

ISOTOPES, INC. RADIOCARBON MEASUREMENTS II

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INTRODUCTION

The following list presents the dates obtained on a fraction of the total number of measurements made during the year 1961. Those results which do not appear are withheld pending additional information or at the request of our clients.

Procedures employed in sample pretreatment, preparation of CO₂ and method of counting remain unchanged as are our methods of age calculation. The smaller of our two counters (see Isotopes, Inc. I) was restored to use during the past year for the assay of small samples. Except for minor alterations the comments on the C¹⁴ ages, information concerning the sample site, etc., are provided by persons submitting samples.

ACKNOWLEDGMENTS

It is recognized that data obtained at Isotopes, Inc. remain the sole property of our clients. Nevertheless, we encourage our clients to submit these descriptions for publication and we wish to acknowledge the cooperation extended by all personnel mentioned in this list. In addition, we are indebted to Jerry M. Bonicos of Isotopes, Inc. for technical assistance in the laboratory.

SAMPLE DESCRIPTIONS

I. GEOLOGIC SAMPLES

This I(GSC) series of samples, from several areas in Canada, was collected by the staff of the Geol. Survey of Canada (sample I(GSC)-264 by Geog. Branch) and submitted during 1960 and 1961 by Dept. of Mines and Tech. Surveys, Geol. Survey of Canada, Ottawa, Canada. Results are published with the permission of the Director, Geol. Survey of Canada.

A. *Western Canada*

I(GSC)-211. Cowley, Alberta **10,400 ± 200**

Fresh water gastropod shells in marl, overlain by alluvium, alt 4600 ft, Cowley (49° 40' N Lat, 113° 59' W Long), in NW ¼ sec. 27, T8, R30, W 4th Meridian. Pond deposits were laid down in small valley in Porcupine Hills when stream issuing from the hills was dammed by front of Laurentide Ice Sheet. Marl was underlain by ca. 20 varves containing ice-rafted stones and overlain by ca. 15 ft alluvium which included a buried soil and a band of volcanic ash 3 in. thick. Coll. 1960 by A. MacS. Stalker. *Comment:* sample was expected to yield a date for time when surface of the last Wisconsin ice sheet lay at 4600-ft level in this area shortly after it had begun its retreat. Date is ca. 4000 yr younger than expected.

I(GSC)-214. Lynn Creek, Vancouver **32,200 ± 3300**

Compressed peat at 80 ft depth, underlying upper sand and till, exposed in highway cut W of Lynn Creek (49° 19' N Lat, 123° 03' W Long). The cut,

100 ft high, exposes three till sheets and two intervening units of stratified sand and silt; peat separates each sand unit from till below. Sample came from peat layers at base of upper sand unit. Coll. 1960 by J. B. Armstrong. *Comment*: C¹⁴ date of sample provides a basis for placing the upper sand unit in the interstadial Quadra interval. Quadra has yielded a number of dates between 24,000 and 36,000 yr (L-221 A, L-221 B, L-424 B, L-424 C, L-424 E, Lamont V; L-455 B, L-502, Lamont VI) as well as two older dates (L-475 A, >41,500 and L-475 B, >35,600, Lamont VII).

I(GSC)-248. Boundary Bay, British Columbia 12,800 ± 175

Marine pelecypod shells, alt ca. 150 ft, in till-like deposit, exposed in Delta municipal gravel pit, 1/8 mi N of United States boundary in upland near Boundary Bay (49° 01' N Lat, 123° 04' W Long). Sample taken from middle of layer of till-like material, 6 to 10 ft thick, resting on gravel, and overlain by beach gravel and sand 3 to 5 ft thick. Coll. 1960 by J. E. Armstrong. *Comment*: till-like material inclosing the dated shells is interpreted as glaciomarine, accumulated during a glacial advance within the period of wastage of the last (Vashon) ice sheet. Shells dated as 12,625 ± 450 (I(GSC)-6, Isotopes, Inc. I) and 11,900 ± 360 (L-391 C, unpubl.) are assigned by Armstrong to the same event, whereas several dates ranging from 10,950 to 11,700 B.P. (L-221 D, and E, Lamont III; L-331 A, B and C, Lamont IV) relate to the Sumas glacial advance, which may be later.

