

RIKEN NATURAL RADIOCARBON MEASUREMENTS VIII

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The ^{14}C dates given below are continued from our previous list (R, 1972, v 14, p 223-238), and results obtained mainly during 1971-2 are described. A 2.7L stainless steel counter and a 3.3L copper counter are used as previously, yielding background counting rates of 6.9 and 6.0 cpm, respectively, when filled with dead CO_2 at ca 1.8 atm. Dates have been calculated on the basis of the ^{14}C half-life of 5568 yr and 95% of NBS oxalic acid is modern standard. No correction has been made for any of the samples in this list.

SAMPLE DESCRIPTIONS

I. GEOLOGIC SAMPLES

A. Japan

Tokyo Bay series

Samples from boring cores. Coll 1970 by K Kojima; subm by K Kojima and K Kuwahara, Public Works Res Inst.

N-1296. Off Kawasaki (28-H-14') >37,800

Shell from coarse sand, elev -91.4m TP, off Kawasaki (35° 27' N, 139° 54' E), Borehole 28, water depth 13.7m TP.

26,100 ± 860

N-1297. Ukishima-cho (32-H-11') 24,150 BC

Shell from silty fine sand, elev -85.8m TP, at Ukishima-cho, Kawasaki city (35° 32' N, 139° 47' E), Borehole 32, surface elev 2.8m TP.

385 ± 85

N-1298. Ukishima-cho (32-H-1) AD 1565

Wood from alluvial sandy silt (N-value 2~4), elev -11.3m TP, at same borehole as N-1297. *Comment* (KK): comparing with some ^{14}C dates and geologic data (Kanto Regional Construction Bureau, 1973), date of N-1296 is reasonable but N-1297 seems rather young. Borehole 32 is on reclaimed land.

N-1231. Shishimuta Dam (R2'-35) >37,800

Charcoal from buried talus overlain by Aso lava, from an adit dug for dam foundation survey at river cliff of Kusu R, a branch of Chikugo R, Kuju-cho, Kusu-gun, Oita Pref (33° 11' N, 131° 12' E). Coll 1972 by K Hayashi, Chikugogawa Sta, Ministry of Construction; subm by K Kojima and K Kuwahara. *Comment* (KK): Aso lava is correlated to Young Aso lava dated ca 30,000 BP in other place (Ariake Bay Res Group, 1965).

Yahagi River series

Samples from boring core taken from alluvium of Yahagi R, Ugaik-

cho, Nishio-shi, Aichi Pref (34° 50' N, 137° 5' E). Coll 1971 and subm by A Moriyama, Aichi Univ Education.

N-1262. Yahagi River 1

**8850 ± 145
6900 BC**

Peat from muddy sand ca 28m below surface.

N-1263. Yahagi River 2

**4180 ± 95
2230 BC**

Peat from sand ca 7m below surface, near base of upper sand overlying mud.

N-1264. Yahagi River 3

**3250 ± 95
1300 BC**

Black organic soil from sand as above, ca 3m below surface. *Comment* (AM): sedimentary structure of alluvia in drainage basin of Yahagi R at coastal area is well stratified and slaty. Structure at inland area, however, N of New Tokaido Line, is disordered and confused. Evidently, they depend upon expanse of transported bed loads by tidal or off-shore currents in open sea and lens-like deposition of coarse materials in channel belts on alluvial upland or in closed sea. Using measured ¹⁴C age of these layers at coastal area, lower sands accumulated from ca 10,000 BP, middle muds ca 7000 BP, and upper sands ca 4500 BP. The coast of the maximum "Jomon" transgression may have lain a little N of the New Tokaido Line. By rapid and successive alluviations, the coast at the age of late "Yayoi" may have lain near the line which links Isshiki with Kira (Moriyama and Ozawa, 1972).

B. Great Britain

N-962. Gate Helmsley (SE65/8463)

**6030 ± 140
4080 BC**

Wood from 2 to 2.5m beneath eolian sand, inner side of York Moraine near Gate Helmsley, Yorkshire (53° 58' N, 0° 58' W). Coll and subm 1970 by B Matthews, Soil Survey England & Wales. *Comment* (BM): date indicates area was wooded during Atlantic Period; later, wind blown sand accumulated in lee of moraine, probably after Neolithic forest clearance.

East Moor series

Samples from various depths at East Moor, Sutton-on-the-Forest, Yorkshire (54° 4' N, 1° 4' W). Coll and subm 1970 by B Matthews.

N-963. East Moor 1 (SE66/1041/1)

**11,000 ± 200
9050 BC**

Sandy peat from 118 to 121cm.

N-964. East Moor 2 (SE66/1041/2)

**11,200 ± 160
9250 BC**

Sandy peat from 122.5 to 124cm.

General Comment (BM): those and N-488 (10,700 ± 190, R, 1969, v 11, p 455), and N-820 (9950 ± 180, R, 1972, v 14, p 227) limit dates for

deposition of eolian sand in Vale of York and for Allerød interstadial in the area (*ie*, 9950 to 11,200 yrs BP). Evidence suggests Allerød started later in Yorkshire than in S England and lasted till a later date (Matthews, 1970; 1971).

6400 \pm 310
N-965. East Moor 3 (SE66/1041/3) 4450 BC

Plant roots embedded in calcareous clayey till from depth 138 to 180cm. *Comment* (BM): sample either contaminated or roots are from vegetation of Atlantic period.

II. PEDOLOGIC SAMPLES

Total organic carbon, unless otherwise stated, of samples from humic horizon in volcanic ash and muck from various localities, coll 1971 to 1972 by Y Yamada, Natl Inst Agric Sci, are dated to determine relationship between soil age and properties of humus in soil.

Kitamoto series

Samples from various depths in volcanic ash soils developed at Kitamoto, Saitama Pref.

1120 \pm 110
N-850. Kitamoto 1-1 AD 830

From depth 0 to 45cm, A_p horizon, at Yamanaka, Kitamoto-cho, Kitaadachi-gun, Saitama Pref (36° 2' N, 139° 33' E). Carbon content: 2.63%.

1540 \pm 110
N-849. Kitamoto 1-2 AD 410

From depth 45 to 50cm, IIA horizon. Carbon content: 3.24%.

3410 \pm 120
N-957. Kitamoto 11-2 1460 BC

From depth 28 to 60cm, IIA horizon on Omiya plateau at Miyauchi, Kitamoto-cho (36° 2' N, 139° 32' E). Carbon content: 5.20%. *Comment*: (YY): horizon yielding N-957 corresponds to that of N-849. However, N-957 was expected to be older from character of humus.

18,800 \pm 370
N-958. Kitamoto 13-3 16,850 BC

From depth 160 to 180cm, at Haramamuro, Konosu city (36° 3' N, 139° 31' E). Horizon yielding N-958 is considered to overlie Lower Tachikawa Loam bed. Carbon content: 4.41%.

Fukui series

Sample from various depths in organic soils in Fukui city and its environs.

620 \pm 100
N-1082. Fukui 1-2, soil organic matter AD 1330

M₁ horizon of peaty soil, depth 20 to 40cm, at Mitome, Shimizu-cho, Nyu-gun, Fukui Pref (36° 1' N, 136° 9' E). Carbon content: 2.81%.

