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UNIVERSITY OF WISCONSIN RADIOCARBON DATES XVIII

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Procedures and equipment have been described in previous date lists. Except as otherwise indicated, wood, charcoal, and peat samples are pretreated with dilute NaOH-$Na_4P_2O_7$ and dilute H_3PO_4 before conversion to the counting gas methane; marls and lake cores are treated with acid only. Very calcareous materials are treated with HCl instead of H_3PO_4.

The dates reported have been calculated using 5568 as the half-life of ^{14}C. The standard deviation quoted includes only the 1σ of the counting statistics of background, sample, and standard counts. Background methane is prepared from anthracite, standard methane from NBS oxalic acid. The activities of the dated samples for which $\delta^{13}C$ values are listed have been corrected to correspond to a $\delta^{13}C$ value of $-25‰$.

Sample descriptions are based on information supplied by those who submitted samples.

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I. ARCHAEOLOGIC SAMPLES

A. Illinois

Cahokia site

Excavations at Cahokia's Woodhenge structures (Wittry, 1969) Madison Co (38° 39′ 35.7″ N, 90° 04′ 28″ W) July 1978 by W L Wittry, Univ Illinois at Chicago Circle. Subm by W L Wittry. Earlier dates on wood from Woodhenge Circle No. 2 were reported (WIS-948 and -969) (R, 1979, v 21, p 121). Post from Feature 601 showed less disintegration than that of Feature 618 but bark was not visible in either sample.

940 ± 60

WIS-1128. Cahokia site $\delta^{13}C = -27.3‰$

Outer rings of *Juniperus* post from Feature 601, post pit of Circle No. 2. Post apparently broke in removal attempt.

920 ± 60

WIS-1130. Cahokia site $\delta^{13}C = -24.7‰$

Dup'icate sample from Feature 601.

890 ± 60

WIS-1133. Cahokia site $\delta^{13}C = -26.6‰$

Outer rings of Eastern red cedar *(Juniperus)* post from Feature 618, post pit of Circle No. 2. Post apparently broke during attempt to remove post.

990 ± 60

WIS-1136. Cahokia site $\delta^{13}C = -27.0‰$

Duplicate sample from Feature 618.

B. Iowa

4100 ± 70

WIS-1083. Brassica Bench site (13PK251) $\delta^{13}C = -26.7‰$

Wood charcoal, ISU Cat No. 1471, from Feature 10, cultural fill of basin-shaped pit, 0.43 to 0.55m below orifice of feature. Sample should date earliest habitation of site and was thought to provide date for one Middle Woodland occupation within central Des Moines R valley in Polk Co (41° 44′ N, 93° 43′ W). Coll 1976 and subm by D M Gradwohl, Iowa State Univ, Ames, Iowa.

C. North Dakota

South Cannonball Village (32SI19) site

Uncarbonized wood from prehistoric site at confluence of Cannonball and Missouri Rivers in N Sioux Co (46° 24′ 30″ N, 100° 35′ 15″ W). Site is component of Extended Middle Missouri tradition. Coll 1967 by J J Hoffman; subm by W R Wood, Univ Missouri, Columbia, Missouri.

570 ± 70

WIS-1097. South Cannonball Village (32SI19) $\delta^{13}C = -26.3‰$

Catalogue No. 5584, Feature 16, Post 50.

600 ± 70

WIS-1104. South Cannonball Village (32SI19) $\delta^{13}C = -28.3‰$

Cat No. 5546, Feature 16, Post 1.

750 ± 60

WIS-1098. South Cannonball Village (32SI19) $\delta^{13}C = -26.5‰$

Cat No. 3009, Post 1, Feature 93.

760 ± 70

WIS-1011. South Cannonball Village (32SI19) $\delta^{13}C = -26.5‰$

Cat No. 3010, Post 3, Feature 93.

740 ± 60

WIS-1100. South Cannonball Village (32SI19) $\delta^{13}C = -27.6‰$

Cat No. 2472, Feature 74.

510 ± 70

WIS-1102. South Cannonball Village (32SI19) $\delta^{13}C = -28.3‰$

Cat No. 4133, Post 29, Feature 13.

560 ± 60

WIS-1103. South Cannonball Village (32SI19) $\delta^{13}C = -26.6‰$

Cat No. 866, Post 27, Feature 15.

630 ± 60

WIS-1105. South Cannonball Village (32SI19) $\delta^{13}C = -26.8‰$

Cat No. 3874, Post 33, Feature 7.

680 ± 70

WIS-1110. South Cannonball Village (32SI19) $\delta^{13}C = -27.4‰$

Cat No. 3896, Post 75, Feature 7.

660 ± 70

WIS-1106. South Cannonball Village (32SI19) $\delta^{13}C = -26.2‰$

Cat No. 3587, Post 79, Feature 5.

D. Oklahoma

Jones site (34Lf69

Wood charcoal from Jones site, LeFlore Co (35° 19′ N, 94° 35′ 30″ W) Ft Coffee quad. Coll 1939 by K G Orr (1946); subm by C L Rohrbaugh, Univ Wisconsin-Madison. Samples dated to establish time range of variation of house orientation in Early Fort Coffee focus phases.