B. Eastern Canada

I(GSC)-183. Geraldton, Ontario 5230 ± 110

Gyttja, taken with Hiller borer, at 175 to 185 cm depth at bottom of a bog ca. 3 1/2 mi W of Geraldton (49° 41' W Lat, 87° 01' W Long). Gyttja is overlain by peat and underlain by sandy gravel which overlies till. Dated material is from the lowermost 10 cm of the gyttja. Locality is at the western limit of glacial Lake Barlow-Ojibway and sample should date the drainage of the lake from this area. Coll. 1960 by Jaan Terasmae. *Comment*: date indicates a minimum age for the drainage of Lake Barlow-Ojibway. Study of the pollen profile, which extends into the underlying sand, is in progress.

I(GSC)-184. Kakabeka Falls, Ontario 8240 ± 200

Silty gyttja, taken with Hiller borer, at 260 to 270 cm beneath present bog surface, 6 mi N of Kakabeka Falls (48° 29' N Lat, 89° 38' W Long), and ca. 19.5 mi NW of Fort William. Sample is lowermost 10 cm of organic deposit overlying glacial material. Depression now occupied by bog is above limits of postglacial lakes in Lake Superior basin. Date on bottom sample should give a minimum age for ice retreat from this site. Coll. 1960 by Jaan Terasmae. *Comment*: age obtained is definitely a minimum age for ice retreat. Study of the pollen record, which extends both above and below the sample level, is in progress.

C. Northern Canada

I(GSC)-178. Adelaide Peninsula, NW Territories 3690 ± 120

Marine pelecypod shells in beach deposit, alt 72 ft, Adelaide Peninsula (68° 22' N Lat, 97° 47' W Long), McGillivray Bay. Collected from lowest of

a series of sandy beaches forming concentric rings around a drumlin. Coll. 1960 by B. G. Craig. *Comment*: dated shells represent deposition when sea was ca. 70 ft above its present level and possibly 500 ft below its maximum stand following retreat of the Laurentide Ice Sheet. Geology of the district described by Craig (1961); see also samples I(GSC)-179, 212, 213 and 215, this date list, and "Northern Keewatin Series," GSC I.

I(GSC)-212. Simpson Lake, NW Territories 7160 ± 160

Marine pelecypod shells, alt 175 ft, in foreset beds of delta, Simpson Lake, W (68° 42' N Lat, 92° 27' W Long). Coll. 1960 by B. G. Craig. *Comment*: dated shells represent deposition when sea was ca. 175 ft above its present level and ca. 425 ft below its maximum stand following retreat of Laurentide Ice Sheet (Craig, 1961).

I(GSC)-213. Pelly Bay, NW Territories, 293 ft 7880 ± 150

Marine pelecypod shells, alt 293 ft, Pelly Bay (68° 51' N Lat, 90° 40' W Long). Shells were at surface in delta and beach sands reworked from an esker. Coll. 1960 by B. G. Craig. *Comment*: dated shells represent deposition when sea was 393 ft above its present level and ca. 300 ft below its maximum stand following retreat of Laurentide Ice Sheet (Craig, 1961).

I(GSC)-179. Pelly Bay, NW Territories, 540 ft 8370 ± 200

Marine pelecypod shells, alt 540 ft, at surface of marine clay, Arrowsmith River (68° 12' N Lat, 90° 34' W Long), Pelly Bay. Marine clay occurs as an erosional remnant in a small terrace on side of valley. Coll. 1960 by B. G. Craig. *Comment*: dated shells found in sea-floor deposits ca. 100 ft below the marine limit and represent deposition close to the time of maximum transgression following retreat of the Laurentide Ice Sheet (Craig, 1961).

