils (mainly *Warnstorfia exannulata*), whereas the conventional dates (GSC- and BGS-) are on bulk sediment.

Depth (cm)	Lab No.	Age (1±2d)
Nauyak Lake		
28-36	BGS-1472	9500±150
Tulugak Lake		
37.5-45.5	GSC-5483	8870±1001
90-91	TO-3242	36 120±340
Ukalik Lake		
22-28.5	GSC-5496	3220±1101
66-73	GSC-5492	6980±1101
89-95.5	GSC-5486	9370±901
102-103	TO-3241	37 990±410
Amarok Lake		
11-12	CAMS-11335	modern
29.5-30.5	CAMS-11125	8380±60
37-37.5	CAMS-11122	8890±70
37-45	GSC-5478	10 500±1101
44-45	CAMS-11121	12 860±90
68-69	CAMS-12256	17 330±1200
111-113	CAMS-11340	18 730±90
112-113	TO-3243	20 110±340
110-117	GSC-5497	> 38 000

All dates are conventionally corrected to a $\delta^{13}C$=-25.00‰ PDB, and are reported in uncalibrated radiocarbon years before present (BP).A more complete discussion of these sites appears in Wolfe (1994a, b, c).

Baffin Island (Fig. 13 and Fig. 14)

GSC-5295 Point Kendall 5870±70

$\delta^{13}C$= -25.2‰

The driftwood (*Picea*; identified by H. Jetté (unpublished GSC Wood Report No. 91-61)) was enclosed in gravel. Sample 91-DCA-410 was collected by J. Hooper on July 11, 1991, from 7 km northwest of Point Kendall, Crown Prince Frederick Island, northwest Baffin Island, District of Franklin, Northwest Territories (70° 2'N, 86° 37'W), at an elevation of 68 m; submitted by A.S. Dyke.

The sample (16.1 g dry weight) was treated with hot base, hot acid, and distilled water rinses (noncalcareous). The treated sample (8.5 g) yielded 8.24 L of CO_2 gas. The age estimate is based on one count for 3760 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 13.650±0.076, 2.287±0.039, and 28.354±0.135 cpm, respectively.

The uncorrected age is 5870±70.

Comments (**J. Hooper**): The wood was wet when collected and was fissile with clay packed in the cracks and with some surficial green mould and lichens. The sample was partly cleaned and partly dried before shipping from the field. This sample was subject to a fire after being canned and before arriving in Ottawa. Some pieces of wood were charred and the plastic wrapper had melted onto the wood in places. Exterior wood was cut away before submission for dating. The small driftwood log was well embedded to a maximum depth of 18 cm in coarse beach gravel. Some clay was deposited around the wood after stranding. GSC-5295 provides a date on a 68 m relative sea level and on the chronology of driftwood penetration to Gulf of Boothia. The elevation is based on one altimeter measurement with 49 minutes between readings at sample site and at datum.

Baffin Island (Fig. 13 and Fig. 14)

GSC-5294 Crown Prince Frederick 4220±70
$\delta^{13}C$= -24.3‰

The driftwood (*Picea*; identified by H. Jetté (unpublished GSC Wood Report No. 91-65)) was enclosed in gravel. Sample 91-DCA-401 was collected by J. Hooper on July 8, 1991, from the north side of Crown Prince Frederick Island, northwest Baffin Island, District of Franklin, Northwest Territories (70° 4'N, 86° 46'W), at an elevation of 34.5 m; submitted by A.S. Dyke.

The sample (16.6 g dry weight) was treated with hot base, hot acid, and distilled water rinses (noncalcareous). The treated sample (8.4 g) yielded 8.17 L of CO_2 gas. The age estimate is based on two counts for 1910 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 16.787±0.107, 2.287±0.039, and 28.354±0.135 cpm, respectively.

The uncorrected age is 4210±70.

Comments (**J. Hooper**): A two-metre long driftwood log was well embedded in coarse beach gravel. The top of the log was nearly flush with the beach surface and it was embedded to a maximum depth of 30 cm. The wood was wet when collected and was fissile with clay packed in the cracks. The weathered exterior of the wood had minor contamination by lichens. Exterior wood was removed prior to submission for dating. GSC-5294 provides a date on a 34.5 m relative sea level and on the chronology of driftwood penetration to Gulf of Boothia. The elevation is based on two altimeter measurements with 18 minutes between readings at sample site and at sea level.

Baffin Island (Fig. 13 and Fig. 14)

GSC-5374 Whyte Inlet 3820±90

$\delta^{13}C = +1.9‰$

The marine shells (*Mya truncata*; identified by J. Hooper) were enclosed in sandy mud. Sample 91-DCA-470 was collected by J. Hooper on August 12, 1991, from 1 km north of the head of Whyte Inlet, northwest Baffin Island, District of Franklin, Northwest Territories (70° 7'N, 84° 47'W), at an elevation of 23.5 m; submitted by A.S. Dyke.

The sample (31.95 g dry weight) was treated with an acid leach to remove the outer 10% of the sample. The treated sample (29.1 g) yielded 6.23 L of CO_2 gas. The age estimate is based on two counts for 2110 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 11.311±0.081, 1.249±0.025, and 18.139±0.145 cpm, respectively.

The uncorrected age is 3790±90.

Comments (**J. Hooper**): The sample consisted of paired whole valves of *Mya truncata* (dominant) and *Hiatella arctica*, many with intact periostraca and syphons. Six valves of *Mya truncata* were rinsed and scrubbed to remove sediment and loose periostraca and submitted for dating. The shells were collected from a 60 cm thick horizon about 2 m below the top of an extensive delta surface. The shells were enclosed in sand that contained numerous dropstones. GSC-5374 provides a date on a 23.5 m relative sea level. The elevation is based on two altimeter measurements with 12 minutes between readings at the sample site and at high tide line.

Baffin Island (Fig. 13 and Fig. 14)

GSC-5345 Autridge Bay 5560±100

$\delta^{13}C = +2.1‰$

The marine shells (*Mya truncata*; identified by J. Hooper) were enclosed in silt with dropstones. Sample 91-DCA-454 was collected by J. Hooper on August 3, 1991, from 26 km east-northeast of the head of Autridge Bay, northwest Baffin Island, District of Franklin, Northwest Territories (70° 7'N, 85° 12'W), at an elevation of 44.5 m; submitted by A.S. Dyke.

The sample (17.6 g dry weight) was treated with an acid leach to remove the outer 10% of the sample. The treated sample (16.4 g) yielded 3.57 L of CO_2 gas. The age estimate is based on two counts for 1980 minutes in the 2 L counter with a mixing ratio of 1.26. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 9.105±0.089, 1.312±0.025, and 18.119±0.128 cpm, respectively.

The uncorrected age is 5530±100.

Comments (**J. Hooper**): The sample is dominated by *Macoma calcarea* and *Mya truncata* with single valves of *Clinocardium ciliatum* and *Serripes groenlandicus* and a gastropod. *Mya truncata* valves were rinsed and scrubbed to remove sediment and periostraca and submitted for dating. The shells, mostly whole valves that included several intact pair, were eroding from a face cut in silt with dropstones. GSC-5345 provides a maximum date on a 44.5 m relative sea level. The elevation is based on one altimeter measurement with 42 minutes between readings at the sample site and at datum.

Baffin Island (Fig. 13 and Fig. 14)

GSC-5395 Autridge Bay 5850±100
$\delta^{13}C = +2.63‰$

The marine shells (*Mya truncata*; identified by J. Hooper) were enclosed in sand. Sample 91-DCA-445 was collected by J. Hooper on July 30, 1991 from 24 km east-northeast of the head of Autridge Bay, northwest Baffin Island, District of Franklin, Northwest Territories (70° 7'N, 85° 15'W), at an elevation of 57.5 m; submitted by A.S. Dyke.

The sample (20.8 g dry weight) was treated with an acid leach to remove the outer 10% of the sample. The treated sample (18.7 g) yielded 4.10 L of CO_2 gas. The age estimate is based on two counts for 2000 minutes in the 2 L counter with a mixing ratio of 1.08. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 8.803±0.079, 1.249±0.025, and 18.139±0.145 cpm, respectively.

The uncorrected age is 5810±100.

Comments (**J. Hooper**): The sample submitted for dating consisted of six valves of *Mya truncata* rinsed and scrubbed to remove sediment and loose periostraca. Shells, mostly whole valves of *Mya truncata* and *Macoma calcarea*, many paired and with periostraca and syphons, were collected from a 50 cm thick horizon in deltaic sand with a few dropstones, interpreted as a former tidal flat, that is located 2 m below the top of the section. GSC-5331 provides a minimum date on a 57.5 m relative sea level. The elevation is based on two altimeter measurements with 25 minutes between readings at the sample site and at sea level.

Baffin Island (Fig. 13 and Fig. 14)

GSC-5364 Autridge Bay 3390±60

$\delta^{13}C = +2.0‰$

The marine shells (*Mya truncata*; identified by J. Hooper) were enclosed in mud. Sample 91-DCA-456 was collected by J. Hooper on August 4, 1991 from 22 km east of the head of Autridge Bay, northwest Baffin Island, District of Franklin, Northwest Territories (70° 7'N, 85° 17'W), at an elevation of 15.0 m; submitted by A.S. Dyke.

The sample (43.2 g dry weight) was treated with an acid leach to remove the outer 20% of the sample. The treated sample (37.1 g) yielded 7.46 L of CO_2 gas. The age estimate is based on two counts for 2000 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 18.562±0.108, 2.305±0.035, and 28.206±0.135 cpm, respectively.

The uncorrected age is 3360±60.

Comments (**J. Hooper**): This collection consists mainly of paired, whole valves, many with intact periostraca and syphons. The sample submitted for dating consists of whole valves of *Mya truncata* rinsed and scrubbed to remove sediment and loose periostraca. The shells, dominated by *Mya truncata* with minor *Serripes groenlandicus*, were collected from a 50 cm thick horizon in laminated sand mud with dropstones, located 1.5 m below the top of a section. The extensive surface at the top of the section is interpreted as a former tidal flat. GSC-5364 provides a maximum date on a 15.5 m relative sea level. The elevation is based on two altimeter measurements with 14 and 5 minutes between readings at the sample site and at sea level.

Baffin Island (Fig. 13 and Fig. 14)

GSC-5087 Cape Appel 5930±100
$\delta^{13}C = +1.9‰$

The marine shells (*Hiatella arctica*; identified by J. Hooper) were enclosed in silty clay. Sample 90-DCA-425 was collected by J. Hooper on July 17, 1990 from 5 km due east Cape Appel, Baffin Island, District of Franklin, Northwest Territories (70° 7'N, 86° 7'W), at an elevation of 65.5 m; submitted by A.S. Dyke.

The sample (28.3 g dry weight) was treated with an acid leach to remove the outer 10% of the sample. The treated sample (25.5 g) yielded 5.30 L of CO_2 gas. The age estimate is based on two counts for 1950 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 8.698±0.076, 1.029±0.028, and 18.121±0.154 cpm, respectively.

The uncorrected age is 5900±100.

Comments (**J. Hooper**): The sample consisted of whole valves and fragments of *Hiatella arctica* variably weathered and encrusted with secondary calcite, red silt, and grey and black lichens. A split of the better material was cleaned by cavitron to remove chalky and flaky material and calcite. The shells were collected from the surface of an extensive, eroding, raised marine sediment, 3 km south of a large marine-limit delta measured at 119 m elevation. GSC-5087 provides a maximum date on a 65 m relative sea level.

Baffin Island (Fig. 13 and Fig. 14)

GSC-5331 Autridge Bay 6350±100
$\delta^{13}C = +3.00‰$

The marine shells (*Mya truncata*; identified by J. Hooper) were enclosed in sand. Sample 91-DCA-455 was collected by J. Hooper on August 4, 1991 from 22 km east-northeast of the head of Autridge Bay, northwest Baffin Island, District of Franklin, Northwest Territories (70° 8'N, 85° 16'W), at an elevation of 65.0 m; submitted by A.S. Dyke.

The sample (26.7 g dry weight) was treated with an acid leach to remove the outer 20% of the sample. The treated sample (22.5 g) yielded 3.96 L of CO_2 gas. The age estimate is based on two counts for 2080 minutes in the 2 L counter with a mixing ratio of 1.13. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 8.341±0.080, 1.288±0.028, and 18.276±0.111 cpm, respectively.

The uncorrected age is 6300±100.

Comments (**J. Hooper**): This collection consists of paired, whole valves, many with intact periostraca and syphons. The shells were collected from a 60 cm thick horizon 1 m below the top of a section in massive deltaic sand. A marine-limit delta above the sample site is at 118.5 m. The sample consists of *Mya truncata*, *Hiatella arctica*, *Macoma calcarea*, *Serripes groenlandicus*, *Clinocardium ciliatum*, and one valve of *Mya*-like shell without the truncated end, likely *Mya pseudoarenaria*. Valves of *Mya truncata*, rinsed and scrubbed to remove sediment and loose periostracum, were submitted for dating. GSC-5395 provides a maximum date on a 65 m relative sea level and a minimum age on deglaciation and marine limit. The elevation is based on 2 altimeter measurements with 32 minutes between readings at the sample site and sea level.

Baffin Island (Fig. 13 and Fig. 14)

GSC-5372 Whyte Inlet 6310±80

$\delta^{13}C = +3.1‰$

The marine shells (*Mya truncata*; identified by J. Hooper) were enclosed in muddy sand. Sample 91-DCA-461 was collected by J. Hooper on August 7, 1991 from 8 km north of the head of Whyte Inlet, northwest Baffin Island, District of Franklin, Northwest Territories (70° 11'N, 84° 41'W), at an elevation of 71.0 m; submitted by A.S. Dyke.

The sample (24.0 g dry weight) was treated with an acid leach to remove the outer 20% of the sample. The treated sample (19.2 g) yielded 4.44 L of CO_2 gas.The age estimate is based on one count for 3900 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 8.316±0.057, 1.238±0.028, and 18.133±0.104 cpm, respectively.

The uncorrected age is 6260±80.

Comments (**J. Hooper**): The shells of *Mya truncata* and *Hiatella arctica* were collected from a maximum depth of 30 cm in slumping wet sands in a thaw gully at the foot of a marine limit delta the terrace of which is at 114 m elevation. The sample includes several paired valves. Four whole valves of *Mya truncata*, rinsed and scrubbed to remove sediment and loose periostraca, were submitted for dating. GSC-5372 provides a maximum date on a 71 m relative sea level and a minimum date on marine limit (114 m) and on deglaciation. The elevation is based on two altimeter measurements with six minutes between readings at the sample site and datum.

Baffin Island (Fig. 13 and Fig. 14)

GSC-5327 Cape Godfred Hansen 7670±130

The marine shells (*Hiatella arctica*; identified by J. Hooper) were collected from the surface of mudboils in stony silt. Sample 91-DCA-435 was collected by J. Hooper on July 25, 1991 from 10 km northeast of Cape Godfred Hansen, Agu Bay area, northwest Baffin Island, District of Franklin, Northwest Territories (70° 20'N, 86° 48'W), at an elevation of 95.5 m; submitted by A.S. Dyke.

The sample (19.7 g dry weight) was treated with an acid leach to remove the outer 10% of the sample. The treated sample (17.9 g) yielded 3.75 L of CO_2 gas. The age estimate is based on one count for 3490 minutes in the 2 L counter with a mixing ratio of 1.19. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 7.080±0.089, 1.188±0.059, and 18.396±0.155 cpm, respectively.

Comments (**J. Hooper**): This collection consisted of fragments and a few whole valves with some calcite encrustation and adhering black lichens. The shells, dominated by *Hiatella arctica* with minor *Mya truncata*, were collected from the surface of a raised beach. A delta terrace thought to mark marine limit 10 km to the north was measured at 138 m elevation. The cleanest whole valves of *Hiatella arctica* were cleaned by cavitron to remove chalky exterior layers and submitted for dating. GSC-5327 provides a minimum date on marine limit and on deglaciation and a maximum date on a 95.5 m relative sea level. The elevation is based on two altimeter measurements with 20 minutes between readings at the sample site and at high tide line.

Baffin Island (Fig. 13 and Fig. 14)

GSC-5076 Foss Fiord 1140±80

$\delta^{13}C$= -24.9‰

The driftwood (*Picea*; identified by R.J. Mott (unpublished GSC Wood Report No. 90.42)) was collected from the surface underlain by gravel. Sample 90-DCA-404 was collected by J. Hooper on July 7, 1990 from 0.3 km west of west arm of Foss Fiord, Baffin Island, District of Franklin, Northwest Territories (70° 22'N, 87° 16'W), at an elevation of 3 m; submitted by A.S. Dyke.

The sample (12.8 g dry weight) was treated with hot base, hot acid, and distilled water rinses (noncalcareous). The treated sample (9.0 g) yielded 7.84 L of CO_2 gas. The age estimate is based on two counts for 2000 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 15.410±0.120, 1.003±0.022, and 17.754±0.102 cpm, respectively.

The uncorrected age is 1140±80.

Comment (**J. Hooper**): The driftwood was collected from the surface of washed till at 3 m altitude. It is one of very few collections of postglacial driftwood from northern Baffin Island. The surface of the wood was weathered grey and partly covered in grey lichens. Plant roots had found their way into the wood along cracks. The sample submitted for dating was cleaned by cutting away all surface wood and wood along cracks. GSC-5076 provides a date on a 3 m relative sea level and on driftwood penetration to southeastern Gulf of Boothia.

