[RADIOCARBON, VOL. 15, NO. 1, 1973, P. 42-67]

GAKUSHUIN NATURAL RADIOCARBON MEASUREMENTS VIII

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This list continues Gakushuin VII (R., 1969, v. 11, p. 295-362); the same instruments and techniques were employed. Age calculations are based on the Libby half-life of C^{14}, 5570 ± 30 years, and the modern activity given by 95% of the activity of NBS oxalic acid standard. Errors quoted are the standard deviation obtained from the number of counts only. When observed activity is less than 2σ above background, infinite date is given with a limit corresponding to the activity of 3σ. For shell samples, dates are computed without any correction for environmental and biological isotopic fractionation. The description and comments are essentially those of the submitters.

SAMPLE DESCRIPTIONS

I. GEOLOGIC SAMPLES

A. Japan

Yoko-oji series, Kyoto

Samples from alluvium at Yoko-oji, Fushimiku, Kyoto City (34° 55′ N Lat, 135° 44′ 38″ E Long), S of Kyoto City, alt. 10.5 m. Coll. and subm. 1967 by Shiro Ishida, Kyoto Univ., for study of sedimentation rate at Kyoto basin and ages of tephra in the sediment.

GaK-1453. Kyoto, 1 — **12,340 ± 220** / **10,390 B.C.**

Wood (*Quercus*) from gravel 12.5 m below surface of alluvium.

GaK-1454. Kyoto, 2 — **8520 ± 170** / **6570 B.C.**

Roots of reed from sand 9 m below surface of alluvium. *Comment* (S.I.): dates period of swamp formation.

GaK-1455. Kyoto, 3 — **6720 ± 150** / **4770 B.C.**

Twigs and leaves from clay 7.25 m below surface of alluvium, 20 cm above volcanic ash. *Comment* (S.I.): dates volcanic ash.

GaK-1456. Kyoto, 4 — **4910 ± 90** / **2960 B.C.**

Wood from peaty clay 6.5 m below surface of alluvium.

GaK-1457. Kyoto, 5 — **6220 ± 90** / **4270 B.C.**

Drift wood from fine sand 5.7 m below surface of alluvium. *Comment* (K.K.): drift wood date may show age of sedimentation of fine sand.

3200 ± 100

GaK-1458. Kyoto, 6 **1250 B.C.**

Leaves (*Quercus*) from sand, 4.8 m below surface of alluvium.

4190 ± 130

GaK-1459. Kyoto, 7 **2240 B.C.**

Driftwood in clay, 4.3 m below surface of alluvium. *Comment* (K.K.): see GaK-1457.

7050 ± 140

GaK-1460. Kyoto, 8 **5100 B.C.**

Peaty clay 7.5 m below surface of alluvium, underlying volcanic ash. *Comment* (K.K.): date does not confirm that volcanic ash is same as Akahoya (GaK-1241, R., v. 11, p. 296) at S Kyushu.

4500 ± 80

GaK-1461. Matta-moroguchicho **2550 B.C.**

Wood from sandy clay marine deposit, Umeda layer, at Matta-moroguchicho, Jotoku Osaka (34° 42.3′ N Lat, 135° 35′ E Long), 4.7 to 4.8 m below ground surface. Coll. 1967 by S. Ishida and subm. by M. Senchi, Osaka City Mus. Nat. Sci.

Shinhama series

Boring samples from Shinhama, Kusatsu City, Shiga Pref. (34° 59′ 55″ N Lat, 135° 55′ 35″ E Long). Coll. 1966 and subm. by Akira Unozawa, Geol. Survey of Japan.

GaK-1584. Shinhama, 1 **>33,600**

Peat from 16.7 to 17.0 m below ground surface, in granitic sand and gravel overlain by terrace deposit.

29,000 ± 1700

GaK-1585. Shinhama, 2 **27,050 B.C.**

Peat from 5.5 to 5.7 m below ground surface. *Comment* (A.U.): dates peat (Sukumo) just above terrace deposit.

6460 ± 110

GaK-1393. Kashiwazaki **4510 B.C.**

Wood from Kamiwa, Kashiwazaki City, Niigata Pref. (37° 19′ N Lat, 138° 28′ E Long), in lower terrace, Kashiwazaki Layer, with large pebble. Coll. 1966 and subm. by Tsutomu Utashiro, Niigata Univ.

28,050 ± 1550

GaK-1451. Shinchi, Fukushima **26,100 B.C.**

Wood from peat layer at Shinchi-mura, Soma-gun, Fukushima Pref. (37° 51′ 53″ N Lat, 140° 15′ 40″ E Long), underlying sand and gravel, 3 m below surface of lowest terrace. Coll. 1966 and subm. by Keiji Suzuki, Fukushima Univ.

18,750 ± 500

GaK-1452. Negishi, Kukushima **16,800 B.C.**

Wood from fujita fan deposit at Negishi, Kori-machi, Fukushima

Pref. (37° 50′ 47.5″ N Lat, 140° 32′ 20.1″ E Long), 3.2 m below surface. Coll. and subm. 1967 by K. Suzuki. *Comment* (K.S.): dates last stage of Fujita fan deposit (Koriyama Research Group, 1966); see GaK-209 (R., 1963, v. 5, p. 114).

15,000 ± 400

GaK-2370. Hiroshima, Hokkaido **13,050 B.C.**

Wood from Hiroshima-cho, Sapporo-gun, Hokkaido (42° 56′ 22″ N Lat, 141° 32′ 10″ E Long), alt. 53.2 m, 4.5 m below surface of lower terrace deposit which consists of secondary deposit including Shikotsu pumice flow. Coll. and subm. 1968 by Makoto Kashiwabara, Sapporo Daiichi High School.

B. Australia

32,200 ± 400

GaK-1908. Fremantle **30,250 B.C.**

Shells of marine gastropod *Turbo (Ninella) whitleyi* from coarse calcarenite exposed in a quarry (32° 5′ S Lat, 115° 45′ E Long) near Fremantle, W Australia. Coll. and subm. by D. Merrilees and G. W. Kendrick, W Australian Mus. *Comment* (D.M. and G.W.K.): from exposure up to 1 m above modern mean sea level, and probably represents a stand of the sea about this level. Assoc. marine mollusca and coral indicate water temperatures similar to those of today.

GaK-2542. Reef Beach **>32,000**

Charcoal from low cliffs at Reef Beach in Bremer Bay dist., W Australia (34° 29′ S Lat, 119° 9′ E Long). Coll. and subm. 1969 by D. Merrilees. *Comment* (D.M.): from immediate vicinity of mandible (W Aust. Mus. Specimen 69.4.37) of large extinct diprotodontid marsupial (*Zygomaturus trilobus*). Date suggests accumulation of calcareous dunes near Bremer Bay was slower than at Fremantle (cf. GaK-875, R., 1969, v. 11, p. 303, and GaK-1908). Preliminary note on occurrence in Merrilees (1970).

19,400 ± 1200

GaK-2417. Deepdene Cave **17,450 B.C.**

Bone (mainly juvenile *Petrogale*, a marsupial) from lower half of a rimstone pool floor deposit (now dry) in Deepdene Cave, Augusta dist., W Australia (34° 16′ S Lat, 115° 3′ E Long). Coll. 1968 and subm. by D. Merrilees. *Comments* (D.M.): peculiar nature of deposit not yet explained. (K.K.): dated on collagen.

6660 ± 120

GaK-2874. Guildford, Western Australia **4710 B.C.**

Shells of marine bivalve (*Paphia callistotapes* sp.), dredged from sediments in Swan Estuary bed near Guildford, W Australia (31° 54′ S Lat, 115° 58′ E Long). Coll. by G. W. Kendrick and subm. 1970 by D. Merrilees. *Comment* (D.M.): dredged from unrecorded depth from 2.7 to 4.8 m below low-water mark, Fremantle. Other mollusks with same matrix were also marine, and significantly different from living

mollusk fauna of Estuary, but similar to some marine mollusks at Fremantle, 30 km downstream. A marked environmental change seems evident within Swan Estuary since mid-Holocene.

C. England

Bishop Middleham series

Peat from Bishop Middleham, Durham, England (54° 40′ 3″ N Lat, 1° 29′ 49″ W Long). Deposit, 150 cm deep, lies in channel forming part of system, seemingly connected with Ferryhill Gap. Pollen analysis indicates peat growth began during Boreal period. Coll. 1967 and subm. by D. D. Bartley, Univ. Leeds.