400 ± 70

WIS-1109. Jones site (34Lf69) $\delta^{13}C = -25.7‰$

Charcoal from House 4, two-center-post rectangular house pattern with baked clay fireplace. House oriented with center posts along azimuth 8° off E-W axis.

630 ± 70

WIS-1116. Jones site (34Lf69) $\delta^{13}C = -25.4‰$

Charcoal from House 1, two-center-post rectangular house pattern. House oriented with center posts along azimuth 10° off E-W axis.

Moore site (34Lf31)

Wood charcoal coll 1969 by by D G Wyckoff from site in LeFlore Co (35° 16′ 30″ N, 94° 36′ 30″ W). Site correlated with latest Caddoan occupation of Arkansas Valley in Oklahoma, Fort Coffee phase. Subm by C L Rohrbaugh.

580 ± 70

WIS-1111. Moore site (34Lf31) $\delta^{13}C = -26.1‰$

Sample from exterior rings of N center post of House 3. House is rectangular two-center-post house oriented roughly N to S and assoc with Fort Coffee phase ceramics and other artifacts.

560 ± 60

WIS-1112. Moore site (34Lf31) $\delta^{13}C = -26.5‰$

Samples from S center post of House 3.

370 ± 70

WIS-1113. Moore site (34Lf31) $\delta^{13}C = -25.9‰$

Wood charcoal and charred nut fragments from Feature 8, roughly circular trash pit containing artifacts typical of Fort Coffee phase.

570 ± 70

WIS-1114. Spencer Littlefield IV site (34Lf82) $\delta^{13}C = -24.6‰$

Wood charcoal from site in LeFlore Co (35° 17′ N, 94° 33′ W). Coll 1939 by K G Orr; subm by C L Rohrbaugh. Material from House 1, two-center-post rectangular house pattern with baked clay fireplace, oriented with center posts only 1° off N-S axis. Dates beginning of Fort Coffee focus in Spiro locality.

490 ± 70

WIS-1118. Spencer Littlefield I site (34Lf60) $\delta^{13}C = -26.4‰$

Wood charcoal from site in LeFlore Co (35° 17′ 30″ N, 94° 33′ W). Coll 1938 by K G Orr; subm by C L Rohrbaugh. Samples from House 1, two-center-post rectangular house with baked clay fireplace with center axis oriented directly E to W.

650 ± 70

WIS-1119. Spencer Littlefield III site (34Lf64) $\delta^{13}C = -26.8‰$

Wood charcoal from site in LeFlore Co (35° 16′ 30″ N, 94° 31′ 30″ W). Coll 1938 by K G Orr; subm by C L Rohrbaugh. Sample from House 2, of three superimposed houses, all oriented considerably away from cardinal axes. Houses have no fireplaces.

Garrett Ainsworth site (34Lf80)

Wood charcoal from single component site in LeFlore Co (35° 15′ N, 94° 36′ 30″ W) coll 1939 by K G Orr. Site represents early phase within Fort Coffee focus (Orr, 1946), probably contemporary with Spiro phase at Spiro. Subm by C L Rohrbaugh.

480 ± 70

WIS-1117. Garrett Ainsworth site (34Lf80) $\delta^{13}C = -25.8‰$

Sample from House 1, two-center-post rectangular house pattern with central baked clay fireplace. Center posts oriented 8° off E-W axis.

WIS-1132. Garrett Ainsworth site (34Lf80) **480 ± 90**

Humic acids extracted from WIS-1117 were dated to check reliability of date.

470 ± 60

WIS-1115. Garrett Ainsworth site (34Lf80) $\delta^{13}C = -25.8‰$

Sample from House 2, two-center-post rectangular house pattern with central fireplace. Center posts oriented directly along E-W axis. Dates earliest phase of Fort Coffee focus.

E. South Dakota

George Hey site (39FA302)

Charcoal from excavations in 1977 at McKean Complex site (Tratebas and Vagstad, 1979) in Fall River Co (43° 26′ N, 103° 48′ W). Coll and subm by A M Tratebas, South Dakota Archaeol Research Center, Ft Meade, South Dakota.

3930 ± ±70

WIS-1085. George Hey site (39FA302) $\delta^{13}C = -24.3‰$

Charcoal *(Pinus)* from Feature 9, hearth in lower of two main cultural horizons. Features in lower horizon appear to represent single occupation and are earliest occupation within excavated area. Date places this horizon within McKean complex.

3520 ± 70

WIS-1086. George Hey site (39FA302) $\delta^{13}C = -24.5‰$

Charcoal *(Pinus)* from Feature 6, 50cm diam, basin-shaped, slab-lined hearth in upper of two main cultural horizons. Assoc artifacts included pitted mano and Duncan point. This horizon is actually series of overlapping occupations with hearth belonging to uppermost occupation within excavated area. Site was apparently occupied repeatedly by small groups of people belonging to McKean complex.

1030 ± 60

WIS-1084. Lost Bumper Tipi-Ring site (39FA392) $\delta^{13}C = -23.6‰$

Charred log (*Pinus* sp) from Feature 2, straight-walled pit hearth, 70cm deep, which formed central hearth of tipi ring. Scattered within hearth were remains of infant, adult sternum fragment, bone awl, and charred or semi-charred logs. Tipi-rings containing deep central pit hearths are rare. Pit hearths with burials and assoc bone awls were found at one nearby site (39FA71) during River Basin Survey at Angostura Reservoir but hearths were not inside tipi rings. Coll 1978 from site in Fall River Co (43° 22′ N, 103° 46′ W). Subm by A M Tratebas.