Baffin Island (Fig. 13 and Fig. 14)

GSC-5077 Kimatko Peninsula 4680±80

$\delta^{13}C$= -24.0‰

The driftwood (*Larix*; identified by R.J. Mott (unpublished GSC Wood Report No. 90-43)) was enclosed in beach gravel. Sample 90-DCA-414 was collected by J. Hooper on July 11, 1990 from 9.5 km north of the east end of Kimatko Peninsula, Foss Fiord area, Baffin Island, District of Franklin, Northwest Territories (70° 22'N, 87° 42'W), at an elevation of 36.5 m; submitted by A.S. Dyke.

The sample (13.0 g dry weight) was treated with hot base, hot acid, and distilled water rinses (noncalcareous). The treated sample (8.6 g) yielded 8.39 L of CO_2 gas. The age estimate is based on two counts for 1970 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 9.940±0.079, 1.003±0.022, and 17.754±0.102 cpm, respectively.

The uncorrected age is 4660±80.

Comments (**J. Hooper**): The driftwood was well embedded in raised beach gravel at 36.5 m altitude. It is one of very few collections of postglacial driftwood from northern Baffin Island. The sample was recovered from a large log. The wood is full of cracks, some of which have accumulated sediment but no obvious organic contaminants. The sample submitted for dating was cleaned by cutting away all surface wood and wood along cracks. This sample provides a date on a 36.5 m relative sea level and on driftwood penetration to southeastern Gulf of Boothia.

Baffin Island (Fig. 13 and Fig. 14)

GSC-5373 Foss Fiord 3200±80

$\delta^{13}C = +2.7‰$

The marine shells (*Mya truncata*; identified by J. Hooper) were enclosed in sandy mud. Sample 91-DCA-430 was collected by J. Hooper on July 20, 1991 from 1 km east of the head of the southeast arm of Foss Fiord, northwest Baffin Island, District of Franklin, Northwest Territories (70° 23'N, 86° 44'W), at an elevation of 8 m; submitted by A.S. Dyke.

The sample (26.0 g dry weight) was treated with an acid leach to remove the outer 20% of the sample. The treated sample (21.0 g) yielded 4.58 L of CO_2 gas. The age estimate is based on one count for 2400 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 12.251±0.079, 1.249±0.025, and 18.139±0.145 cpm, respectively.

The uncorrected age is 3150±80.

Comments (**J. Hooper**): The sample is dominated by *Macoma calcarea* or *Astarte borealis* with subdominant *Mya truncata*. The *Mya* are friable but well preserved. The shells were collected from laminated greenish-grey mud about 4 m below the top of a section. The shells came from a 40-50 cm thick horizon. The mud is overlain by raised beach gravel. The sample consists of numerous paired valves of with intact periostraca. Whole valves of *Mya* were rinsed and scrubbed to remove sediment and loose periostraca and submitted for dating. GSC-5373 provides a maximum date on an 8 m relative sea level. The elevation is based on two altimeter measurements with 8 minutes between readings at the sample site and at high tide line.

Baffin Island (Fig. 13 and Fig. 14)

GSC-5086 Navarana Lake 8540±100
$\delta^{13}C = +0.9‰$

The marine shells (*Hiatella arctica* and *Mya truncata*; identified by A.S. Dyke) were enclosed in stony silt. Sample 90-DCA-419 was collected by J. Hooper on July 13, 1990 from 3 km northwest of the south end of Navarana Lake, Foss Fiord, Baffin Island, District of Franklin, Northwest Territories (70° 29'N, 87° 11'W), at an elevation of 137.5 m; submitted by A.S. Dyke.

The sample (25.1 g dry weight) was treated with an acid leach to remove the outer 10% of the sample. The treated sample (22.6 g) yielded 5.16 L of CO_2 gas. The age estimate is based on one count for 5000 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 6.271±0.047, 1.029±0.028, and 18.121±0.154 cpm, respectively.

The uncorrected age is 8520±100.

Comments (**J. Hooper**): The shells were collected from the surface of stony silt. Raised beaches occur on the east side of a ridge below the collection site. These are the highest shells found in the area but they are not stratigraphically associated with a marine-limit feature. The sample consisted of whole valves and fragments of *Hiatella arctica* and *Mya truncata* variably weathered and encrusted with grey and black lichens. A split of the better material was cleaned by cavitron to remove chalky and flaky layers. GSC-5086 provides a minimum date on marine limit and on local deglaciation.

Baffin Island (Fig. 13 and Fig. 14)

GSC-5090 Bernier Bay 7910±120

$\delta^{13}C = +1.5‰$

The marine shells (*Mya truncata* and *Hiatella arctica*; identified by A.S. Dyke) were collected from the surface of a slightly stony marine silt. Sample 90-DCA-491 was collected by J. Hooper on August 9, 1990 from 15 km north-northwest of head of Bernier Bay, Brodeur Peninsula, Baffin Island, District of Franklin, Northwest Territories (71° 8'N, 87° 5'W), at an elevation of 92.5 m; submitted by A.S. Dyke.

The sample (22.1 g dry weight) was treated with an acid leach to remove the outer 10% of the sample. The treated sample (19.9 g) yielded 4.54 L of CO_2 gas. The age estimate is based on two counts for 1710 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 6.790±0.074, 1.029±0.028, and 18.121±0.154 cpm, respectively.

The uncorrected age is 7880±120.

Comments (**J. Hooper**): The shells were collected from the surface of slightly stony marine silt adjacent to and immediately below the terrace of a large marine-limit delta at 111 m elevation. The sample consisted of fragments of *Hiatella arctica* and *Mya truncata* along with a few whole valves all variably weathered and encrusted with secondary calcite and lichens. A split of the better material was cleaned by cavitron to remove chalky and flaky material and calcite. GSC-5090 provides a minimum date on marine limit and on local deglaciation.

Baffin Island (Fig. 13 and Fig. 14)

Berlinquet R. series

GSC-5089 Berlinguet River 6860±100
$\delta^{13}C = +1.1‰$

The marine shells (*Hiatella arctica* and *Mya truncata*; identified by J. Hooper and A.S. Dyke) were enclosed in pebbly clay. Sample 90-DCA-460 was collected by J. Hooper on August 1, 1990 from 11 km northwest of Berlinguet River mouth, Brodeur Peninsula, Baffin Island, District of Franklin, Northwest Territories (71° 10'N, 86° 25'W), at an elevation of 64 m; submitted by A.S. Dyke.

The sample (23.1 g dry weight) was treated with an acid leach to remove the outer 10% of the sample. The treated sample (20.8 g) yielded 4.74 L of CO_2 gas. The age estimate is based on one count for 3400 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 7.730±0.058, 1.029±0.028, and 18.121±0.154 cpm, respectively.

The uncorrected age is 6840±100.

Comments (**J. Hooper**): The shells were collected from the surface of a raised marine terrace on sandy silt with a pebble lag on the proximal (south) side of a large end moraine and about 47 m below a 111 m marine-limit delta. The delta occupies a gap in the moraine about 200 m north of the sample site. The sample consisted of fragments of *Hiatella arctica* and *Mya truncata* along with many whole valves of *H. arctica* and a few of *Astarte borealis* variably weathered and encrusted with secondary calcite and lichens, but mostly fairly clean. A split of the better material was cleaned by cavitron to remove chalky and flaky material and calcite. GSC-5089 provides a minimum date on marine limit and on local deglaciation.

GSC-5088 Berlinguet River 6840±140
$\delta^{13}C = +1.0‰$

The marine shells (*Hiatella arctica* and *Mya truncata*; identified by J. Hooper and A.S. Dyke) were enclosed in silty clay. Sample 90-DCA-459 was collected by J. Hooper on August 1, 1990 from 12 km northwest of Berlinguet River mouth, Brodeur Peninsula, Baffin Island, District of Franklin, Northwest Territories (71° 11'N, 86° 25'W), at an elevation of 68.5 m; submitted by A.S. Dyke.

The sample (22.4 g dry weight) was treated with an acid leach to remove the outer 10% of the sample. The treated sample (20.2 g) yielded 4.59 L of CO_2 gas. The age estimate is based on two counts for 1933 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 7.756±0.072, 1.092±0.024, and 18.125±0.241 cpm, respectively.

The uncorrected age is 6820±140.

Comments (**J. Hooper**): The shells were collected from the surface of a hummocky raised marine silt with a few dropstones on the distal (north) side of a large end moraine and about 42 m below the surface of a 111 m marine-limit delta. The delta occupies a gap in the moraine about 350 m southeast of the sample site. The sample consisted mostly of fragments of *Hiatella arctica* and *Mya truncata* along with a few whole valves of *H. arctica* and *Astarte borealis* variably weathered and encrusted with secondary calcite and lichens, but mostly fairly clean. A split of the better material was cleaned by cavitron to remove chalky and flaky material and calcite. GSC-5088 provides a minimum date on marine limit and on local deglaciation.

Baffin Island (Fig. 13 and Fig. 14)

GSC-5091 Bernier Bay 7640±110

$\delta^{13}C = +1.8‰$

The marine shells (*Mya truncata* and *Hiatella arctica*; identified by A.S. Dyke) were enclosed in gravel. Sample 90-DCA-500 was collected by J. Hooper on August 10, 1990 from 29 km northwest of head of Bernier Bay, Brodeur Peninsula, Baffin Island, District of Franklin, Northwest Territories (71° 12'N, 87° 29'W), at an elevation of 80.5 m; submitted by A.S. Dyke.

The sample (23.4 g dry weight) was treated with an acid leach to remove the outer 10% of the sample. The treated sample (20.6 g) yielded 4.71 L of CO_2 gas. The age estimate is based on two counts for 1960 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 7.021±0.070, 1.029±0.028, and 18.121±0.154 cpm, respectively.

The uncorrected age is 7620±110.

Comments (**J. Hooper**): The shells were collected from the surface of stony silt (likely washed till), about 4 to 5 m lower than the upper raised beaches on the side of a large end moraine to both east and west. The sample consisted of fragments of *Hiatella arctica* and *Mya truncata* along with a few whole valves all variably weathered and encrusted with secondary calcite and lichens. A split of the better material was cleaned by cavitron to remove chalky and flaky material and calcite. GSC-5091 provides a minimum date on marine limit and on local deglaciation.

Baffin Island (Fig. 13 and Fig. 14)

GSC-5084 Jungersen Bay 2900±60
$\delta^{13}C = +1.0‰$

The marine shells (*Mya truncata*; identified by A.S. Dyke) were enclosed in sand silt. Sample 90-DCA-104 was collected by A.S. Dyke on July 22, 1990 from Jungersen Bay, Borden Peninsula, Baffin Island, District of Franklin, Northwest Territories (71° 30.5'N, 84° 31'W), at an elevation of 1 to 3 m; submitted by A.S. Dyke.

The sample (51.0 g dry weight) was treated with an acid leach to remove the outer 20% of the sample. The treated sample (36.3 g) yielded 8.13 L of CO_2 gas. The age estimate is based on two counts for 1800 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 19.740±0.117, 2.196±0.038, and 28.279±0.131 cpm, respectively.

The uncorrected age is 2890±60.

Comments (**A.S. Dyke**): The shells were collected from a 2 m vertical interval in horizontally bedded sand silt with occasional dropstones. This deposit extends to 3.5 m above high tide line and is overlain by about 1 m of beach gravel, the whole forming a significant terrace at 4.5 m. The terrace appears to have formed as deltaic sediment was transported southward by longshore drift, thus causing the lower reach of the parent river to assume a course parallel to the present coastline for a distance of about 2 km (see airphoto A-16259-20). The dropstones are thought to have been deposited by sea ice rather than glacier ice. The sample submitted for dating was selected from a large collection of *Mya truncata* collected exclusively in growth position (paired valves in vertical positions with syphons extending upward). Periostraca and other soft tissue (syphon sheaths) were extensively preserved. Paired valves of *Mya* were cleaned by sandblaster and cavitron to remove periostraca and any chalky exterior layers prior to submission for dating. GSC-5084 provides a maximum date on a 4.5 m relative sea level.

Baffin Island (Fig. 13 and Fig. 14)

GSC-5073 Jungersen Bay 6620±90
$\delta^{13}C = +0.7‰$

The marine shells (*Mya truncata*; identified by A.S. Dyke) were enclosed in sand. Sample 90-DCA-69 was collected by A.S. Dyke on July 17, 1990 from Jungersen Bay, Borden Peninsula, Baffin Island, District of Franklin, Northwest Territories (71° 30.6'N, 84° 19.5'W), at an elevation of 60-66 m; submitted by A.S. Dyke.

The sample (50.4 g dry weight) was treated with an acid leach to remove the outer 20% of the sample. The treated sample (39.6 g) yielded 8.48 L of CO_2 gas. The age estimate is based on two counts for 2175 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 7.799±0.067, 1.003±0.022, and 17.754±0.102 cpm, respectively.

The uncorrected age is 6610±90.

Comments (**A.S. Dyke**): The shells were collected from horizontally bedded sand with dropstones up to 1 m across. The top of the sand at the collection site is at 68 m elevation but against the adjacent hill to the north the sand extends to 72 m. A large glaciomarine delta associated with a series of lateral meltwater channels to the south (same valley) lies at 72 m and records marine limit. The sample consisted mostly of large whole valves of *Mya truncata* and a few of *Serripes groenlandicus* and *Hiatella arctica*. Periostraca were common on the *Mya* valves. The subsample submitted for dating was cleaned by cavitron to remove chalky exterior layers. GSC-5073 provides a direct date on marine limit and deglaciation of a site near the head of Admiralty Inlet. The elevation is based on 1 altimeter measurement with 2 hours between sample site and sea level readings.

Baffin Island (Fig. 13 and Fig. 14)

GSC-5173 Sunday Bay 6430±70

$\delta^{13}C = +0.4‰$

The marine shells (*Mya truncata*; identified by A.S. Dyke) were enclosed in sand. Sample 90-DCA-154 was collected by A.S. Dyke on August 1, 1990 from Sunday Bay, Borden Peninsula, Baffin Island, District of Franklin, Northwest Territories (71° 40.6'N, 85° 9'W), at an elevation of 40-44 m; submitted by A.S. Dyke.

The sample (50.4 g dry weight) was treated with an acid leach to remove the outer 30% of the sample. The treated sample (40.3 g) yielded 8.04 L of CO_2 gas. The age estimate is based on one count for 3970 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 12.771±0.071, 2.233±0.035, and 28.426±0.139 cpm, respectively.

The uncorrected age is 6430±70.

Comments (**A.S. Dyke**): The shells were collected from 10 m section in deltaic sand extending to 49 m elevation directly above the sample site. This is the highest shell-rich deposit in the Sunday Bay area and it was laid down when relative sea level stood at or above 49 m. Many of the shells were paired and in growth position, particularly the *Mya truncata*. The sample also includes *Serripes groenlandicus* and *Hiatella arctica*, but *Mya truncata* is dominant. A bowhead whale maxillary bone is eroding from this section (not collected) and is higher than any other bowhead bone seen in this area. The shells submitted for dating were cleaned with a cavitron to remove any chalky or exfoliating outer shell layers. GSC-5173 provides a maximum date on a 49 m relative sea level. The elevation is based on two altimeter measurements with 13 minutes between top of section and high tide readings.

Baffin Island (Fig. 13 and Fig. 14)

GSC-5082 Sunday Bay > 31 000
$\delta^{13}C = -0.9‰$

The marine shells (*Hiatella arctica*; identified by A.S. Dyke) were enclosed in sand. Sample 90-DCA-126 was collected by A.S. Dyke on July 26, 1990 from Sunday Bay, Borden Peninsula, Baffin Island, District of Franklin, Northwest Territories (71° 49.7'N, 85° 22'W), at an elevation of 74 m; submitted by A.S. Dyke.

The sample (16.8 g dry weight) was treated with an acid leach to remove the outer 20% of the sample. The treated sample (13.4 g) yielded 3.40 L of CO_2 gas. The age estimate is based on two counts for 2200 minutes in the 2 L counter with a mixing ratio of 1.33. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 0.150±0.049, 1.029±0.028, and 18.121±0.154 cpm, respectively.

Comments (**A.S. Dyke**): The shells collected from a small stream bed and low sand bank in a marine-limit delta whose lip is at 88 m above high tide. These are the highest shells found in the delta but none were in growth position. Whole valves and fragments of *Hiatella arctica* without obvious contamination were cleaned by cavitron to remove chalky and flaky material. It was hoped that the sample would provide a minimum date on marine limit and on local deglaciation. However, in light of the age determination, it seems likely that the all or most of the shells were glacially transported and redeposited. The sample thus provides an indication of the minimum age of the nonglacial interval before the last Laurentide ice advance down Admiralty Inlet.

Baffin Island (Fig. 13 and Fig. 14)

GSC-5214 Sunday Bay 30 400±660

$\delta^{13}C = +0.67‰$

The marine shells (*Hiatella arctica*; identified by A.S. Dyke) were collected from the surface of a stony silt. Sample 90-DCA-127 was collected by A.S. Dyke on July 26, 1990 from Sunday Bay, Borden Peninsula, Baffin Island, District of Franklin, Northwest Territories (71° 50.5'N, 85° 23'W), at an elevation of 76 m; submitted by A.S. Dyke.

The sample (50.6 g dry weight) was treated with an acid leach to remove the outer 20% of the sample. The treated sample (39.8 g) yielded 8.85 L of CO_2 gas. The age estimate is based on one count for 2600 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 0.646±0.051, 2.048±0.039, and 28.302±0.166 cpm, respectively.