6760 ± 120

GaK-2070. Bishop Middleham, 100 cm **4810 B.C.**

Peat, 100 cm below surface. *Comment* (D.D.B.): suggests rapid growth for 1st 40 cm of peat if Boreal-Atlantic transition is placed at ca. 140 cm. Date was required due to marked rise in pollen of *Quercus* and Tilia, beginning at 100 cm depth.

5180 ± 110

GaK-2071. Bishop Middleham, 80 cm **3230 B.C.**

Peat, 80 cm below surface. Pollen (*Plantago lanceolata*) makes its 1st appearance in pollen diagram, presumably indicating beginning of Neolithic agriculture. *Comment* (D.D.B.): supposed elm decline (ca. 3300 B.C.) at 90 cm falls midway between levels giving these 2 dates; thus, a very slow growth of deposit between 100 and 90 cm and a greatly accelerated rate between 90 and 80 cm is presumed. Climatic changes may be assoc., since part of pollen diagram between 100 and 90 cm shows high values of pollen of *Quercus* and *Tilia* and markedly low values for *Alnus*, indicating drier conditions for much of Atlantic period.

3660 ± 80

GaK-2072. Bishop Middleham, 60 cm **1710 B.C.**

Peat, 60 cm below surface.

3360 ± 80

GaK-2073. Bishop Middleham, 40 cm **1410 B.C.**

Peat, 40 cm below surface. *Comment* (D.D.B.): together with Gak-2072, shows that major phase of agriculture, indicated by rise in pollen values of Gramineae, Cyperaceae, *Plantago lanceolata, P. Major,* etc., can be dated to Bronze age. Separation of the 2 dates by only 300 yr suggests rapid deposition of detrital material at that time.

N Derbyshire series

Three peat bogs on a ridge of upland composed of gritstone and shale, at Leash Fen, N Derbyshire, England (53° 15′ 40″ N Lat, 1° 33′ 30″ W Long), alt. 285 m, Totley Moss, N Derbyshire, England (53° 18′ N Lat, 1° 34′ 30″ W Long) alt. 360 m, and Hipper Sick, N Derbyshire, England (53° 12′ 40″ N Lat, 1° 32′ 40″ W Long), alt. 315 m.

Leash Fen samples are taken in sequence from one boring using Hiller Type peat borer. Monoliths were cut for Totley Moss and Hipper Sick peat. Samples coll. 1968 by S. P. Phillips and subm. by Bartley.

GaK-2284. Leash Fen, base **6250 ± 150**
4300 B.C.

Dates beginning of peat growth at Leash Fen. Sample from base of peat bog. Peat growth began in Pollen Zone VIIa some time after Boreal/Atlantic Transition. *Comment* (S.P.P.): agrees with pollen evidence but is later than expected, according to other upland peats. Yet, 285 m is low alt. for upland peat and might explain later growth.

GaK-2285. Leash Fen, 502 cm depth **4070 ± 100**
2120 B.C.

Dates 1st clearance phase; small clearance of fairly short duration assoc. with pastoral rather than arable farming. *Comment* (S.P.P.): accords well with archaeologic evidence of Neolithic activity in area. Neolithic stone axes of 2 different petrologic groups were recovered from gritstone upland and both groups are placed in mid/late 3rd millennium B.C.

GaK-2286. Leash Fen, 460 cm depth **3740 ± 100**
1790 B.C.

GaK-2287. Leash Fen, 410 cm depth **3450 ± 110**
1500 B.C.

Gak-2286 and Gak-2287 date 2 clearance phases on Leash Fen Diagram which, like the 1st (GaK-2285), are fairly small and of short duration although the one at 410 cm is of slightly greater magnitude. *Comment* (S.P.P.): correlating archaeologic and palynologic evidence with radiocarbon dates suggests clearance phase dated at 1790 B.C. could be assoc. with Late Neolithic Beakers although assoc. with Food Vessels is more likely. Later phase dated at 1500 B.C. must correlate with Collared Urns.

GaK-2288. Leash Fen, 340 cm depth **2290 ± 100**
340 B.C.

GaK-2289. Leash Fen, 270 cm depth **2090 ± 100**
140 B.C.

Gak-2288 and GaK-2289 date beginning and end of major clearance phase on Leash Fen diagram. *Comment* (S.P.P.): from 340 cm to 270 cm depth percentage of tree pollen falls dramatically, Gramineae pollen rises, *P. lanceolata* pollen increases and cereal pollen grains are present for 1st time. Dates 340 B.C. to 140 B.C. for duration of phase place it as Iron age. Abundant Iron age remains accord well with magnitude of clearance.

2110 ± 100

GaK-2290. Leash Fen, 180 cm depth **160 B.C.**

Dates minor clearance phase though result is somewhat anomalous, but considering quoted errors, dates GaK-2289 and GaK-2290 are virtually the same. Possibly, peat bog was growing very rapidly, a theory supported by stratigraphic evidence: above 270 cm (depth of GaK-2289) peat is obviously less humified and contains higher proportion of *Sphagnum*. Apparent separate clearance phase at 180 cm may therefore be part of Iron age phase.

1910 ± 100

GaK-2291. Leash Fen, 130 cm depth **A.D. 40**

1530 ± 90

GaK-2292. Leash Fen, 70 cm depth **A.D. 420**

GaK-2292 and GaK-2291 date beginning and end of penultimate clearance phase, which, from pollen evidence is assoc. with both pastoral and arable farming. *Comment* (S.P.P.): dates A.D. 40 to A.D. 420 correspond well with Roman occupation. First stage of Roman road system in Derbyshire, Foss Way, is dated at A.D. 47.

4490 ± 140

GaK-2293. Totley Moss **2540 B.C.**

Dates 1st occurrence of pollen (*Plantago lanceolata*) at Totley Moss.

4770 ± 110

GaK-2294. Hipper Sick **2820 B.C.**

Dates 1st occurrence of pollen (*Plantago lanceolata*) at Hipper Sick.

General Comment (D.D.B. and S.P.P.): pollen diagrams from a number of deposits on gritstone uplands of S. Derbyshire revealed series of phases of agricultural interference with vegetation. Diagram from Leash Fen, lowest peat deposit (285 m), was taken as reference for region and series of clearance phases were dated. In pollen diagram, clearance phases are shown by fall in percentage of tree pollen with rise in values of Gramineae, and presence of agricultural indicators, *Plantago lanceolata, Rumex acetosa,* and *Pteridium aquilinum*. Pollen diagrams at Totley Moss and Hipper Sick show agricultural activity predates 1st clearance phase at Leash Fen, supported by C^{14} dates, 3040 B.C. and 2820 B.C., which indicate a Neolithic phase although there is no archaeologic evidence of Neolithic in early 3rd millennium B.C.

II. ARCHAEOLOGIC SAMPLES

A. Canada

3100 ± 80

GaK-1272. Kajewski site, Alberta **1150 B.C.**

Charred bone from Kajewski site (49° 35′ N Lat, 110° 20′ W Long), Cypress Hills, Alberta. Scattered bone from Sq. 49D.0, from surface of buried slump block in area of dense occupation. Probably 3 components.

Material recovered is largely artifacts made from quartzite cobbles and flakes. Charred bone is from lowest culture-bearing level, assoc. with cobble choppers, a projectile point with basally-thinned stemmed, and a triangular projectile point. Lowest level is dense living floor of occupation debris. Will date the number of dominant cobble and flake tools found throughout Cypress Hills. Est. age 4000 B.C. Coll. 1966 by N. Deemer and subm. for R. Bonnichsen, Univ. Alberta, by R. Wilmeth, Natl. Mus. Canada. *Comments* (R.B.): date overestimated by ca. 3000 yr, a tremendous margin of error even if bone sample gave slightly incorrect date. For lack of diagnostic artifacts at Kajewski, date must be accepted at face value. (K.K.): dated on residues after dissolution of charred bone by nitric acid.

Head-Smashed-In Buffalo Jump series, Alberta

Bone from Head-Smashed-In Buffalo Jump, DkPj-1 (49° 43′ N Lat, 113° 40′ W Long), Porcupine Hills, 16 km W of Fort MacLeod, Alberta. Largest known buffalo jump in NW Plains, 244 m long by 60 m wide. Average depth 6 m, max. depth 12 m. Upper deposits contain typical late prehistoric side-notched points. Lower levels contain Besant, Pelican Lake, and Hanna points. Lowest levels contain wide assortment of stone and bone tools, but no projectile points. Age of deposits is unknown but could predate last glaciation at 12,000 yr ago. Coll. 1966 by Reeves, and subm. for R. G. Forbis, Univ. Calgary, by R. Wilmeth.