- N-1077. Fukui 1-2, FeCO_3** **Modern**
 FeCO_3 concretion, same horizon as above.
1270 \pm 100
- N-1083. Fukui 1-4, soil organic matter** **AD 680**
 M_2 horizon, depth 40 to 50cm. Carbon content: 9.05%.
- N-1084. Fukui 2-2, soil organic matter** **AD 620**
 M horizon of muck soil, depth 20 to 40cm, at Ryo-machi, Fukui city (36° 4' N, 136° 16' E). Carbon content: 2.89%.
- N-1078. Fukui 2-2, FeCO_3** **AD 1610**
 FeCO_3 concretion, same horizon as above.
340 \pm 100
- N-1085. Fukui 3-2, soil organic matter** **AD 1055**
 M horizon of muck soil, depth 16 to 35cm, at Sakai-cho, Sakai-gun, Fukui Pref (36° 9' N, 136° 13' E). Carbon content: 4.43%.
- N-1079. Fukui 3-2, FeCO_3** **Modern**
 FeCO_3 concretion, same horizon as above.
- N-1206. Fukui 26-2** **AD 1645**
 M horizon of muck soil, depth 30 to 50cm, at Hamajima, Kawanishi-cho, Fukui city (36° 9' N, 136° 7' E). Carbon content: 4.46%.
- N-1207. Fukui 27-4** **AD 240**
 M horizon of muck soil, depth 33 to 44cm, at Tameyori, Kawanishi-cho, Fukui city (36° 8' N, 136° 7' E). Carbon content: 14.24%.
- N-1208. Fukui 28-4** **AD 580 BC**
 M horizon of muck soil, depth 37 to 60cm, at Yawata, Kawanishi-cho, Fukui city (36° 9' N, 136° 8' E). Carbon content: 6.13%.
- N-1209. Fukui 29-1** **Modern**
 A_p horizon of peat soil, depth 0 to 11cm, at Kinoshita, Kawanishi-cho, Fukui city (36° 8' N, 136° 8' E). Carbon content: 4.10%.
- N-953. Fukui 29-2 (1)** **AD 470**
Peat from depth 21 to 40cm of P horizon. No pretreatment was made.
1480 \pm 110
- N-954. Fukui 29-2 (2)** **AD 480**
Above sample was washed with 0.5% NaOH , air-dried, and dated.
1470 \pm 110

N-955. Fukui 29-2 (3)**1460 ± 140**
AD 490

Humic acid extracted from N-953.

Imaichi series

Sample from various depths in volcanic ash soils in Imaichi city and its environs.

N-1180. Imaichi 3-1**1370 ± 100**
AD 580 A_{11} horizon from depth 0 to 20cm, at Myojin, Imaichi city (36° 41' N, 139° 43' E). Carbon content: 19.7%.**N-1181. Imaichi 3-2****3130 ± 110**
1180 BC A_{12} horizon from depth 20 to 35 cm. Carbon content: 18.7%. *Comment* (YY): considered to correspond to GaK-726 (R, 1967, v 9, p 46) and GaK-1328 (R, 1969, v 11, p 300).**N-1182. Imaichi 3-3****4140 ± 110**
2190 BC A_{13} horizon from depth 35 to 50cm. Carbon content: 17.6%.**N-1183. Imaichi 3-4****5560 ± 125**
3610 BC A_{14} horizon from depth 50 to 70cm. Carbon content: 12.0%.**N-956. Imaichi 3-5****5360 ± 120**
3410 BC A_3 horizon from depth 70 to 84cm underlain by Shichihonzakura pumice layer. Carbon content: 6.78%.**N-1184. Imaichi 4-1****1690 ± 100**
AD 260 A_p horizon from depth 0 to 28cm, at Osawa, Imaichi city (36° 42' N, 139° 45' E). Imaichi 4 soil is used as upland field. Carbon content: 14.9%.**N-1185. Imaichi 4-2****4290 ± 120**
2340 BC A_{12} horizon from depth 28 to 46cm. Carbon content: 12.1%.**N-1186. Imaichi 4-3****5900 ± 125**
3950 BC A_{13} horizon from depth 46 to 60cm. Carbon content: 9.0%.**N-1418. Imaichi 8-1****1010 ± 75**
AD 940From depth 0 to 15cm, A_p horizon, at Yokaichi, Imaichi city (36° 42' N, 139° 46' E). Profile characteristics are nearly equal to Imaichi 4 soil. Used as paddy field. Carbon content: 9.21%

- N-1187. Imaichi 5-1** **670 ± 100**
AD 1280
 A_p horizon from depth 0 to 15cm, at Yokaichi, Imaichi city (36° 42' N, 139° 46' E). Carbon content: 13.9%.
- N-1188. Imaichi 5-2** **1820 ± 100**
AD 130
 A_{pg} horizon from depth 15 to 22cm. Carbon content: 11.8%.
- N-1189. Imaichi 5-3** **2060 ± 90**
110 BC
 A_{12} horizon from depth 22 to 37cm. Carbon content: 12.3%.
- N-1190. Imaichi 5-4** **2980 ± 110**
1030 BC
 A_{13} horizon from depth 37 to 61cm. Carbon content: 12.2%.
- N-1360. Imaichi 5-5** **5970 ± 80**
4020 BC
 A_3 horizon from depth 61 to 67cm. Carbon content: 7.60%. *Comment* (YY): considered to roughly correspond to Imaichi 3-4 and 3-5 (N-1183, N-950, above).
- N-1191. Imaichi 6-1** **415 ± 100**
AD 1535
 A_p horizon from depth 0 to 18cm of volcanic ash soil derived from secondary deposits of volcanic ash on narrow valley plain on middle terrace, at Yokaichi, Imaichi city (36° 42' N, 139° 45' E). Imaichi 6 soil is used as paddy field. Carbon content: 9.7%.
- N-1192. Imaichi 6-3** **1790 ± 100**
AD 160
 A_{12} horizon from depth 22 to 35cm. Carbon content: 9.4%.
- N-1193. Imaichi 6-4** **1800 ± 160**
AD 150
 A_{13} horizon from depth 35 to 53cm. Carbon content: 5.4%.
- N-1194. Imaichi 7-1** **165 ± 80**
AD 1785
 A_p horizon from depth 0 to 14cm, at Shionomuro, Imaichi city (36° 44' N, 139° 48' E). Carbon content: 8.4%.
- N-1195. Imaichi 7-2** **1420 ± 100**
AD 530
 A_{12} horizon from depth 14 to 26cm. Carbon content: 9.7%.
- N-1196. Imaichi 7-3** **2490 ± 110**
540 BC
 A_{13} horizon from depth 26 to 60cm. Carbon content: 11.5%.

N-1361. Imaichi 7-4 **4340 ± 90**
2390 BC
 A_{14} horizon from depth 60 to 80cm (Aodo soil). Carbon content: 9.78%.

Tokorozawa series

Sample from various depths in volcanic ash beds in Tokorozawa city and its environs.

N-1382. Tokorozawa 12-1 **1420 ± 90**
AD 530
 A_p horizon from depth 0 to 22cm, at Arahata, Tokorozawa city (35° 46' N, 139° 27' E). Carbon content: 2.22%.

N-1383. Tokorozawa 12-2 **2830 ± 100**
880 BC
 A_{13} horizon from depth 22 to 50cm. Carbon content: 2.32%.

N-1384. Tokorozawa 17-1 **630 ± 70**
AD 1320
 A_p horizon from depth 0 to 25cm, at Kamiyamaguchi, Tokorozawa city (35° 46' N, 139° 25' E). Carbon content: 1.45%.

