

**GAKUSHUIN NATURAL RADIOCARBON MEASUREMENTS VII**  
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This list continues Gakushuin VI (Radiocarbon, 1967, v. 9, p. 43-62), the same instruments and techniques having been employed.

Age calculations are based on the Libby half-life of  $C^{14}$ ,  $5570 \pm 30$  years, and the modern activity given by  $0.95 A_{ox}$ , i.e., 95% of the activity of NBS oxalic acid standard. The errors quoted are the standard deviation obtained from the number of counts only. When observed activity is less than  $2\sigma$  above background, infinite date is given with a limit corresponding to the activity of  $3\sigma$ , and when it is greater than  $0.95 A_{ox} - 2\sigma$ , modern date is given with a limit  $= 0.95 A_{ox} - 3\sigma$ . 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*

**GaK-1042. Ikei-jima, Ryukyu** **18,800  $\pm$  400**  
**16,850 B.C.**

Bone (*Metacervulus astylodon Matsumoto*) from limestone cave near Ikei Health Center, Ikei-jima, Yonagusuku-son, Okinawa, Ryukyu Islands ( $26^{\circ} 23' 40''$  N Lat,  $128^{\circ} 0' 14''$  E Long). Sample was taken from beneath travertine on wall and floor of cave developed in basal part of Ryukyu Limestone. Coll. and subm. by Hisao Nakagawa, Tohoku Univ. *Comment*: dated on inorganic carbonate. Not enough organic carbon was obtained by extraction with diluted sulfuric acid. See Tokunaga and Takagi (1938); MacNeil (1960).

**GaK-872. Iso, Kagoshima** **17,300  $\pm$  300**  
**15,350 B.C.**

Shells from Iso, Kagoshima City ( $31^{\circ} 38' 39''$  N Lat,  $130^{\circ} 34' 22''$  E Long), imbedded in Iso layer. Coll. and subm. 1965 by R. Ōta, Geol. Survey of Japan. *Comment*: confirms stratigraphic order of Ito layer and Ito pumice flow dated 16,350 B.P. GaK-473 (Radiocarbon, 1966, v. 8, p. 57). Deposits referred to by Minato and Katsui (1957).

**Kaimon-dake series**

Humic soil from base of ash fall from Kaimon-dake, Ibusuki-gun, Kagoshima Prefecture. Coll. and subm. 1966 by H. Furukawa, Ministry of Agriculture and Forestry.

**GaK-1240. Kaimondake, 1** **3620 ± 140**  
**1670 B.C.**

Taken from lowest part of ash fall from Kaimondake, Yamakawamachi, Ibusuki-gun, Kagoshima Prefecture (31° 10' 17" N Lat, 130° 35' 32" E Long), 8.5 m below surface. *Comment* (H.F.): dates beginning of eruption of Kaimondake.

**Gak-1241. Kaimondake, 2** **3520 ± 100**  
**1570 B.C.**

Taken from Minanarigawa, Ibusuki-gun, Kagoshima Prefecture (31° 15' 22" N Lat, 130° 25' 58" E Long), 1.1 m below surface, overlain by welded ash from Kaimondake (Kora-layer) and underlain by pumice of Akahoya.

**GaK-1329. Yoe** **25,600 ± 1000**  
**23,650 B.C.**

Peat from boring at Yōe, Kamimatsuo, Kumamoto City (32° 47' 32.4" N Lat, 130° 36' 57.2" E Long), 47.5 m below surface, at base of thick clay. Coll. and subm. 1967 by Shigeru Imanishi, Kumamoto Univ.

**GaK-1239. Ushinomizu** **950 ± 80**  
**A.D. 1000**

Shells from Ushinomizu, Arao City, Kumamoto Prefecture (23° 40' 36" N Lat, 130° 38' 40" E Long), imbedded in large shell bed at +5 m. Coll. and subm. 1966 by H. Furukawa.

**GaK-1043. Yasuoka** **3360 ± 100**  
**1410 B.C.**

Peat from Yasuoka, Shimonoseki-shi (34° 1' 30" N Lat, 130° 40' 10" E Long), 2.2 m below surface. Coll. and subm. 1965 by Takeo Yamamoto, Univ. of Tokyo. *Comment* (T.Y.): dates Yasuoka peat layer. Date supports results of pollen analysis which conflicts with previous view that peat is contemporary with Shimosueyoshi period.

**GaK-1004. Uchiumi, Miyazaki** **2870 ± 90**  
**920 B.C.**

Shells from Uchiumi Miyazaki City (31° 45' N Lat, 131° 44' E Long). Taken from wave-cut notches at +5 to +6 m. Coll. and subm. 1965 by Shoji Fujii, Toyama Univ. *Comment*: dates sea-level change.

**GaK-1125. Yoshizu, Tottori** **8350 ± 150**  
**6400 B.C.**

Peat from Yoshizu, Yonago City, Tottori Prefecture (35° 28' 30" N Lat, 133° 15' 8" E Long), -20 m, overlain by Nakanoumi silt layer and underlain by thick fine sand. Coll. and subm. 1965 by Hideo Mii, Shimane Univ. *Comment* (H.M.): date is minimum of Yumigahama sand delta.

**GaK-1191. Daisen, Kotoku** **>34,200**

Wood charcoal from Kotoku, Nawa-cho, Tottori Prefecture (35° 30' 39" N Lat, 133° 31' 25" E Long), depth 7 m in base of mudflow over-

lain by ash. Coll. and subm. 1966 by Tsurunaga Kimachi, Yonago Kita High School. *Comment*: see GaK-383 (Radiocarbon, 1965, v. 7, p. 11).

**2500 ± 80**

**GaK-904. Kamihate-cho, Kyoto**

**550 B.C.**

Humic soil from Kitashirakawa fan deposit, Kamihate-cho Kitashirakawa, Kyoto-shi (35° 2' N Lat, 135° 47' 40" E Long), 2 m below surface. Coll. and subm. 1966 by Shiro Ishida, Kyoto Univ. *Comment* (S.I.): sample was from upper humic layer which is affected by an overthrust. Dates maximum age of dislocation.

**Continental shelf series**

Shells from outer ridge of continental shelf of Honshu I., taken by dredge. Depths given are beneath water surface.

**15,900 ± 300**

**GaK-858. Uchiura**

**13,950 B.C.**

Shell (*Glycimeris*) from Uchiura, Suruga Bay (35° 4' 19" N Lat, 138° 48' 20" E Long), 278 m depth. Coll. and subm. 1965 by Michihei Hoshino, Tokai Univ.

**930 ± 80**

**GaK-1234. Hazikisaki, Sado**

**A.D. 1020**

Shells from 8 km N of Hazikisaki, Sado I. (38° 24.7' N Lat, 138° 31.4' E Long), 140 m depth. Coll. and subm. 1966 by Yoshio Iwabuchi, Maritime Safety Agency.

**160 ± 70**

**GaK-1233. Mukose, Oga**

**A.D. 1790**

Shells (*Ostrea*) 16 km W of Oga Peninsula, Akita Prefecture (39° 51.5' N Lat, 139° 34.0' E Long), ca. 100 m depth. Coll. and subm. 1966 by Y. Iwabuchi. *General Comment*: samples expected to date lowering of sea level, but except for GaK-858, measured dates are too recent.

**2110 ± 80**

**GaK-903. Ōnebu, Ishikawa**

**160 B.C.**

Peaty soil from Ōnebu, Uchinada-machi, Ishikawa Prefecture (36° 39' 28" N Lat, 136° 39' 3.2" E Long), 7 m below sand dune. Coll. and subm. 1965 by Norio Fuji, Kanazawa Univ. *Comment* (N.F.): dates end of formation of Uchinada dune.

**4410 ± 100**

**GaK-997. Okino**

**2460 B.C.**

Shells (*Meretrix lamarckii*) from Okino, Himi-shi, Toyama Prefecture (36° 51' N Lat, 136° 57' E Long), depth 30 cm, alt +8 m. Coll. and subm. 1966 by Shoji Fujii, Toyama Univ. *Comment* (S.F.): dates sea-level change.

**4500 ± 90**

**GaK-1003. Hachigasaki**

**2550 B.C.**

Shells (*Dosinia japonica* and *Meretrix lamarckii*) from shell bed at Hachigasaki, Notojima-machi, Ishikawa Prefecture (37° 9' 37.3" N Lat,

137° 2' 48.2" E Long), alt 2 m. Coll. 1963 by Junro Muramoto and subm. by S. Fujii. *Comment* (S.F.): dates sea-level change.

#### **Matsunoyama series, Niigata**

Wood samples from sediments of recent landsliding at Matsunoyama-cho, Niigata Prefecture (37° 3' N Lat, 138° 37' E Long). Depths are indicated. Coll. and subm. 1966 by Michiyuki Makino, Maebashi Forest Bureau.

<b>GaK-1136.</b>	<b>Matsunoyama</b>	<b>-6 m</b>	<b>&lt;120</b>
			<b>1320 ± 90</b>
<b>GaK-907.</b>	<b>Matsunoyama</b>	<b>-7 m</b>	<b>A.D. 630</b>
			<b>390 ± 80</b>
<b>GaK-1137.</b>	<b>Matsunoyama</b>	<b>-10 m</b>	<b>A.D. 1560</b>

*General Comment* (M.M.): dates landslide, and shows overturning of sediment during movement.

#### **Busuno series, Niigata**

Wood samples from sediments of recent landslide at Busuno, Yasuzuka-cho, Niigata Prefecture (37° 3' N Lat, 138° 28' E Long). Depths are indicated. Coll. and subm. 1966 by M. Makino.

<b>GaK-1138.</b>	<b>Busuno</b>	<b>-0.4 m</b>	<b>2040 ± 90</b>
			<b>90 B.C.</b>
<b>GaK-1139.</b>	<b>Busuno</b>	<b>-0.8 m</b>	<b>&lt;220</b>
			<b>320 ± 80</b>
<b>GaK-1140.</b>	<b>Busuno</b>	<b>-1.0 m</b>	<b>A.D. 1630</b>
			<b>3540 ± 100</b>
<b>GaK-615.</b>	<b>Busuno</b>	<b>-1.5 m</b>	<b>1590 B.C.</b>
			<b>310 ± 80</b>
<b>GaK-1141.</b>	<b>Busuno</b>	<b>-2.0 m</b>	<b>A.D. 1640</b>

*General Comment*: see Matsunoyama series, above.

