

UNIVERSITY OF WISCONSIN RADIOCARBON DATES XII

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Procedures and equipment of the laboratory have been described in previous date lists. Wood, charcoal, and peat samples are pretreated with dilute NaOH 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 , with 1950 as the reference year. The standard deviation quoted includes only the 1σ of the counting statistics of background, sample, and standard counts. The $\delta^{13}C$ values for the CO_2 samples prepared by thermal decomposition of NBS oxalic acid vary from -19.2 to -20.4% (compared to the PDB standard) and are corrected to -19% (Craig, 1961). The dated samples for which $\delta^{13}C$ values are reported have been corrected to -25.0% .

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I. ARCHAEOLOGIC SAMPLES

A. Illinois

Divers site series (11MO28)

Excavations at Divers site, Monroe Co, Illinois ($38^\circ 27' 42''$ N, $90^\circ 15' 25''$ W) July 1972 by Glen Freimuth, Univ Illinois, Urbana. Site is Mississippian variant in Lundsford-Pulcher area of American Bottom. Subm by D A Baerreis. A date, AD 1105, WIS-334 (R, 1970, v 12, p 340) was reported from earlier excavation.

1045 ± 55

WIS-625. Divers site (11MO28)

AD 905

Charcoal from bottom of Feature 76, large refuse pit. Late Woodland vessel from bottom of pit.

945 ± 55

WIS-627. Divers site (11MO28)

AD 1005

Acorns from Feature 66, pit, superimposed on Feature 85, wall trench structure. Acorns from pit floated into wall trenches.

900 ± 55

WIS-637. Divers site (11MO28)

AD 1050

Additional sample identical with WIS-627. Date repeated because of possible contaminant in reagent used in 1st preparation.

Spoon River Culture series

Archaeologists working with Spoon River culture in central Illinois R valley found the 18 radiocarbon dates available as of 1967 (Hall, 1967) too ambiguous to be of value. Because of our continuing interest in effects of neo-Atlantic/Pacific climatic discontinuity (Baerreis and Bryson, 1965) on culture, we made use of improved techniques and larger sample selections, hoping to simplify this problem. Carefully selected samples from 5 sites, Eveland, Orendorf, Cooper, Crable, and Larson, covering all except the latest known period of occupation, were dated. The series is internally consistent, except for those attributable to the late Larson phase (Conrad and Harn, ms in preparation), indicated in comments below on individual samples. Wood samples id by L A Conrad.

Eveland site (11F900)

Charcoal from Eveland site, Fulton Co, Illinois (40° 20' N, 90° 10' W) coll 1958 to 1960 by W L Wittry and J R Caldwell, Illinois State Mus; subm by L A Conrad, Univ Wisconsin-Madison. Site seems to have functioned as some type of outpost for the Ramey state which centered on Cahokia. Mississippian ceramics from site are clearly part of shell tempered component of Stirling phase assemblage at Cahokia as described by Fowler and Hall (1972) which dates between AD 1050 and 1150. The presence of Sepo ware (Harn, 1973) of indigenous Late Woodland people and Mississippian-Woodland hybrid types suggest an amalgamation of 2 ethnic groups at site. The 6 dates derived for the site by 2 different laboratories (Hall, 1967 and Crane and Griffin, 1960; 1972) ranged from AD 930 to 1300 with no discernable patterning. The current series was run in hopes of eliminating the ambiguity.

WIS-652. Eveland site (11F900) **865 ± 50**
AD 1085
 $\delta^{13}C = -26.6\text{‰}$

Charred wood (*Carya* sp) from log, Level g, House 2, NE corner.

WIS-653. Eveland site (11F900) **895 ± 55**
AD 1055
 $\delta^{13}C = -25.8\text{‰}$

Charcoal (*Carya* sp) from House 4, Log E.

WIS-654. Eveland site (11F900) **820 ± 50**
AD 1130
 $\delta^{13}C = -25.9\text{‰}$

Charcoal, hickory nuts, from floor of S room of House 6, cross-shaped structure.

General Comment (LAC): dates agree perfectly with those from Cahokia.

Orendorf site series (11F1284)

Excavations in 1972 at Middle Mississippian Orendorf site in Fulton Co, Illinois (40° 29' N, 90° 57' W) were supervised by L A Conrad;

subm by L A Conrad. Site was temple town with major occupation predating Larson site. Other dates were previously reported (R, 1973, v 15, p 613-614).