GaK-1474. Head-Smashed-In Buffalo Jump, Test Y — **3040 ± 120 / 1090 B.C.**

Bone (NMC-170) from Test Y, cultural Horizon 5, soil Horizon 19 (Ah), depth 3.0 to 3.2 m. First drive of Late Prehistoric. Point assoc. is Avonlea and another unnamed type. Est. age A.D. 300 to 400.

GaK-1475. Head-Smashed-In Buffalo Jump, N test pit — **1860 ± 120 / A.D. 90**

Bone (NMC-171) from N test pit, Layer 8, depth 1.8 to 2.0 m. Earliest horizon with identifiable projectile points, Hanna and Pelican Lake. Will date appearance of these points, and allow for termination date of semi-sterile interval separating bottom horizons. Est. age 800 to 600 B.C.

GaK-1476. Head-Smashed-In Buffalo Jump, Test X — **4050 ± 100 / 2100 B.C.**

Bone (NMC-172) from Test X, 15 cm below bottom of Pelican Lake. In Test Y, this is cultural Horizon 8, soil Horizon 31 (Ah), depth 5.1 to 5.7 m. Will date termination of early occupation of jump. Assemblage at this depth contained no projectile points. Est. age greater than 800 B.C., possibly earlier than 10,500 B.C.

General Comments (R.G.F. and B.R.): dates on GaK-1474 and GaK-1475

are opposite of expected results. Additional date on Late Prehistoric Avonlea level is A.D. 305 ± 130 (GX-1252). (K.K.): dated on collagen.

Nanook site series, Northwest Territories

Charred fat and sod from Nanook site, KdDq-9 (62° 39′ N Lat, 69° 37′ W Long), Cape Tanfield, Baffin I., N.W.T., Canada. Two-component site probably occupied in winter when sea level was almost 8 m higher than at present. Typology fits into 12-site continuum for Tanfield Valley. Coll. 1966 by M. S. Maxwell, Michigan State Univ. and subm. by R. Wilmeth.

GaK-1493. Nanook site, Sq. SL15 **2010 ± 80 60 B.C.**

Charred fat (seal?) (NMC-132) from Sq. SL15, surface depth 2.7 m, in permafrost. Scraped from encrusted cooking rock on floor of earliest level of upper (more recent) of 2 components. Should date beginning of component. Should be more recent than M-1535 (2410 ± 120) (Crane and Griffin, 1966) and older than P-704 (1916 ± 61 (Stuckenrath *et al.,* 1966).

GaK-1494. Nanook site, Sq. OL15 **1870 ± 110 A.D. 80**

Sod (NMC-129) from Sq. OL15, surface depth 30 cm, underlying GaK-1284, in permafrost. Should date most recent part of lower of 2 components. Was expected to be equivalent to GaK-1284 (2380 ± 80) and was subm. as a check using sample of different organic composition. Should be slightly more recent than M-1535.

General Comments (M.S.M.): NMC-132 (GaK-1493): date seems too recent by ca. 180 yr. A series of carbon dates from a stratigraphic column in this site, and archaeologic evidence including comparative typology indicates 3 major uses of this settlement locale; one centering ca. 410 B.C. ± 30 yr; the 2nd centering around 240 B.C. ± 30 yr, and the 3rd centering ca. A.D. 60 ± 30 yr. Sample should date to early point in 2nd occupation. Contamination with melt water is suspected.

NMC-129 (GaK-1494): date, A.D. 80, is unacceptable in light of other carbon dates from site and archaeologic analysis. Other evidence suggests that at 30 cm depth in this permafrost midden samples are contaminated by organisms in standing melt water, unless taken as soon after thawing as possible. Probably future samples should be chopped out before thawing. Caribou skin overlying sample was dated to 430 B.C. (GaK-1284), consistent with M-1535 (460 B.C.) and GaK-1286 (420 B.C.). Note, however, that GaK-1288 from same midden depth of 30 cm, and GaK-1285 from 9 cm lower, date from A.D. 1370 and A.D. 550, respectively. These 2 samples and GaK-1494 may have been exposed to melt water for a longer period than the 3 "good" samples.

Elk Island site series, Manitoba

Charcoal from Elk Island site (GdKn-1), S shore of Elk I., God's

Lake, Manitoba (54° 38′ N Lat, 94° 14′ W Long). Stratified site with Shield Archaic below Selkirk focus (Cree). Coll. 1967 by J. V. Wright, Natl. Mus. Canada. Subm. for Wright by R. Wilmeth.

2760 ± 240

GaK-1860. Elk Island site, 10-14 cm depth **810 B.C.**

Charcoal (NMC-226) from test Trench 2, Level 2, from beneath Hearth 1, at 10 to 14 cm depth. Represents 1st radiocarbon date on Shield Archaic. Est. age: <700 B.C.

2830 ± 210

GaK-1861. Elk Island site, 30 cm depth **880 B.C.**

Charcoal (NMC-227) from test Trench 2, under edge of boulder at 37 cm N and 1.4 m W, 30 cm depth. Will date Shield Archaic component and check GaK-1860 relative to time depth within deposit. Est. age: <700 B.C.

General Comment (J.V.W.): both dates indicate Elk Island site component is late example of Shield Archaic. Time between the 2 readings also suggests that Archaic occupation of site was of limited duration.

1140 ± 80

GaK-1862. God's Lake site, Manitoba **A.D. 810**

Charcoal (NMC-228) from God's Lake site (GdKn-3), at NE end of bay leading to Chataway Lake, God's Lake, Manitoba (54° 37′ 30″ N Lat, 94° 15′ 10″ W Long). From test Trench 1, Sec. 3, E edge of Feature 1, 1 m E, 15 cm S, depth 13 cm. Stratified, with Selkirk focus and Laurel tradition in superposition above a Shield Archaic component. Sample should date Shield Archaic component, but being from upper portion of deposit, it may pertain to Laurel tradition or Selkirk-focus occupations. Est. age: <700 B.C. Coll. 1967 by J. V. Wright and subm. by R. Wilmeth. *Comment* (J.V.W.): reading obviously pertains to Late Woodland Selkirk focus and equates with readings for early portion of this complex from Southern Indian Lake (Wright, 1968).

140 ± 60

GaK-1864. Kitchen site, New Brunswick **A.D. 1810**

Charcoal (NMC-235) from Kitchen site (CaDu-7), upper terrace on left bank of St. John R., opposite mouth of Eel R. and village of Meductic, New Brunswick (45° 0′ N Lat, 67° 29′ 30″ W Long). From W sec., Pit I, 38 to 40 cm depth from surface. Site on old river terrace beside unnamed creek. Matrix is river-deposited silty sand; probably late Archaic. This is 1st Archaic site in Maritime Provinces to be radiocarbon dated and is oldest known site in Mactaquac Reservoir area. Est. age: 3000 or more yr. Coll. 1967 by D. Laverie and D. Sanger, Natl. Mus. Canada and subm. by R. Wilmeth. *Comment* (D.S.): date is obviously wrong. More charcoal needed for dating.

GaK-1865. Frank Channel site, Northwest Territories **670 ± 70 A.D. 1280**

Charcoal (NMC-239) from Frank Channel site (KePl-1), N arm of Great Slave Lake, 3 m above present lake level, N.W.T. (62° 47′ 30″ N Lat, 115° 57′ W Long). From excavated hearth in Unit D, depth 21 cm, assoc. with fish bone. Late component of Taltheilei Shale complex, developmentally ancestral to Yellowknife Indians. Sample should date Lockhart horizon. Est. age: A.D. 1400 to 1700. Coll. 1967 by W. C. Noble, Univ. Calgary and subm. for Noble by R. Wilmeth. *Comment* (W.C.N.): date is acceptable, only about a century older than estimate. Frank Channel materials are similar to Lockhart (MacNeish, 1951).

GaK-1866. Windy Point site, Northwest Territories **1230 ± 180 A.D. 720**

Carbon from burned log (NMC-240) from Windy Point site (LcPc-7), S shore of Winter Lake in Snare R. system, 4.5 m above high water lake level, on esker, N.W.T. (64° 28′ N Lat, 112° 57′ 30″ W Long). From log lying horizontally in Unit C, of middle terrace excavation, assoc. with artifacts including stemmed projectile point. Max. depth of log, 15 cm below surface. Cultural materials from 5 to 8 cm deep black sandy humus, overlain by 2.5 cm cover of gray-black moss and underlain by orange-brown B soil horizon 18 cm deep with no artifacts. Fine gray clay gumbo till and boulders are below B soil horizon. Est. age: 1000 to 500 B.C. Coll. 1967 by W. C. Noble and subm. by R. Wilmeth. *Comment* (W.C.N.): original estimate of 1000 to 500 B.C. was based on presence of Arctic Small Tool points and scrapers as surface finds on lowest terrace of Windy Point esker. Apparently, increasing age is not directly correlated with higher terrace elev. Date is acceptable on typologic or contextual grounds.