Asamizo series

Sample from various depths of humus horizons in volcanic ash soil at Asamizo-dai, Sagamihara city, Kanagawa Pref (35° 46' N, 139° 25' E).

N-1419. Asamizo 1 **800 ± 80**
AD 1150
 A_p horizon from depth 0 to 21cm. Carbon content: 8.36%.

N-1420. Asamizo 2 **1680 ± 80**
AD 270
 II A_{11} horizon from depth 21 to 43 cm. Carbon content: 7.95%.

N-1421. Asamizo 3 **3160 ± 90**
1210 BC
 II A_{12} horizon from depth 43 to 50cm. Carbon content: 6.14%.

N-1422. Asamizo 4 **4220 ± 90**
2270 BC
 III A horizon from depth 50 to 80 cm. Carbon content: 8.11%.

N-1423. Asamizo 5 **6500 ± 120**
4550 BC
 IV A horizon from depth 80cm. Carbon content: 7.30%.

N-1424. Asamizo 6 **7060 ± 130**
5110 BC
 VB horizon from depth 130 to 150cm. Carbon content: 2.64%.

III. ARCHAEOLOGIC SAMPLES

*A. Japan***Sanrizuka series**

Charcoal of coniferous tree from ca 1.2m below ground surface at construction site of New Tokyo International Airport at Kogome, Narita city, Chiba Pref (35° 46' N, 140° 24' E). Lens shaped charcoal concentration, 120cm in diam and ca 30cm thick, from lower part of Level 5, considered Tachikawa Loam. Same horizon yielded stone tools such as knife, blade, hand axe, etc (Furuuchi, 1971). Coll 1971 by C Watanabe; subm by G Nishino, Hokuso Kosha, Chiba Pref.

N-1080. Sanrizuka 1 **29,300 ± 980**
27,350 BC
Charcoal from A55,402,002.

N-1081. Sanrizuka 2 **28,700 ± 920**
26,750 BC
Charcoal from A55,402,007.

Hamabekkai series

Material from archaeol remains at Hamabekkai, Bekkai-cho, Not-suke-gun, Hokkaido (43° 27' N, 144° 37' E). Coll and subm 1971 by T Iwasaki, Tokyo Univ Education.

N-1111. Hamabekkai 1 **1130 ± 110**
AD 820
Charred timber from probably burned house remnant (H-4) of Post Jomon period.

N-1112. Hamabekkai 2 **895 ± 110**
AD 1005
Burned wood from floor of house remnant of Okhotsk culture period.

N-1113. Hamabekkai 3 **1020 ± 100**
AD 930
Charcoal from hearth of dwelling pit (H-10) of Latest Satsumon period. Probably assoc with coin of Ming dynasty. *Comment* (TI): other dates of remains of same period are: GaK-186 and -187 (R, 1963, v 5, p 116) and TK-4, -17, -52, and -53 (R, 1968, v 10, p 147; R, 1969, v 11, p 512) and I-555.

N-1114. Hamabekkai 4 **3990 ± 125**
2040 BC
Burned wood from floor of house remnant (H-20) of Middle Jomon period.

Suwanohara series

Material from floor of burned houses of Latest Yayoi or Early Kofun period at Suwanohara, Matsudo city, Chiba Pref (35° 47' N, 139° 54' E). Coll and subm by T Iwasaki.

N-1115. Suwanohara 1 **1930 ± 100**
AD 20
Charcoal from S-1.

N-1116. Suwanohara 2 **1820 ± 100**
AD 130
Charcoal from S2.

N-1117. Suwanohara 3 **1830 ± 100**
AD 120
Charcoal from S-22.

General Comment (TI): dates older than expected by ca 200 yr.

Kode series

Material from archaeol remain at Kode, Matsudo city, Chiba Pref (35° 47' N, 139° 54' E). Coll by I Yawata; subm 1971 by T Iwasaki.

N-1156. Kode 1 **5790 ± 140**
3840 BC
Charcoal from shell mound, assoc with pottery of Hanazumi-Kaso type of Early Jomon period.

N-1157. Kode 2 **5900 ± 115**
3950 BC
Charcoal from floor of Dwelling Pit 202, assoc with pottery of Sekiyama type of Early Jomon period.

Kainohana series

Material from Kainohana shell mound, Hachigasaki, Matsudo city, Chiba Pref (35° 49' N, 139° 56' E). Coll by I Yawata; subm 1971 by T Iwasaki.

N-1429. Kainohana 1 **3940 ± 105**
1990 BC
Charcoal from dwelling pit, assoc with pottery of Horinouchi I type of Late Jomon period.

N-1430. Kainohana 2 **3840 ± 190**
1890 BC
Charcoal from shell bed, assoc with pottery of Kasori BI type of Late Jomon period.

N-1431. Kainohana 3 **4170 ± 105**
2220 BC
Charcoal from shell bed, assoc with pottery of Kasori E type of Middle Jomon period.

N-1259. Kotani **3470 ± 85**
1520 BC

Wood fragment from archaeol remains at Kotani, Kasai city, Hyogo Pref (34° 53' N, 134° 52' E). Coll 1971 by Y Maeda; subm by K Huzita.
Comment (KH): assoc artifacts suggest 4th or 5th century occupation.

Tripod Cinerary Urn

Human bone and charcoal contained in a cinerary urn supported with 3 legs of animal-leg shape, owned by Tokuzo-ji monastery, at Higashi-Murayama city, Tokyo (35° 46' N, 139° 28' E). Coll by S Asaki; subm 1971 by T Imadate (Asaki, 1957).

N-1212-1. Human bone	1120 ± 165
	AD 830
N-1212-2. Charcoal	1090 ± 140
	AD 860

*B. United States***Snyder site series**

Charcoal from Snyder site, N of El Dorado, Butler Co, Kansas (37° 52' N, 96° 49' W). Coll 1968 to 1971 and subm 1972 by R Grosser, Univ Kansas. Assoc with Archaic materials except N-1280, for which cultural affiliation has not yet been ascertained. *Comment*: other dates of this series are found in R, 1972, v 14, p 229-30.

N-1276. Snyder site 1	2060 ± 80
	110 BC

From depth 45cm, in homogeneous, dark brown, mottled clayey soil. *Comment* (RG): previous date for 40 to 55cm level was 1970 ± 110 (N-769).

N-1277. Snyder site 2	3240 ± 85
	1290 BC

From depth 84cm, same soil zone as N-1276. *Comment* (RG): a hearth at 100 to 125cm yielded 3650 ± 140 (N-770).

N-1278. Snyder site 3	3980 ± 100
	2030 BC

From depth 128cm, same soil zone as N-1276 and -1277. *Comment* (RG): level 125 to 140cm from another area of site yielded 3910 ± 160 (N-771).

N-1279. Snyder site 4	4830 ± 105
	2880 BC

From depth 178cm, in transition zone between homogeneous dark brown clayey soil and underlying yellowish brown clay.

N-1280. Snyder site 5	4600 ± 125
	2650 BC

From depth 250cm in yellowish brown clay, assoc with numerous flakes, grinding stone, and chipped stone. Cultural material absent from preceding 0.5m.

N-1265. Ponshewaing Point site (3182.54)	3030 ± 95
	1080 BC

Charcoal from hearth, Ponshewaing Point site, Emmet Co, Michigan (45° 25' N, 84° 48' W). Coll 1970 by W A Lovis; subm 1972 by the Museum, Michigan State Univ.