WIS-649. Orendorf site (11F1284) **800 ± 55**
AD 1150
 $\delta^{13}C = -25.8\text{‰}$

Charcoal (*Quercus* sp) 10 to 15 outer rings from disturbed fill of trench dug in early 1930s. Collectors' notes mention cutting through logs. Profile cut in 1969 demonstrated that logs were part of mortuary structure on low platform. Date should be representative of period when Orendorf functioned as administrative center.

WIS-683. Orendorf site (11F1284) **865 ± 55**
AD 1085
 $\delta^{13}C = -25.4\text{‰}$

Charcoal from Feature 257. Date is inconsistent with most of series, earlier than expected, but consistent with date for WIS-607, Structure 9, with which Feature 257 was assoc.

WIS-692. Orendorf site (11F1284) **845 ± 65**
AD 1105
 $\delta^{13}C = -26.3\text{‰}$

Juglans sp, 10 rings from near outside of Log 98, Structure 10, normal pretreatment.

WIS-693. Orendorf site (11F1284) **810 ± 45**
AD 1140
 $\delta^{13}C = -26.8\text{‰}$

Same as WIS-692, acid pretreatment only.

WIS-695. Orendorf site (11F1284) **770 ± 55**
AD 1180
 $\delta^{13}C = -9.3\text{‰}$

Zea mays from fill of aboriginal pit, Feature 231, overlain by ca 45.7cm of midden.

Larson site series (11F1109)

Charcoal from Larson site, Fulton Co, Illinois (40° 21' N, 90° 8' W). Coll 1970 by A D Harn, Dickson Mounds Branch, Illinois State Mus, Lewistown, Illinois; subm by D A Baerreis. Site is Spoon R temple town thought occupied after desertion of Orendorf and before occupation of Crable site. Ceramic assemblage at site is appropriate to fully developed Larson phase between AD 1250 and 1350, (Harn, 1970).

WIS-655. Larson site (11F1109) **765 ± 55**
AD 1185
 $\delta^{13}C = -26.7\text{‰}$

Charcoal (*Carya* sp) from Feature 140, storage refuse pit in House 77. Sample and WIS-689 representative of latest occupation of site.

WIS-689. Larson site (11F1109) **760 ± 55**
AD 1190
 $\delta^{13}C = -27.3\text{‰}$

Charcoal (*Quercus* sp) from Feature 140.

WIS-659. Larson site (11F1109) **835 ± 60**
AD 1115
 $\delta^{13}C = -26.3\text{‰}$

Charcoal (*Fraxinus* sp) from Feature 52, storage pit along E wall of House 55. Sample from wall or roof timbers that fell into open pit. Sample and WIS-688 representative of earliest Spoon R occupation of site.

WIS-688. Larson site (11F1109) **815 ± 55**
AD 1135
 $\delta^{13}C = -27.6\text{‰}$

Charred *Ostrya virginiana* from floor of House 55.

General Comment (LAC): dates, as with all late Larson phase dates, are too early to be consistent with remainder of Spoon R series. Site series is internally very consistent.

Charles W Cooper site (11F47)

Excavations at site in Fulton Co, Illinois (40° 24' 10" N, 90° 3' 30" W) undertaken by L A Conrad, summer 1971. These are 1st dates on Charles W Cooper site, only known Oneota village in central Illinois R valley. Site seems to be source of Oneota elements at Crable site (Smith, 1951).

WIS-639. Charles W Cooper site (11F47) **565 ± 55**
AD 1385
 $\delta^{13}C = -26.3\text{‰}$

Charcoal (*Ostrya virginiana*) from floor of Feature 30, 61cm below surface. Prepared clay floor of Feature 30, burned house with basin-shaped floor and single post construction, covered several Spoon River and Bold Counselor (Oneota) pits.

WIS-645. Charles W Cooper site (11F47) **555 ± 55**
AD 1395
 $\delta^{13}C = -27.1\text{‰}$

Charcoal (*Quercus* sp) from Feature 30.

Crable site (11F891)

Charcoal from Crable site, Kerton Township, Fulton Co, Illinois (40° 11' N, 90° 13' W). Coll 1969 and 1970 by R L Hall, Univ Illinois at Chicago Circle; subm by L A Conrad. Site is temple town of Middle Mississippi culture exhibiting evidence of interaction with Oneota culture to N and W. Previous dates from site have been reported as 600, 620, and 530 BP, M-550, -553, and -554, respectively, on charcoal (Crane & Griffin, 1959) and 1150 BP, M-556, on mussel shell (Crane & Griffin, 1958).