			<b>+ 2100</b>
			<b>30,800</b>
			<b>- 1600</b>
<b>GaK-860.</b>	<b>Yahata-machi, Yamanashi</b>		<b>28,850 B.C.</b>

Wood from Yahata-machi, Yamanashi Prefecture (35° 42' N Lat, 138° 46' 32.4" E Long), in peaty silt overlain by fan gravel. Assoc. *Juglans*, *Syrax*, and *Corylus*. Coll. and subm. 1964 by Michio Kuchino, Tokyo Univ. Educ.

#### **Tachikawa Loam series**

Humic soil samples from buried soil in Tachikawa Loam at campus of Seijo Gakuen, Setagaya-ku Tokyo (35° 38' N Lat, 139° 37' E Long). Coll. and subm. 1966 by Takeshi Matsui, Res. Inst. for Nat. Resources.

	<b>17,000 ± 400</b>
<b>GaK-1129. Seijo, 1, Total</b>	<b>15,050 B.C.</b>
First humic soil layer, depth 150 to 180 cm. Dated on total organic carbon in soil.	
	<b>16,000 ± 300</b>
<b>GaK-1014. Seijo, 1, Humic acid</b>	<b>14,050 B.C.</b>
Humic acid separated from GaK-1129.	
	<b>19,800 ± 500</b>
<b>GaK-1015. Seijo, 1, Humin</b>	<b>17,850 B.C.</b>
Humin separated from GaK-1129.	
	<b>24,900 ± 900</b>
<b>GaK-1130. Seijo, 2, Total</b>	<b>22,950 B.C.</b>
Second humic soil layer, depth 200 to 290 cm. Dated on total organic carbon.	
	<b>22,300 ± 900</b>
<b>GaK-1016. Seijo, 2, Humic acid</b>	<b>20,350 B.C.</b>
Humic acid separated from GaK-1130.	
	<b>21,400 ± 600</b>
<b>GaK-1017. Seijo, 2, Humin</b>	<b>19,450 B.C.</b>
Humin obtained from GaK-1130.	

*General Comments* (T.M.): 2 humic buried soil layers are key layers in Tachikawa Loam. (K.K.): separation of humic acid and humin was as described by Olson (1963).

#### Numa series

Samples from Numa Terrace, Kōyatsu, Tateyamashi, Chiba Prefecture (34° 58' N Lat, 139° 49.4' E Long). Coll. and subm. 1966 by T. Shinbori (GaK-1131), and 1962 by M. Hoshino (GaK-254).

	<b>6160 ± 120</b>
<b>GaK-254. Numa, 1</b>	<b>4210 B.C.</b>
Coral from Numa Terrace.	

	<b>7620 ± 150</b>
<b>GaK-1131. Numa, 2</b>	<b>5670 B.C.</b>

Wood from marine sand overlain by coral of Numa Terrace.  
*General Comment* (T.S.): high (20 m) alt of terrace suggested age older than Holocene, but 2 dates confirm younger age; see GaK-129 (Radiocarbon, 1962, v. 4, p. 89).

#### Kanuma series

Humic soil in ash from Hangandai, Kanuma, Tochigi Prefecture (36° 30' N Lat, 139° 45' E Long). Coll. 1963 and subm. by Y. Yamada, Natl. Inst. Agricultural Sci. Objective: relation between age and composition of humus in volcanic soil (Yamada, 1969).

	<b>2140 ± 80</b>
<b>GaK-1076. Kanuma, 2</b>	<b>190 B.C.</b>
18 to 31 cm below ground surface.	

**GaK-1077. Kanuma, 6** **9950 ± 300**  
**8000 B.C.**  
100 cm below ground surface.

**Imaichi series**

Humic soil in ash from Dozawa Imaichi, Tochigi Prefecture (36° 41' N Lat, 139° 44' E Long), 18 to 31 cm below surface. From A<sub>12</sub> horizon of Histic volcanic ash soil. Coll. and subm. 1966 by Y. Yamada. Objective: study of accumulation of humus in volcanic soil (Yamada, 1968).

**GaK-1328. Imaichi, 2, Total** **2640 ± 80**  
**690 B.C.**  
Dated on total organic carbon.

**GaK-1078. Imaichi, 2, Humic acid** **2740 ± 90**  
**790 B.C.**  
Dated on humic acid extracted from GaK-1328.

**GaK-1079. Imaichi, 2, Humin** **1900 ± 100**  
**A.D. 50**  
Dated on organic carbon in residue of GaK-1078.

**Jindaiji series**

Humic soil in volcanic ash from Jindaiji, Chofu, Tokyo (35° 40' N Lat, 139° 33' E Long). Dated on total organic carbon in soil. Coll. and subm. 1966 by Y. Yamada. Objective: same as Kanuma series, above.

**GaK-1084. Jindaiji, 3-7** **5040 ± 100**  
**3090 B.C.**  
Depth 30 to 60 cm.

**GaK-1080. Jindaiji, 1-4** **16,500 ± 600**  
**14,550 B.C.**  
Depth 150 to 180 cm.

**GaK-1081. Jindaiji, 2-1** **16,950 ± 600**  
**15,000 B.C.**  
Upper part of Musashino Loam, 310 cm below ground surface.

**GaK-1082. Jindaiji, 3-1** **15,750 ± 650**  
**13,800 B.C.**  
Depth 190 to 220 cm.

**GaK-1083. Jindaiji, 3-3** **17,250 ± 400**  
**15,300 B.C.**  
Depth 245 to 260 cm.

**GaK-1126. Nuruyu, Fukushima** **5960 ± 140**  
**4010 B.C.**

Wood from 2.5 km ENE of Nuruyu, Mizuho, Fukushima-shi (37° 44' 5" N Lat, 140° 18' 48" E Long), imbedded in lower part of black weathered horizon, overlain by ca. 20 m of pyroclastics ejected probably

from Azuma-kofuji. Coll. and subm. 1966 by Keiji Suzuki, Fukushima Univ.

**31,900 ± 2100**

**GaK-1127. Hara, Fukushima**

**29,950 B.C.**

Peat from terrace sediments 600 m ENE of Hara, Minatomachi, Aizuwakamatsu-shi (37° 26' 50" N Lat, 140° 1' 41" E Long), overlain by lacustrine deposits. Sample was from lower part of uppermost of 3 peat layers. Coll. and subm. 1966 by K. Suzuki. *Comment* (K.S.): dates high lake level of Inawashiro.

**GaK-1128. Suwamae, Fukushima**

**>34,300**

Peat from Suwamae, Inawashiro-machi, Fukushima Prefecture (37° 33.8' N Lat, 140° 6' 3.2" E Long), overlain by volcanic ejecta from Mt. Bandai. Coll. and subm. 1966 by K. Suzuki.

**Sen series, Sendai Bay**

Shells from sea bottom of Sendai Bay, 32.5 to 132 m depth. Species id. by K. Masuda and S. Hayasaka. Dates expected to provide new data on eustatic change of sea level after last glacial maximum. Coll. and subm. 1965 by Rikuo Hattori, Tohoku Univ.

**GaK-1006. Sen 40**

**5600 ± 100**

**3650 B.C.**

Shell (*Mercenaria stimpsoni*) from sea bottom off Abukuma R. (38° 2' 30" N Lat, 141° 4' 18" E Long), water depth 32.5 m, upper part of -20 to -50 m submarine terrace.

**GaK-1007. Sen 47**

**8050 ± 130**

**6100 B.C.**

Shell (*Ostrea gigas*) from sea bottom off Nanakita R. (38° 12' 50" N Lat, 141° 12' E Long), water depth 37.5 m, lower part of -20 to -50 m submarine terrace.

**GaK-1008. Sen 72-1**

**7840 ± 150**

**5890 B.C.**

Shell (*Glycymeris yessoensis*) from sea bottom off Abukuma R. (38° 4' 57" N Lat, 141° 11' 42" E Long), water depth 39.5 m, lower part of -20 to -50 m submarine terrace.

**GaK-1009. Sen 72-1**

**7770 ± 120**

**5820 B.C.**

Shell (*Felaniella usta*) from same locality as GaK-1008.

**GaK-1010. Sen 119**

**10,230 ± 220**

**8280 B.C.**

*Gastropod* and *pelecypod* shells from S of Ojika Peninsula (38° 6' 6" N Lat, 141° 32' 6" E Long), water depth 132 m, upper part of -130 to -150 m submarine terrace. Coll. by gravity corer; shells from 26 to 34 cm core depth.

**Obanazawa series**

Wood and peat from Mogami-gun, Yamagata Prefecture. Dating is for studies on flora (Yamagata and Suzuki, 1966), on pumice (Yonechi and Kikuchi, 1966), and on rate of local folding (Sugimura, 1967). Coll. and subm. by O. Yamagata and F. Yonechi, Yamagata Univ. and A. Sugimura, Tokyo Univ.

+ 4000

**34,900**

– 2700

**GaK-1242. Asizawa, a****32,950 B.C.**

Peat from terrace deposits at Asizawa, Obanazawa City (38° 39' 0" N Lat, 140° 21' 37" E Long), 50 cm below upper silt. Peat contains *Menyanthes* (id. by Yamagata).

+ 5100

**37,400**

– 3200

**GaK-1243. Asizawa, b****35,450 B.C.**

Peat from same site as GaK-1242, 78 cm below upper silt.

**10,740 ± 340****8790 B.C.****GaK-1636. Hijiori, a**

Charred tree trunk from near base of Hijiori pyroclastic flow, Kadowaga, Tozawa-mura (38° 40' 36" N Lat, 140° 10' 10" E Long). Sample from center of trunk of 25-cm radius.

**10,480 ± 220****8530 B.C.****GaK-1637. Hijiori, b**

Same as GaK-1636 but taken from outer part of trunk.

**10,640 ± 180****8690 B.C.****GaK-1638. Hijiori, c**

Charred wood from 3.7 km NW of site of GaK-1636, imbedded in same flow.

**3550 ± 100****1600 B.C.****GaK-1235. Hamanaka**

Humic sand in Shonai sand dune, Hamanaka, Sakata City, Yamagata Prefecture (38° 50' N Lat, 139° 50' E Long), 4.0 m below surface of recent dune, underlain by old sand dune. Coll. and subm. 1967 by Norichika Tchuman, Tohoku Noseikyoku. *Comment* (N.T.): confirms estimated age from assoc. Jomon pottery.

**2980 ± 90****1030 B.C.****GaK-1232. Dekijima**

Carbonaceous material from terrace along shore at Dekijima Nishitsugare-gun, Awomori Prefecture (40° 53' N Lat, 140° 18' E Long), +2 m. Coll. and subm. by Tatsuo Shibazaki, Res. Inst. Nat. Resources.