I(GSC)-215. Pelly Bay, NW Territories, 575 ft 8360 ± 175

Marine pelecypod shells, alt 575 ft, in fine sand exposed at ground surface, Pelly Bay (69° 15' N Lat, 91° 16' W Long). Coll. 1960 by M. Tremblay. *Comment*: shells collected close to upper limit of marine submergence date from early part of marine submergence that followed retreat of Laurentide Ice Sheet (Craig, 1961).

I(GSC)-264. Shei Peninsula, NW Territories 8080 ± 160

Marine mollusc shells, alt 510 ft (aneroid), Shei Peninsula, Axel Heiberg Island (80° 15' N Lat, 87° 45' W Long). Coll. 1960 by B. Robitaille, Geog. Branch. *Comment*: locality lies close to the marine limit on E Axel Heiberg Island. Sample also gives a minimum date for the deglaciation of the area.

I(GSC)-185. Masik River, NW Territories 10,600 ± 320

Peat from base of 20-ft section of interbedded peat and shaly colluvium forming the upper part of S bank of Masik River, 6 mi from the river mouth (71° 35' N Lat, 123° 34' W Long), Banks Island. Peat rests on gravel 20 ft above river bed at alt between 50 and 100 ft. Coll. 1960 by J. G. Fyles. *Comment*: gravel beneath the dated peat postdates all glacial features in vicinity but may be outwash of Laurentide Ice Sheet whose margin is known to have

stood 25 mi to E during Wisconsin time. Although definite evidence of recent marine submergence has not yet been found in vicinity, a delta-like terrace at alt ca. 40 ft near the mouth of the river may be marine and possibly equivalent to the gravel beneath the dated peat.

I(GSC)-197. Kellet River, NW Territories 9820 ± 220

Peat, 8 ft below surface at base of pond deposits, overlying gravel, shale and sandstone, excavated in a gully 4 mi N of Kellet River, Banks Island (71° 56' N Lat, 123° 14' W Long). Pond sediments occupy a shallow depression in the upland. Coll. 1960 by J. G. Fyles. *Comment*: landscape of this part of Banks Island, with hilltop remnants of glacial deposits surrounded by broad colluvial slopes, has an old appearance when compared with the fresh moraines of the last ("classical" Wisconsin) glaciation ca. 30 mi to E. Nonetheless, the date of the bog-bottom sample lies in the normal postglacial range. A similar sample (I(GSC)-26, >38,000, Isotopes, Inc. I), coll. ca. 50 mi to the W, is much older (see also Craig and Fyles, 1960).

I(GSC)-180. Mayo, Yukon Territory > 35,000

Spruce wood from right bank of Stewart River 3 mi downstream from Mayo (63° 36' N Lat, 135° 58' W Long). Partly exposed log 6 in. diam, ca. 4 ft long, abraded at both ends with cracks filled by calcite. Log was imbedded in till at base of till lens near top of an exposure ca. 100 ft high above river level. Till lens lies on sand and gravel and is overlain by bedded silt. It is judged to be same till as that exposed near top of numerous sections from Mayo, downstream to New Crossing, Stewart River. Coll. 1960 by O. L. Hughes. *Comment*: till is product of latest glaciation of locality. Wood appears to have been transported and may be from a deposit much older than the till in which it was found.

I(GSC)-181. Hunker Creek Wood, Yukon Territory > 35,000

Spruce wood from Fant and Norbeck placer pit, left limit of Hunker Creek between Too Much Gold and Gold Bottom Creeks, Klondike District (63° 58' N Lat, 138° 57' W Long). Taken from lenticular body of organic silt, maximum thickness 18 ft, overlying auriferous gravel and overlain, successively, by silty gravel, 2 to 5 ft thick, with abundant remains of mammoth, horse and bison; by organic silt, 3 to 18 ft thick; and by woody, silty peat, 5 to 10 ft thick. Area is unglaciated. Coll. 1960 by O. L. Hughes. *Comment*: as expected, material is very much older than similar material from Hunker Creek. Sample Y-133 (8900 ± 320, Yale II) may be compatible with I(GSC)-196 (9510 ± 220, this date list) which came near the top of the organic silt that overlies the silty bone-bearing gravel.