WIS-648. Crable site (11F891) **565 ± 55**
AD 1385
 $\delta^{13}C = -25.7\text{‰}$

Sample, 10 rings of carbonized wooden poles (*Quercus* sp) from House F14, Sq 790L 260. From stratum of debris at 0.4 to 0.6m below present surface. House stratigraphically above House F117.

WIS-644. Crable site (11F891) **515 ± 60**
AD 1435
 $\delta^{13}C = -25.8\text{‰}$

10 annual rings of carbonized poles (*Fraxinus* sp) from House F117. Sample 86.4cm below present surface.

WIS-610. Maey's site (11MO233) **1225 ± 65**
AD 725
 $\delta^{13}C = -26.4\text{‰}$

Charred wood (*Gymnocladus dioicus*), id by L A Conrad, coll from Feature 2 of Maey's site Monroe Co, Illinois (38° 13' 10" N, 90° 17' 50" W) in 1972 by J W Porter; subm by D A Baerreis. Sample from debris 40 to 90 cm below plow zone in bell-shaped pit in center of test unit S100-102E 64-66.

B. Iowa

Chan-Ya-Ta site (13BV1)

Charcoal from Chan-Ya-Ta site in Buena Vista Co, Iowa (42° 54' N, 90° 16' W) coll 1972 by J A Tiffany, Univ. Wisconsin-Madison; subm by D A Baerreis. Site is single component, fortified Mill Creek site located on peninsular knoll near Brooke's Creek in Buena Vista Co, Iowa. Site was partially excavated in late 1930's by F L Van Voorhis, whose work was summarized by Hurt (1953). Seriation of ceramics recovered suggests that Chan-Ya-Ta belongs in late, Early Little Sioux phase which agrees with radiocarbon dates obtained.

WIS-671. Chan-Ya-Ta site (13BV1) **995 ± 55**
AD 995
Charcoal from Sq H-27, house fill.

WIS-673. Chan-Ya-Ta site (13BV1) **940 ± 55**
AD 1010
Charcoal from Sq H-27, house fill.

WIS-685. Chan-Ya-Ta site (13BV1) **890 ± 60**
AD 1060
Charcoal from Sq H-27, house floor.

WIS-630. Sparks site (13BN121) **1670 ± 55**
AD 280

Charcoal from Sparks site, Boone Co, Iowa (42° 2' 0" N, 56° 56' 30" W). Coll 1970 by David Gradwohl, Iowa State Univ; subm by D A Baerreis. Catalogue no. 2933 from Feature 13 and Catalogue no. 2716 from Feature 6, both feature storage pits or basins. Date of 1600 BP from this site was previously reported (R, 1973, v 15, p 232).

C. Minnesota

Smith site (21KC3)

Excavations in July 1972 at Smith site, also called "Grand Mound site", in Koochiching Co, Minnesota (48° 31' N, 93° 43' W) supervised by Edward Lugenbeal, Univ Wisconsin-Madison; subm by J B Stoltman. Portions of Smith site are deeply stratified containing at least 5 distinct cultural strata. The most intensive occupation appears to have been the latest major occupation of the site by people making "Blackduck" pottery (Evans, 1961).

WIS-611. Smith site (21KC3) **885 ± 60**
AD 1065
 $\delta^{13}C = -25.9\%$

Charcoal from Level 4, main occupation level of Blackduck Late Woodland village. Level 4 is 30 to 40cm below ground level.

WIS-612. Smith site (21KC3) **670 ± 55**
AD 1280
 $\delta^{13}C = -26.1\%$

Charcoal from Level 3, Feature 18. Sample should date late stages of Blackduck occupation of site.

WIS-613. Smith site (21KC3) **850 ± 50**
AD 1100
 $\delta^{13}C = -25.3\%$

Charcoal from Feature 17, Level 4.

WIS-614. Smith site (21KC3) **775 ± 55**
AD 1175
 $\delta^{13}C = -25.5\%$

Charcoal from Feature 17, from bottom of Level 3, sand, with very few cultural remains, and from top of Level 4.