F. Tennessee

2350 ± 80

WIS-1147. Sakti Chaha site (40HR100) $\delta^{13}C = -26.1‰$

Charred nut fragments (*Juglans, Carya*) and wood charcoal coll 1978 by D H Dye, Washington Univ, from Sakti Chaha site on S bank of Tennessee R, Hardin Co (35° 03′ 14″ N, 88° 16′ 98″ W). Sample from 1×2m test excavation of small, single component Late Gulf Formational (Alexander culture, Hardin phase) site. In direct assoc were Alexander series sherds (Futato, 1979, p 19-20).

1990 ± 80

WIS-1148. Hatley Creek site (40HR236) $\delta^{13}C = -26.4‰$

Charred nut fragments (*Juglans, Carya* sp) and wood charcoal coll 1978 by D H Dye from Hatley Creek site on E bank of Tennessee R, Hardin Co (35° 06′ 41″ N, 88° 17′ 45″ W). Sample 50cm below surface from 1x2m test excavation of multicomponent midden. In direct assoc were Wheeler series sherds (Dye, 1977; Futato, 1979, p 18-19).

2910 ± 80

WIS-1149. Walker site (40HR212) $\delta^{13}C = -26.6‰$

Charred nut fragments (*Juglans, Carya*) *and* wood charcoal coll 1978 by D H Dye from Walker site on N bank of Tennessee R, Hardin Co (35° 03′ 57″ N, 88° 16′ 13″ W). Sample immediately below plow

zone in small shallow shell midden in 1×1m excavation unit of small, single component Late Archaic (Lauderdale culture, Perry phase) midden. In direct assoc were Late Archaic (Little Bear Creek and McIntire) projectile point/knives (Webb and DeJarnette, 1942; Futato, 1979).

G. Ecuador

La Ponga site (OGSE-186)

Excavations at Parroquia de Colonche, Canton de Santa Elena, Guayas Prov (1° 53′ S, 80° 40′ W) undertaken Oct-Nov 1978 by R D Lippi, Univ Wisconsin-Madison; subm by R D Lippi. Site is first large inland Machalilla site to be excavated. *Comment* (RL): it is suggested, if dates are taken at face value, that entire Machalilla occupation was quite short, perhaps about 200 to 300 yr.

2790 ± 80

WIS-1140. La Ponga site (OGSE-186) $\delta^{13}C = -25.4‰$

Charcoal (R-14) from sealed early Machalilla context (roughly Machalilla 2 as defined by Bischof (1975)), stratigraphically separated from overlying Machalilla material which, in turn, is stratigraphically separated from overlying Engoroy or Chorrera and Guangala components.

2880 ± 80

WIS-1141. La Ponga site (OGSE-186) $\delta^{13}C = -25.0‰$

Charcoal (R-16) from ashy layer containing mixed early to middle Machalilla ceramics. Evidently aboriginal mixing of ash and soil resulted in temporary loss of stratigraphy in unit.

2920 ± 70

WIS-1125. La Ponga site (OGSE-186) $\delta^{13}C = -24.4‰$

Charcoal (R-25). Presence of several Ayangue Incised sherds plus late form of Machalilla Red Banded suggests deposit is mostly late Machalilla (Machalilla 4 as defined by Bischof, 1974). Some earlier and later ceramics (later material of Engoroy or Chorrera phase) are also present, however.

Samborondon site (OG Sb Sb 5 and OG Sb Sb 3)

Excavations at sites in Canton Samborondon, Prov Guayas (2° 10′ S, 79° 50′ W) Aug 1979 under direction of R G Whitten, Univ South Dakota, Vermillion.

1350 ± 70

WIS-1145. Samborondon site (OG Sb Sb 5) $\delta^{13}C = -24.8‰$

Sample FNS-5, carbon in burial urn. May date use of continuous relict raised fields.

1270 ± 70

WIS-1150. Samborondon site (OG Sb Sb 3) $\delta^{13}C = -26.6‰$

Ash lens in regional and late ceramic complex called "Milagro" 30 to 40cm beneath surface. Sample assoc with raised field farmers of Guayas basin.

H. Egypt

Hierakonpolis site

Excavations in Feb 1978 and March 1979 under direction of J F Harlan at Hierakonpolis, S Upper Egypt, Markaz, Edfu (25° 7′ N, 32° 48′ E). Subm by M A Hoffman, Univ Virginia, Charlottesville. Wood samples are probably *Tamarix* sp (Hoffman, 1973; 1980).

4900 ± 70

WIS-1152. Hierakonpolis site $\delta^{13}C = -27.4‰$

Wood charcoal from Level 6, 50 to 60cm below modern surface in Mound A of Loc 11C, trash mound 2m high of thin discontinuous lenses of charcoal, ash, and midden with well-preserved organic remains. Late Amratian to early Gerzean affiliation.

4750 ± 80

WIS-1151. Hierakonpolis site $\delta^{13}C = -27.4‰$

Wood charcoal from Level 14, 130 to 140cm below modern surface near center of trash Mound A, Loc 11C. Late Amratian to early Gerzean.