I(GSC)-196. Hunker Creek Silt, Yukon Territory 9510 ± 220

Highly organic, frozen silt from left limit of Hunker Creek (63° 58' N Lat, 138° 57' W Long). Site is same as that of I(GSC)-181 but sample is from near the top of organic silt that overlies the silty gravel containing vertebrate remains. Coll. 1960 by O. L. Hughes. *Comment*: see I(GSC)-181 (this date list).

D. United States-Alaska

Barrow Spit series, Alaska

Wood from boring made by 32 in. auger on beach ridge, alt ca. 10 ft, 800 ft SW of N tip of spit, Point Barrow (71° 23' N Lat, 156° 29' W Long), Alaska. Coll. and subm. 1961 by T. L. Péwé and R. E. Church, Univ. of Alaska, College, Alaska.

I(UA)-387. Barrow Spit, 77 in. 1100 ± 120

From frozen gravel 77 in. below surface.

I(UA)-388. Barrow Spit, 115 in. 1090 ± 140

From frozen gravel 115 in. below surface.

I(UA)-389. Barrow Spit, 131 in. 10,800 ± 300

From frozen gravel 131 in. below surface. *Comment:* ages of younger samples, ca. 1100 B.P., seem reasonable as estimates of beginning of latest episode of subsurface freezing in the district. If the very much older date of I(UA)-389, found only slightly deeper, is accepted, the deeper ground may be an inheritance from Valdres time.

I(GSC)-182. Coleman, Alaska 4770 ± 120

Charcoal from soil covered by 3 to 5 ft bouldery till and overlying clayey till, alt ca. 5000 ft on slope flanking Crows Nest Mountain, Coleman (49° 13' N Lat, 114° 37' W Long). Sample was from a forest fire. The bouldery till is part of a ridge interpreted as a lateral moraine left by a valley glacier during its maximum advance. Coll. 1960 by A. MacS. Stalker. *Comment:* there are many other indications, in this region of the Rocky Mountains, of relatively recent glaciers that extended to alt of 5000 to 5500 ft. Date should give a maximum age for greatest extent of this post-Wisconsin, post-Hypsithermal glaciation.

E. Eastern United States

Crusoe Lake series, New York

Samples of gyttja with abundant shells taken with Hiller borer at center of Crusoe Lake (43° 05' N Lat, 76° 47' W Long), Savannah, New York. Coll. 1959 by D. Cox, Marshall College, Huntington, West Virginia and D. Lewis, New York State Mus. and Sci. Service; subm. 1961 by D. Lewis.

I(NYS)-219. Crusoe Lake, 1.3 m 3200 ± 100

1.3 m below lake bottom at transition from underlying gray-brown to overlying gray gyttja. *Comment:* level is transitional between Pollen Zones C2 and C3 where *Tsuga* pollen begins the rise to its final maximum. This level was dated at 2140 ± 250 (C-119, Chicago I) in Upper Linsley Pond, Connecticut, and is thought to be no older than 2600 B.P.

I(NYS)-220. Crusoe Lake, 5.0 m 6850 ± 150

5.0 m below lake bottom in light brown gyttja immediately above a zone of stiff dark brown gyttja. *Comment:* level is transitional between Pollen Zones C1 and C2 where *Tsuga* pollen sharply declines from its initial maximum. This

was dated at 5305 ± 250 (C-120, Chicago I) at Upper Linsley Pond, Connecticut. Incorporation of older carbonates may explain the discrepancies in I(NYS)-219 and 220.