**Yotei series, Hokkaido**

Wood from foot of Mt. Yōtei. Dated for studies on soil at foot of



Mt. Yōtei and vicinity of Lake Toya. Coll. and subm. 1965 by Tatsuo Sasaki, Natl. Inst. Agricultural Sci.

**GaK-854. Mihara** **27,800 ± 1200**  
**25,850 B.C.**

Wood from welded tuff at Mihara, Shiribeshi, Hokkaido (42° 40' N Lat, 140° 30' E Long), overlain by Pumice 1 and ash.

**GaK-855. Mt. Nisekoannupuri** **3930 ± 180**  
**1980 B.C.**

Wood from ash at Mt. Nisekoannupuri, Shiribeshi, Hokkaido (42° 50' N Lat, 140° 35' E Long), underlain by Pumice 1, depth 60 cm.

*B. Australia*

**GaK-875. Fremantle** **26,800 ± 1050**  
**24,850 B.C.**

Charcoal from fossil soil exposed in quarry near Fremantle, Western Australia (32° 4' S Lat, 115° 46' E Long), overlain and underlain by calcareous eolianite. Coll. and subm. 1966 by D. Merrilees, Western Australian Mus. *Comment* (D.M.): may be contemporaneous with marine shell bed exposed in another quarry nearby at ca. +2 m. Eolianite above fossil soil contains articulated skull and mandible of wombat similar to forms still existing in eastern Australia, but not living in Western Australia in historic time. Occurrence mentioned by Merrilees (1968).

**GaK-1164. Gulnare** **2300 ± 80**  
**350 B.C.**

Organic material in soil from stratum apparently formed in local swamp, lower of 2 river terraces, 2.8 mi SWW of Gulnare, County Victoria, Hundred of Bundaleer (33° 28' 56" S Lat, 138° 23' 38" E Long), assoc. with fresh water shells. Coll. 1965 by N. F. Alley; subm. by C. R. Twidale, Univ. of Adelaide. *Comment* (C.R.T.): dates beginning of formation of younger fill terrace (Alley, 1967).

**GaK-962. Lake George** **15,100 ± 300**  
**13,150 B.C.**

Carbonized wood in bed of sand, 8 to 10 cm thick, exposed in gravel pit at N end of Lake George, New South Wales (34° 59' S Lat, 149° 24' E Long), ca. 150 cm below present surface. Coll. and subm. 1966 by R. W. Galloway, CSIRO. *Comment* (R.W.G.): dates construction of beach bar when Lake George was ca. 13 m deep. See Galloway (1967).

**Mt. Kosciusko series**

Peat from Mt. Kosciusko area, S New South Wales. Coll. and subm. 1966 by A. R. H. Martin, Univ. of Sydney, for study of development of peat at high alt.

**GaK-1192. Club Lake, Mt. Kosciusko** **6680 ± 120**  
**4730 B.C.**

*Carex* fluviatile peat from Club Lake, Mt. Kosciusko (36° 25' S Lat, 148° 17' 15" E Long), alt 1900 m, 317 cm below surface of cleft in de

posit of stratified lake mud, peat and small boulders, 625 cm below original surface. *Comment* (A.R.H.M.): samples from this site, near stream level (ca. 320 cm higher than this sample) were dated by NZ-317, 4400 ± 90 B.P. (Radiocarbon, 1963, v. 5, p. 152) and W-770, 4580 ± 220 B.P. (Radiocarbon, 1960, v. 2, p. 176).

**7450 ± 130**  
**5500 B.C.**

**GaK-1193. Smiggin Holes, Mt. Kosciusko**

Peat from layer of transition from *Carex* peat to mineral mud, from Smiggin Holes, Mt. Kosciusko (36° 23' S Lat, 148° 26' E Long), alt 1700 m, 117 cm below surface. *Comment* (A.R.H.M.): should be close to time of origin of peat formation.

*General Comment* (A.R.H.M.): minimum age of presumed cirque glacier at Club Lake (Browne and Vallance, 1963) is increased 2000 yr; Smiggin Holes date is earlier than others on similar raised-bog peats at similar alts in this region.

**6940 ± 140**  
**4990 B.C.**

**GaK-1011. Dahlia Swamp**

Charcoal from organic-rich silt fill of Dahlia swamp, 35 mi S of Sydney, N.S.W. (34° 13' S Lat, 150° 54' E Long), alt 1150 ft, 7 ft 6 in. below surface, 2 ft above sandstone bedrock. Coll. 1966 by G. W. Harden; subm. by T. Langford-Smith, Univ. of Sydney. *Comment* (T.L.S.): slight contamination with surface material during sampling may have occurred. Age relates to former, wetter conditions at site; possibly former pluvial. Similar material occurs at same depth along mid-swamp line.

**480 ± 80**  
**A.D. 1470**

**GaK-1012. Madden's Creek**

Peat from base of silty alluvium forming bank of upper Madden's Creek, 35 mi S of Sydney, N.S.W. (34° 16' S Lat, 150° 56' E Long), alt 1200 ft. Site is at junction of base of alluvium and sandstone bedrock. Coll. 1966 by G. W. Harden; subm. by T. Langford-Smith. *Comment* (T.L.S.): date is minimum for wetter conditions at site.

**1730 ± 100**  
**A.D. 220**

**GaK-1013. Wingecarribee Swamp**

Peat from base of saturated organic fill of Wingecarribee Swamp, 80 mi S of Sydney, N.S.W., 15 mi W of Bowral, N.S.W. (34° 34' S Lat, 150° 31' E Long), alt 2225 ft, 17 ft below surface, 7 ft above bedrock. Coll. 1966 by G. W. Harden; subm. by T. Langford-Smith. *Comment* (T. L.S.): date is minimum for wetter conditions at site.

**760 ± 80**  
**A.D. 1190**

**GaK-1149. The Salt Lake**

Charcoal from camp-fire mound at earlier, higher strandline of The Salt Lake, 65 mi S of Tibooburra, New South Wales (30° 8' S Lat, 142° 8' E Long). Coll. and subm. by G. H. Dury and T. Langford-Smith. *Comment* (G.H.D. and TL-S.): sample assoc. with miscellaneous artifacts and dates aboriginal occupation of site.

**Myall Lakes series**

Shells from coastal sand barrier system in Myall Lakes region, 40 mi NE of Newcastle, on central New South Wales coast. Coll. 1967 by M. J. Shepherd; subm. by T. Langford-Smith.

**GaK-1468. Myall Lakes, 1** **5850 ± 140**  
**3900 B.C.**

(32° 37' S Lat, 152° 12' E Long). Taken from excavation in estuarine- or lagoonal deposits immediately underlying inner margin of Outer Barrier. Depth: 7 ft below Newcastle datum (3.1 feet below mean sea level).

**GaK-1469. Myall Lakes, 2** **4950 ± 70**  
**3000 B.C.**

(32° 36' S Lat, 152° 14' E Long). From excavation in beach sand, under innermost Outer Barrier ridge, alt +1 ft.

**GaK-1470. Myall Lakes, 3** **4970 ± 70**  
**3020 B.C.**

(32° 35' S Lat, 152° 15' E Long). From borehole on Outer Barrier ridge 250 m seaward of innermost ridge. Shells imbedded in beach sand at top of shelly zone extending downward +2 ft.

*General Comment* (M.J.S.): dates are maximum for Outer Barrier system in area. They indicate that sea was at or very close to present level during building of Barrier.

**Bellinger River, Lower North Arm series**

Samples are from old alluvial and more recent alluvial deposits in Lower North Arm of Bellinger R., W of Bellingen, New South Wales. Coll. and subm. 1966 by R. F. Warner, Univ. of New England.

**GaK-849. Bellinger River, BNA 1** **7180 ± 130**  
**5230 B.C.**

Charcoal from silty clay just above strongly oxidized sec. of low terrace (30° 27' S Lat, 152° 52' E Long). *Comment* (R.F.W.): dates post-Pleistocene oxidized terrace.

**GaK-850. Bellinger River, BNA 2** **8450 ± 150**  
**6500 B.C.**

Charcoal in oxidized clay 5 to 6 ft above basal gravel in same terrace as GaK-849, at different location (30° 27' 12" S Lat, 152° 52' 12" E Long). *Comment* (R.F.W.): confirms post-Pleistocene age of terrace.

**GaK-851. Bellinger River, BNA 3** **1410 ± 90**  
**A.D. 540**

Charcoal from sandy lens near base of 15-ft alluvial sec. exposed through recent floods (30° 26' 24" S Lat, 152° 51' 36" E Long). *Comment* (R.F.W.): dates in-channel lateral accretion for this part of alluvial sequence.

**Bellinger River, Upper South Arm series**

Samples are from slope and alluvial deposits in Upper South Arm of Bellinger R., N.S.W. Coll. 1965; subm. by R. F. Warner.

**21,350 ± 850**  
**19,400 B.C.**

**GaK-891. Bellinger River, BSA 1**

Charcoal from silty clay (30° 30' S Lat, 152° 45' E Long) Clay is lens-like body interposed between coarser phyllitic pieces and appears to be colluvium. *Comment* (R.F.W.): date is maximum for main terrace in this valley.

**20,900 ± 500**  
**18,950 B.C.**

**GaK-892. Bellinger River, BSA 2**

Charcoal from silty clay (30° 30' 45" S Lat, 150° 44' E Long). Clay body is thought to be colluvium. *Comment* (R.F.W.): confirms GaK-891.

+ 4100  
**34,200**  
– 2700

**32,250 B.C.**

**GaK-893. Bellinger River, BSA 3**

Charcoal from oxidized coarse alluvium bordering Cook's Creek, tributary of South Arm (30° 31' 12" S Lat, 152° 45' 24" E Long), exposed by recent flood. *Comment* (R.F.W.): dates basal gravels of terrace.

**Coal River Estuary series**

Samples 1 and 2 are from delta of Coal R., SE Tasmania, undercut by present channel. Sample 3 is from alluvium of Coal R. 5 mi upstream from delta. Subm. by Albert Goede, Univ. of Tasmania.

**1990 ± 100**  
**40 B.C.**

**GaK-905. Coal River, 1**

Charcoal from sandy alluvium (42° 45' S Lat, 147° 27' E Long). Coll. 1965.

+ 3400  
**33,600**  
– 2400

**31,650 B.C.**

**GaK-906. Coal River, 2**

Charcoal from alluvium. Coll. 1965 from site close to but on opposite river bank from GaK-905.