4820 ± 80

WIS-1153. Hierakonpolis site $\delta^{13}C = -29.2‰$

Wood from small post assoc with Feature 1, mud structure, possibly manger, in Loc 11C, Sq 0N-6E, Level 3. Late Amratian to early Gerzean.

4710 ± 80

WIS-1168. Hierakonpolis site $\delta^{13}C = -29.0‰$

Wood from large post remnant, 27cm diam and 25cm long, assoc with what is believed to be latest occupational component of Loc 11C. Late Amratian to early Gerzean. Acid treatment only.

4760 ± 80

WIS-1169. Hierakonpolis site $\delta^{13}C = -28.5‰$

Carbonized wood from ash and charcoal midden above floor of kiln, Structure 1, Loc 29, Sq 10L10, Level 2. Early Amratian.

4300 ± 80

WIS-1180. Hierakonpolis site $\delta^{13}C = -21.7‰$

Wood from large circular post, ca 24cm diam, part of superstructure over royal Predynastic Tomb 1, Loc 6. Constitutes earliest forerunner to Protodynastic royal tombs known from Abydos and, thus, may date inception of Egyptian state. Late Gerzean, early Protodynastic or early Dynasty O (Hoffman, 1976).

4570 ± 80

WIS-1181. Hierakonpolis site $\delta^{13}C = -27.5‰$

Carbonized wood from undraught kiln, Loc 11C, Sq 6.5N-21W, Level 7. Late Amratian to early Gerzean.

4680 ± 80

WIS-1182. Hierakonpolis site $\delta^{13}C = -27.9‰$

Wood charcoal from wall post of semi-subterranean house, Structure II, Loc 29, Sq 17L13, Level 1B, Feature 5. This early Amratian house

dates earliest substantial architecture yet unearthed in Egypt (Hoffman, 1980).

4800 ± 80

WIS-1183. Hierakonpolis site $\delta^{13}C = -27.0‰$

Wood charcoal from Structure II, Sq 17L13, Level 3, Feature 5. Should provide check on date given by WIS-1182 since sample is believed to come from burned corner post.

4670 ± 80

WIS-1184. Hierakonpolis site $[\delta^{13}C = -27.9‰]$

Wood charcoal from Feature 1, simple pottery kiln, Loc 29, Sq 10L10, NW quad 20cm from modern surface of Structure I. Average δ value for nine other samples used.

II. GEOLOGIC SAMPLES

A. Alabama

WIS-1186. Goshen Springs site **8330 ± 90**

Silt from two adjacent lake-sediment cores 1976A and B coll Nov 1976 by Paul and Hazel Delcourt from center of basin in Goshen Springs, Pike Co (31° 44′ N, 86° 08′ W). Depth 205 to 212cm below water surface. Sample intermediate between WIS-956 and -957 which were dated at 5620 ±70 and 26,000 ±380 BP, respectively (R, 1979, v 21, p 125) (Delcourt, 1980). Subm by H E Wright, Univ Minnesota, Minneapolis. Acid treatment only.

B. Idaho

400 ± 70

WIS-1167. Lemhi Range site $\delta^{13}C = -22.9‰$

Pinus flexilis (id tentative) from S facing slope near ridgetop in Targhee Natl Forest, Butte Co (44° 13′ N, 113° 02′ W). Specimen represents period when tree line was ca 61m higher than at present. Dated to determine whether tree line fluctuations in Idaho are synchronous with those in White Mts of California (La Marche, 1973) and, thus, whether past climatic variation has been broadscale enough to affect these disparate locations. Coll and subm by W Dort, Jr and W C Johnson, Kansas Univ, Lawrence, Kansas.

C. Iowa

Smokey Hollow site

Samples coll by Dean Thompson from Smokey Hollow Subwatershed, Woodbury Co (42° 15′ N, 95° 57′ W) with CME flight auger.

2160 ± 70

WIS-1146. Smokey Hollow site $\delta^{13}C = -28.4‰$

Sample SH-2, fragments of uncarbonized wood coll near base of Soetmelk alluvium (De Forest formation) and should provide max age for Soetmelk alluvium in valley (Daniels and Jordan, 1966). This is oldest Holocene alluvium in W Iowa, base marks Late Pleistocene-Holocene boundary.

3400 ± 70

WIS-1144. Smokey Hollow site $\delta^{13}C = -27.1‰$

Sample SH-3, carbonized materials from prehistoric culture site (13WD32); cultural assoc unknown, possibly Middle Woodland on Plains (Johnson, 1973). Sample coll within A horizon of paleosol developed on Hatcher alluvium (De Forest formation) (Daniels and Jordan, 1966). Date is min for Hatcher alluvium and max for Mullenix alluvium.

D. Massachusetts

Titicut Swamp and Swamp Margin

Cores coll Dec 1978 from *Acer rubrum* swamp, Bristol Co (41° 57′ N, 71° 02′ W) by R Bradshaw, A Peters, and D Goldsmith, Brown Univ, Providence, Rhode Island and from swamp margin Feb 1979 by R Bradshaw and T Webb, III. Subm by T Webb, III.

7250 ± 80

WIS-1179. Titicut Swamp $\delta^{13}C = -31.4‰$

Gyttja 367 to 382cm below surface. Dates rise of *Nyssa* and *Fagus* pollen percentages.