II. ARCHAEOLOGIC SAMPLES

I(NMC)-217. Pre-Columbian *Littorina*, Halifax 700 \pm 225

Snail shells (*Littorina littorea* (Linn.)) from the Reid archaeological site, Sand Cove, St. Margaret's Bay, Halifax, Nova Scotia (ca. $44^{\circ} 35' N$ Lat, ca. $63^{\circ} 55' W$ Long). Sample was 12 shells, average height ca. 15 mm. Coll. 1960 by J. S. Erskine; subm. 1961 by A. H. Clarke, Jr., Natl. Mus. of Canada, Ottawa, Canada. *Comment*: site is pre-European Micmac encampment and contained *Cepaea hortensis* (Müller) as well as *Littorina*; the status of these species as natives of the New World was doubted. The presence of reindeer (*Rangifer tarandus*) bones and crowded lines of growth in *Mercenaria mercenaria* (Linn.) provided evidence that the climate had been colder than today. A tentative date of 13th century A.D., previously assigned, now confirmed (Clarke and Erskine, 1961).

I(MNM)-251. Valentine Village, log 1640 \pm 90

Rotted wood (*Juniperus* sp., id. by T. A. Lee, Jr.) from Pine River Sec., Navajo Reservoir Dist., SW $\frac{1}{4}$ NE $\frac{1}{4}$ sec. 18, T31N, R7W, New Mexico ($36^{\circ} 54' 00'' N$ Lat, $107^{\circ} 36' 30'' W$ Long). Sample is from a first course log on N side of main room, Structure 10, Site LA 4289 (Valentine Village). Coll. 1960 and subm. 1961 by F. W. Eddy, Mus. New Mexico. *Comment*: sample dates construction of Structure 10, an early non-ring house in the Los Pinos Phase. Culturally, this phase correlates with Basket Maker II occupation N of Durango, Colorado, dated by tree rings from A.D. 46 to ca. A.D. 330 (Morris and Burgh, 1954). However most tree-ring dates in this sequence cluster around A.D. 325.

I(MNM)-252. Valentine Village, fill 1420 \pm 80

Charcoal from Pine River Sec., Navajo Reservoir Dist., SW $\frac{1}{4}$ NE $\frac{1}{4}$ sec. 18, T31N, R7W, New Mexico ($36^{\circ} 54' 00'' N$ Lat, $107^{\circ} 36' 30'' W$ Long). Sample was from refuse filling interior of Structure 4, Site LA 4289 (Valentine Village). Coll. 1960 and subm. 1961 by F. W. Eddy. *Comment*: sample dates the refuse fill of a ring-style house at Valentine Village. Refuse was dumped into the house after it had fallen into disuse. In conjunction with I(MNM)-251, this date list, gives an idea when the ring-house type was in use and something of the span of the Los Pinos Phase.

I(TTC)-208. Lubbock Reservoir, Texas, Stratum 6 160 \pm 90

Charcoal from Lubbock Reservoir site, Lubbock, Texas ($33^{\circ} 35' N$ Lat, $101^{\circ} 50' W$ Long). Sample was hand picked from hearth in Stratum 6 slightly more than 2 ft below present surface and 3 ft laterally from the vertical bank of the reservoir cut. Hearth materials included charcoal, numerous fragments of burnt and unburnt bone, and burnt caliche pebbles. Coll. 1960 and subm. 1961 by F. E. Green, Texas Technol. College Mus., Lubbock, Texas. *Comment*: sample is from same stratum and probably same occupation level as I(TTC)-140 (70 ± 70 , Isotopes, Inc. I). Archaeologic and geologic evidence indicates that this horizon should be between 500 and 1000 yr old.