GaK-1867. Blackfly Creek site, Northwest Territories **2360 ± 140 410 B.C.**

Carbon (NMC-241) from Blackfly Creek site, S side of Blackfly Creek, draining into Winter Lake in Snare R. system, N.W.T. (64° 28′ 15″ N Lat, 113° 6′ W Long). From exposed buried burned soil horizon of black humus and charred spruce wood 4 to 5 cm thick and ca. 3.6 m above water level. Horizon overlain by 88 cm of wind-blown sands, capped by present stable vegetation. Weak podsol development under buried burned horizon. No cultural materials assoc. Sample is important in dating forest penetration, burning, and establishment of soil horizon in Winter Lake area. Currently, lake lies in forest-tundra transition zone, and Blackfly Creek is within a gallery forest extension. Coll. 1967 by W. C. Noble and subm. by Wilmeth. *Comment* (W.C.N.): date is acceptable, although earlier than expected, on basis of assumed cultural-terrace sequence at Windy Point (see GaK-1866). It is now apparent that tree-line burning in central dist. of MacKenzie is not totally consistent with sequence for S Keewatin. Closest correlation of Blackfly Creek

date is J. A. Larsen's 190 ± 80 B.C. (WIS-136) date from NE end of Artillery Lake (R., 1967, v. 9, p. 54) and 260 ± 160 B.C. (WIS-29) from Ennadai Lake (R., 1965, v. 7, p. 406). In contrast to Artillery Lake, spruce forest grew back and restabilized in Blackfly Creek (Winter Lake) area since it burned off ca. 400 B.C.

CaDu-8 site series, New Brunswick

Charcoal from CaDu-8 site, left bank of St. John R., opposite mouth of Eel R. and village of Meductic, on lowest terrace, New Brunswick (45° 0′ N Lat, 67° 29′ 30″ W Long). Site is on lowest terrace of large interval flooded annually. Matrix is river-deposited silty sand; Woodland period, with small basal-notched projectile points. Site is only component of this type dated in Madtaquac Reservoir. Est. age: 800 to 1000 yr. Coll. 1967 by D. Laverie and D. Sanger and subm. by R. Wilmeth.

GaK-1868. CaDu-site, Pit 4 **1260 ± 90 A.D. 690**

Charcoal (NMC-255) from test Trench 3, Pit 4, 40 cm below surface.

GaK-1869. CaDu-8 site, Pit 7 **2350 ± 100 400 B.C.**

Charcoal (MNC-256) from test Trench 3, Pit 7, 45 cm below surface.

General Comment (D.S.): date for GaK-1868 is a little earlier than expected but is not unreasonable. GaK-1869 should have dated very close to GaK-1868, and since an earlier component is not indicated, it must be erroneous.

Honna River site series, British Columbia

Charcoal from Honna River site (FhUa-1), E side of mouth of Honna R., Queen Charlotte Is., British Columbia (53° 15′ 15″ N Lat, 132° 7′ 30″ W Long). Stratified 3.6 m deep shell midden, overlain by 60 cm of recent humus accumulation. Site was not used by Historic Haida. Fauna differs greatly from that of mainland. Coll. 1967 by McMillan and C. Armstrong for G. F. MacDonald, Natl. Mus. Canada and subm. by R. Wilmeth.

GaK-1870. Honna River site, upper shell zone **3040 ± 100 1090 B.C.**

Charcoal (NMC-273) from upper zone of loose shell and mussel, depth ca. 2.5 m. Est. age: ca. 1750 yr.

GaK-1871. Honna River site, lower shell zone **3300 ± 100 1350 B.C.**

Charcoal (NMC-274) from lower shell zone at W end of profile overlying basal gravel. Est. age: ca. 2000 yr.

General Comment (G.F.M.): site was studied at suggestion of S. Brown who revealed this shell deposit on strand line of Graham I. dated ca. 8000 yr ago. Deposit represented a dump that was behind a prehistoric

village and had accumulated long after the drop in sea level that formed strand. Est. max. age for beginning of dump: 3500 yr, from position of the 2 samples.

Garden Island site series, British Columbia

Charcoal from Garden Island site (GbTo-23), Venn Passage, Prince Rupert, British Columbia (54° 19′ 5″ N Lat, 130° 23′ 15″ W Long). Shell midden covering small island (15 × 75 m) in coast Tsimpsian area. Midden averages 3 m depth. Coll. 1967 by G. F. MacDonald and subm. by R. Wilmeth.

910 ± 80

GaK-1872. Garden Island site, 47 cm **A.D. 1040**

Charcoal (NMC-275) from Sq. 2A, S 2.14 m W 2.11 m, depth 47 cm below datum. Assoc. with skeletal material and artifacts. Est. age: ca. 700 yr.

950 ± 90

GaK-1873. Garden Island site, 90 cm **A.D. 1000**

Charcoal (NMC-276) from Sq. 2A, SW corner, depth 90 cm below datum. From burnt shell hearth. Est. age: ca. 1200 yr.

1400 ± 100

GaK-1874. Garden Island site, 2.4 m **A.D. 550**

Charcoal (NMC-277) from Sq. 2A, loose mussel and clam shell immediately below Burial XVII:B-172 in E wall, depth 2.4 m below datum. Will date mass burial. Human skeletal sample will probably give physical type for area on this time level. Est. age: ca. 1900 yr.

3660 ± 110

GaK-1875. Garden Island site, 2.55 m **1710 B.C.**

Charcoal (NMC-278) from Sq. 4A3, S 2.1 m W 1.5 m, depth 2.55 m below datum. From peat layer cut by base of pit, Feature 3. Will date layer at base of midden, occupation prior to extensive use of shell fish. Est. age: ca. 2100 yr.

General Comment (G.F.M.): due to greatly accelerated accumulation rate of midden refuse, particularly shell, in upper levels acceleration curve and the maximum time depth of deposit was underestimated. The same observation applies to the other middens excavated on N coast. Three dates in the 3000 to 4000, and 2 dates in the 4000 to 5000-yr range indicate sea level has been relatively stable for the past 5000 yr on N coast as opposed to S coast, where stratified sites have accumulated only within the past 3000 yr.

Dodge Island site series, British Columbia

Charcoal from Dodge Island site (GbTo-18), Dodge I., Prince Rupert Harbour, British Columbia 54° 17′ 30″ N Lat, 130° 22′ 40″ W Long). One half of small island is covered by shell midden up to 3 m thick, underlain by thick humus containing shipped stone implements. Coll. 1967 by G. F. MacDonald and subm. by R. Wilmeth.

2000 ± 100

GaK-1876. Dodge Island site, 0.7 m **50 B.C.**

Charcoal (NMC-279) from Sq. J20, N 0, W 0.9, depth 0.7 m below datum (ca. 25 cm into black level). Will date occupation at base of midden. Est. age: 3400 to 4000 yr.

2480 ± 100

GaK-1877. Dodge Island site, 0.6 m **530 B.C.**

Charcoal (NMC-280) from Sq. J20, S 0.7, W 3.0, depth 0.6 m below datum (5 cm into top of black layer). Will date earliest occupation of site. Est. age: 3500 to 4000 yr.

2610 ± 100

GaK-1878. Dodge Island site, 2.3 m **660 B.C.**

Charcoal (NMC-282) from Sq. D6, Feature 8, rock-lined hearth in center at depth 2.3 m below datum (E6 stake). Est. age: 1500 yr.

4790 ± 100

GaK-1879. Dodge Island site, 2.8 m **2840 B.C.**

Charcoal (NMC-283) from Sq. D7, in decomposed rock, some crushed shell, and soil, depth 2.8 m below datum, floor of Feature 3. Est. age: ca. 1950 yr.

4130 ± 90

GaK-1880. Dodge Island site, 1.8 m **2180 B.C.**

Charcoal (NMC-284) from Sq. H8, Level 12 (black soil and decomposed stone), depth 1.8 m below datum. Burial and barbed point in same level adjacent to beach sand. Est. age: 2000 yr.