**1730 ± 110**  
**A.D. 220**

**GaK-1678. Coal River, 3**

Charcoal from fine-grained alluvium, 9 ft below flood plain, just below gravel (42° 40' S Lat, 147° 27' E Long). Coll. 1966. *General Comment* (A.G.): dates river-mouth terrace and deposition of alluvium.

**Valley of Tea Tree Rivulet series**

Samples are from alluvial bank of Tea Tree Rivulet, Tasmania, exposed by stream trenching. Subm. by A. Geode.

- GaK-1146. Tea Tree Rivulet, 1** **6200 ± 200**  
**4250 B.C.**  
Charcoal from lowest of 3 layers, depth 10 ft beneath flood plain (12° 38' S Lat, 147° 37' E Long). Coll. 1965. *Comment*: large error in age is due to escape of counting gas before measurement.
- GaK-1289. Tea Tree Rivulet, 1'** **5720 ± 120**  
**3770 B.C.**  
Charcoal from same site as GaK-1146; coll. 1967. *Comment*: good check for GaK-1146.
- GaK-1147. Tea Tree Rivulet, 2** **4360 ± 90**  
**2410 B.C.**  
Charcoal from same site as GaK-1146, middle 3 layers, 6 ft 8 in. below surface of flood plain. Coll. 1965.
- GaK-1148. Tea Tree Rivulet, 3** **3850 ± 90**  
**1900 B.C.**  
Charcoal from same site as GaK-1146, uppermost of 3 layers, 4 to 5 ft below surface of flood plain. Coll. 1965.
- GaK-1677. Tea Tree Rivulet, 4** **3040 ± 90**  
**1090 B.C.**  
Charcoal from fine-grained alluvium, 3 ft 9 in. below surface of partial channel fill (12° 38' S Lat, 147° 47' E Long). Coll. 1967.  
*General Comment* (A.G.): dates aggradation.

*C. Pacific***Managalase series, Papua**

Charcoal from ash layers of Managalase, Northern District, Papua (9° Lat, 148° 10' E Long). Coll. and subm. 1966 by B. P. Ruxton, C.S.I.R.O.

- GaK-1183. Managalase, T1** **4210 ± 80**  
**2260 B.C.**  
Charcoal layer in lower Silimbo Ash, depth 12 to 18 in.
- GaK-1176. Managalase, S78d** **4820 ± 90**  
**2870 B.C.**  
Charcoal layer in uppermost Kea Ash, depth 10 to 16 in.
- GaK-1177. Managalase, S78e** **9150 ± 200**  
**7200 B.C.**  
Charcoal layer in Siurani Ash, depth 40 to 46 in.
- GaK-1179. Managalase, G168a** **12,800 ± 350**  
**10,850 B.C.**  
Charcoal layer in basal Numba Ash, depth 68 to 74 in.
- GaK-1180. Managalase, G168b** **17,450 ± 400**  
**15,500 B.C.**  
Charcoal layer in middle Natanga Ash, depth 94 to 95 in.

- GaK-1181. Managalase, R1** **26,100 ± 1100**  
**24,150 B.C.**  
Charcoal layer in basal Sagamasi Ash, depth 84 to 92 in.  
+ 6400  
**30,600**  
– 3600
- GaK-1178. Managalase, S78f** **28,650 B.C.**  
Charcoal layer in Ash Layer L, depth 111 to 114 in.  
**120 ± 100**
- GaK-1182. Managalase, V** **A.D. 1830**  
Charcoal layer at site of old village, depth 24 to 36 in. *Comment* (B.P.R.): probably man-made charcoal post-dating all eruptive activity.
- GaK-1185. Managalase, El** **430 ± 80**  
**A.D. 1520**  
Charcoal layer in mixed dacite ash and mud from explosion craters, depth 12 in.
- GaK-1173. Managalase, Ua** **630 ± 70**  
**A.D. 1320**  
Wood from roots, depth 10 to 11 in. at base of upper mud layer from explosion craters.
- GaK-1174. Managalase, Ub** **380 ± 80**  
**A.D. 1570**  
Charcoal layer in rhyodacite ash below thick basalt ash and mud layers from explosion craters, depth 147 to 154 in.
- GaK-1175. Managalase, Uc** **6450 ± 200**  
**4500 B.C.**  
Charcoal layer in coarse pumiceous rhyodacite ash from recent Man-na Volcanics, depth 162 to 170 in.  
*General Comment* (B.P.R.): seven samples (GaK-1176 to 1181 and GaK-1183) supplement dates for upper ash layers around Mt. Lamington (Ruxton, 1966a). Six samples (GaK-1173 to 1175, GaK-1182, 1184, and 1185) date ash layers connected with recent volcanicity on E part of Managalase (Ruxton, 1966b). Complete cover of climax rain forest has developed on products of these eruptions; they would almost certainly have to be over 200 yr old, and dates of GaK-1173, 1174, 1184, 1185 all seem to fall ca. 500 B.P. which is consistent with stratigraphy and skeletal nature of weathering.

### **Karkar Volcano series, New Guinea**

Wood and charcoal from volcanic island off N coast of New Guinea, upper sequence of bedded fragmental deposits on Karkar Volcano. Coll. 1965 by G. A. M. Taylor; subm. by N. H. Fisher, Bureau of Mineral Resources, Geol. and Geophysics. Dates may help assess potential of volcano for further large-scale eruption.

- 1430 ± 100**
- GaK-769. Karkar, 1** **A.D. 520**  
Carbonized tree trunks from near crater rim (4° 38.0' S Lat, 145° 56.9' E Long), in a pumiceous ash flow 2 ft thick, underlain by lava and overlain by pyroclastics.
- 730 ± 90**
- GaK-770. Karkar, 2** **A.D. 1220**  
Carbonized tree trunks in pumiceous ash flow occupying shallow valley (4° 35.0' S Lat, 145° 55.1' E Long).
- 820 ± 90**
- GaK-771. Karkar, 3** **A.D. 1130**  
Carbonized branches in bed of pumice blocks and lapilli (4° 34.7' S Lat, 145° 55.0' E Long), >50 ft thick.
- 2820 ± 80**
- GaK-772. Karkar, 4** **870 B.C.**  
Branches in weathered tuff overlain by pyroclastics (4° 42.0' S Lat, 145° 56.5' E Long).
- 890 ± 90**
- GaK-773. Karkar, 5** **A.D. 1060**  
Uncarbonized tree remnants buried in soil horizon beneath sample Karkar 3 (4° 34.7' S Lat, 145° 55.0' E Long).  
*General Comment* (G.R.M.T.): catastrophic eruption is estimated to have occurred a few centuries ago.

## II. ARCHAEOLOGIC SAMPLES

### *A. Canada*

#### **Klo-kut site series, Yukon**

Wood charcoal and charred bone from Klo-kut (MjVI-1) (67° 54' N Lat, 139° 41' W Long), right bank of Porcupine R. ca. 6 mi above Old Crow, Yukon Territory. Large seasonally occupied Athabaskan site, with 3 to 4 ft of prehistoric deposits beneath late 19th to early 20th century level with metal and glass. Matrix consists of flood-deposited sands, silt, and clays, on bank 30 ft above summer low water. Area IA and W Block are ca. 700 ft apart; their stratigraphic units are numbered differently. All samples except those from Area IA are located on uniform grid measured in ft. Coll. 1966 by W. N. Irving and D. MacLeod, Natl. Mus. of Canada; subm. by R. Wilmeth, Natl. Mus. of Canada.

**GaK-1253. Klo-kut, IA, L-6A** **<240**

Charcoal from Area IA, Feature 7, hearth, in Sq. 22, Layer 6A, separated from inferior and superior strata by sterile silt. Will date prehistoric occupation virtually identical to that in Strata 6 and 7. Difference in age would help calculate rate of sediment deposition and stability of cultural assemblage over a period of time. *Comment* (W.N.I.): date is inconsistent with GaK-1252 from Layer 7, and with GSC-747

from Layer 6. In view of dates from other parts of site, GaK-1253 probably has given spurious date; no reason for error can be suggested.

**1040 ± 100**

**GaK-1252. Klo-kut, IA, L-7** **A.D. 910**

Charcoal from Area IA, Sq. 13-22, Layer 7, deepest artifact-bearing stratum in Area IA. *Comment* (W.N.I.): although older than expected, date agrees with others from same stratigraphic level.

**180 ± 80**

**GaK-1263. Klo-kut, W Block, N5/0, L-IA** **A.D. 1770**

Charcoal from W Block, N5.0, hearth (Feature 11), bottom of Layer IA. From lower part of twice-used hearth, from layer with flint chips but no historic material. Upper part of hearth contained metal objects. Will date latest prehistoric occupation at site. *Comment* (W.N.I.): date is as expected.

**920 ± 70**

**GaK-1249. Klo-kut, N20/E202 1/2-205** **A.D. 1030**

Charcoal from N20/E202 1/2-205, Feature 19, depth 31 in. Trench-like feature ca. 3 in. deep filled with bones and charcoal, but no ash. Contained small barbed antler-point fragment. Perhaps hearth of double lean-to. Will date prominent occupation level in area, and may confirm correlation with upper Layer 4 at W end of site and with Layer 6A in Area IA at E end. *Comment* (W.N.I.): suggests correlation with upper Layer 4 in W end of site and with Layer 6A or Layer 7 in Area IA; cf. GaK-1264 and GaK-1253.

**910 ± 70**

**GaK-1264. Klo-kut, W Block, W100, L-4B** **A.D. 1040**

Charcoal from W Block, Sq. 0/W100, Layer 4B, ca. 30 in. below surface. Scattered fragments of charcoal picked from bone midden resting on distinct occupation level. Will date prominent occupation level at top of lower 1/3 of cultural deposits. *Comment* (W.N.I.): agrees with GaK-1249 and GaK-1252, which came from stratigraphically comparable level elsewhere.

**1790 ± 180**

**GaK-1265. Klo-kut, W Block, S10/W96** **A.D. 160**

Charcoal from W Block, S10/W96, from thin layer of charcoal just below hearth (Feature 16), which in turn is below Layer 5. Feature 16, deposit of ash with no accompanying artifacts, probably is oldest feature at W end of site. Will provide very near 1st period of occupation, somewhat earlier than severe forest or brush fire. *Comment* (W.N.I.): much older than expected, but cannot be discounted on stratigraphic grounds. If correct, it indicates long period of relatively slow alluviation prior to the beginning of intensive occupation. Date may represent human activity at site, but this is uncertain.