5170 ± 80

WIS-1178. Titicut Swamp $\delta^{13}C = -31.3‰$

Gyttja 270 to 272cm below surface. Dates decline of *Tsuga* pollen percentages.

3170 ± 70

WIS-1107. Titicut Swamp $\delta^{13}C = -29.6‰$

Herbaceous peat with some detritus 228 to 234cm from surface. Dates transition from gyttja to peat and assoc decline in *Alnus* pollen percentages.

8720 ± 80

WIS-1171. Titicut Swamp Margin $\delta^{13}C = -30.4‰$

Peat 99 to 101cm from surface. Dates decline of *Pinus* pollen percentages.

1070 ± 70

WIS-1170. Titicut Swamp Margin $\delta^{13}C = -29.9‰$

Peat 36cm from surface. Dates rise in Tubuliflorae pollen percentages.

Duck Pond site

Core, 253cm, obtained with Livingstone sampler from Duck Pond sediments in South Wellfleet, Barnstable Co (41° 50′ N, 70° 00′ W). Coll Aug 1979 and subm by Marjorie Winkler, Univ Wisconsin-Madison. Samples treated with both base and acid.

6540 ± 80

WIS-1120. Duck Pond site $\delta^{13}C = -28.8‰$

Sample was sandy, silty 1654.5 to 1659.5cm from lake surface, 12.5cm from base of core. Pollen diagram shows abundance of spruce.

WIS-1185. Duck Pond site **10,170 ± 100**

Lake sediment 1591 to 1597cm from lake surface. Spruce pollen at this level may indicate profound climatic change in area.

Nunket's Pond

Core coll Feb 1979 from small pond in Plymouth Co (41° 58′ N, 71° 03′ W). Coll and subm R Bradshaw. Depths reported from water surface. Samples treated with acid only.

WIS-1177. Nunket's Pond **11,500 ± 170**

Clay with some organic material 819 to 825cm sec. Dates rise in *Picea* pollen. (One 3-day count.)

9800 ± 100

WIS-1108. Nunket's Pond $\delta^{13}C = -29.4‰$

Lake mud 701 to 704cm below surface. Dates rise in pollen percentages of *Pinus* and *Quercus*.

6700 ± 80

WIS-1172. Nunket's Pond $\delta^{13}C = -30.7‰$

Lake mud 349 to 351cm below surface. Dates rise in *Fagus* pollen percentages.

3510 ± 70

WIS-1176. Nunket's Pond $\delta^{13}C = -30.2‰$

Lake mud 204.2 to 207.7cm below surface. Dates break or hiatus in sedimentary record.

6980 ± 90

WIS-1127. Pamet Cranberry Bog $\delta^{13}C = -30.8‰$

Humified peat, 738 to 743.5cm below surface of bog in North Truro, Barnstable Co (42° 00′ N, 70° 02′ W). Coll June 1979 by W A Patterson, III and subm by M Winkler. Sample represents basal sec Pamet Bog core. Date will provide information on start of peat accumulation and may correlate with sea level rise in area.

5230 ± 80

WIS-1129. Altantic White Cedar Swamp site $\delta^{13}C = -29.2‰$

Fibrous peat with wood particles from bottom 25cm of 7m core taken with Hiller corer from Atlantic White Cedar Swamp, Barnstable Co (41° 54′ 30″ N, 69° 59′ W). Coll Aug 1979 and subm by M Winkler. Treated with both base and acid.

Hawley Bog Pond site

Core coll from Hawley Bog Pond in Franklin Co (42° 34′ N, 72° 53′ W) Feb 1979 by W A Patterson, III, Univ Massachusetts, Amherst. Sample depths reported from water surface, water depth 1m.

7520 ± 80

WIS-1124. Hawley Bog Pond site $\delta^{13}C = -25.6‰$

Limnic sediments 530 to 539cm below surface. Pollen percentages for *Pinus* reach low values of 10%, *Tsuga* increases to 20%.

8970 ± 90

WIS-1121. Hawley Bog Pond site $\delta^{13}C = -28.6‰$

Limnic sediments 665 to 655cm below surface. Dates decline of *Pinus* pollen and arrival of *Tsuga* in area.

10,290 ± 100

WIS-1123. Hawley Bog Pond site $\delta^{13}C = -30.1‰$

Limnic sediments 703.5 to 692.5cm below surface. Sample includes peak in *Betula* pollen prior to increase in haploxylon pine pollen.

WIS-1122. Hawley Bog Pond site **14,000 ± 130**

Limnic sediments 741 to 753cm below surface. Sample marks start of deposition of organic sediments and includes rise in spruce pollen marking arrival of forest in area.

2930 ± 70

WIS-1126. No Bottom Pond site $\delta^{13}C = -31.9‰$

Dark fibrous peat 11cm above bottom of 237cm core obtained with Livingstone sampler Aug 1979 by M Winkler from No Bottom Pond, Barnstable Co (41° 45′ N, 70° 04′ 30″ W). Subm by M Winkler.

E. Michigan

Chippewa Bog site

Core coll June 1977 from Chippewa Bog, LaPeer Co (43° 07′ N, 83° 15′ W) by P J Ahearn and R E Bailey, Central Michigan Univ, Mt Pleasant, Michigan. Subm by R E Bailey and Thompson Webb, III.