General Comment (G.F.M.): GaK-1876 may be contaminated by ground water saturation; this can be tested in future samples. Another explanation of more recent date than predicted may relate to a shift in settlement pattern to areas further from beach due to growth of village. The same applies to GaK-1877, from level slightly below GaK-1876. Gak-1879 was from base of cultural deposit, on top of sterile gravel. Date appears confirmed by other basal dates from British Columbian coast which suggested maximum age ca. 5000 yr for shell middens. Same comment for GaK-1880.

Nickerson Mound series, Manitoba

Wood from 3 S Manitoba mounds excavated 1913 and 1914. Samples now at Natl. Mus. of Canada, was described by Capes (1963) and assigned to Blackduck (Manitoba) focus (MacNeish, 1954) or to "closely related peoples influenced by accumulated traits that reach back to Middle Woodland times" (Capes, 1963). Suggested dates are late prehistoric and early historic. Wood assoc. with 3 of Nickerson's mounds subm. to test this conclusion. Coll. by W. B. Nickerson and subm. by R. Wilmeth.

390 ± 90

GaK-1881. Mound G **A.D. 1560**

Wood (NMC-291) from Mound G, right bank of Gainsborough Creek, Souris R. drainage, Manitoba (49° 8′ 30″ N Lat, 101° 2′ 40″ W Long). Part of decaying burial pole from base of mound, 50 cm high and 10 to 11 m diam. Untrimmed branches lay below mound. No primary interment, center disturbed. Fragment of human skull and tibia at depth 0.6 m.

850 ± 90

GaK-1882. Heath Mound **A.D. 1100**

Wood (NMC-292) from Heath Mound, right bank of Souris R., Manitoba (49° 9′ 50″ N Lat, 101° 1′ W Long). From 1.5 m NW of mound center driven into subsurface to depth 15 to 20 cm. Low broad mound 45 cm high and 12.6 to 12.8 m diam. A 4.5 m burned earth ring within mound with burned poles below, suggests a mud-plastered structure destroyed by fire; mound then built over ruin.

1330 ± 90

GaK-1883. Riverview Mound **A.D. 620**

Wood (NMC-293) from Riverview Mound, Souris R., Manitoba (49° 10′ 20″ N Lat, 101° 1′ W Long). From covering of burial pit, excavated into subsoil to depth 77 cm. Small dome-shaped mound, 75 cm high, and 12.3 to 10.5 m diam. Burial pit slightly S of center, contained 1 skeleton and parts of 2 others. Ocher-painted human bone outside pit.

General Comment (R.W.): date range indicates mounds built over longer period than originally thought. Two later dates are within Blackduck focus time range, but earliest date falls during transition from Middle to Late Woodland. In view of age of similar mounds in N and S Dakota (Neuman, 1967), S Manitoba mounds may represent cultural tradition surviving from Middle Woodland to Historic times.

Garden site series, Alaska

Charcoal from Garden site, NE shore of Healy Lake, Alaska (64° N Lat, 144° 43′ W Long). Stratified site, with historic Athabaskan material in upper levels, and below, in increasing order of age, are industries of Campus/Denali/Northwest Microblade tradition, Tuktu, and an earlier, as yet unidentified culture. Coll. 1967 by J. P. Cook, Univ. Alaska and subm. by R. Wilmeth.

1270 ± 80

GaK-1884. Garden site, red-brown stratum **A.D. 680**

Spruce charcoal (NMC-294) from Sq. S 10-15, W 20-25, in red-brown stratum. Should relate to Campus/Denali/Northwest Microblade tradition.

1260 ± 90

GaK-1885. Garden site, upper part **A.D. 690**

Spruce charcoal (NMC-295) from Sq. S 15-20, W 20-25, upper part of red-brown stratum. Should relate to later part of Camus/Denali/Northwest Microblade tradition.

General Comment (J.P.C.): dates should pertain to middle part of reddish-brown horizon of loess, *i.e.*, lower part of Level 1, slightly above "sweat-bath" features assoc. with points and microblades.

Village site series, Alaska

Charcoal from Village site, on E side Healy Lake at narrowest part (64° 1′ N Lat, 144° 44′ 50″ W Long). Stratified site, levels from top to bottom assigned respectively to historic Athabaskan, early or proto-Athabaskan, Campus/Denali/Northwest Microblade tradition, Tuktu, and an early, as yet unidentified, culture. Coll. 1967 by J. P. Cook and subm. by R. Wilmeth.

900 ± 90

GaK-1886. Village site, top of red loess **A.D. 1050**

Spruce and Birch/Alder charcoal (NMC-296) from Sq. N 15-20, E 10-15, from top of red loess, just below yellow-brown stratum, and 14 cm below datum. Should relate to early or proto-Athabaskan occupation. Est. age: within Christian era.

1360 ± 80

GaK-1887. Village site, red-brown stratum **A.D. 590**

Spruce charcoal (NMC-297) from Sq. N 25-30, W 45-50, from red-brown stratum. Should relate to later part of Campus/Denali/Northwest Microblade tradition.

General Comment (J.P.C.): dates from Level 1, internally consistent with each other and with GX-1340 (8960 ± 150) and GX-1341 (11,090 ± 170) from Levels 4 and 8, respectively.

1290 ± 80

GaK-1888. Eidlitz site, New Brunswick **A.D. 660**

Wood charcoal (NMC-298) from Eidlitz site (BgDs-4), on point locally known as Sunbury Shore, St. Andrews, New Brunswick (45° 4′ 30″ N Lat, 67° 4′ 30″ W Long). From hearth in Sq. E 16.5-17, S 0.5-1.0, depth below surface 35 to 40 cm. Site is shell midden, in ethnographic Passamaquoddy (Malecite) territory, ploughed for several yr, with disturbance of top 15 to 20 cm of deposit. Currently, 3 dates exist from St. Andrews area, all from culturally similar deposits, dated ca. A.D. 1. Ceramics and point styles from Eidlitz suggest much later occupation for which we have no dates in New Brunswick. Excavation is part of intensive program in Passamaquiddy area to continue for 2 or 3 more yr. Age of sample hard to estimate but should be ca. 1000 yr. Coll. 1967 by D. Sanger, Natl. Mus. Canada and subm. by R. Wilmeth. *Comment* (D.S.): date is a little earlier than expected on basis of artifacts recovered

in 1967. Artifacts coll. 1968 consistent with date. Site may have been occupied for some time and additional charcoal dates will be secured.

0 ± 80

GaK-1889. Sutton site, Alberta **A.D. 1950**

Charred wood (NMC-199) from Sutton site (GhPh-103), E shore of Calling Lake, SE ¼ Sec. 8, R21, T72 W4th, N Alberta (55° 15′ N Lat, 113° 15′ W Long). From Sq. IA 13, apparent hearth in top of gray silt zone. Shallow occupation extending ca. 30 cm below modern turf. Sample should date prehistoric occupation, but may be modern wood, since site area has been disturbed; this sample from coll. most likely to be reliable. Coll. 1966 by R. Gruhn, Univ. Alberta and subm. by R. Wilmeth. *Comment* (R.G.): plow marks on profiles is evidence of modern intrusion.

Montgomery Lake site series, Ontario

Charcoal from Montgomery Lake site (M5), N shore of Montgomery Lake, just E of outlet of Cartier Creek, Ontario (45° 56′ 7″ N Lat, 77° 33′ 36″ W Long). Middle Woodland site with Vinette 2 ceramics, generally lying 7.5 to 15 cm below present ground level. Red ocher-stained cremations present. Most popular ceramic decorative motif is banding, with short, closely spaced, oblique pseudo-scallop shell stamp. Coll. 1966 by B. M. Mitchell and subm. by R. Wilmeth.

2380 ± 90

GaK-1891. Montgomery Lake site, 42 to 60 cm **430 B.C.**

Charcoal (NMC-216) from Sq. 14/15, depth 42 to 60 cm, below a red-stained soil pocket 42 cm deep. Should date cremation burial in Sq. 14, accompanied by red ocher staining and grave goods. Est. age: A.D. 100.

GaK-1892. Montgomery Lake site, 38 to 43 cm **1860 ± 80 A.D. 90**

Charcoal (NMC-217) from Sq. 14, depth 38 to 43 cm, at base of red-stained soil pocket. Should date burial assoc. with GaK-1891. Est. age: A.D. 100.

General Comment (B.M.M.): dates are acceptable. An intermittent occupation by Middle Woodland groups over the date range is feasible, with at least one group practicing ochered cremations.