*General Comment* (W.N.I.): GaK-1253 cannot be right in view of dates for GaK-1252 and GSC-747 (A.D. 1300) on very similar material. Other



dates are plausible, even though all except GaK-1263 are a good deal earlier than anticipated. This series, and that analyzed by GSC, dates oldest known site of Athabaskan culture. Note that intensive use of Klokut began abruptly ca. 1000 yr ago.

**GaK-1257. OdPc-2, N.W.T. 1860 ± 100 A.D. 90**

Charcoal from Site OdPc-2 (70° 34' N Lat, 112° 40' W Long), Victoria I., Northwest Territories. From Trench 1, Sq. 15, 5 in. to 7 in. depth, in hearth. Bone industry typical of early Dorset in E Arctic, but stone industry is suggestive of S affiliations (Lockhart River?). Sample should date earliest Dorset occupation of site, and give date for Central Arctic Dorset bone industry, similar to early Dorset in E Arctic, but which may be later in time. Coll. 1966 by R. McGhee, Univ. of Calgary; subm. by R. Wilmeth. *Comment* (R.M.): more recent than age estimate obtained by comparing assoc. industry with dated Dorset culture components in E Arctic. Acceptance of date would imply that "early" phase of Dorset culture existed to later period in central Arctic than in E Arctic, an interpretation which is also suggested by relative scarcity of central Arctic components of more developed phases of Dorset culture. Shallow depth of sample suggests that contamination from floral, rodent, or frost activity may account for lateness of date.

**GaK-1256. OdPq-1, N.W.T. 1820 ± 80 A.D. 130**

Wood, charcoal, and burned bone from Site OdPq-1 (70° 36' 30" N Lat, 117° 32' W Long), NW coast of Prince Albert Sound, Victoria I., Northwest Territories. From Sq. F3 in midden immediately in front on House 4, depth 6 to 9 in. Site located in boggy depression directly behind coastal cliffs and consists of 4 rather small Thule houses. Coll. 1966 by R. McGhee; subm. by R. Wilmeth. *Comment* (R.M.): not acceptable. Sample was closely assoc. with artifacts of relatively early Canadian Thule culture with estimated age of 700 yr. Sample represents cultural debris, and there is no trace at site of earlier occupation which could have caused contamination. Acceptance of date would place Canadian Thule culture earlier in time than Birnirk stage at Point Barrow, considered to be ancestral to Thule complex.

**JcRw-3 series, N.W.T.**

Charcoal from Site JcRw-3 (60° 21.5' N Lat, 124° 50' W Long), N end of Fisherman Lake, SW MacKenzie Dist., Northwest Territories. Coll. 1966 by J. F. V. Millar and C. E. Eyman, Univ. of Calgary; subm. by R. Wilmeth.

**GaK-1274. JcRw-3, Sq. 54 3780 ± 160 1830 B.C.**

Charcoal from Sq. 54 at base of silty loess sec. on thin green glacial clay over till, coordinates 0.56 S, 6.32 W. Sample should date earliest occupation, early Cordilleran component.

**GaK-1257. JeRw-3, Sq. 118****8720 ± 190****6830 B.C.**

Charcoal from Sq. 118, coordinates 9.98 S, 2.5 W, in old hearth depression extending to clay and silt horizon. Should date hearth assoc. with early Plano component.

*General Comment* (J.F.V.M.): GaK-1274 appears to be some 5000 yr later than expected. Stratigraphically, sample lies below GaK-1275, which would seem slightly earlier than expected age, but acceptable.

**GaK-1258. Narrows site, N.W.T.****1010 ± 160****A.D. 940**

Burned bone (caribou) from Narrows site (KeNo-2) (62° 47' N Lat, 108° 56' W Long), on 2nd highest recognizable delta formation on NE side of N shore of narrows between Charlton Bay and Lockhart Bay at extreme E end of Great Slave Lake, N.W.T. From hearth in buried component 26 ft 9 in. above present lake level, overlain by 14 in. of laminated fine sands and rotted wood indicating overwash or ponding of water with subsequent deposition. Site is late component of slate complex manifest all around N shore of E arm of Great Slave Lake. Sample will yield at least minimal date for complex hitherto poorly understood. Coll. 1966 by W. C. Noble, Univ. of Calgary; subm. by R. Wilmeth.

**Nanook site series, N.W.T.**

Organic material from Nanook site (KcDq-9) (62° 39' N Lat, 69° 37' W Long), Cape Tanfield, Northwest Territories. Area of site est. at 3600 sq. ft with midden 20 to 24 in. deep. Not beach site. Probably occupied in winter at time when sea level almost 25 ft higher than present. Typology fits into 12-site continuum for "Tanfield Valley." Coll. 1966 by M. S. Maxwell, Michigan State Univ.; subm. by R. Wilmeth.

**GaK-1279. Nanook site, Feature 3****2220 ± 100****270 B.C.**

Sod from floor of Feature 3. Should date early part of Component II and be slightly older than P-706, 1827 ± 61 B.P. and close in time to P-704, 1916 ± 61 B.P. (Radiocarbon, 1966, v. 8, p. 363), both from same site. *Comment* (M.S.M.): fits well with typological seriation from this region and compares well with GaK-1287 from 0.3 ft higher in Component II midden.

**GaK-1284. Nanook site, 1 ft depth****2380 ± 80****430 B.C.**

Seal, caribou skin, and other organic matter from Sq. OL15, depth 1 ft, in permafrost, from approx. middle of Component III midden. Should be older than P-709, 1929 ± 53 B.P. and slightly more recent than M-1535, 2410 ± 120 B.P. (Radiocarbon, 1966, v. 8, p. 278) from same site. *Comment* (M.S.M.): in typological seriation of harpoon tips, material from this part of the Component III midden should be about 2 centuries older than Component II midden. Carbon date equates well with M-1535 from same depth of Component III midden in location 15 ft to

E, and with GaK-1286 coll. from point directly under GaK-1284 and 0.2 ft deeper in Component III midden.

**1400 ± 80**

**GaK-1285. Nanook site, 1.3 ft depth**

**A.D. 550**

Sod from Sq. OL15, depth 1.3 ft in permafrost. Culturally sterile buried sod layer. Should provide date for time prior to earliest occupation of site. *Comment* (M.S.M.): this cannot possibly date provenience for which sample was recovered and represents either contamination or sampling error. Sample was recovered from directly under other samples in series. Sample was taken from layer of sterile sod which apparently overlay site prior to 1st occupation. Once permafrost regime has been disturbed in this site, meltwater seeps through ground from 1.2' to 1.3' beneath surface. This action may have affected sample coll. from 1.3 ft.

**2370 ± 100**

**GaK-1286. Nanook site, 1.2 ft depth**

**420 B.C.**

Willow twigs from Sq. OL15, depth 1.2 ft in permafrost. Layer of indigenous willow twigs lying on thin gravel lens containing worked wood fragments and animal bone, overlaying sterile sod level which yielded GaK-1285. Should date beginning of Component III occupation. *Comment* (M.S.M.): fits nicely into sequence. It was recovered from 0.2 ft lower in midden than GaK-1284 and M-1532, and should date slightly older. However, samples of 3 different kinds of materials are involved, *i.e.*, animal skin, charred seal fat, and willow twigs. Typological analysis suggests that no more than 50 yr elapsed between beginning and end of Component III.

**2110 ± 80**

**GaK-1287. Nanook site, 5 ft depth**

**160 B.C.**

Whale baleen from Sq. 15L10, 5 ft depth, in permafrost. Material from Component II midden. Should date about beginning of Christian era, based on Samples P-704 and M-1535. Provides date for middle of component, and serves as additional check for other samples. *Comment* (M.S.M.): equates very well with GaK-1279. It is 30 yr more recent, and 0.3 in. higher in Component II midden.

**580 ± 80**

**GaK-1288. Nanook site, 1 ft depth**

**A.D. 1370**

Willow twigs from Sq. OL15, 1 ft depth, in permafrost. From thin sterile zone lying immediately above skin layer yielding GaK-1284 and underlying charred cooking rock. Therefore underlies floor of Feature 3 of Component II. Should date hiatus between 2 components. *Comment* (M.S.M.): this assessment cannot possibly date provenience. Sample lay directly on top of GaK-1284 and 0.4 ft beneath GaK-1274 in undisturbed permafrost. Any date for this sample more recent than 200 B.C. would be highly suspect.

*General Comment* (M.S.M.): samples were taken under controlled conditions from 6-in. baulk left standing between 2 5-ft excavated squares in

approx. middle of Nanook site. Samples were subm. prior to analysis of recovered cultural data. At that time we interpreted field situation to include 2, and perhaps 3, components occupying different horizontal segments of same site. These horizontal sections were numbered KdDq-9-1, KdDq-9-2, and KdDq-9-3, and so appear in Radiocarbon, 1966, v. 8, p. 256-285 and p. 348-385. Since that time we have interpreted complex site situation to include early component which underlies entire Nanook site (Component III); a later occupation (Component II) overlying only part of site, and still more recent occupation (Component I) on another part of site and lying immediately on top of Component III.

**GaK-1281. Closure site, N.W.T.** **4460 ± 100**  
**2510 B.C.**

Charred fat (seal?) from Closure site (KdDq-11-6) (62° 39' N Lat, 69° 37' W Long), Cape Tanfield, Baffin I., N.W.T. From encrusted cooking rock in Sq. 55L15, surface depth 4 ft within active layer. This component is one of number of test squares excavated on top of Cape Tanfield, all producing uncontaminated assemblages of pre-Dorset material. Test Pit 6 lies at sea level elev. 45 ft and is 11 ft higher than original excavations at Closure site dated at 4067 ± 73, P-707 (Radiocarbon, 1966, v. 8, p. 362). Since this component (Test Pit 6) is thought to be part of same Closure site, age of this sample should be same or slightly older. Coll. 1966 by M. S. Maxwell; subm. by R. Wilmeth. *Comment* (M.S.M.): fits well with archaeological evidence. Site is oldest in continuum at Lake Harbour.