N-1266. Pine River Channel site (3683.10) **915 ± 80**
AD 1035

Charcoal from hearth, Pine River Channel site, Charlevoix Co, Michigan (45° 19' N, 85° 16' W). Coll 1971 by C E Cleland; subm 1972 by the Museum, Michigan State Univ.

N-1267. Eagle Island site (3458.7.7) **2400 ± 80**
450 BC

Charcoal from hearth, Eagle Island site, Charlevoix Co, Michigan (45° 18' N, 85° 1' W). Coll 1969 by C E Cleland; subm by the Museum, Michigan State Univ.

N-1268. O'Neill site (3468.15.14) **905 ± 115**
AD 1045

Charcoal from lower occupation zone, O'Neill site, Charlevoix Co, Michigan (45° 36' N, 85° 21' W). Coll 1971 by W A Lovis; subm 1972 by the Museum, Michigan State Univ.

Indian Mound Park series

Material from cap area of 2 burial mounds containing 21 persons of both primary and secondary interment at Indian Mound Park (20Ibl), Rolland Township, Isabella Co, Michigan (43° 31' N, 84° 59' W). Late Woodland ceramics, quartz projectile point and celt were found, assoc with cap layers. Coll 1971 by K C Carstens; subm by Maria Campbell, Central Michigan Univ.

N-1289. Indian Mound Park 1 **1070 ± 75**
AD 880

Charcoal of occurrence 530R515, Level 2.

N-1290. Indian Mound Park 2 **1080 ± 75**
AD 870

Charcoal of occurrence 545R500, Level 2.

Lilbourn series

Charcoal from burial on Lilbourn archaeol site, 23NM38, fortified Middle Mississippian townsite in New Madrid Co, SE Missouri (36° 34' N, 89° 36' W). Coll and subm by A H Chapman, Univ Missouri-Columbia.

N-1232. Lilbourn 1 **830 ± 85**
AD 1120

Cat No. 71-1884.

N-1233. Lilbourn 2 **835 ± 85**
AD 1115

Cat No. 71-1885.

Towosahgy State Archaeological site series

Charcoal from fill of stockade trenches encircling center of Towosahgy State Archaeol site, 23Mi2, fortified ceremonial center for Mississippian tradition of SE Missouri, East Prairie, Missouri (36° 42' N,

89° 14' W). Coll by J C Cotter; subm 1972 by M D Southard, Towosahgy State Archaeol site.

N-1250. Towosaghy 1 (CS2-70) **815 ± 85**
AD 1135
From burned post in Stockade Trench A, Grid Unit 857R1353.

N-1251. Towosaghy 2 (CS1-71) **1060 ± 85**
AD 890
From burned post in Stockade Trench A, Grid Unit 703N/130E.

N-1252. Towosaghy 3 (CS2-71) **930 ± 95**
AD 1020
From base of Stockade Trench B, Grid Unit 694.8N.

N-1253. Towosaghy 4 (CS3-71) **1200 ± 140**
AD 750
From burned post in Stockade Trench A.

General Comment (MDS): dates seem too early and do not represent true age of stockade feature assoc with Cairo Lowland phase of Middle Mississippian occupation of Towosahgy. Previous date for post from Stockade A yielded 675 ± 70 (UGA-244).

Pot Shelter series

Material from stratified site of Pot Shelter (23CR149), E-central Missouri (38° 6' N, 91° 10' W). First 2 samples come from Woodland occupation; next 3 from Archaic occupation. Coll 1971 by F E Schneider; subm by R Krause, Univ Missouri-Columbia. *Comment* (RK): excavation will be reported in the 3rd Rept to US Natl Park Service on Archaeol Salvage in Proposed Meramec Park Reservoir.

N-1169. Pot Shelter 1 **1300 ± 110**
AD 650

Charcoal from concentrated area of ash and charcoal representing hearth, Feature 7, 46 to 56cm below surface, sealed under a pile of large rocks.

N-1170. Pot Shelter 2 **4150 ± 125**
2200 BC

Charcoal from excavation Level 15, 107 to 114cm below surface, within both a cultural and soil transition zone between upper Woodland and lower Archaic deposits. Pottery first appears stratigraphically in Level 14.

N-1171. Pot Shelter 3 **5750 ± 140**
3800 BC

Charcoal from Level 23, 160 to 175cm below surface. Side-notched dart point was next to Feature 16, burned clay fire hearth.

N-1172. Pot Shelter 4**5600 ± 125****3650 BC**

Charcoal from Level 26, 188 to 198cm below surface, where burned clay fire hearths, Features 18, 19 and 20, first appear.

N-1173. Pot Shelter 5**6480 ± 145****4530 BC**

Charcoal combined from Level 30, 221 to 241 cm below surface and from burned clay fire hearth, Feature 24.

N-1174. Smith Shelter (23CR80)**805 ± 100****AD 1145**

Charcoal from Feature 4, Sq 2, excavation Level 4 at Smith Shelter, E-central Missouri (38° 6' N, 91° 10' W), in which main occupation is Late Middle Woodland. Feature consisted of circular area of charcoal, max diam 30cm, depth 5cm, as expected for a burned post. A rocker-stamped sherd came from level below. Coll 1971 by F E Schneider; subm by R Krause.

N-1175. Patton site (23CR60)**1010 ± 100****AD 940**

Charcoal from composite sample from Level 3 to 6, 25 to 53cm below surface, in large pit, Feature 3 in Patton site, E-central Missouri (38° 2' N, 91° 14' W). The pit, 101 x 99cm, contained cultural debris, charcoal, and burned limestone and was probably roasting or cooking pit. Coll 1971 by F E Schneider; subm by R Krause.

Saba Shelter series

Material from Saba Shelter (23BE149), Benton Co, Missouri (38° 12' N, 93° 28' W). Site is stratified and to depth at least 183cm below surface are Woodland materials: ceramics, abundant lithic artifacts and debitage, and floral and faunal material. Coll 1970 by R Vehik; subm by R Krause.

N-1176. Saba Shelter 1**1400 ± 100****AD 550**

Charcoal from top of small pit, 30cm below surface, containing lithic artifacts, debitage, worked bone, charcoal, seeds, nuts, burned and unburned bone, shell, and snails.

N-1177. Saba Shelter 2**2070 ± 100****120 BC**

Charcoal from dark brown humus of Stratum 2, 61 to 91cm below surface, assumed assoc with Woodland occupation, because of cord-marked and plain pottery, Scallorn-like points, Rice side-notched points, and other lithic artifacts.

McRoberts Oneota site series

Charcoal from McRoberts site (23SA5), Saline Co, Missouri (39° N, 93° W). Site consists of a group of small horticultural outposts occupied during late spring and late summer-early fall seasons for planting and

harvesting crops in Missouri R flood plain. Coll and subm 1972 by R Krause.

N-1269. McRoberts Oneota site 1 (CN 9)	Modern
	300 ± 95
N-1106. McRoberts Oneota site 2 (CN 10)	AD 1650
N-1270. McRoberts Oneota site 3 (CN 12)	Modern
N-1271. McRoberts Oneota site 4 (CN 13)	Modern
	110 ± 75
N-1272. McRoberts Oneota site 5 (CN 16)	AD 1840
	300 ± 75
N-1273. McRoberts Oneota site 6 (CN 16)	AD 1650
	390 ± 75
N-1274. McRoberts Oneota site 7 (CN 19)	AD 1560

General Comment (RK): because recovered trade items, eg, glass beads, brass kettle fragments, and lead rifle ball were found, site was expected to date between AD 1600 to 1800. Dates of N-1106, -1272-1274 fall within or near expected age. N-1269 is equivalent to N-1106 in terms of archaeol context and assoc; both samples were from same prepared hearth. Date of N-1269 is, thus, unacceptable. N-1270 and -1271 were from a prepared hearth assoc with Oneota potsherds; these 2 dates are unacceptable also, but their consistency suggests an error in field interpretation.