I(TTC)-246. Lubbock Reservoir, Texas, Stratum 1 12,650 ± 250

Pelecypod shells (*Sphaerium* and *Pisidium*) from Lubbock Reservoir site, Lubbock, Texas (33° 35' N Lat, 101° 50' W Long). Shells were hand picked during excavation from single horizon within basal sand and gravel of Stratum no. 1 (Sellards, 1952). This stratigraphic unit is a stream deposit, but most of the shells were articulated and believed to be contemporaneous with the deposit. The sampled horizon is 24 in. below shells taken from Folsom horizon in Stratum no. 2 which have been dated as 9700 ± 450 (L-283 G; Lamont IV) and is stratigraphically beneath charred bone samples also taken from Folsom horizon, and dated as 9883 ± 350 (C-558, Libby, 1955). Coll. 1960 and subm. 1961 by F. E. Green. *Comment*: from stratigraphic and paleontological evidence at the site Stratum no. 1 is believed to equate with the strata containing artifacts of the Llano culture at the Clovis site in New Mexico, and the Naco and Lehner sites in Arizona. The top of Stratum no. 1 at this site marks the disappearance of the Pleistocene horse, mammoth and camel and must therefore date between the 10,000 yr dates found on the two samples from the Folsom horizon near the base of Stratum no. 2 and the 12,650 yr date found on the present sample in Stratum no. 1. Stratigraphically the time of extinction occurs closer to the Folsom horizon and hence probably falls somewhere between 10,000 and 11,000 yr B.P.

I(NGS)-171. Dzibilchaltun, Mexico, Late Formative 2270 ± 80

Carbonized jack beans (*Canavalia ensiformis* D C) at base of midden in Late Formative sequence, Dzibilchaltun, 15 km N of Mérida, Yucatan, Mexico (21° 17' N Lat, 89° 40' W Long). Coll. and subm. 1960 by E. W. Andrews, Natl. Geog. Soc., Washington, D. C. *Comment*: in close agreement with LJ-279 (2200 ± 200, La Jolla II) from Structure 450, also of Late Formative age. This sample had been tentatively equated with deposits associated with I(NGS)-171 on basis of ceramics.

I(FG)-240. Kama-kura figure, Freer Gallery 560 ± 80

Wood (*Cryptomeria japonica*) from a Japanese guardian figure, 89 $\frac{1}{8}$ in. high, now in Freer Gallery of Art, Smithsonian Inst., Washington, D. C. Sample chiseled from back of figure. Coll. and subm. 1961 by R. J. Gettens, Freer Gallery of Art. *Comment*: from style and documentary evidence the object had previously been dated as belonging to the Kama-kura Period (A.D. 1180-1331). C¹⁴ date is in reasonable agreement.

I(FG)-243. Suiko figure, Freer Gallery 1450 ± 90

Wood (*Cryptomeria japonica*) from a Japanese wooden statuette, 37 $\frac{3}{4}$ in. high, now in Freer Gallery of Art. Sample taken from base of statuette with auger bit. Coll. and subm. 1961 by R. J. Gettens. *Comment*: statuette had been dated stylistically as belonging to the Suiko Period (ca. A.D. 600). C¹⁴ date is in reasonable agreement.

I(B)-238. Wat Po Buddha, Bangkok 290 ± 70

Clay core material, including rice hulls and cow dung, from bronze Buddha image at Wat Po, Bangkok (13° 45' N Lat, 100° 30' E Long). Image, seated

in the attitude of subduing Mara, was probably removed from Sukhothai to Bangkok in the late 18th century. Inscription on base bears no date but on basis of script style the image should be between 500 and 700 yr old. Coll. and subm. 1961 by M. C. S. Diskul, Bangkok Natl. Mus., Thailand. *Comment*: it was assumed that the date of the core would support age estimated from script-style dating. Core was not homogeneous and it is possible that some was replaced at some time after image was made.

I(B)-239. Thai Antiquarium Buddha, Bangkok 700 ± 100

Clay core material from bronze Buddha owned by Thai Antiquarium, Bangkok, Thailand (13° 45' N Lat, 100° 30' E Long). Image is similar but somewhat smaller than that described in I(B)-238 (this date list). Probably found in N Thailand. Coll. by D. V. Sampati, Thai Antiquarium, Bangkok; subm. 1961 by M. C. S. Diskul. *Comment*: core material is similar to that described for I(B)-238 and dating was undertaken for same purpose. Age agrees well with that expected by Thai scholars but the de Vries effect should be borne in mind in considering these two dates.

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