**GaK-1280. Tanfield site, N.W.T.** **2360 ± 100**  
**410 B.C.**

Sod and twigs from Tanfield site (KdDq-7) (62° 39' N Lat, 69° 37' W Long), Baffin I., N.W.T. From Sq. 40L5, midden bottom, depth 1.4 ft from surface. Site located in "Tanfield Valley" at elev. 18 ft above present highest tide, which, in this specific location, puts its chronologic position early in Dorset sequence. Coll. 1966 by M. S. Maxwell; subm. by R. Wilmeth. *Comment* (M.S.M.): date poses new problems in assessing age of site. In 1962 a large chunk of charred seal fat was recovered, from permafrost, at depth 0.6 ft in undisturbed midden. One-third of sample was dated 650 B.C., P-698 (Radiocarbon, 1966, v. 8, p. 363). Date was perfect fit with archaeological evidence which made site coeval with following sites: T-1, Igloolik, and Tyara, all carbon-dated within 100 yr of 650 B.C. One year later one of remaining thirds of same sample was dated 440 B.C., M-1528 (Radiocarbon, 1966, v. 8, p. 274). Since this was thought too recent, re-run was asked for (M-1528 A) which dated 300 B.C. Gakushuin sample comes from very bottom, and earliest part of this midden and date younger than 700 B.C. would do much violence to archaeologically derived chronologic framework. Possibility of contamination exists. Permafrost regime is now destroyed in this part of midden and, since profile from which sample was taken has remained open since 1962, recent organic material may have intruded into this sample of sod and twigs.

**3040 ± 110**

**GaK-1477. Co-op site, British Columbia**  
**1090 B.C.**

Charcoal from Co-op site, GbTo-10 (54° 17' 24" N Lat, 130° 21' 24" W Long), S outskirts of Prince Rupert, W coast of Kaien I., British Columbia. From carefully cleaned face of bulldozed cut into midden, 6 ft S of Main test pit on shore side of site. Pocket of charcoal from which sample was taken was in stratum of black ash from 2 to 6 in. above sub-soil at total depth of nearly 15 ft. Site was large shell midden. Coll. 1954 by C. E. Borden, Univ. of British Columbia; subm. by R. Wilmeth. *Comment* (C.E.B.): recent lab analysis of excavated material has confirmed earlier tentative conclusions that cultural deposit at site consists of at least 2 components, of which uppermost evidently represents recent Tsimshian occupation and culture. Date indicates approx. time of initial accumulation of earlier component whose affinities are still unknown. and represents earliest date so far from Tsimshian territory.

**Garden Island series, British Columbia**

Peat and charcoal from Garden Island site, GbTo-23 (54° 19' 5" N Lat, 130° 23' 15" W Long), Venn Passage, Prince Rupert Harbour, British Columbia. Site is shell midden covering a small is. (ca. 50 ft by 250 ft) in Coast Tsimshian area. Coll. 1966 by G. MacDonald and P. Monohan, Natl. Mus. of Canada; subm. by R. Wilmeth.

**2520 ± 100**

**GaK-1250. Garden Island site, 9.4 ft depth**  
**570 B.C.**

Peat from Trench 2, 0.5 ft W, 3.5 ft S, 9.4 ft depth. From peat horizon which underlies many of middens in Venn Passage, Prince Rupert Harbour area.

**1660 ± 80**

**GaK-1251. Garden Island site, 7.5 ft depth**  
**A.D. 290**

Charcoal from Trench 2, 0.2 ft S, 9.0 ft W, 7.5 ft depth, immediately below 2nd humus layer in area of burned shell. Artifact concentrations and hearth stones frequent in humus, but no samples adequate for dating. *General Comment* (G.M.): ca. 2000 artifacts and 40 human burials have been recovered from site. Majority fell between these 2 dates which appear to agree with components and events in more S coastal sites.

**Ash Point Site series, British Columbia**

Charcoal and wood from Ash Point site, DcRv-1 (48° 20' 50" N Lat, 123° 34' 15" W Long), Pedder Bay, Metchosin, Vancouver Island, British Columbia. Prehistoric village or large camp site, excavation of which yielded unitary assemblage of generally recent aspect but with scattered elements more typical of Marpole culture type. Latter has been found stratigraphically underlying recent "Coast Salish" components at other sites in the region. Coll. 1964 by N. D. Abbott, for W. Duff, Univ. of British Columbia; subm. by R. Wilmeth.

**1580 ± 100****GaK-1484. Ash Point site, A****A.D. 370**

Charcoal layer of dark sandy soil and gravel with ash between Floors 2 and 3. Location N 19 ft 2 in. to 19 ft 7 in., W 121 ft 10 in. to 122 ft 2 in., depth 26 in. below surface.

**140 ± 180****GaK-1485. Ash Point Site, B****A.D. 1810**

Wood fragments of cedar stake or post found in compacted level intermediate between Floors 2 and 3 and which is probably composed of tailings from pits dug into Floor 3 level. Location N 2 ft 2 in. to 2 ft 8 in., W 120 ft 3 in. to 120 ft 9 in., depth 20 to 30 in.

*General Comment* (D.N.A.): GaK-1485 ought to be a little earlier than GaK-1484 but absence of any identifiable cultural change between strata in excavation precludes any possibility of time differential as great as this. Since GaK-1485 was wooden stake, conclusion seems inevitable that it was driven in from recent surface. A.D. 370 date is acceptable although it is older than I had expected. This is much earlier than most other dates so far received for other components attributed to late period locally, only date  $1514 \pm 40$ , UW-24 (Radiocarbon, 1962, v. 4, p. 7) for Fox Cove component, Sucia I., Washington being comparable. On the other hand, this date is identical with that for Whalen II assemblage and is actually older than some of those for Beach Grove component of Marpole culture type. Few examples of Marpole-like artifact types found in Pedder Bay assemblage thus become of considerable interest and raise again the question of continuity or culture change in regional sequence. On the one hand this assemblage could be interpreted as an instance of transition from earlier Marpole-like culture to be "Developed Coast Salish." Contrary view can equally well be taken that one culture replaced the other after period of co-existence represented, for example, at this site.

**1970 ± 100****GaK-1480. Point Grey site, British Columbia****20 B.C.**

Charcoal from Point Grey site, DhRt-5 (49° 16' 30" N Lat, 123° 14' 30" W Long), Burrard Peninsula, British Columbia. From N 59 ft 7 to 11 in., E 165 ft 1 to 5 in.; depth from Datum Plane B.C. 24 in., from surface 20 in., in mussel shell deposit ca. 4 in. above dark brown sand and gravel layer. Site is on bluff, ca. 30 to 40 ft above beach, and is ca. 900 ft long and 80 ft wide. Max. depth of remaining deposit slightly over 4 ft. Probably village site. Excavated cultural remains indicate single component of Marpole phase. Date will be approx. for 1st occupation and aid in establishing duration of Marpole phase. Coll. 1965 by C. Mossop and P. Hayward; subm. for C. E. Borden by R. Wilmeth. *Comment* (C.E.B.): very close to age estimated for sample on basis of dates from type site of Marpole phase. Age determination has been significant aid in ascertaining duration of this phase in Fraser Delta culture sequence.



**GaK-1283. Musqueam North site** **2350 ± 80**  
**400 B.C.**

Charcoal from Musqueam North site, DhRt-3 (49° 13' 30" N Lat, 123° 11' 45" W Long), Musqueam Indian Reserve, Fraser R., British Columbia. From hearth in lowermost stratum of House, underlain by sterile gravel. Superior strata consist of ca. 20 in. of successive hearths and other house floor deposits, topped by 10 in. cultivated soil. Village site representing pure component of Marpole phase. Coll. 1959 by C. E. Borden; subm. by R. Wilmeth. *Comment* (C.E.B.): about as expected. Must be considered key date for Marpole phase, since results of 3 measurements on S-17 (McCallum, 1955) from type site were very erratic. One was almost same as new date from Musqueam North, while other 2 yielded dates some 5 centuries older or younger.

**Beach Grove site series, British Columbia**

Charcoal from Beach Grove site, DgRs-1 (49° 2' N Lat, 123° 4' W Long), SW Fraser delta at junction of delta flood plain with NE margin of Point Roberts upland. Large village site, total length ca. 0.5 mi. Max. depth of deposits over 13 ft. Cultural materials indicate site is component of Marpole phase. Coll. 1957 by C. E. Borden and J. Baldwin; subm. by R. Wilmeth.

**GaK-1478. Beach Grove site, 1** **2170 ± 70**  
**220 B.C.**

Charcoal from N 2 ft, E 6 ft 6 in. from Datum A (1957), depth 67 in. Stained sand and black ash stratum. Unknown amount of material had been removed by bulldozer prior to excavation, and total depth is est. at 160 in. Charcoal originated from remains of fire just below main village deposits and should go back to time at or just prior to beginning of settlement. Age determination will aid in establishing duration of Marpole phase.

**GaK-1479. Beach Grove site, 2** **630 ± 180**  
**A.D. 1320**

Charcoal from N 28 ft to 31 ft 6 in., W 0 ft (on datum line) from Datum A (1957), depth 48 in. from Datum Plane A plus 6 ft. Depth 30 in. from surface. Taken from thin layer of charcoal and black ash ca. 6 in. below Burial 9. Mussel, gravel, and sand stratum. Will aid in determining duration of Marpole phase and in dating Burial 9, remarkable for its side grave inclusions.

*General Comment* (C.E.B.): both tend to confirm earlier suspicions that Beach Grove is multicomponent site. GaK-1478 very likely relates to occasional use of locality by Locarno Beach phase groups near end of that phase, an assumption which is supported by presence of characteristic Locarno Beach ground slate projectile in beach sand from which sample GaK-1478 originated. Dates from overlying village deposit suggest that Marpole phase settlement was not established here until a few centuries later. GaK-1479 falls well within time of Stselax phase. This last phase

of the Fraser Delta sequence began ca. A.D. 1250. Burial 9, located some distance above sample GaK-1479, is intrusive into these deposits and thus probably dates to late time in Stselax phase and may even be proto-historic.

**1260 ± 100****GaK-1273. Elkwater Lake site, Alberta****A.D. 690**

Burned soil possibly containing charcoal from Elkwater Lake site, DjOn-100 (49° 40' N Lat, 110° 20' W Long), Elkwater Lake, Alberta. From Sq. 54Q, 45 to 110 cm W, 65 to 105 cm S, depth 22 cm below ground surface. Site on surface of large slump-block, with ca. 30 cm of occupational deposits. Coll. 1966 by R. Bonnichsen, Univ. of Alberta; subm. by R. Wilmeth. *Comment* (R.B.): 3 projectile points, rather aberrant in terms of classic point types, came from nearly same vertical depth as sample. They appear most closely related to Besant points, but also have affinities to Hanna points. Date A.D. 690 would tend to support Besant identification.