C. Mexico

Santa Luisa series

Material from archaeol site 30GZ1 at Santa Luisa, Mexico (20° 28' N, 97° 4' W). Coll and subm 1970 by S J K Wilkerson. *Comment* (SJKW): dates help establish reliable chronology for N-central Veracruz area, particularly for Formative periods.

	2830 ± 140
N-912. Santa Luisa 1	880 BC
Charcoal dispersed in earth from hearth, Trench 5, Level 14, depth 250 to 260cm. Estimated age: 600 to 400 BC.	
	4740 ± 100
N-913. Santa Luisa 2	2790 BC
Dispersed charcoal from Trench 5, Level 25, depth 460 to 480cm. Assoc with obsidian flakes and oyster shells in deepest level. Estimated age: 600 to 1000 BC.	
	2370 ± 105
N-914. Santa Luisa 3	420 BC
Charcoal from Trench 5, Level 11, depth 190 to 210cm. Estimated age: 500 to 200 BC.	

N-915. Santa Luisa 4**2280 ± 120****330 BC**

Total organic carbon in 900g of ash from interior of Structure A-sub 4, earliest ceremonial architecture found at site. Trench 3-B, depth 270 to 272cm. Estimated age: AD 300 to 600.

N-916. Santa Luisa 5**2730 ± 105****780 BC**

Charcoal from Trench 5, Level 13, depth 230 to 250cm. Estimated age: 600 to 400 BC.

N-917. Santa Luisa 6**1110 ± 100****AD 840**

Charcoal from firepit, Trench 2, Level 6, depth 110 to 120cm. Estimated age: AD 600 to 900.

N-918. Santa Luisa 7**2710 ± 105****760 BC**

Charcoal from Trench 5, Level 12, depth 210 to 230cm. Estimated age: 500 to 200 BC.

N-919. Santa Luisa 8**1600 ± 100****AD 350**

Charcoal from Trench 3-C, depth 415 to 425cm. Estimated age: AD 400 to 700.

N-920. Santa Luisa 9**4410 ± 130****2460 BC**

Inorganic carbon from carbonaceous ash, Trench 2, Level 9 and 10, depth 178 to 183cm. Estimated age 300 to 0 BC.

Nexpa series

Charcoal from archaeol remains at Nexpa, Morelos, Mexico (18° 31' N, 99° 9' W). Coll and subm 1970 by D C Grove, Univ Illinois at Urbana-Champaign.

N-941. Nexpa 1**3100 ± 120****1150 BC**

From Pit Na-1A, N sidewall, assoc with walls of apparent Early Formative age, 105cm below ground surface.

N-942. Nexpa 2**3100 ± 120****1150 BC**

From Pit Na-1, assoc with wall and apparent house floor of Early Formative age, 125 to 140cm below ground surface.

N-943. Nexpa 3**3170 ± 120****1220 BC**

From Pit Na-3, from packed clay house floor of apparent Early Formative age, 65 to 75cm below ground surface.

N-944. Nexpa 4 **3180 ± 125**
1230 BC

From Pit Na-4, from ash layer adjacent to Burial 1 containing Tlatilco-Rio Cuautla style burial offerings. Age: Late Early Formative.

N-945. Nexpa 5 **2930 ± 130**
980 BC

From Pit Nc-2, Layer VI. Age: Early Formative.

N-946. Nexpa 6 **3010 ± 120**
1060 BC

From Pit Nc-2, Level VII. Age: Early Formative.

Chalcatzingo series

Charcoal from archaeol site at Chalcatzingo, Morelos, Mexico (18° 41' N, 99° 46' W). Coll and subm 1972 by D C Grove.

N-1402. Chalcatzingo 1 **2620 ± 80**
670 BC

From excavation Unit 112-114S, 0-2E, at depth 57cm. Cemetery area on central plaza. Age: Middle Formative.

N-1403. Chalcatzingo 2 **2480 ± 80**
530 BC

From Unit 112-114S, 2-4E, at depth 20 to 42cm. Cemetery area on central plaza. Age: Middle Formative.

N-1404. Chalcatzingo 3 **2580 ± 65**
630 BC

From Unit 114-116S, 0-2E, at depth 40 to 60cm, near burial offering No. 94 in cemetery area on central plaza. Age: Middle Formative.

N-1405. Chalcatzingo 4 **2700 ± 95**
750 BC

From Unit 114-116S, 2-4E, at depth 40 to 60cm. Cemetery area on plaza. Age: Middle Formative.

N-1406. Chalcatzingo 5 **2890 ± 100**
940 BC

From Unit 118-120S, 0-2E, at depth 90cm. Cemetery area on central plaza. Age: Middle Formative.

N-1407. Chalcatzingo 6 **2960 ± 80**
1010 BC

From Trench 90-87, at depth 360 to 380cm of central plaza. Age: Middle Formative.

N-1408. Chalcatzingo 7 **2800 ± 80**
850 BC

From Trench 84-80, at depth 180 to 220cm, central plaza. Age: Middle Formative.

- N-1409. Chalcatzingo 8** **3010 ± 95**
1060 BC
From Trench 75-71 at depth 370 to 390cm, central plaza. Age: Middle Formative.
- N-1410. Chalcatzingo 9** **2620 ± 90**
670 BC
From Trench 60-63.5 at depth 233cm, central plaza. Assoc with bone and architectural features. Age: Middle Formative.
- N-1411. Chalcatzingo 10** **2840 ± 95**
890 BC
From excavation Area 110-112S 16-18E, at depth 40 to 80cm, central plaza. Assoc with architectural features. Age: Middle Formative.
- N-1412. Chalcatzingo 11** **2910 ± 130**
960 BC
From Area 110-112S, 16-18E, at depth 190 to 210cm, central plaza. Assoc with architectural features. Age: Middle Formative.
- N-1413. Chalcatzingo 12** **3320 ± 80**
1370 BC
From Area 14-17.5S, 39-40E, at depth 180 to 220cm, E edge of long platform mound bounding N side of central plaza. Age: probably Early Formative.
- N-1414. Chalcatzingo 13** **1390 ± 75**
AD 560
From Unit 0-2S, 0-2E, at depth 20 to 40cm, from terrace of Middle Formative and Classic house structures. Age: Classic.
- N-1415. Chalcatzingo 14** **1350 ± 75**
AD 600
From Unit 4-6S, 0-2W, at depth 31 to 40cm, Soil Zone B, from terrace of Middle Formative and Classic house structures. Age: Classic.
- N-1416. Chalcatzingo 15** **3030 ± 130**
1080 BC
From Unit 8-10S, 0-2W, at depth 140 to 160cm, Soil Zone D, from terrace of Middle Formative house structure.
- N-1417. Chalcatzingo 16** **2720 ± 80**
770 BC
From Unit 8-10S, 2-4W, at depth 60 to 80cm, Soil Zone B, from terrace of Middle Formative house structure.

*D. Great Britain***Craig Phadrig series**

Material from archaeol remains at Craig Phadrig, Inverness, N Scotland (57° 29' N, 4° 14' W). Coll and subm 1971 by Alan Small, Univ Dundee.