WIS-615. Smith site (21KC3) **840 ± 55**
AD 1110
 $\delta^{13}C = -25.1\%$

Charcoal from Feature 18, Level 4.

WIS-616. Smith site (21KC3) **1020 ± 65**
AD 930
 $\delta^{13}C = -26.5\%$

Charcoal from Feature 16, Level 6, NW and SE quads, and Level 7, NW quad, and Feature 11, Level 4. Sample is from lowest Blackduck levels in Features 11 and 16.

WIS-622. Smith site (21KC3) **1385 ± 60**
AD 565
 $\delta^{13}C = -23.4\%$

Bones of mammal, fish, bird, from Feature 16, Level 7, SE quad, from stratum containing latest Middle Woodland "Laurel culture" occupation of site.

WIS-631. Smith site (21KC3) **1470 ± 60**
AD 480
 $\delta^{13}C = -23.7\text{‰}$

Miscellaneous fragments of bone from Feature 18, Level 8. Sample stratigraphically below major Laurel horizon at site.

WIS-638. Smith site (21KC3) **1190 ± 55**
AD 760
 $\delta^{13}C = -23.5\text{‰}$

Charcoal from Feature 16 and bone from Feature 18, Level 6.

D. South Dakota

Swanson site, South Dakota (39BR16)

Since dates from Swanson site (43° 54' N, 99° 20' W) previously reported (R, 1973, v 15, p 236-237; 618-619) were erratic and suggested contamination during lengthy storage in museum, more samples were obtained through the courtesy of J S Sigstad, Univ South Dakota and W R Wood, Univ Missouri. These samples were first extracted with petroleum ether, then with acetone before the usual base and acid treatment, and were found to have been treated with varying amounts of paraffin. Those in which no paraffin was detectable, WIS-657 and -660, produced dates that agree well with assays of the same samples reported previously (R, 1973, v 15, p 236-237). Extraction with organic solvents thus produced no change in dates except when paraffin contamination was removed.

WIS-650. Swanson site (39BR16) **1100 ± 65**
AD 850
 $\delta^{13}C = -22.3\text{‰}$

Juniperus virginiana, id by L A Conrad, from House 2, Post D.

WIS-651. Swanson site (39BR16) **955 ± 60**
AD 995
 $\delta^{13}C = -21.6\text{‰}$

Juniperus virginiana from House 1, Post 2, exterior rings.

WIS-657. Swanson site (39BR16) **1130 ± 60**
AD 820
 $\delta^{13}C = -22.5\text{‰}$

Wood from inner rings of Post 2, House 1.

WIS-660. Swanson site (39BR16) **935 ± 55**
AD 1015
 $\delta^{13}C = -23.0\text{‰}$

Juniperus virginiana from Post C, House 2, outer rings.

E. Wisconsin

Hilgen Spring Park site (47OZ7)

Charcoal from Mound 2, Hilgen Spring Park site, Cedarburg, Wisconsin (43° 17' 30" N, 87° 58' 30" W). Coll 1968 by H Van Langen; subm by T F Kehoe, Milwaukee Public Mus, Milwaukee, Wisconsin.

WIS-643. Hilgen Spring Park site (47OZ7) **2475 ± 65**
525 BC
 $\delta^{13}C = -26.1\%$

Charcoal from Feature 6, fire-pit, 1.22m diam intruding from mound fill into red sub-soil layer.

WIS-647. Hilgen Spring Park site (47OZ7) **2790 ± 65**
840 BC

Charcoal from Feature 5, from fire hearth of limestone on surface of cleared mound floor. *Comment* (TFK): date of 2410 BP, WIS-354 (R, 1970, v 12, p 337), from Mound 1 was reported earlier in error from Mound 2. These mounds are no longer considered of Effigy Mound culture. Mound 1 construction and Feature 6 of Mound 2 are considered contemporaneous with earlier Mound 2 construction (Kehoe & Kehoe, 1973).

F. Venezuela

Caño Caroni Barinas series

Excavations at Rancho Corozal, Dist Barinas, State of Barinas, Venezuela on N bank of Caroni R (08° 11.5' N, 68° 43.5' E) directed by Alberta Zucchi, January 1972; subm by W M Denevan, Univ Wisconsin-Madison. Archaeologic site is small pre-Columbian village in gallery forest. Assoc ceramics belong to various phases of Arauquinoid series of Central Orinoco region. Sites occur in general region of relic, raised agricultural fields.