1200 ± 70

WIS-1076. Chippewa Bog site $\delta^{13}C = -28.3‰$

Peat with coarse organics 2.22 to 2.31m below mat surface. Dates late Holocene increase of *Pinus* from 15 to 55%.

4130 ± 70

WIS-1077. Chippewa Bog site $\delta^{13}C = -31.1‰$

Black algal gyttja with plant debris 4.77 to 4.86m below bog mat surface. Dates *Fagus* decline in mid-Holocene and major *Ulmus* decline from 16.3 to 4.2%.

8410 ± 80

WIS-1080. Chippewa Bog site $\delta^{13}C = -27.3‰$

Black algal gyttja 7.42 to 7.51m below bog mat surface. Dates first appearance of *Fagus* (2.4%) in pollen profile. Acid treatment only.

9540 ± 100

WIS-1079. Chippewa Bog site $\delta^{13}C = -27.1‰$

Black algal gyttja with wood chip 8.57 to 8.60m below bog mat surface. Dates near basal organic sediment and *Picea* max. Acid treatment only.

F. Minnesota

Myrtle Lake site

Core taken in 1971 from Myrtle Lake, Koochiching Co (47° 58′ N, 94° 23′ W) by H E Wright. Subm by H E Wright. Samples from levels

in core at which pollen concentration or pollen percentages change. Dated to calculate annual pollen influx and to provide further information concerning vegetation history (Janssen, 1968). Depths are below water surface. Acid treatment only.

6830 ± 80

WIS-1155. Myrtle Lake site $\delta^{13}C = -27.5‰$

Organic lake sediment from 745 to 750cm depth.

7400 ± 80

WIS-1157. Myrtle Lake site $\delta^{13}C = -27.2‰$

Lake sediment from 721 to 729cm depth.

5800 ± 80

WIS-1165. Myrtle Lake site $\delta^{13}C = -29.6‰$

Lake sediment from 687 to 695cm depth.

5430 ± 70

WIS-1156. Myrtle Lake site $\delta^{13}C = -29.0‰$

Lake sediment from 643 to 651cm depth.

1470 ± 80

WIS-1158. Myrtle Lake site $\delta^{13}C = -25.4‰$

Peat from 256 to 266cm depth.

G. New York

Brandreth Lake Inlet site

Eight cores sampled Sept 1978 from bog 2km up Brandreth Lake Inlet in Adirondack Mts, Hamilton Co, New York (44° 55′ N, 74° 41′ W). Dates in conjunction with pollen analysis to aid in study of paleoecologic and paleoclimatologic history of Central Adirondack Mts. Coll by J T Overpeck, Brown Univ, and R R Kautz, Hamilton Coll, New York; subm by J T Overpeck. Previous dates from site have been reported, WIS-1050, -1051, -1052 (R, 1980, p 119-120). Acid treatment only.

4570 ± 70

WIS-1096. Brandreth Lake Inlet site $\delta^{13}C = -33.4‰$

Gyttja, 501 to 525cm interval of 10.52m core through homogeneous peat and into underlying varved clays.

3120 ± 70

WIS-1098. Brandreth Lake Inlet site $\delta^{13}C = -30.7‰$

Gyttja, 161 to 179cm interval of 10.52m core.

H. Wisconsin

Lima Bog site

Core coll Jan 1979 from Lima Bog, Rock Co (42° 48′ N, 88° 5′ W) by Kent Van Zant, Earlham Coll, Richmond, Indiana. Subm by Kent Van Zant. Samples were very calcareous, required lengthy acid treatment.

8960 ± 110

WIS-1134. Lima Bog $\delta^{13}C = -29.7‰$

Calcareous gyttja, 1184 to 1194cm sec of core. Oak and elm pollen were ca 50% of pollen rain. (One 3-day count.)

7090 ± 80

WIS-1135. Lima Bog $\delta^{13}C = -27.0‰$

Calcareous gyttja, 990 to 1000cm sec of core. Sample at base of core into early postglacial sediments. Oak and elm pollen decreasing in abundance, Gramineae, *Artemisia,* and *Ambrosia* type pollen percentages increasing. Date will be used to correlate this core with one coll in previous year (WIS-1045, R, 1980, v 22, p 121).

3970 ± 80

WIS-1131. Lima Bog site $\delta^{13}C = -20.5‰$

Organic gyttja, 435 to 445cm sec of core. Hardwood forests occupied uplands around depression. Gramineae pollen increased dramatically in abundance in pollen rain, due apparently to establishment of aquatic grass around or in water of lake.

Wood Lake site

Cores coll from Wood Lake, Taylor Co (45° 20′ N, 90° 05′ W) Jan and March 1979 by Kathleen Heide, subm by K Heide and T Webb. WIS-1089 is basal date on core coll in March.

13,000 ± 110

WIS-1089. Wood Lake site $\delta^{13}C = -33.0‰$

Fine-grained, black lacustrine sediment 1434.5 to 1455.5cm below water-sediment interface. Dates beginning of lacustrine sedimentation succeeding proglacial sedimentation.

10,710 ± 100

WIS-1137. Wood Lake site $\delta^{13}C = -30.3‰$

Black gyttja with trace of vivianite 1284 to 1296cm below water-sediment interface. Sample dates decline in *Picea* pollen percentages.