- N-1118. Craig Phadrig 1 (CP25)** **2030 ± 100**
80 BC
Charred timber between layers of upper and lower occupations overlying collapse of rampart.
- N-1119. Craig Phadrig 2 (CP107)** **1540 ± 85**
AD 410
Charcoal from upper occupation layer.
- N-1120. Craig Phadrig 3 (CP114)** **2250 ± 100**
300 BC
Dispersed charcoal from wooden beam in earthen rampart.
- N-1122. Craig Phadrig 4 (CP128)** **2280 ± 100**
330 BC
Charcoal from base of wall buried in rubble, 3.5m high.
- N-1123. Craig Phadrig 5 (CP130)** **2220 ± 100**
270 BC
Charcoal under buried wall.
- N-1124. Craig Phadrig 6 (CP133)** **2320 ± 105**
370 BC
Charcoal and peat from face of buried wall, 50cm below top of wall.
- N-1238. Reswallie Farm** **3160 ± 70**
1210 BC
Human bone from Reswallie Farm, Rescobie, Scotland (56° 40' N, 2° 49' W). Inhumation in short cist. Grave goods included food vessel and flint flake. Coll 1967 and subm by H Coutts, Dundee Mus. *Comment*: bone collagen dated.
- N-1239. Cookston Farm** **3550 ± 85**
1600 BC
Human bone from Cookston Farm, Eassie, Scotland (56° 37' N, 3° 4' W). Inhumation in short cist. Grave goods included beaker and bone button. Coll 1970 and subm by H Coutts. *Comment*: bone collagen dated.
- N-1240. Glamis** **3390 ± 90**
1440 BC
Human bone from Glamis, Angus, Scotland (56° 36' N, 3° W). Inhumation in short cist. Grave goods included food vessel sherd. Coll 1947 by D R Dow; subm by H Coutts. *Comment*: bone collagen dated.
- Green Cairn series**
Material from archaeol remains at Green Cairn, Fife, Scotland (56° 5' N, 3° 35' W). Coll and subm 1972 by L M Wedderburn, Dundee City Mus. Estimated age: 1000 to 3500 BP.

N-1318. Green Cairn 1 (G.C./T1/4/S1) **2130 ± 100**
180 BC
Charcoal from twigs.

N-1375. Green Cairn 2 (G.C./T5/5/S2) **2340 ± 95**
390 BC
Carbon rich material from post hole.

N-1376. Green Cairn 3 (G.C./T1/4/S3) **2490 ± 90**
540 BC
Charcoal from burned timber beam.

General Comment (LMMW): dates represent construction, destruction, and occupation of defended settlement of Scottish Iron age and are supported by stratigraphy of excavated areas.

E. Africa

Chondwe series

Charcoal from Early Iron age site at Chondwe, Copperbelt Prov, W Zambia (13° 12' S, 28° 47' E). Coll by N Filmer and E Mills, Ndola, Zambia; subm 1970 by B M Fagan, Univ California, Santa Barbara. *Comment* (BMF): may date beginnings of occupation. Probable date: ca 1100 BP.

N-997. Chondwe 1 **1150 ± 145**
AD 800
From Trench 2, Sq 5, depth 1.98 to 2.06m.

N-998. Chondwe 2 **1440 ± 160**
AD 510
From Trench 2, Sq 5, depth 2.06 to 2.13m.

Kansanshi series

Material from Kansanshi copper mine, Zambia (11° 40' S, 26° 30' E). Coll by M S Bisson; subm 1972 by B M Fagan.

N-1281. Kansanshi 1 **360 ± 80**
AD 1590
Charcoal from distinct hearth at contact of orange-gray rubble and sandy orange layer at depth 3.20m in fill, Trench I, 4.2 to 4.65m S of datum.

N-1282. Kansanshi 2 **295 ± 80**
AD 1655
Charcoal from angular rubble and brown sandy matrix at depth 1.73m in fill, Trench I, 5.42m S of datum.

N-1283. Kansanshi 3 **1320 ± 85**
AD 630
Charcoal from daga pit in probably earliest village horizon at Kansanshi, at depth 45 to 75cm, Pit II, Site Ksm. Assoc with copper working.

N-1284. Kansanshi 4**1190 ± 85****AD 760**

Charcoal from interface between black and yellow layer at depth 37cm, Site Ksm. Assoc with early type pottery.

N-1285. Kansanshi 5**2360 ± 90****410 BC**

Charcoal from orange clay at base of layer, depth 26cm, containing earlier type of pottery and underlain by (?) Middle Stone age tools, Site Ksm.

N-1286. Kansanshi 6**1550 ± 90****AD 400**

Charcoal from Pit I fill at depth 47cm. Assoc with Late Iron age pottery and anthill furnace fragments, Site Ksm.

General Comment (MSB): N-1281 and -1282 were from rubble backfill of ancient copper mine at Kansanshi hill. They date final period of great prehistoric activity, obliterating all traces of earlier copper mining. N-1283 to -1286 were all from prehistoric smelting area adjacent to Kansanshi mine. N-1283 dates 1st phase of Early Iron age activity at the mine while N-1284 dates 2nd phase. Both phases are characterized by distinct ceramic assemblages. Dates agree fully with already known Early Iron age dates from NW Zambia. Date of N-1285 was earlier than expected and probably belongs to underlying layer below Iron age pottery. Date of N-1286 was earlier than expected. Subsequent study of pottery from this pit shows that it falls within range of variation of 1st phase of Early Iron age.

Chundu series

Charcoal from Chundu site, Livingstone Dist, S Prov, Zambia (17° 35' S, 25° 41' E). Coll 1970 and subm by J O Vogel, Livingstone Mus.

N-1137. Chundu 1 (Zlm-32)**1190 ± 100****AD 760**

Charcoal from depth 1.2m in ashpit, Trench 5.

N-1138. Chundu 2 (Zlm-33)**1290 ± 100****AD 660**

Charcoal from depth 1.2m in ashpit, Trench 2.

N-1139. Chundu 3 (Zlm-34)**1160 ± 160****AD 790**

Charcoal from depth 0.6m within horizon containing village-assoc cultural material, Trench 4. *Comment* (JOV): earlier sample N-668 (220 ± 170: R, 1970, v 12, p 572) was inconsistent with typologic evidence.

Zambesi series

Charcoal from Zambesi site, Livingstone Dist, S Prov, Zambia (17° 49' S, 25° 37' E), from provenance believed assoc with Early Iron age horizon. Coll 1971 and subm by J O Vogel.