WIS-602. Caño Caroni, Barinas **745 ± 50**
AD 1205
 Charcoal from Trench D, Pit 1, 0.50 to 0.75m deep.

WIS-617. Caño Caroni, Barinas **535 ± 55**
AD 1415
 Charcoal from Trench D, Pit 2, 0.25 to 0.50m deep.

WIS-619. Caño Caroni, Barinas **610 ± 50**
AD 1340
 Charcoal from Trench D, Pit 2, 0.50 to 0.75m deep.

WIS-621. Caño Caroni, Barinas **1970 ± 55**
20 BC
 Charcoal from Trench D, Pit 3, 0.50 to 0.75m deep.

WIS-620. Caño Caroni, Barinas **695 ± 50**
AD 1255
 Charcoal from Trench D, Pit 3, 0.75 to 1.00m deep.

G. Russia

WIS-475. Kokorevo I site **15,410 ± 130**
13,460 BC
 Charcoal from Kokorevo I (Zabochka) on Yenisei R near village of Kokorevo, Novoselovskii Dist, Krasnoyarsk Terr, USSR. Sample from cultural layer 2, 2.60m deep. Coll and subm by Z A Abramova, Inst

Archaeol, Acad Sci, USSR. Date, $13,300 \pm 50$, GIN-91 (R, 1968, v 10, p 435) was reported on charcoal from site.

II. GEOLOGIC SAMPLES

A. Illinois

WIS-635. Cahokia site **920 \pm 50**
AD 1030

Small charcoal fragments from matrix of dark clay and sand 110 to 130cm deep from 2m sec of soil accumulated in borrow pit at Cahokia site, St Clair Co, Illinois ($38^{\circ} 39' N$, $90^{\circ} 04' W$). Coll 1972 by R L Hall; subm by A M Swain, Univ Wisconsin-Madison. Date will help determine time scale for pollen diagram and deposition rate of sediment in pit.

B. Michigan

Wintergreen Lake

Core coll from ice surface of lake February 1972 by R E Bailey, Central Michigan Univ, Mt Pleasant, Michigan, from Wintergreen Lake, Kalamazoo Co, Michigan ($42^{\circ} 24' N$, $85^{\circ} 23' 30'' W$). Subm by Thompson Webb, III, Univ Wisconsin-Madison and Brown Univ, Providence, Rhode Island. Core depths represent depth from ice surface of lake; true age of 680 to 685cm level is AD 1820, time of land clearance in area of lake marked by ragweed increase. Lake is currently eutrophic.

WIS-668. Wintergreen Lake **3375 \pm 60**
1425 BC
Heavy black organic gyttja from 846 to 855cm depth.

WIS-670. Wintergreen Lake **8945 \pm 90**
6995 BC

Heavy black organic gyttja from 1116 to 1125cm depth. This level dates beginning of mixed hardwood pollen assemblage marked by abundance of oak.

WIS-672. Wintergreen Lake **11,425 \pm 110**
9475 BC
Marly gyttja from 1226 to 1235cm depth. This level dates spruce-fir pollen assemblage in lake.

WIS-676. Wintergreen Lake **13,195 \pm 125**
11,245 BC
Marly gyttja containing plant macrofossils from 1291 to 1295cm depth. Sample dates period just prior to levels in sediment where pollen becomes abundant.

Green Lake

Core, 380cm long, coll March 1972 from Green Lake, Antrim Co, Michigan ($44^{\circ} 53' N$, $85^{\circ} 07' W$) by R E Bailey. Lake is presently hard water; samples were very calcareous and required lengthy acid treatment to remove carbonate. Carbonate content of lake raises uncertainty in sample ages (Deevey *et al*, 1954; Donner *et al*, 1971). Sample depths are from mud-water interface. Subm by Thompson Webb, III.

WIS-669. Green Lake **4215 ± 65**
2265 BC

Black organic gyttja from 75.5 to 84.5cm depth. Dates change from pine assembly zone to mixed hard wood assemblage.

WIS-664. Green Lake **11,845 ± 115**
9895 BC

Marl and marly gyttja, 235.5 to 244.5cm depth. Dates change from spruce-herb pollen assemblage to pine assemblage.

WIS-663. Green Lake **15,215 ± 155**
13,265 BC

Marl with clay and silt fraction from 375.5 to 389.5cm depth. Dates early spruce-herb pollen assemblage near time when basin began accepting pollen.