The uncorrected age is 30 400±660.

Comments (A**.S. Dyke**): The shells were collected from the surface of mud boils on glaciomarine stony silt locally forming a veneer over till at 76 m in front of an ice contact marine-limit delta whose lip is at 88 m above high tide. Extensive areas of high level silts were searched for shells and this was the only site where shells were found. This collection consists of fragments and whole valves in highly variable condition, many seriously degraded by pitting and lichen growth. A split of the best material was cleaned by cavitron, removing as much of the outer shell layers as possible. The sample submitted for dating had little discolouration remaining on the shell surfaces. It was hoped that GSC-5214 would provide a minimum date on marine limit. In light of the age determination, however, it is likely that the shells were glacially transported and redeposited. Deglaciation of this stretch of the Admiralty Inlet coast occurred about 8 ka as reported in earlier date lists.

Comment (**R. McNeely**): Although the age quoted is finite, this sample should be considered old and the finite age used with caution. The other attempt to date the marine limit in this area also resulted in an unexpectedly old age determination (GSC-5082).

Baffin Island (Fig. 13 and Fig. 14)

GSC-5289 Phillips Creek 5890±80
$\delta^{13}C = +1.2‰$

The marine shells (*Hiatella arctica*; identified by A.S. Dyke) were enclosed in stony silt. Sample 91-DCA-009 was collected by A.S. Dyke on July 9, 1991 east of Phillips Creek, at the head of Milne Inlet, northwest Baffin Island, District of Franklin, Northwest Territories (71° 52'N, 80° 51'W), at an elevation of 32 m; submitted by A.S. Dyke.

The sample (50.2 g dry weight) was treated with an acid leach to remove the outer 20% of the sample. The treated sample (40.2 g) yielded 9.16 L of CO_2 gas. The age estimate is based on two counts for 2110 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 13.652±0.110, 2.287±0.039, and 28.354±0.135 cpm, respectively.

The uncorrected age is 5870±80.

Comments (**A.S. Dyke**): A large sample of shells, dominated by *Hiatella arctica* and *Macoma calcarea* with minor, generally small, *Mya truncata*, were collected from bare silt with a sprinkling of dropstones. Unvegetated, dropstone-rich silt forms low-angle slopes along the east side of the head of Milne Inlet. Dropstones cover 5% of the surface and are mostly less than 30 cm diameter. The shell sample came from the highest silt outcrop on the upper foreslope of a raised marine-limit delta and can be traced underneath the foreset sands of the delta. The marine-limit delta terrace here is 48 m above high tide and is underlain by medium gravel, 16 m above the collection site. The sample submitted for dating consisted of whole valves of *Hiatella arctica* cleaned by cavitron to remove sediment and chalky exterior shell. GSC-5289 provides a maximum date on a 32 m relative sea level and a closely limiting minimum date on 48 m marine limit. The elevation is based on one altimeter measurement with six minutes between readings at sample site and at high tide line. GSC-328 (Lowdon et al., 1967) gave an age estimate of 6.4 ka on shells from an elevation of 46 m from a creek north of the mouth of Phillips Creek. The reported co-ordinates unfortunately place this site south of the mouth of Phillips Creek and at a location that is thought to have been deglaciated after the site of GSC-5289. This confusion more likely results from changes in geodetic control than from a morphostratigraphic reversal of ages of deglaciation.

Baffin Island (Fig. 13 and Fig. 14)

GSC-5376 Phillips Creek 3250±70
$\delta^{13}C = +1.6‰$

The marine shells (*Mya truncata*; identified by A.S. Dyke) were enclosed in muddy sand. Sample 91-DCA-030 was collected by A.S. Dyke on July 13, 1991 east of the mouth of Phillips Creek, at the head of Milne Inlet, northwest Baffin Island, District of Franklin, Northwest Territories (71° 53'N, 80° 54'W), at an elevation of 2.5 m; submitted by A.S. Dyke.

The sample (44.8 g dry weight) was treated with an acid leach to remove the outer 20% of the sample. The treated sample (36.1 g) yielded 7.51 L of CO_2 gas. The age estimate is based on two counts for 2100 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 18.884±0.124, 2.305±0.035, and 28.206±0.135 cpm, respectively.

The uncorrected age is 3220±70.

Comments (**A.S. Dyke**): A large sample of shells, exclusively paired valves of *Mya truncata* (strongly dominant but small), Hiatella arctica, and Macoma calcarea with few Serripes groenlandicus, were collected from a single bed of muddy sand in a sequence of sand foreset beds at the middle level of a low section. Foreset sands are overlain by 1 m of topset gravelly sand by 30 cm of beach gravel. The beaches occupy a narrow plain at 5 m above high tide, which appears to be an erosional marine bench cut into the main delta terrace at 10 m. The 10 m terrace is extensive, with a well preserved network of distributary channels. Whole valves of Mya truncata cleaned by cavitron to remove sediment, stains, periostraca and any chalky exterior layers were submitted for dating. The shells relate to a minimum relative sea level of 5 m and (more likely) to a maximum relative sea level of 10 m. The elevation is based on 3 altimeter measurements with 2 minutes between readings at the sample site and at high tide line.

Baffin Island (Fig. 13 and Fig. 14)

GSC-5398 Koluktoo Bay 5490±90
$\delta^{13}C$= - 0.6‰

The marine shells (*Mytilus edulis*; identified by A.S. Dyke) were enclosed in stony clay. Sample 91-DCA-049 was collected by A.S. Dyke on July 17, 1991 from Koluktoo Bay, on the west side of Milne Inlet, northwest Baffin Island, District of Franklin, Northwest Territories (72° 4'N, 81° 9'W), at an elevation of 28-29 m; submitted by A.S. Dyke.

The sample (33.5 g dry weight) was treated with an acid leach to remove the outer 10% of the sample. The treated sample (30.4 g) yielded 6.43 L of CO_2 gas. The age estimate is based on one count for 2540 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 9.148±0.069, 1.249±0.025, and 18.139±0.145 cpm, respectively.

The uncorrected age is 5500±90.

Comments (**A.S. Dyke**): A large shell sample, exclusively paired valves of *Mya truncata* (small), *Hiatella arctica* (small), *Macoma calcarea* (very small), *Serripes groenlandicus*, *Mya pseudoarenaria*, *Portlandia arctica*, and *Mytilus edulis*, was collected from stony clay at base of a section through a small delta. The stony clay is overlain by 1.5 m of foreset sand, 1 m of topset sand 0.3 m of beach gravel. Section top (delta terrace) is at 29 m above high tide. Judging only by the nature of the sediment, the fossiliferous stony clay could represent bottomset material of the 29 m delta or it could be older glaciomarine sediment deposited when sea stood close to or at marine limit. However, the variety of species here, especially presence of *Mytilus edulis*, is greater than normally found in ice proximal facies or in marine-limit deltas. Sediment and most periostracum were removed from whole valves of *Mytilus edulis* by cavitron before submission for dating. GSC-5398 provides a maximum date on a 29 m relative sea level and a date on a range extension of *Mytilus edulis* amd *Mya pseudoarenaria*. These similar dates on dropstone-rich silts and clays show that sediment that might routinely be mapped as "glaciomarine" has continued to be deposited in the high arctic throughout postglacial time. The dropstones presumably are dispersed by normal sea ice. The elevation is based on 2 altimeter measurements with 4 minutes between the sample site and datum readings.

Baffin Island (Fig. 13 and Fig. 14)

GSC-5290 Koluktoo Bay 7390±70
$\delta^{13}C = +1.7‰$

The marine shells (*Hiatella arctica*; identified by A.S. Dyke) were enclosed in stony clay. Sample 91-DCA-052 was collected by A.S. Dyke on July 17, 1991 from the head of Koluktoo Bay, Milne Inlet, northwest Baffin Island, District of Franklin, Northwest Territories (72° 5'N, 81° 20'W), at an elevation of 50 m; submitted by A.S. Dyke.

The sample (40 g dry weight) was treated with an acid leach to remove the outer 20% of the sample. The treated sample (39.8 g) yielded 8.91 L of CO_2 gas. The age estimate is based on one count for 3930 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 11.335±0.070, 2.287±0.039, and 28.354±0.135 cpm, respectively.

The uncorrected age is 7360±70.

Comments (**A.S. Dyke**): The shells, mostly *Hiatella arctica* with minor *Mya truncata* and *Macoma calcarea*, were collected from stony clay bottomsets overlain by low-angle foreset sand gravelly sand by topset gravel forming a marine-limit delta abutting the distal side of a large end moraine loop. The delta has a single simple terrace at 61 m elevation in section directly above the sample site. The moraine marks the limit of a regionally significant readvance of Laurentide ice. The sample submitted for dating consisted of whole valves of *Hiatella arctica* cleaned by cavitron to remove any chalky exterior. GSC-5290 provides a direct date on marine limit and on a prominant Laurentide end moraine. The elevation is based on one altimeter measurement with 31 minutes between sample site and datum readings.

Baffin Island (Fig. 13 and Fig. 14)

GSC-5466 Robertson River 5840±80

$\delta^{13}C = +2.9‰$

The marine shells (*Hiatella arctica*; identified by A.S. Dyke) were collected from the surface of fine marine sediment. Sample 63-CD-133 was collected by B.G. Craig on August 13, 1963, from the southwest shore of a large lake north of Robertson River, 19 km west-northwest of the head of Koluktoo Bay, northwest Baffin Island, District of Franklin, Northwest Territories (72° 9'N, 81° 32'W), at an elevation of 30 m; submitted by A.S. Dyke.

The sample (18.9 g dry weight) was treated with an acid leach to remove the outer 10% of the sample. The treated sample (17.0 g) yielded 3.72 L of CO_2 gas. The age estimate is based on one count for 3965 minutes in the 2 L counter with a mixing ratio of 1.17. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 8.862±0.061, 1.207±0.022, and 18.234±0.101 cpm, respectively.

The uncorrected age is 5800±80.

Comments (**A.S. Dyke**): The shells were collected from the surface of an extensive deposit of fine marine sediment at an elevation of about 30 m. The site is located about 4 km beyond the lip of an ice-contact marine-limit delta at 70 m elevation as determined by altimetry by B.G. Craig. The marine-limit delta is associated with a series of lateral moraines that extend southward from the site and that were deposited by retreating Laurentide ice. The small sample collected in August 1992 consisted dominantly of *Hiatella arctica* and *Mya truncata*, mostly small to medium sized whole valves, with minor *Macoma calcarea*, whole valves, and *Mytilus edulis*, fragments only. F.J.E. Wagner (GSC, unpublished report PI-3-64, 1964) noted these species in the sample as well as *Astarte montagui* var. *striata* (Leach). The shells are variously weathered and encrusted with secondary calcite and minor black lichen spots. The least encrusted *H. arctica* valves were selected and cleaned by cavitron to remove the exterior layers prior to submission for dating. GSC-5466 provides a minimum date on marine limit and deglaciation and a maximum date on a 30 m relative sea level. The species assemblage indicates a range extension of *Mytilus edulis* although there is too little of this shell for a direct conventional age determination.

Baffin Island (Fig. 13 and Fig. 14)

GSC-5382 Beta River (I) 6500±80
$\delta^{13}C = +1.3‰$

The marine shells (*Mya truncata*; identified by A.S. Dyke) were enclosed in stony silty clay. Sample 91-DCA-096 was collected by A.S. Dyke on July 27, 1991 from Beta River, inner Tremblay Sound, Borden Peninsula, northwest Baffin Island, District of Franklin, Northwest Territories (72° 16'N, 81° 17'W), at an elevation of 42 m; submitted by A.S. Dyke.

The sample (51.7 g dry weight) was treated with an acid leach to remove the outer 20% of the sample. The treated sample (41.3 g) yielded 8.10 L of CO_2 gas. The age estimate is based on two counts for 2025 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 12.590±0.092, 2.305±0.035, and 28.206±0.135 cpm, respectively.

The uncorrected age is 6480±80.

Comments (**A.S. Dyke**): Shells of *Mya truncata* and *Hiatella arctica* (dominant), *Macoma calcarea* (common), and *Clinocardium ciliatum* and *Serripes groenlandicus* (present) were collected from a highly fossiliferous gullied outcrop of bottomset silty clay with dropstones near the distal end of a large raised delta extending to marine limit at about 79 m elevation. The delta lies just behind a system of lateral moraines formed during separation of the Borden Peninsula Ice Cap and Laurentide ice in innermost Tremblay Sound. Whole valves of *Mya truncata* cleaned by sandblaster and cavitron to remove periostraca, stains and chalky exterior layers were submitted for dating. GSC-5382 provides a minimum date on marine limit and local deglaciation and a maximum date on a 42 m relative sea level. The elevations are based on altimetry. Four minutes elapsed between readings at the collection site and at sea level; 14 minutes elapsed between readings at marine limit and sea level.

Baffin Island (Fig. 13 and Fig. 14)

GSC-5435 Beta River (II) 7690±100

$\delta^{13}C$= +1.70‰

The marine shells (*Hiatella arctica*; identified by A.S. Dyke) were enclosed in stony silty clay. Sample 91-DCA-095 was collected by A.S. Dyke on July 27, 1991 from Beta River, inner Tremblay Sound, Borden Peninsula, northwest Baffin Island, District of Franklin, Northwest Territories (72º 16.5'N, 81º 17'W), at an elevation of 48 m; submitted by A.S. Dyke.

The sample (19.80 g dry weight) was treated with an acid leach to remove the outer 10% of the sample. The treated sample (18.1 g) yielded 4.1 L of CO_2 gas. The age estimate is based on one count for 3385 minutes in the 2 L counter with a mixing ratio of 1.10. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 7.072±0.059, 1.214±0.025, and 18.357±0.145 cpm, respectively.

The uncorrected age is 7660±100.

Comments (**A.S. Dyke**): Shells of *Hiatella arctica*, *Mya truncata* and *Macoma calcarea* were collected from the gullied and wind eroded surface of bottomset silty clay with dropstones near the distal end of a large raised delta extending to marine limit at about 79 m elevation. The delta lies just behind a system of lateral moraines formed during separation of the Borden Peninsula Ice Cap and Laurentide ice in innermost Tremblay Sound. *Hiatella arctica*, cleaned by cavitron to remove any encrustations, stains or chalky exterior layers, were submitted for dating. GSC-5435 provides a minimum date on marine limit and deglaciation and a maximum date on a 48 m relative sea level. The elevations are based on altimetry. Eight minutes elapsed between readings at the collection site and at sea level; 14 minutes elapsed between readings at marine limit and sea level.

Baffin Island (Fig. 13 and Fig. 14)

GSC-5329 Tremblay Sound 6820±100
$\delta^{13}C = +2.0‰$

The marine shells (*Mya truncata*; identified by A.S. Dyke) were enclosed in stony silty clay on the lower foreslope of a large marine-limit delta. Sample 91-DCA-088 was collected by A.S. Dyke on July 24, 1991 from inner Tremblay Sound, Borden Peninsula, northwest Baffin Island, District of Franklin, Northwest Territories (72° 18'N, 81° 13'W), at an elevation of 24 m; submitted by A.S. Dyke.

The sample (20.7 g dry weight) was treated with an acid leach to remove the outer 10% of the sample. The treated sample (18.7 g) yielded 4.14 L of CO_2 gas. The age estimate is based on one count for 3320 minutes in the 2 L counter with a mixing ratio of 1.09. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 7.970±0.066, 1.261±0.033, and 18.546±0.156 cpm, respectively.

The uncorrected age is 6780±100.

Comments (**A.S. Dyke**): The shells, mostly whole valves (few paired) of *Macoma calcarea* and *Hiatella arctica* (dominant) with *Mya truncata* (subdominant) and *Clinocardium ciliatum*, were collected from a small outcrop of stony silty clay on the lower foreslope of a large marine-limit delta. The delta has a single terrace marking marine limit at 79 m above high tide. The terrace is underlain by gravel topsets and by thick sand gravelly sand foresets that are non-fossiliferous, resting on the fossiliferous silty clay. Shells are very abundant where several shell-rich beds are being eroded on the face of the outcrop. The rest of the bottomset sediment appears barren of shells at this locality. The delta was deposited by meltwater issuing from a retreating lobe of the Borden Peninsula Ice Cap following the retreat of coalescent Borden Peninsula and Laurentide ice from Tremblay Sound. Laurentide ice extended at least to the mouth of Tremblay Sound during the last glacial maximum. This is one of three deltas at the mouths of major river valleys formed during deglaciation of the west side of Tremblay Sound. The sample submitted for dating consisted of whole valves of *Mya truncata* cleaned by cavitron to remove sediment, stains, periostraca, and chalky exterior layers. GSC-5329 provides a minimum date on marine limit and on deglaciation and a maximum date on a 24 m relative sea level. The elevations are based on altimetry. Six minutes elapsed between readings at the collection site and at sea level; ten minutes elapsed between readings at marine limit and at sea level.

Baffin Island (Fig. 13 and Fig. 14)

GSC-5434 Tremblay Sound 6660±70
$\delta^{13}C = +3.2‰$

The marine shells (*Hiatella arctic*a; identified by A.S. Dyke) were enclosed in stony silty clay. Sample 91-DCA-089 was collected by A.S. Dyke on July 24, 1991 from inner Tremblay Sound, Borden Peninsula, northwest Baffin Island, District of Franklin, Northwest Territories (72° 18'N, 81° 13'W), at an elevation of 34 m; submitted by A.S. Dyke.