- N-1140. Zambesi 1 (Zlm-35)** **1410 ± 130**
AD 540
Charcoal from large pit assoc with hut and filled with Early Iron age pottery, Trench 10.
- N-1141. Zambesi 2 (Zlm-36)** **895 ± 110**
AD 1055
Charcoal from large pit in Trench 7.
- N-1142. Zambesi 3 (Zlm-37)** **795 ± 95**
AD 1155
Charcoal from ashpit at 0.8m in Trench 6.
- N-1143. Zambesi 4 (Zlm-38)** **910 ± 160**
AD 1040
Charcoal assoc with hut daga in Trench 8.
- N-1144. Zambesi 5 (Zlm-39)** **710 ± 100**
AD 1240
Charcoal assoc with hut in Trench 10.
- N-909. Turkwel R Irrigation scheme, Site U** **1500 ± 100**
AD 450
Charcoal from possible hearth remnant exposed at surface of wind-deflated site, near Lorogumu, Turkana Dist, Kenya (2° N, 36° E). Late Stone age tools and incised pottery were adjacent to charcoal. Coll and subm 1970 by L H Robbins, Michigan State Univ.
- Lothagam Hill series**
Material from archaeol sites near Lothagam Hill, S Turkana Dist, Kenya (2° N, 36° E). Subm 1971 by L H Robbins.
- N-1100. Lothagam Hill (ZU-4)** **8420 ± 170**
6470 BC
Shell from compact grayish sand level, 20 to 30cm below surface, assoc with cultural material including Late Stone age flaking debris and pottery. Coll 1969 by L H Robbins. *Comment* (LHR): shell from Site ZU-6, ca 100m apart from Site ZU-4 yielded 7960 ± 140 (N-813: R, 1972, v 14, p 237).
- N-1101. Lothagam Hill 2 (ZU-5)** **6010 ± 160**
4060 BC
Shell from exposure of shell beds, 35 to 40cm below surface, Site ZU-5, < 1.6km from ZU-4. Late Stone age flaking debris and pottery found at adjacent surface. Coll 1969 by L H Robbins and J I Ebert.
- N-1102. Lothagam Hill 3a (BB-9)** **8230 ± 180**
6280 BC
Shell from dark organic lake sediment at Site BB-9, ca 0.4km from S end of Lothagam Hill, yielding human skeletal remains, Late Stone age artifacts, bone points, and fauna. Coll 1969 by L H Robbins.

N-1103. Lothagam Hill 3b**2260 ± 100****310 BC**

Black organic sediment from above site, 2 to 16cm below surface. *Comment* (LHR): material did not serve as independent check against N-1102.

N-1076. Lukenya Hill**1330 ± 100****AD 620**

Charcoal from prehistoric rockshelter, Site GvJm/22, Lukenya Hill, Machakos Dist, Kenya (1° 29' S, 37° 4' E), from hearth 50 cm below surface. Coll and subm 1971 by R M Gramly, Univ Nairobi. *Comment* (RMG): should date 2 pottery wares and provide upper limit for Narosura ware.

N-1066. Manda**1240 ± 100****AD 710**

Water-logged wood, probably mangrove, from one of a series of large piles ca 20cm diam, sunk into mud 3.5m thick filling what must have been open creek at Manda, Lamu Dist, Kenya (2° 14' S, 40° 58' E). Present shoreline is ca 15m away. Mud surface is at approx present mid-tide level and remains permanently water-logged with salt water. Coll 1970 by H N Chittick; subm by R C Soper, British Inst E Africa. *Comment* (HNC): sample can be assigned to early stage of city of Manda and probably belongs to 9th or 10th century AD, based on pottery imported from Persian Gulf.

New Seronera Game Lodge series

Charcoal from cave site at New Seronera Game Lodge, Serengeti Natl Park, Tanzania (2° 25' S, 34° 50' E). Coll 1971 by J R F Bower; subm by R C Soper.

N-1067. New Seronera Game Lodge 1**2020 ± 115****70 BC**

Charcoal from depth 30 to 40cm from surface, Sq B-2, Site SE-3, underlying stratigraphic break in cave deposits formed by boulder rubble. Assoc with pottery of possible East African "Neolithic" affinity and microlithic industry, mostly obsidian. *Comment* (JRFB): consistent with range of dates for pottery of E African "Neolithic" affinity and provides reliable terminal date for pottery (Gumban A) recovered below rubble.

N-1068. New Seronera Game Lodge 2**265 ± 100****AD 1685**

Charcoal from depth 10 to 20cm below surface, Sqs B-1 and C-1, Site SE-3, overlying stratigraphic break in cave deposits. Assoc with Iron age pottery (twisted cord rouletting and various forms of incised decoration) and microlithic industry, mostly quartz. *Comment* (JRFB): unexpected younger age due to thorough disturbance of deposits overlying boulder rubble.

N-1158. New Seronera Game Lodge 3**280 ± 95****AD 1670**

Charcoal recovered at depth 20 to 30cm from surface in Sq C-10, Site SE-4, in colluvium on rock terrace a few meters downslope from cave (SE-3), assoc with thin-walled (av 5mm) pottery with incised, panelled decoration and microlithic industry of mostly quartz. *Comment* (JRFB): date considerably younger than expected. Contamination must have been great, since no natural stratigraphy was observed and immediately overlying layer contained very recent pottery.

Kisii series

Material from various sites in Kisii Dist, W Kenya. Coll 1971 and subm by J R F Bower, Lake Forest College.

N-1234. Kisii 1 (Gs Jd 6)**2090 ± 170****140 BC**

Charcoal from depth ca 55cm in reddish, clayey colluvium (0° 39' S, 34° 49' E), assoc with pottery provisionally labelled Kisii Soft Ware.

N-1235. Kisii 2 (Gs Jd 21)**1190 ± 75****AD 760**

Charcoal from depth ca 70cm in brown, loamy colluvium (0° 40' S, 34° 55' E), assoc with Kisii Soft Ware on burnt clay floor with hearth stones.

N-1236. Kisii 3 (Gt Jc 7)**165 ± 90****AD 1785**

Charcoal from depth ca 60cm in midden-stained soil (0° 49' S, 34° 44' E), assoc with pottery provisionally labelled Button-Necked, lying among hearth stones (?).

N-1237. Kisii 4 (Gt Jc 9)**1650 ± 90****AD 300**

Charcoal from depth ca 60cm in reddish brown colluvium (0° 53' S, 34° 43' E), assoc with pottery of Indeterminate type (decoration consisted in short vertical incisions around rim, horizontal bands of punctuations around body, and multiple parallel U-grooved incisions), chipped stone tools, and very friable bone.

General Comment (JRFB): wide gaps in dates are not surprising, since KSW ware (N-1234 and -1235) differs markedly from both BNP ware (N-1236) and Indeterminate ware (N-1237), and the latter 2 are equally divergent in appearance. Of interest, however, is the gap between the 2 KSW dates and the fact that they bracket date for Indeterminate ware.

Ngungani series

Charcoal from archaeol site at Ngungani, Chyulu Hills, Machakos Dist, Kenya (2° 35' S, 37° 50' E). Coll and subm 1972 by R C Soper. *Comment* (RCS): expected age is within present millennium and comparable to N-290 (435 ± 105: R, 1968, v 10, p 342).

985 ± 75

N-1316. Ngungani 1 **AD 965**
 NG72, Hp14 WI (4). From depth 90cm, assoc with hut floor.

430 ± 75

N-1317. Ngungani 2 **AD 1520**
 NG72, HcJp3 (3). From depth 50cm in large ash heap.

General Comment (RCS): N-1317 compares closely with N-290. N-1316 was expected to be contemporary with other 2 on preliminary examination of pottery, but a detailed study has not yet been made; sample came from very localized area and may have been contained in pre-existing animal burrow.

Kwelikwiji series

Material from Kwelikwiji site, Ngulu Hills, Morogoro Area, Tanzania (6° 6' S, 37° 33' E), assoc with Early Iron age pottery of Kwale type. Coll and subm 1972 by R C Soper.

3210 ± 85

N-1287. Kwelikwiji 1 **1260 BC**
 Charcoal from depth 18 to 22cm in red-brown clay.

3050 ± 85

N-1288. Kwelikwiji 2 **1100 BC**
 Charcoal from depth 30 to 40cm, in red-brown clay.