690 ± 80

GaK-1894. Blattner site, British Columbia **A.D. 1260**

Charcoal and charred wood (NMC-247) from Blattner site (EcQt-2) near NE corner of Otter Lake, in NW ¼ NE ¼ sec. 23, T7, R10, W6, Spallumcheen Dist., British Columbia (49° 24′ 40″ N Lat, 119° 14′ 10″ W Long). From charred and burned pole lying along N edge of House Pit 2, excavation Unit 30 N, 6 W, depth 78 cm. Stratum, Zone 2, is organically-stained deposit composing part of house pit fill. Pole remains lay along line at an old house pit wall, from ca. 29 N, 5.7 W to

edge of unit at 28.8 N, 3.5 W. Position indicates it is remnant left on cleaning house pit prior to final occupation. Site lies on terrace ca. 22 m above present level of Otter Lake. This terrace level extends E to 3rd terrace level 400 m away. Presently forested, site has 3 house pits and overlooks large but shallow open camp site on 1st terrace above lake. Finds in lower terrace indicate relative recency, but house pits may be only seasonal component of same culture, possibly Shuswap. Sample may date one of earlier house pit occupations and may be approx. terminal for deeper component lacking housepits and manifested mainly in large flake implements. Age is probably no more than 1000 yr estimated on basis of assoc. projectile points. Coll. 1967 by G. F. Grabert, Western Washington State College and subm. by R. Wilmeth. *Comment* (G.F.G.): date appears reasonable and is not at all incongruent with dates on a similar series of components from near mouth of river.

2500 ± 100

GaK-2335. Marron Valley site, British Columbia 550 B.C.

Bone (NMC-249) from Marron Valley site (DiQw-2), and old eroded terrace spur facing creek feeding into foot of Marron Lake, Similkameen Land Dist., British Columbia (49° 22′ 10″ N Lat, 119° 41′ 30″ W Long). From Excavation Unit 0 S 18 E, W half of unit, in provisional Stratum 3, a partially cemented sand, densely packed, and gray-white, containing remains of most intensive occupation zone aside from house pit. Cultural affiliation of late components probably Okanagan. Earlier components, if present, unidentified. Sample date presumed pre-house pit component. Est. age: >1500 yr. Coll. 1967 by G. F. Grabert and subm. by R. Wilmeth. *Comment* (G.F.G.): date seems reasonable; with GSC-998 (2130 ± 130) appears to bracket end of microblade techniques in N and probably S Okanagan valley.

7300 ± 150

GaK-2334. East Battle Creek site, Alberta 5350 B.C.

Charcoal (NMC-222) from E Battle Creek site (DjOm-114), N side Cypress Hills, Alberta (49° 39′ N Lat, 110° 2′ W Long). From lowest exposed cultural level at stream level, 4.5 m below ground surface. Stratified site exposed by flood. Soil horizon dated at 1 m below surface, with sequence of cultural levels below. Charcoal, bones (mostly bison), scrapers, and flakes occur in all cultural horizons, but diagnostic (notched) projectile points found only ca. 2 m below surface. Coll. by W. J. Elliott and subm. for A. L. Bryan, Univ. Alberta by R. Wilmeth. *Comment* (A.L.B.): scattered concentrations of occupational debris were periodically flooded by shallow stream depositing silty clay. Unexcavated earliest occupation is well below stream level, but rapid rate of accumulation (3.5 m in ca. 1 millennium) and difficult excavating make further work unfeasible. Despite low artifact yield, because it is the only known clearly stratified site, it will be key site for establishing a stratigraphic sequence for Cypress Hills.

22,700 ± 1000

GaK-2336. Eagle Cave, Alberta **20,750 B.C.**

Bone (NMC-253) from Eagle Cave, N side of Crowsnest Lake, Alberta (49° 37′ N Lat, 114° 38′ W Long). From Sq. 8W, brown cave-earth bed, depth 110 to 210 cm below surface. Solution cavern with stratified deposits ca. 90 m above lake, near Continental Divide. Dates bone deposit underlying glacial outwash gravels. Est. age: 25,000 B.C. Coll. 1967 by A. L. Bryan and subm. by R. Wilmeth. *Comments* A.L.B.): places deposition of bone bed prior to Late Wisconsin and shows that Crowsnest Pass was covered with ice >90 m deep some time during Late Wisconsin. No evidence of previous glaciation. (K.K.): dated on collagen.

620 ± 70

GaK-2337. Hughes site, Northwest Territories **A.D. 1330**

Charcoal (NMC-260) from Hughes site (JcRw-13) NW end of Fisherman Lake on 60 m terrace, N.W.T. (60° 22′ N Lat, 123° 50′ W Long). From Sq. 18, at base of late proglacial lake silt and on earlier verved lake clays. Single component site, with occupation at base of late proglacial lake silt. Should date latter part of time between early and late proglacial lake silt. Est. age: 1000 to 1400 yr. Coll. 1967 by J. F. V. Millar, Univ. Saskatchewan and subm. by R. Wilmeth. *Comment* (J.F.V.M.): sample from same undisturbed geologic horizon as one, previously dated at 5000 yr B.P., ca. 1 to 0.5 m away. Recent date suggests forest fire apparent at surface and dated charcoal fragments to be burned roots.

GaK-2338. Central Klondike site, Northwest Territories **3740 ± 110 / 1790 B.C.**

Charcoal (NMC-261) from Central Klondike site (JcRw-3B), NW end of Fisherman Lake, N.W.T. (60° 22′ N Lat, 123° 50′ W Long), from Sq. 40, H Horizon, from clayey loam 3 cm below heavy bone concentration in hearth. Central sec. of site has series of components with Plano assocs. overlying early Cordilleran component. Sample should date Horizon H in sequence. Est. age: 8000 to 9000 yr. Coll. 1966 by J. F. V. Millar and subm. by R. Wilmeth. *Comment* (J.F.V.M.): equivalent to Horizon H in adjoining part of site and some 7 m NW dated at 8720 ± 190. Sample from shallow water-soaked sec., which, although eroded, had clear stratigraphy. Data is incompatible with other dates at site or with comparable material elsewhere.

770 ± 80

GaK-2341. Shethanei Narrows site, Manitoba **A.D. 1180**

Charcoal (NMC-299) from shethanei Narrow site, at tip of esker on N side of narrows, N Manitoba (58° 48′ N Lat, 97° 45′ W Long). From Level 2, Pit 137E, 2N. Thin occupation layer with medium-sized stemmed, notched and triangular points. Few historic items mixed with upper prehistoric artifacts, suggesting late prehistoric occupation. Sample will date

assoc. stemmed point. Est. age: A.D. 1300. Coll. 1967 by R. J. Nash, Univ. Manitoba and subm. by R. Wilmeth. *Comment* (R.J.N.): this date and I-4149, 220 ± 95, from another part of site indicate materials are probably all late whether or not >1 component is involved. Materials are not easily equated with other late complexes in transitional forest which might also relate to Chipewyan.

GaK-2342. Egnolf Lake site, Manitoba **460 ± 80** **A.D. 1490**

Charcoal (NMC-300) from Egnolf Lake site, on spur of esker on NE shore of lake, N Manitoba (59° 3′ N Lat, 99° 52′ W Long). From occupation layer of Pit 9. Site consists of deeply-buried occupation layer with several hearths and considerable bone and scrapers. Although not *in situ*, a small side-notched point probably assoc. Sample will date site and side-notched point. Complex may be related to historic Chipewyan of area. Est. age: A.D. 1000. Coll. 1967 by R. J. Nash and subm. by R. Wilmeth. *Comment* (R.J.N.): seems somewhat late in view of 25 to 50 cm sand overlying occupation layer, but compatible with small side-notched point. Artifacts contribute to heterogeneity of late transitional forest occupations perhaps attributable to Chipewyan. Heterogeneity may be result of seasonal, functional, or historical factors.