The sample (49.8 g dry weight) was treated with an acid leach to remove the outer 20% of the sample. The treated sample (39.7 g) yielded 7.94 L of CO_2 gas. The age estimate is based on one count for 3940 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 12.426±0.066, 2.106±0.025, and 28.293±0.128 cpm, respectively.

The uncorrected age is 6610±70.

Comments (**A.S. Dyke**): The shells were cleaned by cavitron to remove any sediment, stain, encrustation, or chalky exterior layers and submitted for dating. The delta has a single terrace marking marine limit at 79 m above high tide. The terrace is underlain by gravel topsets and by thick sand gravelly sand foresets that are non-fossiliferous, resting on the fossiliferous silty clay. The delta was deposited by meltwater issuing from a retreating lobe of the Borden Peninsula Ice Cap following the retreat of coalescent Borden Peninsula and Laurentide ice from Tremblay Sound. Laurentide ice extended at least to the mouth of Tremblay Sound during the last glacial maximum. This is one of three deltas at the mouths of major river valleys formed during deglaciation of the west side of Tremblay Sound. The shells, mostly whole valves of *Hiatella arctica*, were preferentially collected from a small outcrop of stony, silty clay on the lower foreslope of a large marine-limit delta. GSC-5434 provides a minimum date on marine limit and deglaciation and a maximum date on a 34 m relative sea level. The elevations are based on altimetry. Seven minutes elapsed between readings at the collection site and sea level; 10 minutes elapsed between readings at marine limit and sea level.

Baffin Island (Fig. 13 and Fig. 14)

GSC-5375 Tremblay Sound 3830±60

$\delta^{13}C$= - 0.1‰

The marine shells (*Macoma calcarea*; identified by A.S. Dyke) were enclosed in muddy gravel. Sample 91-DCA-090 was collected by A.S. Dyke on July 24, 1991 from inner Tremblay Sound, Borden Peninsula, northwest Baffin Island, District of Franklin, Northwest Territories (72° 18.5'N, 81° 12.5'W), at an elevation of 6 m; submitted by A.S. Dyke.

The sample (46.1 g dry weight) was treated with an acid leach to remove the outer 20% of the sample. The treated sample (37.0 g) yielded 8.22 L of CO_2 gas. The age estimate is based on two counts for 2100 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 17.512±0.103, 2.305±0.035, and 28.206±0.135 cpm, respectively.

The uncorrected age is 3830±60.

Comments (**A.S. Dyke**): The shells, exclusively paired valves of juvenile *Macoma calcarea*, were collected from a single bed of muddy gravel in a foreset sequence below 0.5 m of topset gravel forming a small raised delta terrace at 8 m above high tide line. The sample was situated 2 m below the terrace. The shell-rich bed is more than half shell in places. The sample includes a few pieces of *Mytilus edulis*, broken during collection. The latter may have been redeposited. The shells were cleaned by cavitron to remove sediment and periostraca before submitting them for dating. GSC-5375 dates a relative sea level of 8 m and a minimum date on a occurrence of *Mytilus edulis* at a site beyond its present range. The elevation is based on altimetry with two minutes between readings at the collection site and at high tide line.

Baffin Island (Fig. 13 and Fig. 14)

GSC-5325 Alpha River 7680±70
$\delta^{13}C = +2.4‰$

The marine shells (*Mya truncata*; identified by A.S. Dyke) were enclosed in stony silty clay. Sample 91-DCA-092 was collected by A.S. Dyke on July 26, 1991 from the Alpha River, inner Tremblay Sound, Borden Peninsula, northwest Baffin Island, District of Franklin, Northwest Territories (72° 21'N, 81° 10'W), at an elevation of 33 m; submitted by A.S. Dyke.

The sample (52.7 g dry weight) was treated with an acid leach to remove the outer 30% of the sample. The treated sample (36.7 g) yielded 8.22 L of CO_2 gas. The age estimate is based on one count for 3800 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 10.903±0.064, 2.107±0.027, and 28.215±0.129 cpm, respectively.

The uncorrected age is 7640±70.

Comments (**A.S. Dyke**): The sample submitted for dating consisted of whole valves of *Mya truncata* cleaned by sandblasting and cavitron to remove periostraca, sediment, stains, and chalky exterior layers. Whole valves, some paired and with syphons attached, of *Mya truncata*, *Hiatella arctica*, and *Macoma calcarea* (all abundant), and *Clinocardium ciliatum* (subordinate) were collected from silty clay bottomsets with dropstones of pebble to small boulder size. The outcrop is located directly in front of the marine-limit terrace of the large delta at the mouth of the Alpha River and there is no intervening terrace between the outcrop level and the marine limit. The marine-limit terrace is at 71 m above high tide. The delta was formed by meltwater from a retreating lobe of the Borden Peninsula Ice Cap following separation from Laurentide ice upon deglaciation of inner Tremblay Sound. The sample submitted for dating consisted of whole valves of *Mya truncata* cleaned by sandblasting and cavitron to remove periostraca, sediment, stains, and chalky exterior layers. GSC-5325 provides a date on marine limit and deglaciation. The elevations based on altimetry. Seven minutes elapsed between readings at the collection site and sea level; 14 minutes elapsed between readings at marine limit and sea level.

Baffin Island (Fig. 13 and Fig. 14)

GSC-5085 Levasseur Inlet 6460±130
$\delta^{13}C = +1.2‰$

The marine shells (*Mya truncata*; identified by A.S. Dyke) were enclosed in sand. Sample 90-DCA-183 was collected by A.S. Dyke on August 8, 1990 from 1.5 km inland of the head of Levasseur Inlet, Borden Peninsula, Baffin Island, District of Franklin, Northwest Territories (72° 34.6'N, 85° 24.5'W), at an elevation of 20-23 m; submitted by A.S. Dyke.

The sample (25.1 g dry weight) was treated with an acid leach to remove the outer 10% of the sample. The treated sample (22.5 g) yielded 5.08 L of CO_2 gas. The age estimate is based on one count for 2970 minutes in the 2 L counter with a mixing ratio of 1.09. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 8.127±0.064, 1.092±0.024, and 18.125±0.241 cpm, respectively.

The uncorrected age is 6440±130.

Comments (**A.S. Dyke**): The shells were collected from a fresh gully face exposing about 5 m of horizontally bedded red sand capped by 1-2 m of medium gravel forming the topset beds of an estuarine delta at 24 m above high tide. The shells are sparse but in good condition, typically paired and in growth position. The 24 m terrace is extensive and occurs along both sides of Levasseur River. The extent of the deposit and the coarseness of its more proximal parts (mostly gravel) suggest that it was deposited by meltwater. If so, glacier ice still occupied lower Levasseur valley until relative sea level had fallen to 24 m. An ice-contact marine limit delta right at the head of the inlet, farther down valley, is at 40 m elevation, but contains no shells. These shells have a diffuse red stain leached from the enclosing red sediment. The sample submitted for dating was cleaned by cavitron to remove chalky and exfoliating material. GSC-5085 provides a maximum date on a 24 m relative sea level and a closely limiting minimum date on deglaciation of lower Levasseur valley. The elevation is based on one altimeter measurement with 14 minutes between readings at high tide and the delta terrace.

Baffin Island (Fig. 13 and Fig. 14)

GSC-5083 Eqalulik River 7210±110
$\delta^{13}C = +1.6‰$

The marine shells (*Hiatella arctica*; identified by A.S. Dyke) were a surface collection on silty sand. Sample 90-DCA-170 was collected by A.S. Dyke on August 5, 1990 from 0.2 km north of Eqalulik River, Borden Peninsula, Baffin Island, District of Franklin, Northwest Territories (72° 39'N, 85° 39.5'W), at an elevation of 25 m; submitted by A.S. Dyke.

The sample (24.2 g dry weight) was treated with an acid leach to remove the outer 10% of the sample. The treated sample (21.8 g) yielded 4.95 L of CO_2 gas. The age estimate is based on two counts for 2000 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 7.412±0.071, 1.029±0.028, and 18.121±0.154 cpm, respectively.

The uncorrected age is 7180±110.

Comments (**A.S. Dyke**): This is a large collection of only juvenile *Hiatella arctica* valves that are very fragile and have minor red staining (Quaternary sediments are derived from red sandstone). The shells were collected from an area of abundant shells, mostly whole valves but none in growth position, on the surface of stony glaciomarine silty sand forming a veneer over till just behind the youngest of three end moraine loops of the Eqalulik Moraine System. The veneer extends upslope to a prominent bench of beach gravel recording marine limit inside the moraine system at 41 m above high tide as measured by altimeter. Marine limit on the next older moraine is marked by a clear beach limit at 50 m. Just beyond the moraine system to the north, marine limit is recorded by a fan delta superimposed by a beach at 76 m. The glaciomarine sediment veneer from which the dated shells were collected occurs in several large patches behind the moraines but shells were found at only one site. GSC-5083 provides a minimum date on the 41 m marine limit behind the Eqalulik Moraine System and a maximum date on a 25 m relative sea level stand. The elevation is based on one altimeter measurement with 17 minutes between readings at sample site and high tide; 13 minutes between marine limit and high tide. Second measurement of marine limit beach behind moraines was 40 m with 15 minutes between readings at high tide and beach.

Baffin Island (Fig. 13 and Fig. 14)

GSC-5361 Lavoie Point 9280±80

$\delta^{13}C = +2.1‰$

The marine shells (*Mya truncata*; identified by A.S. Dyke) were enclosed in silt and clay with dropstones. Sample 91-DCA-136 was collected by A.S. Dyke on August 1, 1991 from Lavoie Point, on the Navy Board Inlet coast of Borden Peninsula, northwest Baffin Island, District of Franklin, Northwest Territories (72° 45'N, 80° 18'W), at an elevation of 53 m; submitted by A.S. Dyke.

The sample (49.1 g dry weight) was treated with an acid leach to remove the outer 20% of the sample. The treated sample (40.0 g) yielded 8.54 L of CO_2 gas. The age estimate is based on one count for 3900 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 8.894±0.063, 2.215±0.033, and 28.129±0.131 cpm, respectively.

The uncorrected age is 9250±80.

Comments (**A.S. Dyke**): The shells were collected from a 15 m high section of horizontally bedded silt and clay with scattered dropstones exposed in a deep stream cut through the bottomset sediments of a large raised, marine-limit delta at Lavoie Point. The sample includes *Mya truncata*, *Hiatella arctica* (co-dominant), *Macoma calcarea* (common), and rare *Clinocardium ciliatum* and *Portlandia arctica*. The section terminates upward at an extensive terrace, apparently marine limit, at 53 m elevation. The delta extends outward from and partly occupies a breach in a set of lateral and end moraines formed by an eastward flowing lobe of Borden Peninsula Ice Cap. The sample submitted for dating consisted of whole valves, many paired, of *Mya truncata* cleaned by sandblasting and by cavitron to remove periostraca, stains, and chalky exterior layers. GSC-5361 provides a date on marine limit and deglaciation. The elevation is based on 2 altimeter measurements with 17 minutes between readings at the sample site and at high tide line.

Baffin Island (Fig. 13 and Fig. 14)

GSC-5428 Lavoie Point 4170±60

$\delta^{13}C$= -24.6‰

The driftwood (*Larix*; identified by H. Jetté (unpublished GSC Wood Report No. 92-51)) was enclosed in sand. Sample 91-DCA-153 was collected by A.S. Dyke on August 2, 1991 from a bay northwest of Lavoie Point, on the Navy Board Inlet coast of Borden Peninsula, northwest Baffin Island, District of Franklin, Northwest Territories (72° 49'N, 80° 26.5'W), at an elevation of 9 m; submitted by A.S. Dyke.

The sample (16.3 g dry weight) was treated with hot base, hot acid, and distilled water rinses (noncalcareous). The treated sample (8.2 g) yielded 8.04 L of CO_2 gas. The age estimate is based on one count for 2100 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 16.846±0.098, 2.106±0.025, and 28.293±0.128 cpm, respectively.

The uncorrected age is 4160±60.

Comments (**A.S. Dyke**): The driftwood log, about 20 cm diameter, was protruding from gravelly beach sand with 30 cm exposed. The wood extended below the frost table but the sample was taken from the active layer. The log was finely cracked along the grain throughout its thickness and the entire mass was saturated at time of collection. Some plant roots had penetrated along the cracks. The wood was removed from the active layer and the soundest and least discoloured material was sampled. The wood was oven dried and surfaces and wood along cracks were cut off prior to submission for dating. GSC-5428 provides a date on a 9 m beach and on the only piece of old driftwood found yet in this area. A bowhead whale (*Balaena mysticetus*) earbone from a nearby raised beach at 8.5 m elevation yielded an uncorrected age of 3910±140 (S-3427; $\delta^{13}C$ = -14.9‰) and another bowhead earbone from the 11.5 m level yielded an uncorrected age of 4450±140 (S-3417; $\delta^{13}C$ = -15.8‰). The elevation is based on 1 altimeter measurement with 5 minutes between readings at the sample site and at high tide line.

Baffin Island (Fig. 13 and Fig. 14)

GSC-5380 Lavoie Point 7940±90

$\delta^{13}C = +1.5‰$

The marine shells (*Mya truncata*; identified by A.S. Dyke) were enclosed in silty and sandy clay with dropstones. Sample 91-DCA-186 was collected by A.S. Dyke on August 6, 1991 from a bay northwest of Lavoie Point, on the Navy Board Inlet coast of Borden Peninsula, northwest Baffin Island, District of Franklin, Northwest Territories (72° 50.5'N, 80° 32.5'W), at an elevation of 15 m; submitted by A.S. Dyke.

The sample (38.1 g dry weight) was treated with an acid leach to remove the outer 20% of the sample. The treated sample (30.7 g) yielded 6.82 L of CO_2 gas. The age estimate is based on two counts for 1690 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 10.616±0.092, 2.234±0.029, and 28.421±0.132 cpm, respectively.

The uncorrected age is 7910±90.

Comments (**A.S. Dyke**): The shells were paired in a freshly slumping section that exposes 8 m of silty and sandy clay, rich in dropstones; stones (pebbles to small boulders) comprise 20-30% of the sediment volume. The sediment has weak horizontal stratification expressed mainly by massive sand beds up to 30 cm thick. The stony clay itself has no visible lamination. This deepwater sediment is capped by 1.5 m of beach gravel at an elevation of 20 m. This site is located directly in front of a marine-limit delta that has a kettled terrace at 84 m elevation and a non-kettled terrace at 73 m. The latter was built when there was still sufficient meltwater supply to move coarse gravel. The nature of the sediment from which the shells were collected indicates that it was laid down shortly after deglaciation of the site. Overall, the collection included a rich variety of species dominated by *Mya truncata* and *Hiatella arctica* with *Mya pseudoarenaria* (common) and rare *Mytilus edulis*, *Serripes groenlandicus*, *Clinocardium ciliatum*, and *Macoma calcarea* and a gastropod. Whole valves of *Mya truncata* were rinsed and scrubbed to remove sediment and loose periostraca and submitted for dating. GSC-5380 provides a date of a diverse mollusk assemblge, including species well beyond their present ranges, and a maximum date on a 20 m relative sea level. The site was deglaciated before 8.9 ka (see GSC-5436, this series). The elevation is based on one altimeter measurement with 6 minutes between readings at the sample site and at high tide line.

Baffin Island (Fig. 13 and Fig. 14)

GSC-5378 Lavoie Point 8310±80

$\delta^{13}C = +2.6‰$

The marine shells (*Mya truncata*; identified by A.S. Dyke) were enclosed in pebbly clay. Sample 91-DCA-149 was collected by A.S. Dyke on August 2, 1991 from a bay northwest of Lavoie Point, on the Navy Board Inlet coast of Borden Peninsula, northwest Baffin Island, District of Franklin, Northwest Territories (72° 53.5'N, 80° 32'W), at an elevation of 0.0 m; submitted by A.S. Dyke.

The sample (47.0 g dry weight) was treated with an acid leach to remove the outer 20% of the sample. The treated sample (37.8 g) yielded 8.52 L of CO_2 gas. The age estimate is based on one count for 3730 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 10.084±0.067, 2.305±0.035, and 28.206±0.135 cpm, respectively.

The uncorrected age is 8260±80.

Comments (**A.S. Dyke**): Paired valves of several species of shells were recovered from pebbly brown clay at high tide line. One metre of clay is exposed above high tide line and is overlain by 3 m of beach sand gravel. The site is situated at the toe of a large, ice-contact, marine-limit delta whose lip is at 61 m above high tide. The nature of the sediment suggests that it could be either bottomset beds of the glaciomarine delta or younger prolittoral sediment. The site is very rich in shells and contains species not commonly found in glaciomarine sediment in this area. The assemblage is dominated by *Mya truncata* with common *Mya pseudoarenaria*, *Hiatella arctica*, and *Macoma calcarea*. *Serripes groenlandicus* and *Clinocardium ciliatum* are present. The is one of the northernmost records of early Holocene *M. pseudoarenaria*, a species now near extinction but widespread in the early Holocene. Whole valves of *Mya truncata*, cleaned by sandblaster and cavitron to remove periostraca and chalky exterior layers, were submitted for dating. GSC-5378 provides a date on this diverse species assemblage which dates from shortly after deglaciation of the site as recorded by GSC-5436.