**140 ± 70****GaK-1269. South Battle Creek site, Alberta****A.D. 1810**

Charcoal from South Battle Creek site, DjOm-113 (49° 37' N Lat, 110° 12' W Long), head end of S arm of Battle Creek, Alberta. From Sq. 5A, 132 to 145 cm N, 9 to 14 cm W, depth 3 to 6 cm. 50 cm of stratified deposits, occupation beginning ca. 8000 B.P. Sample is from hearth area in last occupation, assoc. with small Plains side-notched points, choppers, and scrapers. Coll. 1966 by N. Zierhut, Univ. of Alberta; subm. for R. Bonnichsen by R. Wilmeth.

**MacBride site series, Manitoba**

Charcoal from MacBride site, HeLw-1 (56° 46' N Lat, 99° 47' W Long), near embouchure of MacBride R. into Barrington R. W of Opachuana Lake, Manitoba. European trade items, in direct assoc. with Selkirk ceramics, stone, and bone tools. Coll. 1966 by J. V. Wright; subm. by R. Wilmeth.

**GaK-1255. MacBride site, Test Tr. 1****<150**

Charcoal from Test Trench 1, NW corner, below and among refuse at depth of 2 to 5 in.

**360 ± 100****GaK-1267. MacBride site, Test Tr. 2****A.D. 1590**

Charcoal from Test Trench, 2 S half, depth 2 to 4 in.

*General Comment* (J.V.W.): GaK-1255 is too late to pertain to sample in question. GaK-1267 is acceptable inasmuch as it indicates lateness of deposits and therefore reinforces apparent assoc. of European and aboriginal artifacts.

**Neck site series, Manitoba**

Charcoal from Neck site, HfLq-1 (56° 57' N Lat, 98° 44' W Long). Southern Indian Lake, Manitoba. Two component stratified, Selkirk focus site. Coll. 1966 by J. V. Wright; subm. by R. Wilmeth.



**760 ± 80****GaK-1259. Neck site, Stratum I****A.D. 1190**

Charcoal from Sq. A, Stratum I, depth 13 in. directly under flooring of potsherds. Stratum I is latest occupation. Sample will check accuracy of earlier determination for this occupation of A.D. 1515 ± 110, I-2078 (Radiocarbon, 1968, v. 10, p. 286).

**1190 ± 70****GaK-1260. Neck site, Stratum II****A.D. 760**

Charcoal from Test Trench 3, Stratum II, depth ca. 7 to 9 in. Stratum II represents earlier occupation. Sample will check accuracy of 2 earlier determinations of A.D. 1245 ± 320, I-2082, and A.D. 1220 ± 150, I-2081 (Radiocarbon, 1968, v. 10, p. 286).

**Long Point site series, Manitoba**

Charcoal from Long Point site, HgLo-1 (57° 6' N Lat, 98° 29' W Long), Southern Indian Lake, Manitoba. Non-ceramic site with stratified sections resulting from storm beach action. Very few significant artifacts recovered. Coll. 1966 by J. V. Wright; subm. by R. Wilmeth.

**930 ± 80****GaK-1261. Long Point site, Stratum 1****A.D. 1020**

Charcoal from Test Trench 2, 1st stratum capped by 6 to 8 in. sterile sand and gravel. Sample will determine whether site is non-ceramic or preceramic, and will test suggestion that occupation of Southern Indian Lake began ca. A.D. 1000.

**1000 ± 80****GaK-1262. Long Point site, 2nd duff line****A.D. 950**

Charcoal from Test Trench 2, 2nd duff line at depth 30 to 34 in. Will determine whether significant gap exists between stratified deposits. *General Comment* (J.V.W.): during excavation Long Point site produced evidence that it was non-pottery site rather than early pre-pottery site. The 2 dates, which confirm stratigraphy, parallel dates from stratified, pottery producing Neck site, therefore support this proposal.

**2490 ± 1000****GaK-1483. Harris No. 1 site, Manitoba****540 B.C.**

Wood charcoal from Harris No. 1 site, C3-C0-1 (49° 46' N Lat, 99° 43' W Long), SE of Brandon, Manitoba. From firepit in Sq. 105N, depth 17 to 23 in. Stratified site. Deepest occupation, average depth 19 to 23 in., is in top of gravels probably laid down as strandline of glacial Lake Brandon and is assoc. with large flake tools. Above is occupation with average depth 15 to 18 in., containing large side-notched points, one of which was assoc. with sample in firepit. Uppermost is thin deposit perhaps representing more than 1 occupation. McKean Lanceolate points found on surface. Sample will date middle occupation, est. at 4000 to 7000 yr (Hlady, 1967; Simpson, 1966). Coll. 1966 by W. M. Hlady, Manitoba Archaeol. Soc.; subm. by R. Wilmeth. *Comment* (W.M.H.): with

another field season, original estimate is recognized as much too early, and date does not seem out of line. Large side-notched point found assoc. with carbon sample is of size which persisted as late as 300 to 400 A.D. in Besant phase.

**390 ± 70**

**GaK-1489. Burntside Lake site, Ontario A.D. 1560**

Birchbark from Burntside Lake site (48° 29.5' N Lat, 91° 42.5' W Long), Quetico Prov. Park, Ontario. From surface of small cave, 16 ft wide at mouth, 16 ft deep, 3.5 ft high. Birchbark used for midé scrolls, sewed with split spruce root. Assoc. with wooden wands and round, rather heavy stick, with red paint. Scrolls similar to those used as ceremonial devices by Ojibwa. Date should throw some light on antiquity of midé ceremonies in Head-of-the-Lakes region, Ontario (Kidd, 1965). Coll. 1960 by T. W. Dalgetty; subm. by R. Wilmeth. *Comment* (K.E.K.): indicates that birchbark scrolls were in use in mid-16th century in area of Rainy Lake, and that midé ceremony was also in existence and practiced at that time.

**1990 ± 90**

**GaK-1282. McCluskey site, Ontario**

**40 B.C.**

Wood charcoal from McCluskey site, DbJm-2 (48° 14' N Lat, 90° 2' W Long), Thunder Bay Dist., Ontario. From Sq. OS110W, depth 10 in. immediately above pottery cache in what appears to be roasting pit. Extensive Blackduck village site. Coll. 1962 by K. C. A. Dawson, Lakehead Univ.; subm. by R. Wilmeth. *Comment* (K.C.A.D.): ca. 1000 yr earlier than expected for a Blackduck site. Early date may be result of Laurel material, evidenced by few Laurel sherds recovered, or due to underlying charcoal layer left by early forest fire.

**MacGillivray site series, Ontario**

Charcoal and wood from MacGillivray site, DbJm-3 (48° 13' N Lat, 90° 12' W Long), NW end of Bishop I. at W end of Shitefish Lake, Thunder Bay Dist., Ontario. Extensive Laurel (Middle Woodland) village site and burial mound. Coll. 1966 by K. C. A. Dawson; subm. by R. Wilmeth.

**2240 ± 80**

**GaK-1278. MacGillivray site, mound floor 290 B.C.**

Charcoal from hearth feature in habitation area of site in mound floor and ca. 4 ft within mound at NE side, Sq. 10 N 53 W, Quad. 3, Should give date for habitation area prior to construction of mound, built from camp refuse. Est. age ca. 2000 B.P.

**1930 ± 200**

**GaK-1492. MacGillivray site, log cribbing A.D. 20**

Wood from log forming part of cribbing around burials in mound, Sq. 9 N 56 W, Quad. I, Level XII. Level XII extends from depth 36 to 39 in. Square is in W part of mound, just above original ground level. *General Comment* (K.C.A.D.): date from mound floor supports and corroborates typological deductions previously made on habitation area.

Date from mound crib reflects intrusion into interior of mound of collapsed log cribbing.

**460 ± 80**

**GaK-1488. Laramie site, Ontario A.D. 1490**

Charcoal from Laramie site (42° 0' 5" N Lat, 82° 50' 23" W Long), Lat 37, Concession 1, Colchester S Twp, Essex Co., Ontario. From Pit 1, Block 23R12, Sec. D, assoc. with oblique dentate-stamped pottery. Site on sandy rise which forms part of Harrow sand plain, near small stream and 0.7 mi from Erie. Appears to be early Late Woodland, with Owasco-like characteristics. Coll. 1966 by J. J. Bond, Univ. of Windsor; subm. by R. Wilmeth. *Comment* (J.J.B.): regarded as satisfactory.

**390 ± 70**

**GaK-1491. Glenbrook site, Ontario A.D. 1560**

Wood charcoal from Glenbrook site (45° 7' N Lat, 74° 38' W Long), Glenbrook, Ontario. From depth 8 to 10 in. in 2 middens, in hands of white and gray ash, and black midden soil containing potsherds. Late Iroquois site which, on bases of pottery and pipe types, more closely resembles Dawson (Hochelaga?) than does any other excavated site in area. Sample will test validity of current concepts premised on ceramic and artifact seriation, regarding position occupied by site in St. Lawrence Iroquois site-seriation pattern. Coll. 1965 by G. N. Gogo; subm. for J. F. Pendergast by R. Wilmeth. *Comments*; for seriation, date needs correction on variation in atmospheric C-14 concentration (Stuiver and Suess, 1966). (J.F.P.): this date closely approximates estimated age of site. However, this conventional radiocarbon date does not place site in acceptable position in seriation of St. Lawrence Iroquois sites.

**200 ± 75**

**GaK-1490. Summerstown Station site, Ontario A.D. 1750**

Wood charcoal from Summerstown Sta. site (45° 5' N Lat, 74° 35' W Long), Summerstown Sta., Ontario. From Area A on W edge of site from lens of white ash at 18 in. depth. Large late Iroquois site thought to be more closely related to Dawson site (Hochelaga?) than to earlier Roebuck site. Will test validity of current concepts, premised on ceramic and artifact seriation, regarding place occupied by site in St. Lawrence Iroquois site-seriation pattern. Est. age A.D. 1500. Coll. 1966 by J. F. Pendergast and L. H. Wylie; subm. by R. Wilmeth. *Comment*: cf. Comment on GaK-1491. (J.F.P.): previous sample of carbonized corn kernels and cob from this site, M-1539, was dated 100 ± 100 (Radiocarbon, 1965, v. 7, p. 140).

**780 ± 150**

**GaK-1487. Cache site, Quebec A.D. 1170**

Charcoal from Cache site, DaEi-7 (48° 10' N Lat, 69° 40' W Long), Ile aux Basques, St. Lawrence R., Prov. of Quebec. From Terrace I-d, Area A, Test Trench 1, Level 4, depth 10 to 11 in. below surface, shallow shell midden in dark sandy layer. Assoc. with sherds decorated with push-pull, incised, and check-stamped motifs, indicating possible affiliation

with Pickering Branch of Early Ontario Iroquois tradition and Castle Creek and Oak Hill phases of late Owasco times in New York. Coll. 1965 by C. A. Martijn, Univ. of Wisconsin; subm. by R. Wilmeth. *Comment* (C.A.M.): on basis of knowledge of developmental states of Iroquois culture in S Ontario and New York State (Wright, 1966; Ritchie, 1965), this date appears to be acceptable age estimate for pottery type assoc. with sample.