7210 ± 100

WIS-1143. Wood Lake site $\delta^{13}C = -32.5‰$

Black gyttja 1036 to 1044cm below water-sediment interface. Sample dates transition to predominantly haploxylon type *Pinus* pollen. (One 3-day count.)

4200 ± 70

WIS-1138. Wood Lake site $\delta^{13}C = -31.2‰$

Gyttja 787 to 795cm below water-sediment interface. Dates transition in pollen sedimentation from high percentages of *Pinus* to high percentages of *Betula* and *Quercus.*

2520 ± 70

WIS-1142. Wood Lake site $\delta^{13}C = -30.9‰$

Black gyttja 538 to 542cm below water-sediment interface. Dates beginning of *Tsuga* pollen at site.

1040 ± 70

WIS-1139. Wood Lake site $\delta^{13}C = -30.7‰$

Black gyttja 231 to 239cm below water-sediment interface. Dates dramatic increase in percentage values of *Tsuga* pollen.

Kelly's Hollow site

Core coll Aug 1978 from small within-woodland basin in Taylor Co (45° 18′ N, 90° 21′ W). Site is important because of small size and inherent pollen catchment properties. Pollen record reflects vegetational history of nearby stand of woodland. Coll and subm by K Heide, Brown Univ, Providence, Rhode Island.

9590 ± 100

WIS-1069. Kelly's Hollow site $\delta^{13}C = -28.1‰$

Peat, fragments of ligneous and herbaceous plants 317.5 to 322cm below surface. Dates start of peat formation.

7700 ± 70

WIS-1090. Kelly's Hollow site $\delta^{13}C = -30.4‰$

Decomposed organic matter, ca 66% coarse detritus and 34% *Substantia humosa* from 189 to 192cm below surface. Dates transition in pollen sedimentation from high percentages of *Abies, Betula, Quercus, Ulmus* pollen to high percentages of *Pinus, Acer,* and *Ostrya-Carpinus.*

4380 ± 70

WIS-1088. Kelly's Hollow site $\delta^{13}C = -28.2‰$

Peat, fragments of ligneous and herbaceous plants 59 to 62cm below surface, 15cm below drastic increase in percentages of *Betula* pollen and decrease in percentage of *Pinus* pollen.

Lower Mud Lake Wetlands

Peat samples were obtained at several locations on wetlands of Lower Mud Lake, Dane Co (42° 59′ 30″ N) as part of study to determine rates of lake-edge wetland formation. Samples were taken just above transition between fibrous peat and lake sedimentary peat. Results will be used to test and refine mathematical model of wetlands formation previously developed for South Waubesa Wetlands (Friedman and DeWitt, 1978; Friedman, ms). Model investigates effect of spatial interrelationships, nutrients, and climate on wetland ecosystem dynamics. Coll May 1979 and subm by T K Kratz, Univ Wisconsin-Madison.

1630 ± 70

WIS-1082. Lower Mud Lake Wetlands $\delta^{13}C = -28.4‰$

Sample 2m below surface.

2530 ± 60

WIS-1087. Lower Mud Lake Wetlands $\delta^{13}C = -26.4‰$

Sample 1.4m below surface.

8280 ± 100

WIS-1091. Lower Mud Lake Wetlands $\delta^{13}C = -31.0‰$

Sample 2.2m below surface.

2910 ± 70

WIS-1092. Lower Mud Lake Wetlands $\delta^{13}C = -30.0‰$

Sample 1.8m below surface.

2380 ± 80

WIS-1093. Lower Mud Lake Wetlands $\delta^{13}C = -28.2‰$

Sample 3m below surface.

1160 ± 60

WIS-1094. Lower Mud Lake Wetlands $\delta^{13}C = -28.2‰$

Sample 1.35m below surface.

1990 ± 70

WIS-1095. Lower Mud Lake Wetlands $\delta^{13}C = -30.6‰$

Sample 2.3m below surface.

Fallison Lake Bog

Samples from base of mat peat taken from varying locations in small unnamed kettle hole bog near Fallison Lake in Vilas Co (46° 00′ N, 89° 37′ W). Results will be used to help determine rate of kettle-hole bog development in N Wisconsin. Effects of climatic fluctuations during entire postglacial period on rate of development are of primary interest (Friedman, DeWitt, and Kratz, 1979). Coll Oct 1979 and subm by T K Kratz.

2750 ± 70

WIS-1159. Fallison Lake Bog $\delta^{13}C = -27.8‰$

Woody stems of *Chamaedaphne calyculata* from base of mat peat 215 to 220cm below surface of peat.

1140 ± 70

WIS-1160. Fallison Lake Bog $\delta^{13}C = -29.3‰$

Ericaceous and sphagnum peat from base of mat peat 90 to 100cm below surface of peat.

7690 ± 90

WIS-1161. Fallison Lake Bog $\delta^{13}C = -30.3‰$

Ericaceous and sphagnum peat from base of peat 260 to 270cm below surface of peat.

1970 ± 80

WIS-1162. Fallison Lake Bog $\delta^{13}C = -28.6‰$

Woody stems of *Chamaedaphne calyculata* from base of mat peat 200 to 230cm below surface of peat.