General Comment (RCS): dates are > 1000 yr earlier than comparable sites to N. Kwale ware sherds were from 15 to 45cm below surface, and nondescript quartz industry from 35 to 60cm, with abundant charcoal also from 15 to 45cm. Either the charcoal dates the stone industry and there has been some disturbance, or the charcoal comes from a very old tree (unlikely to be this old), or Kwale ware really is this old and dates back to pre-Iron age.

370 ± 100

N-1145. Nhunguza Ruin **AD 1580**
 Piece of structural timber supporting roof of main hut in Zimbabwe-type ruin from Nhunguza ruin (Garlake, 1973a), S Rhodesia (17° 23' S, 31° 14' E). Coll and subm 1971 by P S Garlake, Univ of Ife.

Ruanga Ruin series

Charcoal from Ruanga ruin (Garlake, 1973a), S Rhodesia (17° 2' S, 31° 41' E). Coll and subm 1971 by P S Garlake.

450 ± 85

N-1146. Ruanga ruin 1 **AD 1500**
 Charcoal from depth 45cm in midden in Zimbabwe-type ruin, assoc with "Zimbabwe-type" pottery and walling.

N-1147. Ruanga ruin 2**775 ± 100
AD 1175**

Charcoal from depth 1.1 to 1.3m in midden, assoc with "Musengezi-type" pottery, underlying "Zimbabwe" deposits.

N-1148. Tafuna Hill**1070 ± 105
AD 880**

Charcoal from Tafuna Hill, S Rhodesia (17° 23' S, 31° 32' E), from depth 20 to 30cm in occupation level of Early Iron age Chitope-ware settlement (Garlake, 1971). Coll and subm 1971 by P S Garlake.

Obalara's Land series

Charcoal from site, Obalara's Land, Ife town, W Nigeria (7° 29' N, 4° 32' W). Assoc with apparent shrine containing terracotta sculptures of "Classical" period. Estimated age ca 12th to 14th centuries AD. Coll and subm 1972 by P S Garlake (Garlake, 1973b).

N-1390. Obalara's Land 1**480 ± 95
AD 1470**

Charcoal from gravel surrounding concentration of pottery probably representing shrine offering.

N-1391. Obalara's Land 2**580 ± 60
AD 1370**

Charcoal from gravel overlying a group of terracotta sculptures.

N-1392. Obalara's Land 3**760 ± 85
AD 1190**

Charcoal from gravel underlying further concentration of pottery probably representing shrine offering.

N-1393. Obalara's Land 4**625 ± 75
AD 1325**

Charcoal from gravel amongst concentration of human bones close to group of terracotta sculptures.

Begho series

Charcoal from archaeol remains at Begho, trading town in AD 1400 to 1700, near Hani, Brong Ahafo Region, Ghana (7° 15' N, 2° 28' E). Coll and subm 1970 by M Posnansky, Univ Ghana (Posnansky, 1971; Wilks, 1961).

N-929. Begho 1**240 ± 100
AD 1710**

From Pit I, Layer 6, 3rd occupation layer assoc with many sherds. 1.24m below ground surface.

N-930. Begho 2**520 ± 100
AD 1430**

From Pit M33, surface of Layer 6, assoc with lowest pottery horizon within very compact orange subsoil. 1.1m below ground surface.

N-931. Begho 3 **285 ± 100**
AD 1665

From Pit K39, Layer 4, midden deposit below floor of 17th century house. Assoc with mass of pottery. 0.8m below ground surface.

N-932. Begho 4 **500 ± 100**
AD 1450

From Pit K39, Layer 7, underlying floor of building dated by assoc small finds to latter half of 17th century. Assoc with well preserved burial in shallow pit. 1.3m below ground surface.

N-1430. Begho 5 **410 ± 75**
AD 1540

From Pit I, Layer 15, assoc with pottery and bones. 3.2m below ground surface.

Coronation Park series

Charcoal from Coronation Park, Salisbury, Rhodesia (17° 50' S, 31° 6' E). Coll and subm 1971 by T N Huffman, Natl Mus and Monuments, Rhodesia.

N-978. Coronation Park 1 **1240 ± 100**
AD 710

From sealed pit belonging to Coronation facies of Gokomere tradition (Huffman, 1971a).

N-979. Coronation Park 2 **970 ± 100**
AD 980

From village level belonging to Maxton facies of Gokomere tradition (Garlake, 1967), stratified above N-978. *Comment* (TNH): 1st dates for Coronation and Maxton facies, and they demonstrate a 1000 yr continuum of Gokomere tradition in Mashonaland.

N-1275. Makuru **1260 ± 65**
AD 690

Charcoal from Early Iron age Zhizo site at Makuru (Huffman, 1973), 16km W of Shabani, Rhodesia (20° 19' S, 29° 58' E). Coll and subm by T N Huffman. *Comment* (TNH): agrees with dates from Zhizo level at Leopard's Kopje Main Kraal, SR-225 and I-4862 (Huffman, 1971b), and shows that Zhizo and Coronation are contemporary facies of 2nd phase of Gokomere tradition.

REFERENCES

- Ariake Bay Research Group, 1965, Quaternary system of the Ariake and the Shiranui Bay Areas, with special reference to the Ariake soft clay: Assoc Geol Collaboration in Japan, mono 11, p 68.
- Asaki, S, 1957, The cinerary urn with animal legs owned by the Tokuzo-ji Monastery: Archaeol Soc Nippon, Jour, v 43, p 54-58.
- Furuuchi, S, 1971, Sanrizuka, an archaeological survey of site of New Tokyo International Airport: Hokuso Kosha, Chiba Pref.

- Garlake, P S, 1967, Excavations at Maxton Farm, near Shamva Hill, Rhodesia: *Arnoldia Rhodesia*, v 3, no. 9.
- 1971, An Early Iron age site near Tafuna Hill, Mashonaland; *S African Archaeol Bull*, v 26, p 104.
- 1973a, Excavations at the Nhungoza and Ruanga ruins in Northern Mashonaland: *S African Archaeol Bull*, v 27, p 107-143.
- 1973b, Excavations at Obalara's Land, Ife; an interim report: *W African Jour Archaeol*, v 4.
- Huffman, T N, 1971a, A guide to the Iron age of Mashonaland: *Natl Mus Rhodesia, Occ Paper* v 4, no. 1a, p 20-44.
- 1971b, Excavations at Leopard's Kopje Main Kraal; a preliminary report: *S African Archaeol Bull*, v 26, nos 101-102, p 85-89.
- 1973, Test excavations at Makuru, Rhodesia: *Arnoldia Rhodesia*, v 5, no. 39.
- Kanto Regional Construction Bureau, Ministry of Construction, 1973, Report on the marine geotechnical survey at the central part of Tokyo Bay.
- Matthews, B, 1970, Age and origin of Aeolian sand in the Vale of York: *Nature*, v 227, p 1234-1236.
- 1971, Soils in Yorkshire: *Soil Survey Rec*, no. 6, Soil Survey, Great Britain.
- Moriyama, A and Ozawa, M, 1972, Geomorphology and subsurface geology of the alluvial plain of the lower Yahagi River, Central Japan: *Quaternary Research*, v 11, p 193-207.
- Posnansky, M, 1971, Ghana and the origins of West African trade: *African Quart.*
- Wilks, I, 1961, The Northern factor in Ashanti history; Begho and the Manda: *African History, Jour*, v 2, p 25.