Baffin Island (Fig. 13 and Fig. 14)

GSC-5436 Lavoie Point 8920±90

$\delta^{13}C = +2.83‰$

The marine shells (*Mya truncata*; identified by A.S. Dyke) were enclosed in stony silt. Sample 91-DCA-150 was collected by A.S. Dyke on August 2, 1991 from a bay northwest of Lavoie Point, on the Navy Board Inlet coast of Borden Peninsula, northwest Baffin Island, District of Franklin, Northwest Territories (72° 54'N, 80° 32.5'W), at an elevation of 18 m; submitted by A.S. Dyke.

The sample (58.50 g dry weight) was treated with an acid leach to remove the outer 30% of the sample. The treated sample (40.6 g) yielded 8.0 L of CO_2 gas. The age estimate is based on one count for 3385 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 9.277±0.064, 2.111±0.026, and 28.013±0.180 cpm, respectively.

The uncorrected age is 8880±90.

Comments (A.S. Dyke): Shells, mostly whole valves of *Mya truncata*, *Hiatella arctica*, and *Macoma calcarea* were collected from the floor of a slump in stony silt on the lower foreslope of a large ice-contact, marine-limit delta whose lip is at 61 m above high tide. The top of the slump is at 18 m elevation and the first terrace above the site is at 20 m. The 20 m terrace is underlain by silty sand is likely erosional. The shells likely relate to the marine-limit terrace. GSC-5436 provides a minimum date on marine limit and on deglaciation. The elevation is based on two altimeter measurements with two minutes between sample site and sea level readings.

Lab. Comment: Our system developed a small leak during the processing of this sample and therefore the age of the sample may be slightly younger than expected.

Baffin Island (Fig. 13 and Fig. 14)

GSC-5223 Victor Bay 8630±160
$\delta^{13}C = +1.6‰$

The marine shells (*Hiatella arctica*; identified by A.S. Dyke) were enclosed in pebbly deltaic sand. Sample Victor Bay 1 was collected by S.K. Short on July 8, 1987, from 1.4 km inland of the west side of Victor Bay, and 2.35 km northeast of town of Arctic Bay, Borden Peninsula, Baffin Island, District of Franklin, Northwest Territories (73° 3'N, 85° 5'W), at an elevation of 50 m; submitted by A.S. Dyke.

The sample (8.4 g dry weight) was treated with an acid leach to remove the outer 10% of the sample. The treated sample (7.7 g) yielded 1.67 L of CO_2 gas. The age estimate is based on one count for 3720 minutes in the 2 L counter with a mixing ratio of 2.66. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 6.300±0.110, 1.110±0.028, and 18.388±0.133 cpm, respectively.

The uncorrected age is 8600±160.

Comments (**A.S. Dyke**): The sample consisted of fragile, juvenile *Hiatella arctica*, mostly paired at time of collection. The shells appeared free of secondary carbonate or other encrustation. The shells were collected from a 10-15 cm thick lens of shell-rich sand about 8 m above stream level and 3 m below the top of a stream-cut through a glaciomarine delta. The section is cut through the first terrace below the marine-limit terrace as identified by Dyke from airphoto interpretation. The back end of the marine-limit terrace plots on the 60 m contour on the 1:50 000 scale topographic map (10 m contour interval). The delta was likely built by glacial meltwater at a time when the site of the Hamlet of Arctic Bay was still ice covered. The modern streams entering Victor Bay have not constructed deltas despite the availability of erodable raised marine sediments. The site of a deposit of radiocarbon-dated peat at Arctic Bay (Short and Andrews, 1988) must have been ice covered when the delta was being deposited. Nine dates have been run on this peat: I-1315 (9360±120), GX-9304 (14 185±760), GX-10628 (15 810±490), GX-9303 (16 849±860), GX-10290 (7830±230), GX-9302 (8635±565), GX-12852 (6720±390), GX-9686 (5075±210), and GX-9685 (modern). Recent redating of macrofossils from the peat by AMS indicate that the deposit is entirely of Holocene age (J.T. Andrews, pers. comm., 1991). GSC-5223 provides a minimum age of marine limit and deglaciation.

Baffin Island (Fig. 13 and Fig. 14)

GSC-5232 Silt Point uncorrected 6860±150

The marine shells (*Hiatella arctica* and *Macoma calcarea*; identified by A.S. Dyke) were collected from the surface in fine sand on delta terrace. Sample CD 36/63 was collected by B.G. Craig on July 13, 1963, from 1.35 km northeast of Silt Point, Strathcona Sound, Borden Peninsula, Baffin Island, District of Franklin, Northwest Territories (73º 6.5'N, 84º 21.5'W), at an elevation of 35 m; submitted by A.S. Dyke.

The sample (10.9 g dry weight) was treated with an acid leach to remove the outer 10% of the sample. The treated sample (9.8 g) yielded 2.13 L of CO_2 gas. The age estimate is based on two counts for 1700 minutes in the 2 L counter with a mixing ratio of 2.09. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 7.832±0.126, 1.110±0.028, and 18.388±0.133 cpm, respectively.

The uncorrected age is 6860±150.

Comments (**A.S. Dyke**): The shells were collected from the surface of a raised delta terrace at 35 m altitude. Marine limit is marked by another delta terrace just up stream from the collection site and lies at about 50 m as interpolated from the 1:50 000 topographic map. This marine-limit delta lies between moraine ridges of a major end moraine system. According to B.G. Craig's field notes, the shells at this site consisted mostly of fragments but one articulated *Hiatella arctica* was collected. Species in this collection (GSC locality 60183) were identified by F.J.E. Wagner (GSC, unpublished report, 1964) as *Hiatella arctica*, *Mya truncata*, and *Macoma calcarea*. The largest and cleanest fragments from this small sample were cleaned by cavitron (June 1991) and submitted for dating. GSC-5232 should provide a minimum age on marine limit and deglaciation and maximum age on a 35 m relative sea level. However, the age determination is anomalous in that it is the only one in a large series that places the 7 ka shoreline this high on northern Borden Peninsula.

Baffin Island (Fig. 13 and Fig. 14)

GSC-5216 Baillarge Bay 8850±100

$\delta^{13}C = +1.18‰$

The marine shells (*Hiatella arctica*; identified by A.S. Dyke) were enclosed in deltaic sand. Sample CD 29a/63 was collected by B.G. Craig on July 11, 1963, from 3.6 km upvalley from the head of Baillarge Bay, Borden Peninsula, Baffin Island, District of Franklin, Northwest Territories (73° 13'N, 84° 13'W), at an elevation of 33 m; submitted by A.S. Dyke.

The sample (50.83 g dry weight) was treated with an acid leach to remove the outer 20% of the sample. The treated sample (41.0 g) yielded 8.70 L of CO_2 gas. The age estimate is based on one count for 2000 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 9.429±0.085, 2.048±0.039, and 28.302±0.166 cpm, respectively.

The uncorrected age is 8830±100.

Comments (**A.S. Dyke**): The shells were collected from a gully eroded in a marine-limit delta terrace on the south side of the main stream flowing into the head of Baillarge Bay. It is not clear whether the elevation of 33 m measured by altimeter by Craig is that of the sample site or the delta terrace as this is not specified in his field notes. However, the 1:50 000 scale topographic map (10 m contour interval) shows a 40 m contour outlining the outer edge of the delta terrace. This is taken here as the minimum estimate of marine limit elevation. Species in this collection were identified by F.J.E. Wagner (GSC, unpublished report, 1964) as *Hiatella arctica*, *Mya truncata*, *Macoma calcarea*, *Serripes groenlandicus*, and *Clinocardium ciliatum*. Well-preserved whole valves of *Hiatella arctica* were cleaned by cavitron and submitted for dating. GSC-5216 provides a closely limiting minimum age of marine limit and deglaciation.

Baffin Island (Fig. 13 and Fig. 14)

GSC-5072 Cape Charles York 8550±100

$\delta^{13}C = +1.11‰$

The marine shells (*Mya truncata*; identified by A.S. Dyke) were enclosed in stony silt. Sample 90-DCA-14 was collected by A.S. Dyke on July 10, 1990 from Cape Charles York, Borden Peninsula, Baffin Island, District of Franklin, Northwest Territories (73° 39'N, 82° 59'W), at an elevation of 14.5 m; submitted by A.S. Dyke.

The sample (51.02 g dry weight) was treated with an acid leach to remove theouter 20% of the sample. The treated sample (40.35 g) yielded 38.67 L of CO_2 gas. The age estimate is based on one count for 3510 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 6.247±0.051, 1.020±0.024, and 18.094±0.144 cpm, respectively.

The uncorrected age is 8540±100.

Comments (**A.S. Dyke**): The shells were collected from a small stony silt deposit of a square kilometre or so extending outward from the lip of a raised delta at 22 m above sea level. The silts are thought to represent prodelta bottomset deposits laid down when relative sea level stood at 22 m although deposition could have continued until the sea level fell to 14.5 m. The 22 m delta appears to have been deposited by glacial meltwater although it occurs well below marine limit on the adjacent coast, which is recorded by a distinct upper beach limit at 58 m (measured by altimeter; 2 measurements with 5 minutes between marine limit and high tide readings). The 58 m marine limit could be Late Wisconsinan or older. The sample consisted mostly of whole valves of *Mya truncata* (dominant), *Hiatella arctica*, and either *Astarte borealis* or *Macoma calcarea* (common). All were collected from the face of a section; all were disarticulated. The valves are of variable quality, depending on length of residence at the surface, the worst having lichen and calcite encrustations. The cleanest whole valves were submitted for dating after cleaning with a cavitron. GSC-5072 provides a minimum date on the 22 m glaciomarine delta and on deglaciation of the Lancaster Sound coast of Borden Peninsula. The elevation of the shells is based on 1 altimeter measurement with 8 minutes between sample site and high tide readings.

Baffin Island (Fig. 13 and Fig. 14)

GSC-5075 Cape Charles York 1300±70

$\delta^{13}C$= -23.5‰

The driftwood (*Picea*; identified by R.J. Mott (unpublished GSC Wood Report No. 90-45)) was enclosed in beach gravel. Sample 90-DCA-35 was collected by A.S. Dyke on July 14, 1990 from Cape Charles York, Borden Peninsula, Baffin Island, District of Franklin, Northwest Territories (73° 43.5'N, 82° 52'W), at an elevation of 0 m; submitted by A.S. Dyke.

The sample (12.0 g dry weight) was treated with hot base, hot acid, and distilled water rinses (noncalcareous). The treated sample (9.1 g) yielded 8.53 L of CO_2 gas. The age estimate is based on two counts for 2090 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 15.137±0.091, 1.003±0.022, and 17.754±0.102 cpm, respectively.

The uncorrected age is 1280±70.

Comment (**A.S. Dyke**): The driftwood, about 1 m long and 10 cm diameter, was 95% buried in beach gravel of the fifth beach ridge back from the water's edge. The outer two beach ridges are currently active, so the wood is in the third abandonned ridge, on the gentle backslope of that ridge. Four ridges have been added since its deposition. The sample is at the same elevation as the crest of the modern storm ridge, which is about 1 m above quiet high tide, so sea level has not changed appreciably since deposition of the log. A series of 30 or so distinct relict beaches at Cape Charles York rise regularly by about 2 m (as measured by altimeter) from oldest (landward) to youngest (seaward). Lichen cover on beach cobbles and on archaeological structures increases inland, indicating that a considerable span of time is represented by this beach plain. The log consisted largely of intact wood along one side and of very cracked and broken wood along the other. The sample submitted for dating consisted of clean inner material with all outside wood removed. GSC-5075 provides an indication of the rate of accretion of beach ridges at the present coast which is slowly submerging.

Bylot Island (Fig. 14)

GSC-5189 Sermilik Glacier 460±120

$\delta^{13}C$= -25.1‰

The organic debris was enclosed in finely divided organic material in gelatinous silt. Sample 90-SCA-101 was collected by W.W. Shilts and M. Bouchard on July 11, 1990 from about 1.5 km up glacier from the snout of Sermilik Glacier, 25 km north-northwest of town of Pond Inlet, south side of Bylot Island, District of Franklin, Northwest Territories (72° 55'N, 78° 10'W), at an elevation of 150 m; submitted by W.W. Shilts.

The sample (418.8 g wet weight) was treated with hot acid and distilled water rinses; base treatment was omitted (noncalcareous). The treated sample (108.2 g) yielded 2.61 L of CO_2 gas. The age estimate is based on two counts for 1400 minutes in the 2 L counter with a mixing ratio of 1.71. The count rates for the sample (net), and monthly backgrounds and standards (net) were 17.203±0.196, 1.087±0.025, and 18.225±0.161 cpm, respectively.

The uncorrected age is 460±120.

Comment (**W.W. Shilts**): Organic debris melting out of closed fractures occurs extensively in and adjacent to a meltwater valley running along the glacier's axis. An extensive crevasse-field up ice may be a trap for organic debris which then melts out at the ice surface after the crevasses are closed up in the zone of compression. The sediment is dominated by fragments of the algae *Ancylonema nordenskioldii* (identified by A. Larouche and N. Marcoux) which grows vigorously on these glaciers. The relatively old date suggests that the bulk of the organic material collected in depressions that were subsequently sealed to preserve it. Crevasses in the ice-field are the obvious candidates.

Bylot Island (Fig. 14)

GSC-5116 Aktineq Glacier 150±130

$\delta^{13}C$= -23.1‰

The organic debris was enclosed in finely divided organic debris in gelatinous silt. Sample 90-SCA-100 was collected by W.W. Shilts and M. Bouchard on July 13, 1990 from the surface in the snout area of Aktineq Glacier, 37.5 km northwest of the town of Pond Inlet on the south side of Bylot Island, District of Franklin, Northwest Territories (72° 53'N, 78° 55'W), at an elevation of 300 m; submitted by W.W. Shilts.

The sample (68.2 g wet weight) was treated with hot acid and distilled water rinses; base treatment was omitted (noncalcareous). The treated sample (25.5 g) yielded 2.02 L of CO_2 gas. The age estimate is based on two counts for 1800 minutes in the 2 L counter with a mixing ratio of 2.27. The count rates for the sample (net), and monthly backgrounds and standards (net) were 17.793±0.170, 1.092±0.024, and 18.125±0.241 cpm, respectively.

The uncorrected age is 150±130.

Comment (**W.W. Shilts**): The material was composed primarily of fetid lacustrine silt with abundant fecal material, presumably derived from the bottom of a proglacial lake that was densely inhabited by Snow Geese during the breeding season. If this interpretation is correct then the sediment has been transported more than 4 km and uplifted either along a thrust plane or along a meltwater conduit over 100 m above its site of origin.

Charles Island (Fig. 13)

GSC-5197 Charles Bay 1880±60

$\delta^{13}C$= -21.8‰

The organic rich detritus was enclosed in sand. Sample 90-DKA-37.1 was collected by R.A. Daigneault on June 30, 1990 from the east bank of the river flowing northward to Charles Bay, about 1 km from the north coast of Charles Island, District of Franklin, Northwest Territories (62° 39'50"N, 74° 20'10"W), at an elevation of 8 m; submitted by R.A. Daigneault.

The sample (28.5 g dry weight) was treated with cold base, hot acid, and distilled water rinses (slightly calcareous). The treated sample (12.0 g) yielded 6.57 L of CO_2 gas. The age estimate is based on one count for 3785 minutes in the 5 L counter with a mixing ratio of 1.00. The count rate for the sample (net), and monthly backgrounds and standards (net) were 22.681±0.089, 2.107±0.038, and 28.490±0.183 cpm, respectively.

The uncorrected age is 1830±60.

Comment (**R.A. Daigneault**): Sandy littoral sequence containing rare broken shells (Balanus) and two layers of mixed plant remnants (algae and wood, identified by M. Garneau). GSC-5197 dates a sea-level stand at 8 m.

Melville Peninsula (Fig. 13)

GSC-5132 Frozen Strait 6920±100
$\delta^{13}C = +1.5‰$

The marine shells (*Hiatella arctica*; identified by L.A. Dredge) were enclosed in sandy silt. Sample 90-DU-2598 was collected by L.A. Dredge on July 31, 1990, from a marine plain north of Frozen Strait, 6.2 km east of Siuraqtujaq Point, Melville Peninsula, District of Franklin, Northwest Territories (66° 23.2'N, 85° 10.7'W), at an elevation of 100 m; submitted by L.A. Dredge.

The sample (46.2 g dry weight) was treated with an acid leach to remove the outer 20% of the sample. The treated sample (46.2 g) yielded 8.43 L of CO_2 gas. The age estimate is based on one count for 1800 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 7.858±0.073, 1.094±0.019, 18.531±0.106 cpm, respectively.

The uncorrected age is 6890±100.

Comment (**L.A. Dredge**): The shells were collected from the surface of a sandy marine plain below a flight of raised beaches. They provide a minimum date for deglaciation of the southern part of Melville Peninsula.

Melville Peninsula (Fig. 13)

Repulse Bay Series

GSC-5146 Repulse Bay (I) 6760±100
$\delta^{13}C$= + 1.2‰

The marine shells (*Hiatella arctica*; identified by L.A. Dredge) were enclosed in silt. Sample 90-DU-2321 was collected by L.A. Dredge on July 14, 1990, from a small valley along the road to the reservoir, 1.5 km north of the hamlet of Repulse Bay, Melville Peninsula, District of Franklin, Northwest Territories (66° 33.3'N, 86° 14.9'W), at an elevation of 80 m; submitted by L.A. Dredge.