C. Minnesota

Lake of the Clouds

Pollen diagram by Craig (1972) was made from 2 separate cores, H and A, of lake sediment. Dating for last 9400 yr of diagram was provided by varve counts from Core H. Pollen record prior to 9400 BP is from Core A of which only portion is varved. Chronology for Core A is provided by dates below. Core A-5 coll by H E Wright, Jr, Univ Minnesota, in winter 1969 from Lake of the Clouds, Lake Co, Minnesota (48° 00' N, 91° 07' W); subm by A M Swain.

WIS-677. Lake of the Clouds **9075 ± 90**
7125 BC

Lake sediments and algal gyttja from 479 to 486cm in Core A-5.

WIS-681. Lake of the Clouds **9140 ± 90**
7190 BC

Lake sediments, algal gyttja with silt and clay from 510 to 517cm sec in Core A-5. Dates beginning of Pollen Zone LC-2, marked by rise in *Picea* pollen and decline in herb pollen. Also dates rise in pollen concentration from 1000 to 5000 grains/ml.

Kylen Lake

Core 10cm diam, coll November 1970 by H E Wright, Jr, from Kylen Lake, St Louis Co, Minnesota (47° 20' N, 91° 48' W); subm by A M Swain. Sample depths measured from water surface.

WIS-694. Kylen Lake **8410 ± 85**
6460 BC

Organic lake mud (gyttja) from 750 to 753cm depth.

WIS-690. Kylen Lake **8575 ± 80**
6620 BC

Organic lake mud, from 800 to 803cm depth. $\delta^{13}C = -34.1\%$

WIS-684. Kylen Lake **10,055 ± 100**
8105 BC

Organic lake mud, base of pure gyttja, from 850 to 853cm depth.

WIS-679. Kylene Lake **10,430 ± 100**
8480 BC
 Silty gyttja from 880 to 883cm depth.

WIS-682. Kylene Lake **12,390 ± 120**
10,440 BC
 Organic silt, spruce pollen zone, from 900 to 907cm depth.

D. Wisconsin

Seidel Lake

Three lake cores, 180¹ and 180², both 5.1cm diam, and 180³, 10.2cm diam, were coll and subm 1970 by H E Wright, Jr, from Seidel Lake, Kewau-nee Co, Wisconsin (44° 27' N, 87° 31' W). Earlier date, WIS-462, 12,360 BP, on sample from 1417 to 1442cm depth of 5.08cm core was previously reported (R, 1971, v 13, p 480). Initial pollen work was done at this site by West (1961). All samples were very calcareous and required lengthy acid treatment.

WIS-640. Seidel Lake **10,225 ± 85**
8275 BC

Sample from 1264 to 1269cm below water surface, Core 180¹. Level marks major fall in spruce pollen and rise in pine pollen (jack pine or red pine) stratigraphically similar to WIS-646 of adjacent Core 180².

WIS-680. Seidel Lake **8680 ± 90**
6730 BC

Sample from 1260 to 1270cm below water surface, Core 180². Level marks maximum of white pine pollen in early post-glacial vegetational history of E Wisconsin.

WIS-642. Seidel Lake **9225 ± 80**
7275 BC

Sample from 1315 to 1320cm below water surface, Core 180². Level marks initial increase in white pine pollen, assoc with immigration of white pine into E Wisconsin.

WIS-646. Seidel Lake **10,440 ± 95**
8490 BC

Sample from 1363 to 1368cm depth of Core 180², base of gyttja. Level marks fall of spruce pollen and rise of pine pollen.

WIS-641. Seidel Lake **11,620 ± 110**
9670 BC

Sample from 1418 to 1421cm depth below water surface in Core 180³. Sample overlies level of WIS-462, which spanned 30cm of a 5.1cm core. Dates gradual transition from spruce-herb pollen assemblages to spruce-alder-fir assemblage. Pollen change indicates probable transition from spruce parkland to spruce forest in late glacial history of E Wisconsin.