GaK-2344. Sandgirt Lake Lodge site, Newfoundland **940 ± 70** **A.D. 1010**

Cracked caribou long bone (NMC-329) from Sandgirt Lake to small bay separated from lake by esker, at 455 to 456 m elev., Newfoundland (53° 54′ 15″ N Lat, 65° 18′ 45″ W Long). Bones dredged from muck along shore on N side of channel, assoc. with stone artifacts and seemingly connected with older, submerged beach. Site small temporary camp probably used at various times of year, at intersection of several major prehistoric canoe routes through central Labrador. Population probably prehistoric Montagnais-Naskapi. Lithic assemblage falls loosely into Shield Archaic. Sample will help date later phases of Shield Archaic and help interpret coastal-interior relations based on comparisons with material from Northwest R. Est. age: not >1000 or <500 yr. Coll. 1967 and 1968 by D. MacLeod, Natl. Mus. Canada and subm. by R. Wilmeth. *Comments* (D.M.): only radiocarbon-dated archaeologic site in Labrador interior, although lithic similarities almost certainly place at least 2 sites in region in same range. Date as estimated; older end of scale supports submerged beach hypothesis, involving temperature changes and precipitation since ca. A.D. 1000. Artifacts, though few are most, so far, from upper Churchill R. drainage, and with geographic features make FlDh-1 a "type site." But resemblances to both Wright's Shield Archaic and Fitzhugh's Northwest River assemblages are general and generic rather than specific. Material may very well pertain to prehistoric Montagnais/Naskapi, however. Location of finds at water's edge, and high

percentage of caribou bone (almost 100%) suggest use during summer and fall, at least for this part of site. (K.K.): dated on collagen.

810 ± 100

GaK-2747. Chesterfield, N.W.T. **A.D. 1140**

Wood (NMC-336) from 400 m E of Chesterfield (Igluligardjuk) KiJi-3, near crest of long slope to beach of Bay (63° 20′ N Lat, 90° 40′ W Long). From only house excavated in 1968, Sec. F of archaeologic plan diagram, near juncture of floor and lower wall foundation. Site from Thule period, with ca. 18 winter or autumn house depressions in a cluster near top of gentle slope. Sample should date house occupation. Probably, a one component site. Est. age: A.D. 1000 to 1600. Coll. 1968 by A. P. McCartney and subm. by R. Wilmeth. *Comment* (A.P.McC.): fits well with Thule occupation and dates house before historic period of 17th century. Close proximity and similar construction of adjacent houses, applies date to most if not all semi-subterranean houses at site. Site contemporaneous with Kamarvik and Silumiut.

820 ± 100

GaK-2748. Kamarvik site, N.W.T. **A.D. 1130**

Wood (NMC-338) from Kamarvik site (LeHv-1) over most of point of land on coast of Bay; 3 permanent house clusters occur, each ca. 800 m apart (64° 45′ N Lat, 87° 19′ W Long). Sample from "bone" house, S-most of clusters ca. 800 m from coast, in fan-shaped midden in front of entrance passage 25 cm below present surface. Site believed to be one component, of Thule period. Six large house depressions with bone detritus (whale) in most, occur within ca. 1-block area. Should date houses and some assoc. burials. Est. age: A.D. 1000 to 1600. Coll. by A. P. McCartney, 1968 and subm. by R. Wilmeth. *Comment* (A.P.McC.): date fits well with Thule occupation and 6 houses date about same. Site contemporaneous with those of Igluligardjuk and Silumiut. Other 2 house clusters are Thule features.

Cadboro Bay site series, British Columbia

Charcoal from Cadboro Bay site (DcRt-15), E of Gyro Park, Lot 6, Sec. 44, Saanich Municipality, Vancouver I., British Columbia (48° 27′ 35″ N Lat, 123° 16′ 25″ W Long). Shell midden ca. 600 × 21 m, eroded at seaward edge, clearly stratified, with 2 distinct artifact assemblages relating to Marpole and Early Developed Coast Salish. Artifact attributes from extreme lower levels suggest presence of Locarno Beach phase. Coll. 1966 by Susan Douglass, Prov. Mus. British Columbia and subm. by R. Wilmeth.

0 ± 80

GaK-2750. Cadboro Bay site, C-1 **A.D. 1950**

Charcoal (NMC-343) from base of hearth area at N 0 to 10 cm, E 12.8 to 12.9 m ca. 115 cm depth from Datum A, 90 cm depth from surface. From lowest level relating to Early Developed Coast Salish,

which will provide time sequence of cultural change, and estimate age of cairn burials, directly assoc. Est. age: more recent than A.D. 1300.

1810 ± 90

GaK-2751. Cadboro Bay site, C-2 **A.D. 140**

Charcoal (NMC-344) from basal black stratum at N 88 to 112 cm, E 147 to 172 cm ca. 133 cm deep from Datum A and 105 cm from surface. Closely assoc. to microblades, steatite carspool fragments, and rough chipped slate artifacts, which usually identify a Locarno Beach component. Early date will verify. Est. age: 1000 B.C.

General Comment (D. N. Abbott, Prov. Mus. British Columbia): both dates conform excellently with others for similar components in region.

Tolan's Property site series, British Columbia

Charcoal from Tolan's Property site (DfRu-24), Lot 2, Georgeson Bay, NW side of Active Pass, Galiano I., British Columbia (48° 51′ 55″ N Lat, 123° 20′ 55″ W Long). Shell midden ca. 200 m × 120 m. Earliest levels at 6 m depth, below present high tide. Artifacts relate to Locarno Beach and Montague Harbor I phases in lower levels; upper levels relate to Late Developed Coast Salish. Coll. 1968 by S. Douglass and subm. by R. Wilmeth.

750 ± 90

GaK-2752. Tolan's Property site, C-1 **A.D. 1200**

Charcoal (NMC-345) from matrix of black soil and fine broken shell N 0.20 to 0.30 m, E 0 to 0.03 m, ca. 190 to 196 cm deep from Datum A, 121 to 127 cm from surface. Sample from upper levels; estimates time period for Early Developed Coast Salish. Est. age A.D. 500.

2820 ± 100

GaK-2753. Tolan's Property site, C-3 **870 B.C.**

Charcoal (NMC-346) from black soil, sand and pea gravel, N 0.26 to 0.36 m, E 0.44 to 0.52 m, ca. 318 cm from Datum A, 232 to 234 cm from surface. Closely assoc. with similar artifacts from lower levels of Montague Harbor Site DrRu-13. Date may estimate time sequence of these stone artifacts and elucidate Locarno phase in Gulf region. Est. age: 1000 to 1500 B.C.

General Comment (D.N.A.): absurd date for GaK-2750 is unexplainable, which should have been a good sample from undisturbed hearth. Date for GaK-2751 should be confirmed. If correct, it will settle doubts as to whether or not it represents *a priori* "Locarno"-related occupation separate from main "Marpole"-related component overlying it. Date suggests a rather late "Marpole" period and that DcRt-15 is a 2 rather than 3-component site. Suspicious artifact forms are found in both contexts although perhaps more typical of earlier.

1670 ± 90

GaK-2754. False Narrows site, B.C. **A.D. 280**

Charcoal (NMC-347) from False Narrows site (DgRw-4), False Narrows, Santa Bay Beach sub-division, Lot 21, Gabriola I., British Columbia (49° 9′ 25″ N Lat, 123° 46′ 50″ W Long). From matrix of dark brown beach sand and pea gravel, N 11.70 to 12.20 m, E 5.00 m, ca. 142 to 150 cm depth from Datum D, 136 to 144 cm from surface. Site is shell midden ca. 2 km long, on flats above high tide water mark. Marpole and Developed Coast Salish Phases are apparent. Cairn burials relate to Developed Coast Salish but artifacts show transition between the 2 phases. Sample, from Tc-6, should date component of Marpole phase. Est. age: 200 B.C. Coll. by J. Sendey and subm. by R. Wilmeth. *Comment* (D.N.A.): date confirms theory of very close relationship between "Marpole" component of DgRw-4 and that at DgRs-1 (Beach Grove) based on burial practices, grave goods, and some similar artifact forms. Latter site yielded similar late dates for basically "Marpole" assemblage.

Grant Anchorage site series, British Columbia

Charcoal from Grant Anchorage site (FcTc-4), Giggins Passage, S end of Swindle I., Laredo Sound, British Columbia (52° 29′ N Lat, 128° 45′ W Long). Large shell midden (village site). Historically, territory of "Kitasu" (S Tsimshian). Coll. 1969 by B. Simonsen and subm. by R. Wilmeth.

2110 ± 110

GaK-2755. Grant Anchorage, Sec. A, I-A **160 B.C.**

Charcoal (NMC-361) from Sec. A, Unit I-A, S 56 m, E 2.12 m, below Datum I-A, 1.53 m, from charred wood feature near base of deposit.

480 ± 90

GaK-2756. Grant Anchorage, Sec. A, I-C **A.D. 1470**

Charcoal (NMC-362) from Sec. A, Unit I-C, S 1.15 m, E 1.30 m, below Datum I-C, 0.18 to 0.20 m. Represents historic and proto-historic deposits of site. But sample may not correlate with this latest occupation.