The sample (37.6 g dry weight) was treated with an acid leach to remove the outer 20% of the sample. The treated sample (30.4 g) yielded 6.87 L of CO_2 gas. The age estimate is based on two counts for 2060 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 8.080±0.071, 1.101±0.023, 18.696±0.163 cpm, respectively.

The uncorrected age is 6740±100.

Comment (**L.A. Dredge**): The shells were collected from the surface of silty mudboils near Repulse Bay. They date the silty enclosing material and provide a minimum age for deglaciation.

GSC-5166 Repulse Bay (II) 6530±80
$\delta^{13}C$= + 2.0‰

The marine shells (*Mya truncata*; identified by L.A. Dredge) were enclosed in stony sand. Sample 90-DU-2419 was collected by L.A. Dredge on October 22, 1990, from a river bank exposure 12.5 km east of Repulse Bay, Melville Peninsula, District of Franklin, Northwest Territories (66° 35.7'N, 86° 1.7'W), at an elevation of 75 m; submitted by L.A. Dredge.

The sample (52.7 g dry weight) was treated with an acid leach to remove the outer 30% of the sample. The treated sample (30.9 g) yielded 6.64 L of CO_2 gas. The age estimate is based on two counts for 1800 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 12.657±0.098, 2.233±0.035, 28.426±0.139 cpm, respectively.

The uncorrected age is 6500±80.

Comment (**L.A. Dredge**): Paired and single Mya truncata valves were extracted from a 30 m section of beach gravel overlying shelly stony sand and silt (diamicton) which in turn overlies a marine clay. This sample is from the stony diamicton and is thought to date a period of intensive rafting of dirty ice, possibly of glacial origin.

Melville Peninsula (Fig. 13)

GSC-5112 Hoppner Inlet 6490±140

$\delta^{13}C = +1.5‰$

The marine shells (*Hiatella arctica* and *Mya truncata*; identified by L.A. Dredge) were enclosed in fine sand. Sample 90-DU-2014 was collected by L.A. Dredge on July 14, 1990, from along a small stream emptying into the eastern side of Hoppner Inlet, southern Melville Peninsula, District of Franklin, Northwest Territories (66° 32'N, 86° 15'W), at an elevation of 125 m; submitted by L.A. Dredge.

The sample (13.5 g dry weight) was treated with an acid leach to remove the outer 10% of the sample. The treated sample (11.0 g) yielded 2.45 L of CO_2 gas. The age estimate is based on one count for 3925 minutes in the 2 L counter with a mixing ratio of 1.84. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 8.080±0.082, 1.092±0.024, 18.125±0.241 cpm, respectively.

The uncorrected age is 6490±140.

Comment (**L.A. Dredge**): The shells were collected from an exposure in a raised marine delta, whose surface lies at 125-130 m. The shells were extracted from the upper 3 m. They give an approximate age for the 125 m waterplane and a minimum date for deglaciation. Marine limit lies at about 140 m.

Melville Peninsula (Fig. 13)

GSC-5172 Ujarasugjulik Point 3020±80
$\delta^{13}C = +1.5‰$

The marine shells (*Mya truncata*; identified by L.A. Dredge) were enclosed in fine sand. Sample 90-DU-2454 was collected by L.A. Dredge on October 24, 1990, from along a river 2.5 km north of Ujarasugjulik Point, Haviland Bay, southern Melville Peninsula, District of Franklin, Northwest Territories (66° 33.7'N, 86° 38.0'W), at an elevation of 12 m; submitted by L.A. Dredge.

The sample was treated with an acid leach to remove the outer 20% of the sample. The treated sample (43.0 g) yielded 7.69 L of CO_2 gas. The age estimate is based on two counts for 1780 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 12.683±0.091, 1.057±0.020, 18.411±0.103 cpm, respectively.

The uncorrected age is 2990±80.

Comment (**L.A. Dredge**): Paired valves with periostracum were collected from a river exposure. The valves were within intertidal sands and silts, about 1.5 m below the top of the section. They date recent emergence in the Repulse Bay area.

Melville Peninsula (Fig. 13)

GSC-5110 Rae Isthmus 6500±120

$\delta^{13}C = +1.5‰$

The marine shells (*Mya truncata* and *M. arenaria*; identified by L.A. Dredge) were enclosed in sorted littoral sand. Sample 90-DU-2024 was collected by L.A. Dredge on July 12, 1990, from Rae Isthmus, Melville Peninsula, District of Franklin, Northwest Territories (66°43.5'N, 86°38.8'W), at an elevation of 105 m; submitted by L.A. Dredge.

The sample (32.9 g dry weight) was treated with an acid leach to remove the outer 20% of the sample. The treated sample (26.9 g) yielded 5.92 L of CO_2 gas. The age estimate is based on one count for 3695 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 8.094±0.055, 1.092±0.024, 18.125±0.241 cpm, respectively.

The uncorrected age is 6480±120.

Comment (**L.A. Dredge**): Whole valves and fragments were collected from a fresh exposure of stratified medium and fine sand overlying cobbly sand. The shells were collected from the upper unit. They provide a minimum and approximate age for deglaciation and marine inundation across Rae Isthmus. The dates are about 400 years younger than Craig's date (GSC-286, 6850±140; Dyck et al., 1966) from the same site. The redating of Craig's original sample yielded an uncorrected age of 7080±120.

Melville Peninsula (Fig. 13)

GSC–286 2 Anigorchli Lake 7120±120

$\delta^{13}C = +2.5‰$

The marine shells were from a surface collection on silt. Sample CD/DF 148/64 was collected by J.A. Donaldson on July 5, 1964, from Anigorchli Lake, District of Franklin, Northwest Territories (66° 44'N, 86° 42'W), at an elevation of 121 m; submitted by R. McNeely.

The sample (10.4 g dry weight) was treated with an acid leach to remove the outer 10% of the sample. The treated sample (9.4 g) yielded 2.08 L of CO_2 gas. The age estimate is based on one count for 370 minutes in the 2 L counter with a mixing ratio of 1.97. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 7.511±0.091, 1.238±0.028, and 18.133±0.104 cpm, respectively.

The uncorrected age is 7080±120.

For comments see discussion on "Crosschecks" in the "Introduction" section. This crosscheck date also relates to GSC-5110 (6500±120). Original date was published in Dyck et al. (1966).

Brock Island (Fig. 15)

GSC-5181 Cape Murray (l) 5310±70

$\delta^{13}C$= -24.3‰

The plant material was enclosed in sand. Sample HCA 13-7-3A was collected by D.A. Hodgson on July 13, 1990 from 29 km east-southeast of Cape Murray, northeast shore of Brock Island, District of Franklin, Northwest Territories (77° 54.5'N, 113° 54'W), at an elevation of 2 m; submitted by D.A. Hodgson.

The sample (22.9 g dry weight) was treated with hot base, hot acid, and distilled water rinses (noncalcareous). The treated sample (12.0 g) yielded 8.70 L of CO_2 gas. The age estimate is based on one count for 5180 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net), and monthly backgrounds and standards (net) were 9.520±0.049, 1.057±0.020, and 18.411±0.103 cpm, respectively.

The uncorrected age is 5300±70.

Comment (**D.A. Hodgson**): A 1 cm thick mat of compressed allochthonous moss was exposed for a 30 m horizontal distance, halfway up a 4 m high cutbank of stratified sand. The convolute bedding of the frozen sediments suggested subaqueous deposition of the moss, and subsequent dewatering (Hodgson et al., 1994). The related sea level was±4 m asl.

Brock Island (Fig. 15)

GSC-5148 Cape Murray (II) 10 700±120
$\delta^{13}C$= - 0.2‰

The marine shells (*Hiatella arctica*; identified by D.A. Hodgson) were enclosed in silty sand. Sample HCA-90-13-7-4A was collected by D.A. Hodgson on July 13, 1990 from 29 km east-southeast of Cape Murray, northeast shore of Brock Island, District of Franklin, Northwest Territories (77° 54'N, 113° 55'W), at an elevation of 1 m; submitted by D.A. Hodgson.

The sample (19.3 g dry weight) was treated with an acid leach to remove the outer 10% of the sample. The treated sample (17.6 g) yielded 3.89 L of CO_2 gas. The age estimate is based on one count for 3400 minutes in the 2 L counter with a mixing ratio of 1.15. The count rates for the sample (net), and monthly backgrounds and standards (net) were 4.923±0.053, 1.101±0.023, and 18.696±0.163 cpm, respectively.

The uncorrected age is 10 700±120.

Comment (**D.A. Hodgson**): Rare shells were collected from a stony stratum exposed over a 30 m length of a 6 m high cutbank. These are the oldest clearly finite shells so far found on Brock Island. Related sea level is greater than 6 m (Hodgson et al., 1994).

Brock Island (Fig. 15)

GSC-5150 Brock Island 10 000±90
$\delta^{13}C = +0.7‰$

The marine shells (*Hiatella arctica*; identified by D.A. Hodgson) were from a surface collection on silty sand pea gravel. Sample HCA-90-13-7-5 was collected by D.A. Hodgson on July 12, 1990 from the northeast shore of Brock Island, District of Franklin, Northwest Territories (77° 55.7'N, 113° 55'W), at an elevation of 6.5 m; submitted by D.A. Hodgson.

The sample (46.0 g dry weight) was treated with an acid leach to remove the outer 20% of the sample. The treated sample (37.7 g) yielded 8.76 L of CO_2 gas. The age estimate is based on one count for 3800 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net), and monthly backgrounds and standards (net) were 8.171±0.063, 2.233±0.035, and 28.426±0.139 cpm, respectively.

The uncorrected age is 10 000±90.

Comment (**D.A. Hodgson**): Abundant shells were collected on probable beach deposits related to a sea level±6.5 m (Hodgson et al., 1994).

Brock Island (Fig. 15)

GSC-5175 Cape Murray (III) 8830±90

$\delta^{13}C$= -25.1‰

The plant material was enclosed in silty sand. Sample HCA-90-14-7-4A was collected by D.A. Hodgson on July 14, 1990 from 32 km southeast of Cape Murray on southwest coast near southern extremity of Brock Island, District of Franklin, Northwest Territories (77° 43.5'N, 114° 20'W), at an elevation of 2 m; submitted by D.A. Hodgson.

The sample (16.0 g dry weight) was treated with cold base, hot acid, and distilled water rinses (slightly calcareous). The treated sample (4.9 g) yielded 4.12 L of CO_2 gas. The age estimate is based on one count for 3710 minutes in the 2 L counter with a mixing ratio of 1.09. The count rates for the sample (net), and monthly backgrounds and standards (net) were 6.132±0.051, 1.057±0.020, and 18.411±0.103 cpm, respectively.

The uncorrected age is 8830±90.

Brock Island (Fig. 15)

TO-2292 Cape Murray (IIIa) 6650±60

In the same section, rare paired *Macoma* sp. shells were present in stratified sand 1.75 m higher than GSC-5175. D.A. Hodgson collected sample HCA-90-14-7-4 and dated it by AMS.

Comment (**D.A. Hodgson**): Sand adjacent to the plant mats contained (undated) marine shells. The top of the (deltaic?) sediment at 5.5 m asl is the minimum related sea level for 6.5 ka (Hodgson et al., 1994).

Brock Island (Fig. 15)

GSC-5109 Cape Murray (IV) 5830±130

$\delta^{13}C$= -24.7‰

The moss was enclosed in sand. Sample HCA 90 12-7-5 was collected by R.B. Taylor and D.A. Hodgson on July 12, 1990 from 9 km southeast of Cape Murray, on the southwest shore of Brock Island, District of Franklin, Northwest Territories (77° 49.5'N, 114° 42'W), at an elevation of 2.5 to 3 m; submitted by D.A. Hodgson.

The sample (190.6 g wet weight) was treated with cold base, hot acid, and distilled water rinses (noncalcareous). The treated sample (14.2 g) yielded 3.61 L of CO_2 gas. The age estimate is based on one count for 3460 minutes in the 2 L counter with a mixing ratio of 1.38. The count rates for the sample (net), and monthly backgrounds and standards (net) were 8.777±0.072, 1.092±0.024, and 18.125±0.241 cpm, respectively.

The uncorrected age is 5820±130.

Comments (**R.B. Taylor**): The lens of compressed moss was found 3 m asl in silty sand (fluvial or marine) exposed in a cut through the seaward slope of a sea-ice built shore ridge, 300 m inland of the southwest shore of Brock Island (Taylor and Hodgson, 1991). The allochthonous moss was deposited in sediment just upslope and adjacent to well sorted sands interpreted as upper foreshore, i.e. swash deposits. It has not been possible to establish a clear relationship between the age of the sample and the timing of the ridge building as originally hoped (Hodgson et al., 1994). The swash deposits most likely post-date the formation of the shore ridge but their continuity and position below a series of disturbed sediment facies could also mean that they predate the ridge. Sea ice could have built the shore ridge when the beach was frozen without disturbing the swash and moss deposits.

Melville Island (Fig. 15)

GSC-5002 Cape Grassy 10 200±120
$\delta^{13}C$= -27.1‰

The plant material and wood (twigs of *Salix*; identified by R. Mott (unpublished GSC Wood Report No. 90-22)); possibly *S. arctica* (G. Argus, pers. comm., 1990) were enclosed in a frozen dark grey fine sand, silt, clay, and granules with a reduced odour. Sample HCA-89-11.8.4 was collected by D.A. Hodgson on August 4, 1989 from 25 km west of Cape Grassy, northwest Melville Island, District of Franklin, Northwest Territories (76°11.3'N, 113°50'W), at an elevation of 22 m; submitted by D.A. Hodgson.

The sample (29.4 g dry weight) was treated with hot base, hot acid, and distilled water rinses (noncalcareous). The treated sample (10.4 g) yielded 5.52 L of CO_2 gas. The age estimate is based on two counts for 2000 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net), and monthly backgrounds and standards (net) were 5.059±0.061, 1.013±0.027, and 18.000±0.102 cpm, respectively.

The uncorrected age is 10 200±120.

Comment (**D.A. Hodgson**): The detrital? organic sample was collected 8 m below the top of an exposure in a delta formed by north flowing meltwater from an ice cap centred on western Melville Island. The presence of the *Salix arctica* at a site shown by Edlund (1993) to be at the present limit of the shrub indicates that summers were as warm as at present at the time of the Viscount Melville Sound Ice Shelf (Hodgson, 1992, p. 21; Hodgson, 1994, p. 26).

Prince Patrick Island (Fig. 15)

GSC-5170 Cape Hemphill 10 600±110
$\delta^{13}C = +1.2‰$

The marine shells (*Hiatella arctica*; identified by D.A. Hodgson) were enclosed in silt and sand. Sample HCA 90 9-7-2 was collected by D.A. Hodgson on July 9, 1990 from 5 km southwest of Cape Hemphill, northeast Prince Patrick Island, District of Franklin, Northwest Territories (76° 55.5'N, 115° 59'W), at an elevation of 11.5 m; submitted by D.A. Hodgson.

The sample (32.8 g dry weight) was treated with an acid leach to remove the outer 30% of the sample. The treated sample (23.4 g) yielded 5.13 L of CO_2 gas. The age estimate is based on one count for 3570 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net), and monthly backgrounds and standards (net) were 4.951±0.047, 1.099±0.023, 18.484±0.104 cpm, and respectively.

The uncorrected age is 10 600±110.

Comment (**D.A. Hodgson**): Abundant shells were collected from deltaic sediments below a 14 m asl terrace; this is the minimum related sea level (Hodgson et al., 1994).

Prince Patrick Island (Fig. 15)

GSC-5191 Mould Bay uncorrected > 39 000
$\delta^{13}C$= -26.9‰

The plant material (all moss?) was enclosed in pebbly sand. Sample HCA-90 27-7-2 was collected by D.A. Hodgson on July 27, 1990 from 9 km northeast of the head of the northeast arm of Mould Bay, Prince Patrick Island, District of Franklin, Northwest Territories (76° 25.1'N, 119° 17.3'W), at an elevation of 120 m; submitted by D.A. Hodgson.

The sample (31.7 g dry weight) was treated with cold base, hot acid, and distilled water rinses (noncalcareous). The treated sample (9.1 g) yielded 6.23 L of CO_2 gas. The age estimate is based on one count for 1260 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net), and monthly backgrounds and standards (net) were -0.038±0.035, 1.057±0.020, and 18.411±0.103 cpm, respectively.

Comment (**D.A. Hodgson**): The material is probably an autochthonous or allochthonous deposit of moss from/in the Tertiary Beaufort Formation.

Griffith Island (Fig. 16)

GSC-5074 Griffith Island 1380±60
$\delta^{13}C$= -25.9‰

The driftwood (*Picea*; identified by R.J. Mott (unpublished GSC Wood Report No. 90-46) was from a surface collection on gravel. Sample 90-DCA-8 was collected by A.S. Dyke on July 7, 1990, from the northeast coast of Griffith Island, District of Franklin, Northwest Territories (74° 38.6'N, 95° 34.0'W), at an elevation of 4.5 to 5.0 m; submitted by A.S. Dyke.

The sample (11.6 g dry weight) was treated with hot base, hot acid, and distilled water rinses (noncalcareous). The treated sample (8.3 g) yielded 7.87 L of CO_2 gas. The age estimate is based on one count for 3200 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 14.922±0.074, 1.003±0.022, and 17.754±0.102 cpm, respectively.

The uncorrected age is 1400±60.