3400 ± 70

WIS-1173. Fallison Lake Bog $\delta^{13}C = -28.6‰$

Woody stems of *Chamaedaphne calyculata* from base of mat peat 290 to 320cm below surface of peat.

4420 ± 80

WIS-1174. Fallison Lake Bog $\delta^{13}C = -27.3‰$

Woody stems of *Chamaedaphne calyculata* from base of mat peat 315 to 345cm below surface of peat.

WIS-1175. Fallison Lake Bog **3310 ± 70**

Woody stems of *Chamaedaphne calyculata* from base of mat peat 205 to 235cm below surface.

I. Russia

Orshinskii Mokh Bog site

Core coll July 1979 from peat bog 3km S of Ozero Svetloe, Kalininskaia Oblast', USSR (56° 57′ N, 36° 20′ W) by G M Peterson, Univ Wisconsin-Madison and M I Neustadt, Inst Geog, Moscow.

9050 ± 90

WIS-1196. Orshinskii Mokh site $\delta^{13}C = -28.3‰$

Hypnum peat 6.5m deep. *Comment* (GMP): date may be too young. Pollen assemblage suggests Pre-Boreal rather than Boreal age.

5110 ± 80

WIS-1194. Orshinskii Mokh Bog site $\delta^{13}C = -27.9‰$

Scheuchzeria, Sphagnum spp, and Ericaceae peat 3.5m deep.

1290 ± 80

WIS-1195. Orshinskii Mokh Bog site $\delta^{13}C = -26.8‰$

Sphagnum and *Eriophorum* spp, 1.5m deep.

REFERENCES

Bender, M M, Bryson, R A, and Baerreis, D A, 1970, University of Wisconsin radiocarbon dates VII: Radiocarbon, v 12, p 335-345.

———— 1976, University of Wisconsin radiocarbon dates XIII: Radiocarbon, v 18, p 125-139.

———— 1977, University of Wisconsin radiocarbon dates XIV: Radiocarbon, v 19, p 127-137.

———— 1979, University of Wisconsin radiocarbon dates XVI: Radiocarbon, v 21, p 120-130.

———— 1980, University of Wisconsin radiocarbon dates XVII: Radiocarbon, v 22, p 115-129.

Bischof, Henning, 1975, El Machalilla Temprano y Algunos sitios cercanos a Valdivia (Ecuador): Bonn, West Germany, Bonner Am Studien, 22 p.

Daniels, R B and Jordan, R H, 1966, Physiographic history and the soils, entrenched stream systems, and gullies, Harrison County, Iowa: US Dept Agric, Soil Conservation Service, in cooperation with Iowa Agric and Home Econ Experiment Sta and Iowa Geol Survey Tech Bull 1348.

Delcourt, P A, 1980, Goshen Springs: Late Quaternary vegetation record for southern Alabama: Ecology, v 61, p 371-386.

Dye, D H, 1977, A model for late Archaic subsistence systems in the western Middle Tennessee Valley during the Bluff Creek phase: Tennessee Anthropologist, v 2, p 63-80.

Friedman, R M, ms, 1978, The developmental history of a wetland ecosystem: a spatial modeling approach: PhD thesis, Univ Wisconsin-Madison, 143 p.

Friedman, R M and DeWitt, C B, 1978, Wetlands formation: spatial modeling of lake-edge wetlands development, *in* Waubesa Conf on Wetlands Proc: Inst Environmental Studies, Univ Wisconsin-Madison, Madison, Wisconsin.

Friedman, R M, DeWitt, C B, and Kratz, T K, 1979, Simulating postglacial wetland formation: IES rept 106, 60 p, Univ Wisconsin-Madison, Madison, Wisconsin.

Futato, E M, 1979, Cultural resources reconnaisance in the Wheeler National Wildlife Refuge: Univ Alabama, Alabama Office Archaeol Research, rept of investigation 6, 79 p.

Hoffman, M A, 1973, Excavations at Locality 14: Am Research Center in Egypt Jour, v 9, p 49-74.

———— 1976, City of the Hawk—Seat of Egypt's civilization: Expedition, v 18, p 32-41.

———— 1980, A rectangular Amratian house from Hierakonpolis and its significance for Predynastic research: Near Eastern Studies Jour, v 39, p 119-137.

Janssen, C R, 1968, Myrtle Lake: a late and postglacial pollen diagram from northern Minnesota: Canadian Jour Botany, v 46, p 1397-1408.

LaMarche, V C, Jr, 1973, Holocene climatic variations inferred from tree-line fluctuations in the White Mountains, California: Quaternary Research, v 3, p 632-660.

Orr, K G, 1946, The archaeological situation at Spiro, Oklahoma: A preliminary report: Am Antiquity, v 11, p 228-55.

Tratebas, A M and Vagstad, K A, 1979, Archaeological test excavations of four sites in the Black Hills National Forest, South Dakota: Ft Meade, South Dakota, rept prepared for US Forest Service, on file at Archaeol Research Center.

Webb, W S and DeJarnette, D L, 1942, An archaeol survey of Pickwick Basin in the adjacent portions of the states of Alabama, Mississippi and Tennessee: Bur Am Ethnol, Bull 129, 536 p.

Wittry, W L, 1969, The American Woodhenge, *in* Exploration into Cahokia archaeology: Illinois Archaeol Survey Bull 7, p 43-48.