10,480 ± 100**WIS-626. East Blue Mounds Creek site****8530 BC**

Column, 3m length, coll from valley floor site on E branch of Blue Mounds Creek, Iowa Co, Wisconsin (43° 03' N, 89° 47' W) by A M Davis, November 1972; subm by A M Davis and G H Dury, Univ Wisconsin-Madison. Post-settlement alluvium of 64cm is underlain by 97cm of sapric peat containing numerous spruce remnants in base from which sample (*Picea*) was taken at 145cm depth. Peat is underlain by gray marl, grading downward into dolomite and chert rubble referred by Dury (1964) to periglacial activity at approx time of last local glacial maximum. WIS-661, below, West Blue Mounds Creek site, probably dates same episode.

West Blue Mounds Creek site

Core, 4.2m of peat, gyttja, and marl, from peat bog in W branch of Blue Mounds Creek, Iowa Co, Wisconsin (43° 5' N, 89° 52' W). Coll and subm by A M Davis. At 4.2m, marl overlay rubble of chert and dolomite considered periglacial in origin.

10,485 ± 100**WIS-661. West Blue Mounds Creek site****8535 BC**

Woody peat, organic layer at 3.15 to 3.17m level, immediately overlying 80cm marl base devoid of pollen. Assoc pollen spectrum shows predominance of spruce indicative of cool late-glacial climates. Wood remnants are also spruce.

9580 ± 95**WIS-658. West Blue Mounds Creek site****7630 BC**

Spruce from peat and spruce litter layer, 2.65 to 2.67m level. Layer appears to represent final destruction of late-glacial boreal forest. It is overlain by gyttja with pollen assemblage dominated by oak, pine, and non-arboreal pollen.

7335 ± 80**WIS-662. West Blue Mounds Creek site****5385 BC**

Gyttja at 2.02 to 2.12m level. Layer corresponds with high level of non-arboreal pollen in core.

4235 ± 65**WIS-656. West Blue Mounds Creek site****2285 BC**

Sedge peat from 85 to 88cm level of core. Pollen assemblage shows decrease in oak, increase in pine.

Warner Creek, Wisconsin

Part of a continuing study of paleohydrologic episodes of the Driftless area of SW Wisconsin (Knox, 1972). Samples coll to represent common stratigraphic occurrences in Driftless area. Samples coll July 1973 by J C Knox, Univ Wisconsin-Madison and W C Johnson during stratigraphic study of N bank of Warner Creek, Vernon Co, Wisconsin (43° 38' N, 90° 32' W).

WIS-665. Warner Creek **5800 ± 70**
3850 BC

Wood (*Ulmus americana*), id by R Miller, Forest Prods Lab, Madison, from 1.7m below ground within gleyed sand stratum overlying gravel-cobble. Sample burial is probably result of valley aggradation response to middle Holocene climatic change.

WIS-675. Warner Creek **5170 ± 70**
3220 BC

Hardwood charcoal included in compact clay from 1.0 to 1.1m depth. Clay separates gray silty clay above from underlying brown, sandy silt.

Brush Creek, Wisconsin

Samples coll and subm July and August 1973 during stratigraphic studies of bank of Brush Creek, Monroe Co, Wisconsin, in Whitestown Township (43° 43' N, 90° 37' W) and Jefferson Township (43° 44' N, 90° 41' W) by W C Johnson.

WIS-678. Brush Creek **2715 ± 55**
765 BC

Wood (white oak group), id by R Miller, 185 to 200cm deep in gleyed sand layer overlying cobble/gravel in excavation in Jefferson Township.

WIS-674. Brush Creek **5055 ± 65**
3105 BC

Log (white oak group), id by R Miller, 225 to 260cm deep in gravel and cobble in same site as WIS-678, above.

WIS-666. Brush Creek **4440 ± 65**
2490 BC

Wood (*Tsuga canadensis*), id by R Miller, 2.5m deep within gleyed sand immediately overlying gravel-cobble horizon in Whitestown site.

WIS-667. Little Platte River **3070 ± 55**
1120 BC

Wood (white oak group), id by R Miller, from base of left bank of Little Platte R, 285 to 295cm deep in sandy silt, Grant Co, Wisconsin (42° 42' N, 90° 34' W). Coll and subm by J C Knox. Sample overlay gravel, cobble layer; silt over gravel is common stratigraphic occurrence in Driftless area stream channel banks.

WIS-507. Point Beach site **12,060 ± 120**
10,110 BC

Log from eroding bank of bluff overlooking Lake Michigan in Two Creeks Township, Manitowoc Co, Wisconsin (44° 19' N, 87° 32' W) coll 1972 and subm by Dan Sullivan, Wisconsin Electric Power. Date is within range of Two Creeks wood.