Comment (**A.S. Dyke**): GSC-5074 provides a reasonable age estimate on the 4.5 m relative sea level for Griffith Island. Other RSL dates from Griffith Island can be found in Dyke (1993).

W. Axel Heiberg Island (Fig. 17)

Expedition and Strand Fiord Series

Seventeen samples of marine shells collected in 1990 and 1991 along Strand and Expedition fiords were submitted for radiocarbon dating by D.S. Lemmen. Fossiliferous raised marine deposits are rare along Expedition Fiord, and none of the dated samples were composed exclusively of *in situ* shells. Seven of the samples (GSC-5108, -5128, -5130, -5151, -5301, -5318 and TO-2882) serve to define a minimum emergence curve for the head of Expedition Fiord. Deglaciation of both fiords occurred between about 8.4 and 8.2 ka, as evidenced by 10 dates on local marine limits. This is younger than the chronology proposed by Müller (1963), which was based upon a single date of 9000±200 (L-647F). The similar deglacial chronologies of the two fiords are noteworthy as the last glacial maximum was considerably more extensive in Expedition Fiord than in Strand Fiord.

GSC-5396 Strand Fiord (I) 8390±120
$\delta^{13}C$= + 2.1‰

The marine shells (dominantly *Mya truncata*, rare *Hiatella arctica*; identified by A.E. Aitken) were enclosed in marine sediments, sandy silt. Sample 91-LJA-SFS8 was collected by D.S. Lemmen and A.E. Aitken on July 31, 1991, from 5 km east-northeast of head of Strand Fiord, on the south side of the main river, west-central Axel Heiberg Island, District of Franklin, Northwest Territories (79º 16'N, 90º 7'W), at an elevation of 94-102 m; submitted by D.S. Lemmen.

The sample (35.0 g dry weight) was treated with an acid leach to remove the outer 20% of the sample. The treated sample (13.2 g) yielded 2.91 L of CO_2 gas. The age estimate is based on one count for 3730 minutes in the 2 L counter with a mixing ratio of 1.51. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 6.412±0.069, 1.249±0.025, and 18.139±0.145 cpm, respectively.

The uncorrected age is 8350±120.

Comment (**D.S. Lemmen**): Sample GSC-5396 was collected from the northwest flank of a 113 m asl marine limit delta which provides the related sea level for the date. It comprises the highest shells discovered in the Expedition / Strand Fiord region. Along with TO-2883 date a former ice margin (limit?) about 5 km upvalley of the fiord head.

TO-2883 Strand Fiord (II) 8380±60

The fragments of marine shells (*Mya truncata*, identified by A.E. Aitken) were collected from silty sand gravel forming the foreslope of a raised glaciomarine delta. Sample 91-LJA-SFS9 was collected by D.S. Lemmen and A.E. Aitken on July 30, 1991 from 4.5 km east-northeast of the head of Strand Fiord, on the south side of a main river, west-central Expedition Fiord (79º 16'N, 90º 09"W), at an elevation of 76-86 m.

Comment (**D.S. Lemmen**): The sample dates an ice-contact glaciomarine delta at 112 m asl. It compares well with GSC-5396 which is from site <1 km farther upvalley and relates to an separate delta complex at 113 m asl.

GSC-5419 Strand Fiord (III) 8080±100
$\delta^{13}C$= +2.13‰

The marine shells (*Mya truncata*, rare *Hiatella arctica* present; identified by A.E. Aitken) were enclosed in marine sediments, sandy silt. Sample 91-LJA-SFS22 was collected by D.S. Lemmen and A.E. Aitken on August 4, 1991, from 4.5 km east-northeast of the head of Strand Fiord, south side of large river, west-central Axel Heiberg Island, District of Franklin, Northwest Territories (79º 16'N, 90º 9'W), at an elevation of 64-67 m; submitted by D.S. Lemmen.

The sample (51.6 g dry weight) was treated with an acid leach to remove the outer 30% of the sample. The treated sample (36.1 g) yielded 4.03 L of CO_2 gas. The age estimate is based on one count for 3725 minutes in the 2 L counter with a mixing ratio of 1.02. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 6.632±0.053, 1.246±0.024, and 18.063±0.123 cpm, respectively.

The uncorrected age is 8050±100.

Comment (**D.S. Lemmen**): GSC-5419 relates to the same ice contact delta as TO-2883. Shells collected from outlier, interpreted as proximal bottomset deposits, immediately distal to delta foreslope. It is superseded by TO-2883 as a date on deglaciation and 112 m sea level.

GSC-5411 Strand Fiord (IV) 8430±80
$\delta^{13}C$= + 1.4‰

The marine shells (*Mya truncata*, with rare *Hiatella arctica*; identified by A.E. Aitken) were enclosed in silty marine sand. Sample 91-LJA-SFS10 was collected by D.S. Lemmen and A.E. Aitken on August 1, 1991, from 1.25 km northeast of the head of Strand Fiord, west-central Axel Heiberg Island, District of Franklin, Northwest Territories (79º 15'N, 90º 17'W), at an elevation of 84-93 m; submitted by D.S. Lemmen.

The sample (51.0 g dry weight) was treated with an acid leach to remove the outer 10% of the sample. The treated sample (35.8 g) yielded 7.99 L of CO_2 gas. The age estimate is based on one count for 3870 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 9.924±0.067, 2.197±0.037, and 28.267±0.155 cpm, respectively.

The uncorrected age is 8410±80.

W. Axel Heiberg Island (Fig. 17)

Comment (**D.S. Lemmen**): This sample relates to marine limit at the head of Strand Fiord, which extends to at least 114 m and perhaps to 124 m asl. Fossiliferous sediments are overlain by thin regressive beach deposits. The similarity of marine limit dates throughout Strand Fiord indicates that tributary glaciers began retreat at similar times, and preclude the systematic retreat of a trunk glacier upfiord.

GSC-5368 Strand Fiord (V) 8430±80
$\delta^{13}C = +1.9‰$

The marine shells (*Mya truncata*; identified by D.S. Lemmen) were enclosed in deltaic sediments (gravelly sand). Sample 91-LJA-SFS5 was collected by D.S. Lemmen and A.E. Aitken on July 25, 1991, from the south coast of Strand Fiord, about 24.5 km west-southwest of fiord head, west-central Axel Heiberg Island, District of Franklin, Northwest Territories (79º 11'N, 91º 28'W), at an elevation of 69-79 m; submitted by D.S. Lemmen.

The sample (44.9 g dry weight) was treated with an acid leach to remove the outer 20% of the sample. The treated sample (33.8 g) yielded 7.44 L of CO_2 gas. The age estimate is based on one count for 3750 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 9.912±0.067, 2.305±0.035, and 28.206±0.135 cpm, respectively.

The uncorrected age is 8400±80.

Comment (**D.S. Lemmen**): This date relates to age of local marine limit at 95 m and initial retreat of glacier in tributary valley to Strand Fiord. The similarity of marine limit dates throughout Strand Fiord indicates that tributary glaciers began retreat at similar times, and preclude the systematic retreat of a trunk glacier upfiord.

GSC-5408 Strand Fiord (VI) 8390±100
$\delta^{13}C = +1.9‰$

The marine shells (*Mya truncata* and *Hiatella arctica*; identified by A.E. Aitken) were enclosed in sand and gravel (marine and colluvial sediments). Sample 91-LJA-SFS6 was collected by D.S. Lemmen and A.E. Aitken on July 28, 1991, from 16 km east of the mouth of Amarok River on the south coast of Strand Fiord, west-central Axel Heiberg Island, District of Franklin, Northwest Territories (79º 10'N, 91º 47'W), at an elevation of 37-63 m; submitted by D.S. Lemmen.

The sample (32.0 g dry weight) was treated with an acid leach to remove the outer 20% of the sample. The treated sample (25.9 g) yielded 5.66 L of CO_2 gas. The age estimate is based on one count for 3730 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 6.379±0.051, 1.246±0.024, and 18.063±0.123 cpm, respectively.

The uncorrected age is 8360±100.

Comment (**D.S. Lemmen**): GSC-5408 records sedimentation from meltwater channel and relates to initial retreat of tributary valley glacier to Strand Fiord. Shells continue above a washing limit at 53 m into coarse colluvium. Marine limit in adjacent valley is 105 m. The similarity of marine limit dates throughout Strand Fiord indicates that tributary glaciers began retreat at similar times, and preclude the systematic retreat of a trunk glacier upfiord.

GSC-5151 Expedition River (I) 8200±110
$\delta^{13}C = +2.1‰$

The marine shells (unidentified fragments only) were enclosed in gravelly sand. Sample 90-LJA-EFS1 was collected by D.S. Lemmen on July 31, 1990, from the Expedition River area, 11 km north of the fiord head and about 2.2 km from the terminus of Thompson Glacier, west-central Axel Heiberg Island, District of Franklin, Northwest Territories (79º 24'N, 90º 35'W), at an elevation of 78 m; submitted by D.S. Lemmen.

The sample (35.6 g dry weight) was treated with an acid leach to remove the outer 20% of the sample. The treated sample (29.1 g) yielded 6.55 L of CO_2 gas. The age estimate is based on one count for 2070 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 6.769±0.066, 1.101±0.023, and 18.696±0.163 cpm, respectively.

The uncorrected age is 8160±110.

Comment (**D.S. Lemmen**): This sample provides the best estimate of site deglaciation and age of local marine limit (98 m). The shell fragments appear to be derived from gravelly sand foreset beds. Sample GSC-5151 is the most easterly (upvalley) sample collected from Expedition Fiord / River area. It provides a minimum date on site deglaciation and local marine limit of 98 m. Along with samples GSC-5108 and -5301, it documents retreat of the trunk glacier that formerly occupied much of Expedition Fiord.

TO-2882 Expedition River (II) 8120±60

The fragments of marine shells (*Mya truncata*; identified by A.E. Aitken) were collected from the surface of wave-washed till that forms a veneer over gypsum bedrock. Sample 91-LJA-EFS3 was collected by D.S. Lemmen, A.E. Aitken and M. Parent on July 13, 1991 from the north side of Expedition River, 9.5 km east of the head of Expedition Fiord and about 1.5 km from the snout of Thompson Glacier, west-central Axel Heiberg Island (79º 25'N, 90º 41'W), at an elevation of 86 m.

W. Axel Heiberg Island (Fig. 17)

Comment (**D.S. Lemmen**): Abundant shell fragments occur from 55-73 m on the slope. Sample TO-2882 is the highest marine shells yet discovered in Expedition Fiord. A former related sea level is not recorded, but must lie >86 m and <102 m asl. This date confirms other dates from the area (GSC-5151, and -5301) and suggests that the date of 9000±200 (L-647F, Müller, 1963) is anomalously old.

GSC-5301 Expedition River (III) 8310±130
$\delta^{13}C$= + 2.5‰

The marine shells (*Hiatella arctica* and *Mya truncata*; identified by A.E. Aitken) were enclosed in stony, sandy marine silt. Sample 91-LJA-EFS1 was collected by D.S. Lemmen and A.E. Aitken on July 9, 1991, from the south of Gypsum Hill on the north side of Expedition River, 7.5 km east of the head of Expedition Fiord, west-central Axel Heiberg Island, District of Franklin, Northwest Territories (79º 24'N, 90º 44'W), at an elevation of 68-75 m; submitted by D.S. Lemmen.

The sample (27.9 g dry weight) was treated with an acid leach to remove the outer 20% of the sample. The treated sample (22.6 g) yielded 5.04 L of CO_2 gas. The age estimate is based on two counts for 2080 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 6.573±0.085, 1.188±0.059, and 18.396±0.155 cpm, respectively.

The uncorrected age is 8270±130.

Comment (**D.S. Lemmen**): GSC-5301 was collected from the same site as L-647 (9000±200; Müller 1963). Both samples were surface collections from a similar elevational range, and comprised the same species. The difference in the dates, with consideration that nine other dates between about 8.2 and 8.4 ka were obtained on local marine limits in Expedition and Strand fiords, questions the interpretation of Müller's date. This date is the oldest obtained east of the fiord head, and serves as a minimum estimate of site deglaciation and the 102 m marine limit recorded across the trunk valley.

GSC-5199 Expedition River (IV) 6970±90
$\delta^{13}C$= + 1.1‰

The marine shells (*Astarte borealis* and unidentified fragments; identified by D.S. Lemmen) were situated on the surface of slightly stony marine silt. Sample 90-LJA-EFS3 was collected by D.S. Lemmen on August 1, 1990, from the south side of Expedition River, north-northwest of Little Matterhorn about 7.5 km east of the fiord head, west-central Axel Heiberg Island, District of Franklin, Northwest Territories (79º 23'N, 90º 50'W), at an elevation of 25 m; submitted by D.S. Lemmen.

The sample (38.7 g dry weight) was treated with an acid leach to remove the outer 20% of the sample. The treated sample (30.9 g) yielded 6.98 L of CO_2 gas. The age estimate is based on one count for 2000 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 11.987±0.092, 2.107±0.038, and 28.490±0.183 cpm, respectively.

The uncorrected age is 6950±90.

Comment (**D.S. Lemmen**): The sample was collected below a 102 m marine limit delta. There was no stratigraphic evidence to link the sample to the delta, and the date demonstrates that the shells are about 1.3 ka younger than local deglaciation (cf. GSC-5108 and -5151). The sample is superceded by GSC-5128 on a minimum emergence curve for Expedition Fiord.

GSC-5318 Wolf River 8230±80
$\delta^{13}C$= + 2.6‰

The marine shells (*Mya truncata*; identified by A.E. Aitken) were enclosed in marine silt. Sample 91-LJA-EFA8 was collected by D.S. Lemmen and A.E. Aitken on July 11, 1991, from the south side of Wolf River, immediately west of Striae Hill, about 4 km east of the head of Expedition Fiord, west-central Axel Heiberg Island, District of Franklin, Northwest Territories (79º 24'N, 90º 56'W), at an elevation of 61 to 75 m; submitted by D.S. Lemmen.

The sample (35.4 g dry weight) was treated with an acid leach to remove the outer 20% of the sample. The treated sample (28.8 g) yielded 6.48 L of CO_2 gas. The age estimate is based on one count for 3785 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 10.176±0.063, 2.107±0.027, and 28.215±0.129 cpm, respectively.

The uncorrected age is 8190±80.

Comment (**D.S. Lemmen**): Shells occur distal to a small marine limit delta at 95 m. This date records deglaciation in the Wolf Valley, one of the major tributaries that contributed ice to the trunk glacier formerly occupying Expedition Fiord.

GSC-5130 Expedition Fiord (I) 7880±70
$\delta^{13}C$= + 2.0‰

The marine shells (*Mya truncata*; identified by D.S. Lemmen) were enclosed in sandy silt. Sample 90-LJA-EFS8 was collected by D.S. Lemmen on August 7, 1990, from the south head of Expedition Fiord, about 0.8 km east of the coast, west-central Axel Heiberg Island, District of Franklin, Northwest Territories (79º 21'N, 91º 6'W), at an elevation of 39-47 m; submitted by D.S. Lemmen.

W. Axel Heiberg Island (Fig. 17)

The sample (46.0 g dry weight) was treated with an acid leach to remove the outer 20% of the sample. The treated sample (34.6 g) yielded 7.17 L of CO_2 gas. The age estimate is based on one count for 3530 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 10.586±0.066, 2.149±0.028, and 28.117±0.107 cpm, respectively.

The uncorrected age is 7850±70.

Comment (**D.S. Lemmen**): This sample relates to a relative sea level of >69 m. The shells were collected from the upper part of a marine unit that coarsens upward from clayey-silt to sandy-silt, interpreted as proximal bottomset beds. The presence of Astarte borealis along with *Mya truncata* suggests that the deposit does not relate to local deglaciation.

GSC-5128 Expedition Fiord (II) 5540±60
$\delta^{13}C$= + 1.3‰

The marine shells (*Astarte borealis* and *Mya truncata*; identified by D.S. Lemmen) were enclosed in marine silt with a trace of fine sand. Sample 90-LJA-EFS5 was collected by D.S. Lemmen on August 5, 1990, from the north head of Expedition Fiord, about 0.8 km inland 0.7 km from the terminus of Crusoe glacier, west-central Axel Heiberg Island, District of Franklin, Northwest Territories (79º 23'N, 91º 9'W), at an elevation of 19-24 m; submitted by D.S. Lemmen.

The sample (36.0 g dry weight) was treated with an acid leach to remove the outer 20% of the sample. The treated sample (28.8 g) yielded 6.38 L of CO_2 gas. The age estimate is based on two counts for 4200 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 14.135±0.070, 2.149±0.028, and 28.117±0.107 cpm, respectively.

The uncorrected age is 5520±60.

Comment (**D.S. Lemmen**): GSC-5128 dates a unique faunal assemblage for Expedition Fiord that includes Cylichna sp., which is interpreted to represent quiescent, shallow (5-20 m water depth) water sedimentation. It provides a control point on minimum emergence curve for the fiord head.

GSC-5108 Expedition Fiord (III) 8410±170
$\delta^{13}C$= + 0.6‰

The marine shells (*Mya truncata*; identified by D.S. Lemmen) were from a surface collection on slightly stony marine silt. Sample 90-LJA-EFS4 was collected by D.S. Lemmen on August 3, 1990, from the south shore of Expedition Fiord, 6 km west-southwest of the fiord head, west-central Axel Heiberg Island, District of Franklin, Northwest Territories (79º 20'N, 91º 23'W), at an elevation of 58-64 m; submitted by D.S. Lemmen.