#### **Davidson site series, Quebec**

Charcoal from Davidson site, CkEe-2 (47° 40' 15" N Lat, 68° 47' 50" W Long), Lake Temiscouata, Quebec. Stratified site with Archaic to Middle Woodland occupations. Coll. 1965 and 1966 by R. Wilson and C. A. Martijn; subm. by R. Wilmeth.

**220 ± 70**  
**A.D. 1730**

**GaK-1268. Davidson site, Level 2**

Charcoal from Area A, Sq. 17, Level 2, at depth 6 in. below surface, assoc. with rock hearth (Feature 1). Middle Woodland, est. age between A.D. 500 and 900. *Comment*: cf. Comment on GaK-1491. (C.A.M.): sample was taken from area heavily invested with roots; seems likely that some contamination must have taken place.

**1970 ± 100**  
**20 B.C.**

**GaK-1270. Davidson site, Level 3**

Charcoal from Area A, Sq. 7, Level 3, at depth 10 in. below surface. Assoc. with Late Archaic assemblage, probably older than 100 B.C. *Comment* (C.A.M.): somewhat later than anticipated, but there are no compelling reasons for rejecting this date out of hand. More samples from this site, particularly from Area B, should be run for comparative purposes.

#### **McInnes site series, Quebec**

Charcoal from McInnes site, CkEe-5 (47° 43' 21" N Lat, 68° 46' 28" W Long), Grand Touladi Lake, Quebec. Late Middle Woodland and possibly early Late Woodland, assoc. with projectile points of Jack Reef's Corner-notched type. Coll. 1966 by E. Howe and C. A. Martijn; subm. by R. Wilmeth.

**6500 ± 180**  
**4550 B.C.**

**GaK-1276. McInnes site, Sq. 3**

Charcoal from Sq. 3, Level 2b, depth 1 ft 6 in. at bottom of pit containing bone fragments, cracked rock, chips, and fragmentary projectile point.

**1400 ± 90**  
**A.D. 550**

**Gak-1277. McInnes site, Sq. 8**

Charcoal from Sq. 8, Level 2c, from among fire-cracked rocks of large hearth (Feature 1), depth 7 in.

**710 ± 230**  
**A.D. 1240**

**GaK-1495. McInnes site, Sq. 1**

Charcoal from Sq. 1, Zone 2b, depth 7 in., in and around concentra-

tion of rocks, an apparent hearth (Feature 2). Zone 2b contained numerous end-scrapers, thumbnail-scrapers, side-scrapers, and worked flakes.

*General Comment* (C.A.M.): it was anticipated that GaK-1276 is slightly younger than GaK-1277, since pit from which charcoal was obtained appears to have been dug from higher level. Cultural material in direct assoc. with it does not provide any chronologic clues. On basis of cultural material from rest of site, date seems much too old. Possibility cannot be ruled out that stratigraphy may have been more complex than originally thought, e.g., one pit superimposed on another, lowest one being considerably older. Date of GaK-1277 seems quite acceptable on basis of cultural material found, although slightly older than originally estimated. GaK-1495 is somewhat younger than originally estimated.

**2640 ± 70**

**GaK-1271. Port Mouton site, Nova Scotia**

**690 B.C.**

Charcoal from Port Mouton site (43° 55' 42" N Lat, 64° 50' 5" W Long), Port Mouton Harbour, Queens Co., Nova Scotia. From near bottom of site, 26 in. depth. Level is late Upper Bear River culture, stratigraphically below thinner Indian Gardens deposit. Coll. 1966 by J. S. Erskine and C. Theriau, Wolfville, Nova Scotia; subm. by R. Wilmeth. *Comment* (J.S.E.): conflicts seriously with earlier determination of A.D. 648 to 840 for Upper Bear River culture at Port Joli, and date of 265 to 96 B.C. for period just preceding Upper Bear River at Bear River Sub-Site 3. There seems to be no possible contamination of present sample. More stratified sites are needed to clear up confusion in SW Nova Scotia.

**1950 ± 100**

**GaK-1481. The Beaches site, Newfoundland**

**1 B.C.**

Carbonized wood from Beaches site (48° 48' 32" N Lat, 53° 49' 15" W Long), Bloody Run, Bona Vista Bay, Newfoundland. Site is at sea level at W end of tombolo consisting of gravel bar between 2 small unnamed islands. Sample from profile along S side of W end of bar at point between 85 and 100 ft from juncture of bar and island. From Zone III, shallow Archaic occupation zone in profile, buried under 10 in. peat. Multicomponent, but unstratified, with Archaic and historic occupations. Coll. 1966 by H. E. Devereux, Univ. of Calgary; subm. by R. Wilmeth. *Comment* (H.E.D.): seems quite reasonable. See also GaK-1254.

**Curtis site series, Newfoundland**

Wood charcoal from Curtis site, DjAq-1 (49° 39' 30" N Lat, 54° 47' 10" W Long), Twillingate, Newfoundland. Site is Archaic red ocher burial ground with rich deposit of stone artifacts, including unusually high proportion of ground slate. Burials were deep interments and seem to have been cremations. Charcoal samples are all from graves, assoc. with or mixed with red ocher deposits. Artifacts should date ca. 3000 yr B.P. However, if historic Beothuk were late surviving Archaic group, this site might be considerably more recent. Coll. 1966 by D. MacLeod and D. Webber; subm. by R. Wilmeth.

**GaK-1254. Curtis site, 25 to 35 in.** **3200 ± 90**  
**1250 B.C.**  
 Charcoal from Trench A-3, Stratum 4A, 25 to 35 in. level.

**GaK-1266. Curtis site, 45 in.** **6920 ± 160**  
**4970 B.C.**  
 Charcoal from Trench A, NW corner, 45 in. level.

*General Comment* (D.M.): GaK-1254 comes very close to original estimated age of site, and fits well with cultural assemblage. GaK-1266 is aberrant; I cannot explain this date, but its assoc. with burials is less definite than with other samples; sample itself was quite small.

**GaK-1482. Pittman site, Newfoundland** **1780 ± 90**  
**A.D. 170**

Carbonized wood from Pittman site (49° 48' N Lat, 56° 47' W Long), White Bay, Sops I., Newfoundland. From Test Trench J, Level 5, at N end of trench, in occupation zone below humus and 6 to 12 in. peat; depth 2 ft. Multicomponent, pure Dorset in one area, Dorset above Archaic in another. Sample from Dorset component in 1st area. Relationships between 2 secs. not clear at present. Coll. 1966 by H. E. Devereux; subm. by R. Wilmeth. *Comment* (H.E.D.): falls within range of dates for Port aux Choix Dorset, Strait of Belle I., Newfoundland (Radio-carbon, 1966, v. 8, p. 358-360).

*B. North America*

**GaK-694. Greer County, 34GR12** **2770 ± 150**  
**820 B.C.**

Charcoal from Feature 1, Site 34GR12, Area 2, in Greer Co., S bank of Salt Fork of Red R., W of Mangum, Oklahoma (34° 49' N Lat, 99° 37' W Long). Coll. and subm. 1965 by F. C. Leonhardy, Mus. of Great Plains. *Comment* (F.C.L.): isolated artifact complex characterized by heavy choppers and scrapers made of quartzite and projectile points resembling Marshall, Lange, Gary, and Ensor types; closest artifact parallels are with Edwards Plateau aspect of central Texas. Date is consistent with known age of projectile point types, but because of small sample size (2.3 grams) and because no local dates are available for comparison, dating of complex is provisional. (See Leonhardy, 1966.)

**Greer County, 34GR51 series**

Samples are from Site 34GR51, Greer Co., Oklahoma, which is situated on a small bench above Cave Creek, a tributary to the Salt Fork of the Red River, S of Reed, Oklahoma (34° 52' N Lat, 99° 43' W Long). Coll. and subm. 1965 by F. C. Leonhardy.

**GaK-695. Greer County, 34GR51, 1** **590 ± 100**  
**A.D. 1360**

Charcoal from single charred branch from bottom of Feature 6, rock-filled cooking pit dug into sterile subsoil (Stratum 2b). *Comment* (F.C.L.): considered minimum initial dates for occupation at site.

**520 ± 80**

**GaK-696. Greer County, 34GR51, 2** **A.D. 1430**

Charcoal from fill around Feature 1, concentration of burned bone, ash and fire-cracked rock at bottom of Stratum Ib. *Comment* (F.C.L.): subm. primarily as check on GaK-695; dates are consistent. (See Leonhardy, 1966.)

*General Comment* (F.C.L.): site produced complex of artifacts assigned to Late Prehistoric period. Included in sample are some anomalous artifact forms. Dominant projectile point types, Washita and Fresno, and ceramic materials suggest date ca. A.D. 1400 for site, but anomalous artifacts suggest date ca. A.D. 1000 or earlier. Radiocarbon dates are consistent with later artifact types, so presence of earlier forms is unexplained.

**3940 ± 220**

**GaK-1486. Ryegrass site, Washington** **1990 B.C.**

Charcoal from Ryegrass site, 45KT88 (47° N Lat, 120° W Long), near Vantage, Washington. From excavation unit 10.5 N 33 W, SE ¼, Stratum I, depth 103 cm. Site ca. 50 to 75 m, ranging in depth from 80 to 190 cm, with greatest depth in W portion of site. Interior Salish inhabited area in historic times but due to tentative age of site, cultural affiliations are impossible to state. Sample from fire hearth (Feature 3) assoc. with salmon and bird bones. Assoc. artifacts are large points (knives) and wide assortment of projectile points (Munsell, 1967). Should date stratum just above level of maximum microblade concentration and provide upper limit date for temporal distribution of microblades. Coll. 1966 by D. Cole; subm. for D. A. Munsell, Univ. of Washington, by R. Wilmeth. *Comment* (D.A.M.): date 6480 ± 180 B.P. was obtained by UW-113 on shell in direct assoc. with greatest concentration of microblades at site. Charcoal sample gave date 3525 ± 145 B.P., UW-112, which corresponds rather well with Gakushuin date. Microblades ceased to be manufactured at site at sometime prior to this upper limit date.

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