2090 ± 100

GaK-2757. Grant Anchorage, Sec. A, I-C **140 B.C.**

Charcoal (NMC-363) from Sec. A, Unit I-C, S 1.50 m, E W wall to 0.40 E (m), below Datum I-C, 1.59 m. Taken from charred "wooden dish" feature at point which also represents approx. middle of cultural deposits.

GaK-2758. Grant Anchorage, Sec. B, Test Trench B **3480 ± 140** **1530 B.C.**

Charcoal (NMC-365) from Sec. B, Unit test Trench B, S 1.47 m, E 1.33 m, below Datum T.T.-B, 1.51 m. Represents end of cultural

deposits overlying sterile gravel in Sec. B, which appears to be earlier component than that found at comparative depth, Sec. A.

General Comment (B.S.): dates seem acceptable. No estimate was made originally because of lack of comparative material from central coast and difficulties in matching sequence with others farther away, such as Fraser Valley or Prince Rupert Harbour sequence developed by C. E. Borden and G. F. MacDonald.

Silumiut site series, Northwest Territories

Wood from Silumiut site (KkJg-1) Keewatin Dist., N.W.T. (63° 41′ N Lat, 90° 5′ W Long), from island just off coast, ca. 4.8 km NE of village of Chesterfield. Near center of island on highest hill (ca. +3.1 m) are 28 winter house depressions ca. 400 to 800 m from surrounding coasts. Site is Thule-age occupation with 186 burial cairns, many meat caches, tent rings, etc. Coll. 1968 by A. P. McCartney and subm. by R. Wilmeth.

810 ± 70

GaK-2749. Silumiut site, cairn burial A.D. 1140

Wood (NMC-341) from cairn burial support (Sil-156), uncovered and exposed within rock cairn. Should date burial cairn construction. Est. age: A.D. 1300 to 1600.

690 ± 90

GaK-2759. Silumiut site, House 3, Unit E A.D. 1260

Wood (NMC-369) from House 3, excavation Unit E (mapped as Sample H), from floor gravel (20 cm from W sec. line 70 cm from W sec. line 70 cm from S sec. line); ca. 70 cm below ground surface on house floor. Will date occupation of House 3 and possibly other adjacent houses. Est. age: A.D. 1000 to 1700.

General Comment (A.P.McC): NMC-341: date can be accepted tentatively although lack of grave material does not permit check of age. According to C. F. Merbs, burial should be early (Thule-age) based on skeletal decomposition relative to slightly acid (pH 6.0) bed-rock floor and extensive lichen cover of cairn. Large bone toggle harpoon head found inside burial is not Thule in style and has 2 steel-drilled holes typical of historic harpoons, but, because it is well-preserved and above the lower skeletal elements, we presume this is a later historic intrusion and is not contemporaneous with the skeleton. Some of the Silumiut burials are historic as suggested by European items of manufacture and others might fall between historic and Thule periods spanning ca. 500 to 700 yr. NMC-369: date range overlaps those for Kamarvik and Igluligardjuk but is slightly more recent. Sample is thought to date Houses 3-6 but its application to the other deeper houses cannot be determined. Actual occupation date should fall toward earlier end of range given.

B. Japan

Nakada series, Hachioji

Carbonized wood from Nakada site, Hachioji City, Tokyo (35° 40′ N Lat, 139° 20′ E Long). Coll. and subm. 1967 by I. Kono, Hachioji City Bd. Educ.

GaK-1463. Nakada, B-5Y — **1230 ± 60** / **A.D. 720**

From house pit, B-5Y, 70 cm below ground surface.

GaK-1464. Nakada, C-7H — **1700 ± 100** / **A.D. 250**

From C-7H, 80 cm below ground surface.

GaK-1465. Nakada, B-12H — **1770 ± 80** / **A.D. 180**

From B-12H, 100 cm below ground surface.

GaK-1466. Nakada, D-20H — **790 ± 60** / **A.D. 1160**

From D-20H, 60 cm below ground surface.

Hoshino series, Tochigi Prefecture

Wood from Hoshino-machi, Yamaguchi, Tochigi Pref. (36° 27′ N Lat, 139° 39′ E Long). Coll. and subm. 1967 by C. Serizawa, Tohoku Univ. Serizawa (1966) described site in detail.

GaK-1246. Hoshino, 1 — **16,200 ± 400** / **14,250 B.C.**

From Layer 6, 10.5 m below surface. Assoc. with quartz and flint artifacts, overlain by disturbed Moka pumice.

GaK-1353. Hoshino, 2 — **19,100 ± 400** / **17,150 B.C.**

From same cultural level as GaK-1246.

GaK-1581. Kushiro Kaizuka — **7130 ± 120** / **5180 B.C.**

Wood charcoal from Higashi Kaizuka site, Kaizuka-cachi, Kushiro City, Hokkaido (42° 59′ 30″ N Lat, 144° 25′ 0″ E Long), 1.2 to 1.4 m below surface, assoc. with Early Jomon potsherds. Coll. 1967 by S. Sawa and subm. by Y. Okazaki, Hokkaido Univ. Educ. *Comment* (Y.O.): assoc. culture stratigraphically older than Numajiri type culture.

C. Israel

Khirbet et-Tell series

Charcoal from stratified layers on ruins of Khirbet et-Tell near Deir Dibwan, Israel (31° 55′ N Lat, 35° 16′ W Long). All samples from destruction debris on crushed soft chalky limestone surface, and covered by at least 1 m of earth. Coll. 1969 and subm. by J. A. Callaway, Southern Baptist Theological Seminary, Louisville.

4980 ± 120

GaK-2379. Khirbet et-Tell, D IV **3030 B.C.**

From Site D, Area IV, Sub-area 300, Layer 5. Wood charcoal from destruction of Early Bronze Age I building.

4160 ± 120

GaK-2380. Khirbet et-Tell, C IX **2210 B.C.**

From Site C, Area IX, Sub-area 800, Layer 10. Wood charcoal from destruction of Early Bronze Age II building.

5000 ± 120

GaK-2381. Khirbet et-Tell, C I **3050 B.C.**

From Site C, Area I, Sub-area 1, Layer 28b. Charred seeds from destruction of Early Bronze Age II building.

4840 ± 130

GaK-2382. Khirbet et-Tell, A III **2890 B.C.**

From Site A, Area III, Sub-area 201, Layer 4a. Charred wood from destruction of Early Bronze Age II building.

General Comment (J.A.C.): site was built into a city in Early Bronze Age I, during First Dynasty of Egypt and abandoned in Early Bronze III, probably about end of Fifth Dynasty in Egypt. GaK-2380 seems somewhat wrong, because it is stratigraphically contemporary with GaK-2382. Error may be in sampling or improper storage prior to assay. GaK-2379, GaK-2381, and GaK-2382 agree generally with chronology determined by pottery, objects, and correlations with Old Kingdom in Egypt.

D. Scotland

4070 ± 100

GaK-1714. Rothesay **2120 B.C.**

Charcoal from Neolithic settlement site at Townhead, Rothesay, Isle of Bute (55° 49′ N Lat, 5° 3′ W Long), discovered after removal of ca. 1 m topsoil and gravel, assoc. with hazel nut shells, fragments of bone, and Neolithic potsherds. Coll. ca. 1919 by L. M. Mann and subm. by J. G. Scott, Glasgow Mus. and Art Galleries. *Comment* (J.G.S.): age as expected.

Dun Mor Vaul series, Tiree Island

Samples from Dun Mor Vaul, Iron age dry-stone fort at Tiree I., Argyllshire (56° 32′ 50″ N Lat, 6° 48′ 12″ W Long). Coll. and subm. 1967 by E. W. MacKie, Hunterian Mus.

1460 ± 200

GaK-1520. Dun Mor Vaul, 1 **A.D. 490**

Jaw bone from N occupation Layer 2, immediately below Norse composite bone comb, in sticky brown earth under dry rubble Layer 1 in wall gallery. *Comments* (E.W.M.): jaw bone seems likely raw material for a composite bone comb and is probably of same age. (K.K.):

polyvinyl acetate coating was removed mechanically and dated on collagen.

2240 ± 80

GaK-1521. Dun Mor Vaul, 2 **290 B.C.**

Charcoal from Layer 1, Phase IV. *Comment* (E.W.M.): outer court filled with wind-blown earth, probably starting in Phase IIIB when drystone fort (broch) was converted to a dwelling. Date should be near end of use of site as farmstead.

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