The sample (34.1 g dry weight) was treated with an acid leach to remove the outer 20% of the sample. The treated sample (28.0 g) yielded 6.27 L of CO_2 gas. The age estimate is based on two counts for 1600 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 6.373±0.070, 1.092±0.024, and 18.125±0.241 cpm, respectively.

The uncorrected age is 8400±170.

Comment (**D.S. Lemmen**): GSC-5108 provides a minimum age estimate of site deglaciation. An erosional terrace at >82 m is a minimum estimate of marine limit. *Hiatella arctica* was also present at the sample site.

GSC-5350 Expedition Fiord (IV) 7450±70
$\delta^{13}C$= + 0.8‰

The marine shells (*Astarte borealis*; identified by D.S. Lemmen) were enclosed in sandy marine silt. Sample 91-LJA-EFA12 was collected by D.S. Lemmen on July 15, 1991, from the north coast of Expedition Fiord, 10.5 km west of fiord head and 0.5 km west of an unnamed tributary river, west-central Axel Heiberg Island, District of Franklin, Northwest Territories (79º 22'N, 91º 41'W), at an elevation of 30-41 m; submitted by D.S. Lemmen.

The sample (39.3 g dry weight) was treated with an acid leach to remove the outer 20% of the sample. The treated sample (31.8 g) yielded 7.10 L of CO_2 gas. The age estimate is based on one count for 3570 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 11.143±0.069, 2.215±0.033, and 28.129±0.131 cpm, respectively.

The uncorrected age is 7440±70.

Comment (**D.S. Lemmen**): This sample records a period of reduced sedimentation following ice retreat in a major tributary valley to Expedition Fiord. It also relates to a sea level between 60 m and 88 m.

GSC-5193 Expedition Fiord (V) 7620±80
$\delta^{13}C$= + 0.7‰

The marine shells (*Astarte borealis*; identified by D.S. Lemmen) were situated on the surface of marine silt. Sample 90-LJA-EFS11 was collected by D.S. Lemmen on August 10, 1990, from the north coast of Expedition Fiord, 11 km west of fiord head, about 1 km west of a large tributary river, west-central Axel Heiberg Island, District of Franklin, Northwest Territories (79º 22'N, 91º 43'W), at an elevation of 38 m; submitted by D.S. Lemmen.

W. Axel Heiberg Island (Fig. 17)

The sample (60.3 g dry weight) was treated with an acid leach to remove the outer 30% of the sample. The treated sample (42.6 g) yielded 8.43 L of CO_2 gas. The age estimate is based on one count for 3770 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 11.045±0.070, 2.107±0.038, and 28.490±0.183 cpm, respectively.

The uncorrected age is 7610±80.

Comment (**D.S. Lemmen**): GSC-5193 relates to a former sea level that lies between 68 and 88 m. The sample was collected from deltaic sediments that fines laterally from the central axis of the valley. Despite excellent preservation and numerous paired valves, no in situ shells were found.

TO-2259 Expedition Fiord (VI) 7170±80

The marine shell (*Astarte borealis*, identified by D.S. Lemmen) was collected from the surface of soliflucting sandy marine silt. Sample 90-LJA-EFS7 was collected by D.S. Lemmen on August 6, 1990 along the south coast of Expedition Fiord, about 9 km east of the fiord mouth and 1 km south of Index Peninsula, west-central Axel Heiberg Island (79º 18'N, 92º 07'W), at an elevation of 38 m.

Comment (**D.S. Lemmen**): The shell had been fractured by solifluction but the periostracum was intact and complete. The sample was collected at the base of an outlier distal to marine limit delta at 75 m. The sample postdates a major period of delta progradation and is the highest shell sample collected from outer Expedition Fiord.

W. Axel Heiberg Island (Fig. 17)

GSC-5176 Crusoe Glacier modern

$\delta^{13}C = -28.7‰$

The terrestrial plants (organic) were overlain by glacier ice and underlain by ablation material. Sample 90-LJA-EFO1 was collected by D.S. Lemmen on August 4, 1990, from the terminus of Crusoe Glacier, about 1.3 km northeast of the head of Expedition Fiord, west-central Axel Heiberg Island, District of Franklin, Northwest Territories (79° 24'N, 91° 5'W), at an elevation of about 140 m; submitted by D.S. Lemmen.

The sample (196.0 g wet weight) was treated with hot base, hot acid, and distilled water rinses (noncalcareous). The treated sample (10.6 g) yielded 6.91 L of CO_2 gas. The age estimate is based on one count for 1000 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 22.776±0.156, 1.057±0.020, and 18.411±0.103 cpm, respectively.

Comment (**D.S. Lemmen**): This sample documents a recent advance of the Crusoe Glacier which, like the nearby Thompson Glacier (Parent, 1991), is currently more extensive than at anytime since the last glaciation (8.3 ka).

W. Axel Heiberg Island (Fig. 17)

GSC-5162 Thompson Glacier 4770±70

$\delta^{13}C$= -25.8‰

The wood (*Picea*; identified by R.J. Mott (unpublished GSC Wood Report No. 91-08)) was enclosed in gravel. Sample 90-PIA-140 was collected by M. Parent on July 16, 1990 from a push moraine of the Thompson Glacier in the Expedition Fiord area, Axel Heiberg Island, District of Franklin, Northwest Territories (79° 24.7'N, 90° 35.4'W), at an elevation of 35 m; submitted by M. Parent.

The sample (17.6 g dry weight) was treated with hot base, hot acid, and distilled water rinses (noncalcareous). The treated sample (8.4 g) yielded 8.22 L of CO_2 gas. The age estimate is based on two counts for 2070 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net), and monthly backgrounds and standards (net) were 15.664±0.100, 2.233±0.035, and 28.426±0.139 cpm, respectively.

The uncorrected age is 4790±70.

W. Axel Heiberg Island (Fig. 17)

GSC-5160 White Glacier 180±60

$\delta^{13}C$= -29.9‰

The plant debris (organics) was enclosed in a palaeosol buried under till. Sample 90-PIA-105 was collected by M. Parent on July 10, 1990 from the modern end-moraine of White Glacier in the Expedition Fiord area, Axel Heiberg Island, District of Franklin, Northwest Territories (79° 25.6'N, 90° 37.9'W), at an elevation of 55 m; submitted by M. Parent.

The sample (87.3 g dry weight) was treated with hot base, hot acid, and distilled water rinses (noncalcareous). The treated sample (18.4 g) yielded 6.27 L of CO_2 gas. The age estimate is based on two counts for 1960 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net), and monthly backgrounds and standards (net) were 17.906±0.102, 1.099±0.023, and 18.484±0.104 cpm, respectively.

The uncorrected age is 260±60.

Ellesmere Island (Fig. 16)

GSC-5055 Piliravijuk Bay 2880±60

$\delta^{13}C$= -24.5‰

The driftwood (*Picea*; identified by H. Jetté (unpublished GSC Wood Report No. 90-29)) was enclosed in beach shingle. Sample BS-77-357 was collected by W. Blake, Jr. on August 17, 1977, 1.7 km west of the mouth of "Basecamp river", Piliravijuk Bay, Makinson Inlet, Ellesmere Island, District of Franklin, Northwest Territories (77° 19'N, 82° 10'W), at an elevation of 5.3 m; submitted by W. Blake, Jr.

The sample (12.2 g dry weight) was treated with hot base, hot acid, and distilled water rinses (noncalcareous). The treated sample (9.1 g) yielded 8.89 L of CO_2 gas. The age estimate is based on two counts for 2760 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net), and monthly backgrounds and standards (net) were 19.741±0.094, 2.074±0.027, and 28.244±0.132 cpm, respectively.

The uncorrected age is 2880±60.

Comment (**W. Blake, Jr.**): Together with several other dates on driftwood logs (cf. Blake, 1988), this age determination aided in the construction of an emergence curve for innermost Makinson Inlet (Blake, 1993).

Ellesmere Island (Fig. 16)

Hot Weather Creek Series

GSC-5180 Hot Weather Creek (I) 7120±80
$\delta^{13}C$= -27.0‰

The basal peat was underlain by sand overlain by peat. Sample FP-23.07.90-05 (2.8 cm) was collected by C. Bégin and Y. Michaud on July 23, 1990, from 5 km north of the Hot Weather Creek campsite, Fosheim Peninsula, Ellesmere Island, District of Franklin, Northwest Territories (79° 59'N, 84° 08'W), at an elevation of 122 m; submitted by C. Bégin and Y. Michaud.

The sample (124.4 g dry weight) was treated with cold base, hot acid, and distilled water rinses (slightly calcareous). The treated sample (38.1 g) yielded 4.62 L of CO_2 gas. The age estimate is based on one count for 3800 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 7.563±0.052, 1.057±0.020, and 18.411±0.103 cpm, respectively.

The uncorrected age is 7150±80.

GSC-5137 Hot Weather Creek (II) 2640±70
$\delta^{13}C$= -27.5‰

The basal peat was underlain by sand overlain by peat. Sample FP-25.07.90-02 (1.5 m) was collected by C. Bégin and Y. Michaud on July 25, 1990, from 5 km south of the Hot Weather Creek campsite, Fosheim Peninsula, Ellesmere Island, District of Franklin, Northwest Territories (79° 56'30"N, 84° 30'W), at an elevation of 92 m; submitted by C. Bégin and Y. Michaud.

The sample (35 g dry weight) was treated with cold base, hot acid, and distilled water rinses (noncalcareous). The treated sample (16.6 g) yielded L of CO_2 gas. The age estimate is based on one count for 2140 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 13.325±0.084, 1.094±0.019, and 18.531±0.106 cpm, respectively.

The uncorrected age is 2650±70.

GSC-5155 Hot Weather Creek valley 8570±120
$\delta^{13}C$= + 1.1‰

The marine shells (*Mya truncata*; identified by T. Bell) were enclosed in silt. Sample FP-26-S-8906 was collected by T. Bell on August 6, 1989 from the eastern side of Hot Weather Creek valley, 29 km east of Eureka, central Fosheim Peninsula, west-central Ellesmere Island, District of Franklin, Northwest Territories (79° 58'N, 84° 26'W), at an elevation of 100 m; submitted by T. Bell.

The sample (39.9 g dry weight) was treated with an acid leach to remove the outer 30% of the sample. The treated sample (32.7 g) yielded 7.26 L of CO_2 gas. The age estimate is based on one count for 2200 minutes in the 2 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 6.446±0.063, 1.101±0.023, and 18.696±0.163 cpm, respectively.

The uncorrected age is 8550±120.

Comment (**T. Bell**): Hot Weather Creek valley was submerged by the sea during the early Holocene. (Re)occupation of the existing drainage basin began as relative sea level dropped below 134 m and a divide emerged to separate Greely Fiord and Slidre Fiord drainages. GSC-5155 provides a minimum estimate on the initial establishment of local marine limit at 145 m and a maximum date for the initiation of geomorphic processes in the lower two-thirds of the drainage basin. A more complete discussion, including the regional context, appears in Bell (1992).

Ellesmere Island (Fig. 16)

GSC-5081 Slidre River 6040±17*0*

The wood (twigs of *Salix*; identified by R.J. Mott, (unpublished GSC Wood Report No. 90-34)) was enclosed in clayey silt. Sample HCA 90 8-8-1 was collected by D.A. Hodgson on August 8, 1990 from the south bank of the Slidre River, 13 km from its mouth, 4.5 km southwest of the mouth of Hot Weather Creek, Ellesmere Island, Northwest Territories (79^{o} 54.5'N, 84^{o} 38.0'W), at an elevation of 15 m; submitted by D.A. Hodgson.

The sample (2.4 g dry weight) was treated with hot base, hot acid, and distilled water rinses. The treated sample (1.5 g) yielded 1.22 L of CO_2 gas. The age estimate is based on two counts for 2000 minutes in the 2 L counter with a mixing ratio of 3.65. The count rates for the sample (net), and monthly backgrounds and standards (net) were 8.370±0.169, 1.003±0.022, and 17.754±0.102 cpm, respectively.

Comment (**D.A. Hodgson**): The detrital wood sample was collected 29 m below the top of an exposure of sediments deposited by the Slidre River prograding into a sea at least 44 m (Hodgson et al., 1991).

Ellesmere Island (Fig. 16)

Central Eureka Sound Series

A series of marine shell samples from southwestern Fosheim Peninsula, west-central Ellesmere Island, District of Franklin, Northwest Territories was collected by T. Bell and G. Davidge on August 12, 1990; submitted for dating by T. Bell.

GSC-5117 Central Eureka Sound (I) 6330±90
$\delta^{13}C$= + 1.5‰

The marine shells (*Hiatella arctica*; identified by T. Bell) were enclosed in sandy gravel. Sample FP-90-S-9012 was collected from about 90 km south-southeast of Eureka and 4 km north of Vesle Fiord (79º 14'N, 85º 38'W) at an elevation of 28 m.

The sample (40.0 g dry weight) was treated with an acid leach to remove the outer 20% of the sample. The treated sample (31.6 g) yielded 7.20 L of CO_2 gas. The age estimate is based on one count for 3175 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 12.885±0.077, 2.172±0.034, and 28.328±0.234 cpm, respectively.

The uncorrected age is 6330±90.

GSC-5147 Central Eureka Sound (II) 5180±90
$\delta^{13}C$= + 1.4‰

The marine shells (***Hiatella arctica***; identified by T. Bell) were enclosed in sandy gravel. Sample FP-82-S-9012 was collected from 82 km south-southwest of Eureka and 12 km north of the mouth of Vesle Fiord (79º 19'N, 85º 31'W) at an elevation of 14 m.

The sample (37.0 g dry weight) was treated with an acid leach to remove the outer 20% of the sample. The treated sample (30.6 g) yielded 6.48 L of CO2 gas. The age estimate is based on one count for 3520 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 14.752±0.112, 2.153±0.088, and 28.109±0.195 cpm, respectively.

The uncorrected age is 5180±90.

Comment (**T. Bell**): GSC-5117 and -5147 were collected from gravelly foreset beds of adjacent raised marine deltas in central Eureka Sound. If the overlying horizontal gravels are interpreted as topset beds, then GSC-5117 and -5147 relate to former sea levels at 30 m and 16 m, respectively. A more complete discussion, including the regional context, appears in Bell (1992).

Ellesmere Island (Fig. 16)

Blue Man Cape Series

A series of marine shell samples from the Blue Man Cape area, 20 km south-southwest of Eureka, Fosheim Peninsula, west-central Ellesmere Island, District of Franklin, Northwest Territories was collected and submitted by T. Bell.

GSC-5119 Blue Man Cape (I) 7920±100
$\delta^{13}C$= + 0.5‰

The marine shells (*Hiatella arctica*; identified by T. Bell) were enclosed in stony silt. Sample FP-30-S-9027 was collected on July 27, 1990 from Blue Man Cape (79º 51'N, 86º 25'W), at an elevation of 75 m.

The sample (42.5 g dry weight) was treated with an acid leach to remove the outer 20% of the sample. The treated sample (33.8 g) yielded 7.65 L of CO_2 gas. The age estimate is based on one count for 3495 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 10.574±0.069, 2.172±0.034, and 28.328±0.234 cpm, respectively.

The uncorrected age is 7920±100.

Comment (**T. Bell**): A former outlet glacier draining local ice on "Hare Cape ridge" terminated in a valley facing Eureka Sound. Downvalley from associated end moraines, a thick wedge of glaciomarine sediments is overlain by beaches to 106 m. GSC-5119 was collected near the top of the glaciomarine wedge and represents a minimum estimate on recession of the local outlet glacier and initial establishment of marine limit at 148-150 m. A more complete discussion, including the regional context, appears in Bell (1992).

GSC-5156 Blue Man Cape (II) 8680±80
$\delta^{13}C$= + 1.0‰

The marine shells (*Hiatella arctica*; identified by T. Bell) were enclosed in stony silt. Sample FP-28-S-9026 was collected on July 26, 1990 beside a lake 5 km north of Blue Man Cape (79º48'N, 86º18'W), at an elevation of 132 m.

The sample (40.1 g dry weight) was treated with an acid leach to remove the outer 20% of the sample. The treated sample (32.4 g) yielded 7.46 L of CO_2 gas. The age estimate is based on one count for 3870 minutes in the 5 L counter with a mixing ratio of 1.00. The count rates for the sample (net) and for monthly backgrounds and standards (net) were 9.673±0.066, 2.233±0.035, and 28.426±0.139 cpm, respectively.

The uncorrected age is 8660±80.

TO-2237 Blue Man Cape (III) 8640±80

Paired valves of *Hiatella arctica* (identified by T. Bell), a subsample of FP-28-S-9026 (0.204 g dry weight), was treated by the IsoTrace Laboratory with an acid leach to remove the outer 30-40% of the sample. The dated sample was corrected to a base of $\delta^{13}C$=0.0‰, equivalent to a marine reservoir correction of 410 years.

The normalized age is 9050±80.

Comment (**T. Bell**): This sample was collected from the surface of a stony silt veneer at 132 m, 8 m lower than a shell sample collected by J.G. Fyles at the same general location (GSC-254, Dyck et al., 1965a, b). GSC-5156, TO-2237, and GSC-254 provided similar radiocarbon dates of 8680±80, 8640±80, and 8710±140, respectively. All three samples lie within 18 m of local marine limit. A more complete discussion, including the regional context, appears in Bell (1992).