REFERENCES

- Baerreis, D A and Bryson, R A, 1965, Climatic episodes and the dating of the Mississippian cultures: *The Wisconsin Archeologist*, v 46, no. 4, p 205-220.
- Bender, M M, Bryson, R A, and Baerreis, D A, 1970, University of Wisconsin radiocarbon dates VII: *Radiocarbon*, v 12, p 335-345.
- 1971, University of Wisconsin radiocarbon dates IX: *Radiocarbon*, v 13, p 475-486.
- 1973, University of Wisconsin radiocarbon dates X: *Radiocarbon*, v 15, p 229-239.
- 1973, University of Wisconsin radiocarbon dates XI: *Radiocarbon*, v 15, p 611-623.
- Cherdyntsev, V V *et al*, 1968, Geological Institute radiocarbon dates II: *Radiocarbon*, v 10, p 426-436.
- Conrad, L A and Harn, A D, The Spoon River culture in the Central Illinois River Valley: Unpub ms, Dickson Mounds Mus, Lewiston, Illinois, ms in preparation.
- Craig, A J, 1972, Pollen influx to laminated sediments: a pollen diagram from north-eastern Minnesota: *Ecology*, v 53, p 46-57.
- Craig, Harmon, 1961, Mass-spectrometer analyses of radiocarbon standards: *Radiocarbon*, v 3, p 1-3.
- Crane, H R and Griffin, J B, 1958, University of Michigan radiocarbon dates III: *Science*, v 128, p 1117-1123.
- 1959, University of Michigan radiocarbon dates IV: *Am Jour Sci Radiocarbon Supp*, v 1, p 173-198.
- 1960, University of Michigan radiocarbon dates V: *Am Jour Sci Radiocarbon Supp*, v 2, p 31-48.
- 1972, University of Michigan radiocarbon dates XV: *Radiocarbon*, v 14, p 195-222.
- Deevey, E S, Jr, Gross, M S, Hutchinson, G E, and Kraybill, H L, The natural C¹⁴ contents of materials from hard-water lakes: [US] *Nat Acad Sci Proc*, v 40, p 285-288.
- Donner, J J, Jungner, H, and Vasari, Y, 1971, The hard water effect on radiocarbon measurements from Säynäjälampi, north-east Finland: *Commentationes Phys-Math*, v 41, p 307-310.
- Dury, G H, 1964, Subsurface exploration and chronology of underfit streams: *Geol Survey Prof Paper 452-B*, p B1-B56.
- Evans, G E, 1961, Ceramic analysis of the Blackduck Ware and its general cultural relationships: *Minneapolis Acad Sci Proc*, v 29, p 33-54.
- Fowler, M L and Hall, R L, 1972, Archaeological phases at Cahokia: *Illinois State Mus research series*, no. 1, Springfield, Illinois.
- Hall, R L, 1967, Radiocarbon dates for Mississippian complexes in the central Illinois valley: unpub list, 32nd ann mtg Soc Am Archaeol, May 1967.
- Harn, A D, 1970, Notes on the Mississippian occupation of the central Illinois River valley: Paper, 69th ann mtg Am Anthropol Assoc, San Diego, California, November 19-22, 1970.
- 1973, Cahokia and the Mississippian emergence in the Spoon River area of Illinois: Paper, 52nd ann mtg Central States Anthropol Soc, St Louis, Missouri, March 29-31, 1973.
- Hurt, W R, Jr, 1953, Report of the investigation of the Thomas Riggs site, 39 Hu —1, Hughes County, South Dakota: *Archaeol Studies*, circ 5, Pierre, South Dakota.
- Kehoe, A B and Kehoe, T F, 1973, Cognitive models for archaeological interpretation: *Am Antiquity*, v 38, p 150-154.
- Knox, J C, 1972, Valley alluviation in southwestern Wisconsin: *Annals Assoc Am Geog*, v 62, no 3, p 401-410.
- Smith, H G, 1951, The Crable site, Fulton County, Illinois: A late prehistoric site in the central Illinois valley: *Univ Michigan Mus Anthropol*, *Anthropol Papers* 7, 53 p.
- West, R G, 1961, Late- and postglacial vegetational history in Wisconsin, particularly changes associated with the Valdres readvance: *Am Jour Sci*, v 259, p 766-783.